

# The Journeys of Life: Examining a Conceptual Metaphor with Semantic and Episodic Memory Recall

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In four studies, we examine the “*LIFE IS A JOURNEY*” conceptual metaphor using as data output from semantic and episodic memory. In the first three studies output from semantic memory indicates that undergraduate samples, when primed to think in “*LIFE*” in terms of a course followed until one’s 70th year, provided a set of events output in a sequential order and when compared to a second sample, showed high agreement on the ages in which the events would occur. These data were taken as supportive of a “*JOURNEY*” metaphor in which one progressed along a life path. Study 2 indicated that the “*LIFE*” events produced also aroused specific subthemes, consistent with the notion of the arousal of lower-level “*LIFE-JOURNEY*” metaphors (e.g., “*LOVE IS A JOURNEY*”). In a third study, we experimentally constrained the order of report from semantic memory. These data indicate that free output of events (as in Study 1) involves both a forward-temporal output, and clustering of life themes, but that forcing a forward-temporal order is indicative of the arousal of the superordinate conceptual metaphor but not the lower-level themes. Finally, in an episodic memory task one finds the reverse, namely arousal of the lower-level themes but not of the superordinate conceptual metaphor. Taken together, these findings indicate conditions under which the “*LIFE IS A JOURNEY*” metaphor is facilitated, and when lower-level metaphors are made more salient. In a more general way, the studies provide a new tool with which to study conceptual metaphors.

From its inception with the publication of *Metaphors We Live By*, (Lakoff and Johnson, 1980) conceptual metaphor theory has been influential in linguistics,

psychology, communication studies, and a host of other disciplines (for more recent expositions see Kovecses, 2002; Lakoff, 1993). The fundamental tenet of the theory is that metaphor operates at the level of thinking, not language *per se*. Metaphors link two conceptual domains, the ‘source’ domain (typically consisting of literal and concrete entities and relationships) and the ‘target’ domain (often a concept more abstract or less amenable to a simple description, such as “*LOVE*” or “*ANGER*”). The target domain takes its structure and is understood in terms of the source domain, and thus how we conceptually structure, and talk about, the target domain parallels the structures and knowledge held about the better-delineated source domain.

Target domains are therefore believed to have relations between entities, attributes, and processes that mirror those found in the source domain. At the level of language, one can thus find words and expressions (so-called metaphoric *expressions*) about the target domain that refer directly or implicitly to the source domain. Indeed the main source of evidence for the reality of conceptual metaphors is based on patterns of word or expression use. Thus for instance, a proponent or conceptual metaphor theory might notice in naturally occurring language (or intuitively generate) the following metaphoric expressions (from Lakoff and Johnson, 1980, p. 28):

Her ego is very *fragile*  
 His mind *snapped*  
 He *broke* under cross examination  
 I’m *going to pieces*

And from this infer a conceptual metaphor, “*THE MIND IS A BRITTLE OBJECT.*”

The identification of similarities between quite diverse metaphoric expression and, indeed, the consideration of how we understand abstract concepts such as “*ANGER,*” “*DISEASE,*” and “*FREEDOM*” has made this theory very attractive in a wide range of disciplines. Despite this popularity, evidence for the psychological reality of conceptual metaphors is largely based on examination of patterns of language use, largely has been uncritically accepted, and has not been supported often when tested in ways other than through the intuitive linking of patterns of language use (see for instance a critique by McGlone, 2007; methodological problems discussed in Semino, Heywood, and Short, 2004).

In the studies reported here, examination of one metaphor identified by conceptual metaphor theorists (“*LIFE IS A JOURNEY*”) will be examined to see if evidence for it can be adduced from a database other than patterns of language use, namely, output from semantic and episodic memory.

## LIFE IS A JOURNEY

Consider the first lines of Dante Alighieri's literary masterpiece, *The Divine Comedy*: *Nel mezzo del cammin di nostra vita/mi ritrovai per una selva oscura/ché la diritta via era smarrita* ["Midway upon the journey of our life/I found myself within a forest dark/For the straightforward pathway had been lost."]. One can easily see here a mapping of two concepts, "*LIFE*" and "*JOURNEY*." According to conceptual metaphor theory this mapping motivates our understanding of "*LIFE*" in terms of concrete knowledge about "*JOURNEYS*."

Consider for instance some of the entailments that would follow from this mapping. Because journeys define a path from a start to some end point, one can describe life in path-appropriate terms such as: "he stayed on the straight and narrow," or "my daughter seems always to be going around in circles," or "he came to a bad end," or, like Dante, find oneself at some midpoint place along the long and winding path. Moreover, if one is on a path then one is also on some surface and hence it is meaningful to make statements that relate to the type of surface of the path, such as "my father just floated (or sailed) through life," or "he trudged along year by year," or, as in the Tom Cochrane song, "Life is a highway, I wanna ride it all night long." And of course, like journeys in general there can be "twists and turns" in life such that one may find oneself "at a crossroad," or at a "roadblock," or "lost," or "in a safe place." In a journey one encounters places that one has passed or which one is trying to reach; in life the analogue would be transitional life episodes. Thus in lieu of stating "I finally reached my goal—the city," one structures life's progress in similar language: "I finally reached my goal—graduation."

How would the study of memory be relevant to consideration of conceptual metaphor? In the memory literature, a distinction is made between "semantic" and "episodic" memory. Semantic memory is comprised of knowledge of the world represented in some permanent memory store. Such information includes knowledge such as "Lassie is a dog" or that "the first letter of the word 'apple' is an 'a' or the stored belief that 'the world is flat.'" This knowledge can be either directly represented in permanent memory or inferred from other information stored in permanent memory. Conceptual metaphors thus would be parasitic on semantic memory.

Consider for instance asking people to describe "*LIFE*." We should have available much knowledge about this topic in our memory: We can contrast it with "death" or we can consider whether one can have a concept of "artificial life" or what makes for a "good life." In short, thinking of the concept of *LIFE* does not necessarily evoke the "*JOURNEY*" metaphor, or may in fact evoke one or more of a lower-level aspect of the general metaphor, such as "*LOVE*" (or "*CAREER*") *IS A JOURNEY*" (Lakoff, 1993). Moreover, cognitive linguists

have argued for other appropriate metaphors for “*LIFE*,” such as “*LIFE IS A CONTAINER*” (“*He had a full life;*” “*I feel so empty*”) or “*LIFE IS A BUILDING*” (“*doors kept opening for me*” “*she seems always on an elevator, you never know if she is going to be up or down*”) or “*LIFE IS A GAME*” (“*you have to deal with what you are dealt,*” “*you got to know when to hold ‘em, know when to fold ‘em*”). We argue here that the “*LIFE IS A JOURNEY*” metaphor would be evoked when people are primed to think of the *course* of life tied to a time dimension; other source domains could be activated by other primes. When primed by thinking of the course life takes across time, one would expect that entailments from “*JOURNEYS*” should structure what information is elicited from semantic memory and how it is output.

In the studies reported here we will examine whether output from semantic memory provides evidence for the “*JOURNEY*” metaphor, and the conditions that might favor the arousal of this metaphor. The first three studies reported here examine the semantic memorial information held about the course of life. In Study 1, stored knowledge about the events that occur over course of the average person’s life will be identified for a large group of undergraduate students and expectations drawn from the “*JOURNEY*” metaphor examined (Study 1). The life events identified in that study then will be subjected to hierarchical clustering techniques to see whether we can find evidence that life events output from semantic memory is structured along a single path or, as suggested by consideration of higher- and lower-level metaphors (see Lakoff, 1993), in a more varied or multidimensional fashion (Study 2). To anticipate the findings slightly, a set of specific subgroupings were identified. In Study 3 we will experimentally constrain the manner in which life events are output from semantic memory to identify conditions that encourage use of a unidimensional (path) “*JOURNEY*” and conditions that encourage the use of the subgroupings.

A second form of memory is “episodic memory:” memory for specific events that are tied to when, where, and how those events were encountered. Typically, this has been studied through memory for presented events, in which the event involves experimentally controlled materials, such as a list of words or a film. In Study 4, we tested whether the semantic subgroupings identified in Study 2 were active in episodic memory tests, as would be expected if these groupings played a central role in structuring how we encode our experiences and structure knowledge.

## STUDIES 1A & 1B

We report first two studies. In Study 1a, participants were asked to list, in any order that they wished, specific life events that would have happened to an average 70-year-old man or woman. Please note there was no reference to journeys or to any other way to structure how one should report on life

course events. There is an implicit reference to time, namely the perspective of a 70-year-old. As noted previously, conceptual metaphor theorists have posited multiple source domains that can be used to structure the target “*LIFE*” and it is of course possible that subsets of our participants might employ different mappings or that even the same person might activate different mappings in completing the task. Nonetheless, we expected that because we provided the perspective of a person closer to death than birth (a 70-year-old person) that a “*JOURNEY*” metaphor likely would be the mapping most activated for our undergraduate participants.

If a “*JOURNEY*” metaphor is evoked then one should expect that memory output regarding “*LIFE*” should be structured by knowledge of journeys. We examine two specific predictions. First, on a journey one travels a path from beginning to end in a sequential manner. Almost all human cultures posit that the future and its uncertainties lie ahead of us, and the past with its known experiences lies behind us, though there are rare exceptions (see, for instance, Nunez and Sweetser, 2006 analysis found with the Aymara language spoken in parts of South America). If we structure access from semantic memory in the same fashion as one moves across physical space in time, then one might expect that life events would be output chronologically, with earlier life events coming early in the memory output protocol, and later life events being output later. Second, on a journey, there are places or landmarks we encounter along the way and that anyone along that path would encounter the same landmarks, in the same order. If memory output is structured the same way then we would expect a very high degree of agreement, across participants when (that is, at which age) certain events should occur. Naturally, if “*LIFE*” is mapped to some other source domain, then these regularities would not be expected.

In our study, an equal number of men and women were tested and, within each gender, half the participants were asked to list specific life events for the other gender. This mixed-gender design allowed a comparison between the same and different genders to see whether men and women hold different conceptual metaphors. Our reading of the conceptual metaphor literature would be that such differences should not exist, but because there are suggestions in the autobiographical memory literature for some differences (e.g., Werthington, 2000), we thought it most prudent to examine the responses given by men and women.

Finally, we were concerned that the production technique employed in Study 1a might underestimate the number of landmark events over the life span, a concern derived from a finding in a study on autobiographical memory (Berntsen and Rubin, 2004) that, with an analogous procedure, only 5 events were produced by at least 50% of their sample. A similar finding here would be problematic because conceptual metaphors are assumed to be widely available in a given culture. To get another estimate of the salience of the landmark events produced

in Study 1a, events produced by at least 5% of respondents were *provided* to respondents in Study 1b; these respondents were asked to complete a set of questions about each event (e.g., average age in which it would occur). We also asked about how likely the event would occur for the average person. If the events produced even by 5% of the sample in Study 1a are part of a culturally shared set of metaphors, one would expect that all of the events would be rated as fairly likely to occur over the course of an idealized average life and high agreement between studies 1a and 1b on where along one's path (i.e., age) one would experience or encounter the landmark event. Finally, in an exploratory fashion, we asked about the affect associated with each event to see whether, on average, people anticipated both positive and negative events along the journey of life.

## METHOD

**Participants:** Four hundred students from the University of Western Ontario participated; two hundred in each of Studies 1a (average age = 19.4 years) and 1b (average age = 19.3). There were 100 males and 100 females in each study.

**Materials:** In Study 1a, participants were asked to list, *in any order they wished*, emotionally-important events that would have happened to an average person (man or woman) who was 70 years old. They were then asked to produce the age the person would have been when the event occurred, how confident they were that the person actually would have been that age during the event, and how emotionally negative or positive the person would have felt about the event when it occurred. In Study 1b, all events generated by at least 5% of the participants in Study 1a were presented to a new sample of participants, who were then asked to rate the presented events using the same questions probed in Study 1a (age, confidence, and emotionality). In addition, participants were asked to provide an estimate of the likelihood with which the event would have occurred to the average 70-year-old person.

Participants also completed three personality questionnaires: a mood adjective checklist (Matthews, Jones, and Chamberlain, 1990), a measure of extroversion, agreeableness, conscientiousness, emotional stability, and intellect (International Personality Item Pool, 2001), and the Life Orientation Test (Scheier, Carver, and Bridges, 1994). These tests were collected for another project, and will not be discussed further here.

**Procedure:** Testing was counterbalanced such that half of the participants completed the assessment of life events first and the personality/mood questionnaires second, whereas half of the participants completed them in the reverse order. Half of our sample completed the tasks for the same gender, and half for the opposite gender, permitting us to disentangle responses based on general cultural knowledge regarding the life course of men and women (wherein both

male and female participants would agree about differences occurring in the lives of average men and women) from different expectancies held about the life journey by our male and female participants. Participants completed the experiment in groups of 1 to 15, and the tasks were completed in approximately half an hour.

## RESULTS AND DISCUSSION

We emphasize Study 1a because in this study the participants were free to generate the events they deemed relevant. Study 1b will be used, when possible, as a reliability check on the robustness of the effects observed in Study 1a.

### Do Participants Share a Cohesive View of the Life Course?

If there is a culturally shared model of the life course and the landmarks met during one's life, one would expect our participants to agree about the nature of the events one encounters over a 70-year span, and the date in which the event would occur (analogous to the places passed and where they would be located along the route). Table 1 presents the list of 40 events produced by at least 5% of the participants in Study 1a, sorted by the age in which the event is conceptualized as occurring in that study. The Table also depicts the frequency with which each event was produced (Study 1a) or average rating of the likelihood that the event would have occurred to an average 70-year-old person during their life (Study 1b) and the mean emotion associated with the event.

Even though the sample was comprised of undergraduate students, participants had no difficulty in producing events that were nonautobiographical and that extended throughout the 70-year span. Examining the events one finds, as might be expected if the "*LIFE IS A JOURNEY*" metaphor motivated production, most of the events are transitional content or events, events in other words that might be considered landmarks along a path. Moreover, although some events were rated as being negative (e.g., deaths; divorce) for the most part the life events were rated as very positive.

As can be seen also, there is a remarkable consistency across Study 1a and 1b samples in that there was high agreement both in agreed-upon age of occurrence ( $r = .98, p < .001$ ) and of the associated affect ( $r = .98, p < .001$ ) for these landmark events.

The data also show that the production procedure employed in 1a underestimates the salience of the transitional event. In fact, there were only 4 events produced by at least 50% of the sample in Study 1a ("getting married," "having first child," "getting first job," and "having second child"). Despite the overall low level of productivity (only 40 events were produced by at least 5% of our sample), a high likelihood of occurrence (Study 1b) was observed, even

TABLE 1  
 Percent of life events produced (Study 1a) or rated (Study 1b), ranked by age associated with the event (1a), the frequency (1a), or likelihood of occurrence (1b,) and associated emotion.

Item	AGE OCCUR		FREQUENCY		EMOTION	
	Study 1a	Study 1b	Study 1a	Study 1b	Study 1a	Study 1b
Birth of a sibling	4.8	5.3	5.1	75.8	5.2	5.3
Their first day of elementary school	5.6	6.1	34.2	90.8	4.9	4.8
The first day they made friends	9.0	4.8	6.1	92.7	5.7	6.0
Their first experience playing a sport	12.0	6.6	7.1	83.1	5.5	5.5
Their first kiss	13.4	15.3	14.3	87.7	5.7	6.2
Their first day of high school	14.2	14.7	21.9	87.8	4.9	5.2
Their first love/crush	15.2	15.2	15.8	88.0	6.4	6.1
Their first date	15.3	16.3	7.1	87.8	5.7	5.9
Having their first boyfriend or girlfriend	15.5	15.7	20.9	86.4	5.8	5.9
Getting their driver's license	16.4	17.8	7.7	82.6	6.1	5.8
Their first breakup or heartbreak	17.4	17.6	5.1	85.5	1.7	2.3
Going to their prom	17.8	17.7	7.7	78.8	6.3	5.9
Losing their virginity	17.8	20.1	11.7	87.3	5.8	5.5
Their first sexual encounter (other than first intercourse or first kiss)	17.9	17.1	6.1	85.7	5.8	5.7
Their high school graduation	18.0	18.7	36.2	81.8	6.1	6.0
Their first day of university or college	18.9	18.9	27.0	69.8	5.8	5.7
Getting their first job	21.0	16.9	68.4	85.9	5.1	5.3
Living independently of their parents for the first time (moving away from home)	22.0	18.8	15.8	86.8	5.1	5.6
The day they met their future spouse	22.2	21.0	6.1	82.6	6.0	6.0
Buying their first car	22.2	23.5	11.7	79.9	5.8	6.0
Their university or college graduation	23.1	23.6	37.8	65.8	6.5	6.4
Getting engaged	24.3	23.9	9.7	81.4	6.4	6.5
Getting married	25.3	25.8	100.0	81.9	6.7	6.6
Going on a family vacation	27.4	11.4	5.1	78.7	5.9	5.7
Having their first child	27.6	27.0	93.9	79.9	6.7	6.6
Buying a new house	28.1	29.3	14.3	78.3	5.9	6.0
Having their second child	28.4	29.7	53.6	72.1	6.6	6.3
Their first child starts elementary school	32.9	31.7	8.2	84.3	5.2	5.4

(Continued)



TABLE 1  
(Continued)

Item	AGE OCCUR		FREQUENCY		EMOTION	
	Study 1a	Study 1b	Study 1a	Study 1b	Study 1a	Study 1b
An episode that advanced their career	33.2	30.6	6.1	69.8	6.1	6.2
Going on a special vacation	31.7	20.3	15.8	72.9	6.0	6.0
Death of someone close to them (other than their spouse or parents)	37.7	30.4	18.4	85.7	1.3	1.7
Getting a divorce or separation	37.7	38.5	6.1	43.3	2.2	2.4
Their first child moving out of their home	47.2	45.4	8.7	81.8	3.7	4.2
Their first child graduates	48.6	46.2	12.8	78.0	6.6	6.1
Death of their father	51.0	49.1	36.7	88.6	1.4	1.5
Death of their mother	51.2	52.3	37.2	88.0	1.5	1.4
Their first child gets married	52.7	51.2	21.9	78.4	6.6	6.2
Their first grandchild being born	56.7	59.7	44.4	74.9	6.7	6.5
Retiring	61.5	62.3	43.4	898.4	5.3	5.5
Death of their spouse	68.2	70.7	19.4	67.2	1.1	1.4

for events that were produced infrequently (Study 1a). Thus, for example, while only about 7% produced the event “my first date” almost 90% rate that this event is highly likely to occur. These data lend support to the notion that people have an idealized life journey either stored or otherwise easily assembled from information stored in permanent memory.

### Order of Production

Because the “*LIFE IS A JOURNEY*” metaphor has an implied beginning (one’s birth) and end (one’s death), one might expect that a useful heuristic that our participants might employ is to think of typical events one might encounter as one traveled along life’s path, starting at the beginning (what has been called the “*FUTURE*” is in “*FRONT*” of “*EGO*” by Nunez and Sweetser, 2006 and others). We examined whether the life events generated in the free-recall format of Study 1a were ordered temporally in a linear fashion. The average order in which events were produced and the average age at which participants thought they would occur were coded in sequential order. The result was a significant positive correlation, Spearman’s  $Rho = +0.77$ ,  $p < .001$ , indicating a strong tendency for participants to produce events in a forward-temporal order.

## The Content on the Life Course

Finally, in order to get a better sense of the transitional or landmark events deemed important during the life course, we examined the content of the events produced by coding each event according to a slightly modified version of the Pillemer, Wink, DiDonato, and Sanborn's (2003) coding scheme for autobiographical events. Most of the categories in that scheme were represented by only a few produced events; there were only 6 categories that contained at least 5% of the events (those referring to: children, grandchildren, spouse/marriage/romantic relationships, work/retirement, school, and parent death). Thus one might suggest that, at least for our sample, the basic transitional events in life (or, to use the journey counterpart, places, or landmarks encountered on the road) involve children, romance, work, school, and death.

## Gender Differences

Finally, we examined whether men and women held different concepts related to one's life journey. As expected, we did not find any differences in the number of events produced overall by men and women in Study 1a, or whether the events were generated for the average man or the average woman. The only significant gender difference we did find was based on the Pillemer et al. (2003) coding scheme. Both male and female participants produced more events related to work and retirement for men than for women, indicating that participants of both genders conceptualize men would encounter more work- and retirement-related landmark events than would women,  $F(1, 192) = 6.56, p < .05$ .

Taken together, these data indicate a quite remarkable consistency in how the undergraduate students tested here, men and women alike, structured the course of life. Even though participants were not asked to structure their responses around a "JOURNEY" metaphor, the data suggest that they did so nonetheless: There was a strong tendency to work along a path starting at the beginning and moving forward on the path sequentially, strong agreement on the content (landmark events) one would encounter, strong agreement on when one would encounter these events and, finally, strong agreement on the affect associated with each event.

## STUDY 2

The content analysis reported in Study 1 suggests that the "LIFE IS A JOURNEY" metaphor might be deconstructed into a set of specific life themes, such as those related to "Romance," "Work," and the like. It is unclear how these themes might work within the "LIFE IS A JOURNEY" data obtained in Study 1. On the one hand, people might conceptualize a linear life path, and the themes described above as important landmarks on that path. There is an alternative

possibility suggested by cognitive linguists. Lakoff (1993) for instance talks about inheritance hierarchy and, in fact, uses as his higher-level example the "LIFE IS A JOURNEY" metaphor. His lower-level examples were "LOVE IS A JOURNEY" and "CAREER IS A JOURNEY," both of which he claims inherit the basic structure of the higher-order "JOURNEY" metaphor, with travel on a path, with goals and the like. Thus, the themes suggested in the content analysis of Study 1 may reflect lower-level metaphors. Finally, there is the possibility that the "LIFE IS A JOURNEY" metaphor was not activated and participants ordered their recall from semantic memory on the basis of the subgroupings (e.g., thought of a frequently occurring event and then output other emotional events from that same grouping). This possibility is not likely given the paucity of frequently occurring events and would be inconsistent with the correlation discussed earlier between the average order of output and the age attributed to when the event would occur.

The aim of Study 2 is to see whether the basic life events described in Study 1 consists of a single higher-level "LIFE IS A JOURNEY" metaphor or whether we can adduce evidence for subgroupings of life themes. To this end, a new sample of participants was presented the 40 life events employed in Study 1b. These participants were asked to group the events into *whatever categories they thought appropriate*. These categories were then subjected to a clustering analysis to determine any thematic relations of the events. Thus unlike the Pillemer et al. (2003) coding scheme created for a different purpose and which imposes an *a priori* structure on the data, the approach taken here permits the participants themselves to invest the life events with structure. This data analysis should identify the salient structure or groupings of life events output from semantic memory if any such exist.

## METHOD

### Participants and Stimuli

One hundred and twenty-five students at the University of Western Ontario participated. Of this set, 106 provided age and gender demographic information (42 females, average age = 19.6 years, range 18–43; 64 males, average age = 18.7 years, range 17–22). None of the students had participated in either Study 1a or 1b. The same 40 events depicted in Table 1 were employed as stimuli.

### Procedure

Each participant was handed a set of 40 file cards, with one of the life events typed on each, and were instructed to group these events from 2–7 categories, *each category based on whatever similarity you think most appropriate*. After

completing the categorization task, participants were then handed a response sheet and asked to provide a name for each of their groupings that would be specific enough to permit new events to be appropriately categorized.

## RESULTS AND DISCUSSION

A similarity matrix was formed such that, across participants, the probability was calculated in grouping event 1 with event 2, with event 3, with event 4, and so on up to the probability that event 1 was grouped with event 40. Similar similarity scores were obtained for event 2 with event 3, with event 4, and so on. This procedure was repeated such that a similarity matrix was created consisting of each of the 40 events with one another. This matrix was then subjected to a hierarchical cluster analysis.

Discussion of hierarchical clustering analysis is beyond the scope of this paper (for a comprehensive discussion see Lorr, 1983). For our purposes, given a set of 40 life events to be clustered, and a  $40 \times 40$  distance (or similarity) matrix, the basic process proceeds by assigning each item to its own cluster, so that if you have 40 items, you now have 40 “clusters,” each containing just one event-item. We then find the most similar item (or cluster) and merge them into a single cluster such that the distances (similarities) between the clusters equal the distances (similarities) between the events they contain. We then compute distances (similarities) between the new cluster and each of the old clusters and repeat the process until all 40 events have been clustered. The results of this process for the 40 life events are depicted in Fig. 1.

As can be seen, a structure emerges that consists of a set of 7 lower-level groupings, which, in turn, are clustered into two higher-level groups. One of these higher-level clusters is comprised of items from two lower-level clusters (involving the death of others; progeny) and the second is comprised of five lower-level clusters (romance before marriage, events with life partner, family interactions, on achieving independence, school career during youth).

Thus, the first general cluster appears to involve landmark events of events that occur to significant *other* people (such as death of *father*, birth of first *child*) but which, nonetheless, had an impact on the self. In contrast, the other higher-level cluster appears to involve landmark events in which the traveler on the road of life is the main character (e.g., *my* first kiss, *my* first day at university). That is, the events here are those that occur to oneself—being kissed, graduating from school, and the like. Moreover, and not surprisingly, some of the 7 lower-level clusters are more similar to one another than others. Thus “romance before marriage” and “events with life partner,” while separate, nonetheless cluster at a higher level. Similarly “achieving independence” clusters at a higher level with events that occur as one progresses through his or her schooling.

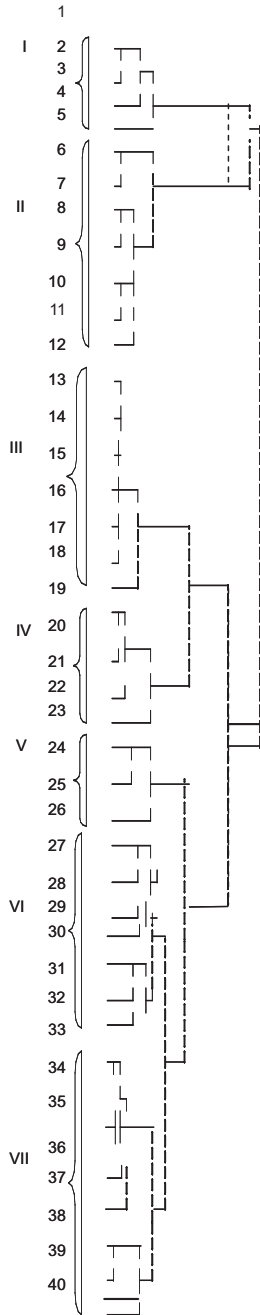


FIGURE 1 Clustering of life script events.

Cluster I	Death of mother (1) Death of father (2) Death of close person (3) Death of spouse (4)
Cluster II	2nd child's birth (5) 1st child's birth (6) 1st child's graduation (7) 1st child starts school (8) 1st child moving out (9) 1st child get's married (10) 1st grandchild (11)
Cluster III	1st love or crush (12) 1st boyfriend/girlfriend (13) 1st date (14) 1st sexual encounter (15) 1st kiss (16) Losing virginity (17) 1st breakup (18)
Cluster IV	Engagement (19) Getting married (20) Meeting future spouse (21) Divorce or separation (22)
Cluster V	Family vacation (23) Special vacation (24) Siblings birth (25)
Cluster VI	Getting driver's license (26) Buying 1st car (27) Moving away from home (28) Buying a house (29) 1st job (30) Career advancement (31) Retiring (32)
Cluster VII	1st day high school (33) High school graduation (34) 1st day of school (35) Starting University/College (36) University/College graduation (37) 1st friend (38) 1st time playing sport (39) Prom (40)

FIGURE 2 Event Code.

It should be noted that there is no *a priori* or logical reason that events had to be structured the way described here. Events from one category could easily have been conceptualized as integral to another category (for instance, birth of first child conceptually could have been organized with “events with life partner,” but, in fact, were not). As such, the structure suggest that the clusters are motivated themselves by some conceptual distinctions shared by our sample. These data suggest that in the output from semantic memory of life events a set of separable thematic-based “*JOURNEYS*” may have been aroused, some of which unfold across the same time periods (e.g., “*EDUCATION IS A JOURNEY*,” “*LOVE IS A JOURNEY*,” “*ACHIEVING INDEPENDENCE IS A JOURNEY*”).

The suggestion that lower-level groupings can in principle be active when one outputs life events from semantic memory permits for the examination of conceptual metaphors using techniques not employed currently in the conceptual metaphor literature. Specifically we will use a procedure in the study of memory based on the contiguity of events in the memory output protocols. For instance, it is well-known that when randomly presented a list of words that belong to a set of discrete categories, people do not recall these items in an unstructured order. Rather, the memory output reflects the underlying conceptual structure, such that people tend to recall items belonging to the same category together *regardless of the order in which they were presented* (e.g., Bousefield, 1953). This phenomenon is known as categorical clustering and is taken to illustrate basic underlying conceptual organization.

Empirical evidence for category clustering life effects in the life journey data would obtain if people produced life events in order according to specific domains, such as “events with life partner” or “achieving independence.” One can test for such “clustering effects” in episodic memory tasks (and we shall do so in Study 4) but they have been found in some semantic memory tests as well (e.g., Brown and Siegler, 1991). Accordingly, here we reanalyze the output data from Study 1a. In the next study, we will manipulate strategies for recall of life-journey information from permanent memory and in the final study we will provide data from an episodic memory test.

### Reanalysis of Study 1a

Recall that in Study 1a, participants were asked to produce life events. Here, we consider the *order* with which each participant produced a life event as recall protocols from permanent memory. We then subjected that output-order to a category clustering procedure based on the 7 categories identified previously. That is, we are interested in seeing whether participants in the Study 1a produced life scripts in a thematic order more than would be expected by chance. That is, we test the likelihood that “events with life partner” or “death” are produced contiguously.

Because the number of items produced by any one person could differ from that produced by any other person, we employed as our measure of thematic clustering the Adjusted Ratio of Clustering (ARC) method (Roemer, Thompson and Brown, 1971). The ARC is a preferred clustering measure because it provides an estimate of clustering that is independent of the number of items recalled, the number of different categories represented in the recall protocol, and the distribution of the total items recalled across the categories. The computational formula for the ARC score is:  $ARC = R - E(R)/\max R - E(R)$ , where R is the total number of times a life event from a given category follows a life event from the same category, E(R) is the chance clustering based on the number of life events produced, and max R is a measure of “perfect” clustering behavior. A computational algorithm can be found in Kazen and Otani (1997).

A clear case of thematic clustering was observed when the ARC analysis was performed on the output- order data of Study 1a. The ARC scores were significantly different from that expected if the events had not been output according to the 7 categories isolated here,  $t(190) = 15.3, p < .001$ . That is, when participants were producing life events regarding an average 70-year-old they tended to produce, in sequence, items that belonged together thematically, such as events grouped together as indicating “events with life partner.” Given the findings from Study 1, in which a forward-temporal order was observed overall, these data, for themes that occur across the life span, suggest that within each thematic life domain, recall was in a forward order, as one would expect from the “*JOURNEY*” metaphor.

### STUDY 3

In the first study, we identified the events that would typically occur over a 70-year span of life as conceptualized by our undergraduate student sample. We also found support that the events produced were motivated by a “*LIFE IS A JOURNEY*” metaphor: Output was in a temporal-forward manner with almost perfect agreement on when the landmarks on the path of life would occur. In Study 2, we identified subcategories of the basic “*LIFE IS A JOURNEY*” and evidence, based on category clustering memory procedures, that these subcategories were aroused when conceptualizing the life journey.

In the study to be reported next we examine again the subcategories of the life journey metaphor, but now do so experimentally. Specifically, we asked people to produce life events (as in Study 1a), but manipulated the order of production: Some participants were asked to produce life events in any order that comes to mind (free recall, as in Study 1a), some were explicitly asked to produce events in the order in which they would occur over the life span as one would expect if a “*LIFE IS A JOURNEY*” metaphor motivated memory output (forward-order),



and some were asked to produce events in the order of personal importance for the average person (importance condition), as would be expected if the life course was organized around a set of important events, regardless of when in life they occurred.

Participants were asked to recall events in a 90-second period so that we could examine the most accessible memories. The number of memories produced should thus be an index of the ease of access, with more events recalled when one proceeds in a manner consistent with the underlying structure one would use naturally. Free recall, because it does not constrain how one would produce information from semantic memory, would provide the best comparison for normal or natural output (and hence the structure employed).

The question of interest would be whether the data obtained in free recall would be similar to that obtained in the forward-order condition or to that obtained in the importance condition. Thus if one were to employ a "*LIFE IS A JOURNEY*" metaphor to think of life events one would expect that the free recall and forward order conditions would produce more events than obtained in the importance condition, and the number of events produced be somewhat similar to one another. In contrast, if one were to output life events on the basis of personal importance, then that condition should produce more events than found in the forward-order condition and be more similar to the free recall data. Finally, if output is sensitive to the subcategories of the "*LIFE IS A JOURNEY*" metaphor identified in Study 2, we should find greater-than-chance clustering, especially in the free recall relative to the other, more constrained production conditions, although clustering should also be apparent if the instructional manipulation engaged the subcategories.

## METHOD

### Participants

One hundred twenty (60 male, 60 female) students at the University of Western Ontario participated. One-half of each gender was asked to produce life events of a person of the same gender and half were told to produce events from the opposite gender.

### Procedure

Participants were told to think of important events from an average person's (man or woman, depending on the condition) life. Note that unlike Study 1a, participants were not given as an anchor a 70-year-old person and hence we did not make as salient the "*JOURNEY*" metaphor. Each participant was given 90 seconds to produce as many life events as possible, in one of three conditions; *free-recall* (in any order they pleased), *forward-temporal order* (from earliest to

latest life events), or *personal-importance order* (from most to least important). Participants were arbitrarily assigned to one of the three conditions based on order of arrival at the testing site.

## RESULTS AND DISCUSSION

In order to determine whether people produced more events for same (relative to opposite) gender participants, a gender of participant by gender of target sample ANOVA was conducted, collapsing across instructional manipulation. The only significant effect was that, overall, females produced about 1 event more in the 90-second period than did males participants; (8.85 vs. 7.63),  $F(1, 108) = 8.73, p < .01$ . However, both men and women tended to produce the same number of events for the idealized male and idealized female target (8.42 and 8.07 respectively);  $F(1, 108) = 0.72$ . Consistent with the findings from Studies 1a and 1b, there was no significant interaction of the two main variables;  $F(1, 108) = 0.72$ , again supporting our earlier observation that men and women do not differ systematically in the landmarks they see as being encountered over a life span. Because there was no reliable interaction, neither gender of participant nor of target group was entered into subsequent analyses.

### The Number of Events, on Average, Produced by Participants in Each Production Condition

There was a significant effect of condition:  $F(2, 108) = 12.45, p < .001$ . The greatest number of events was produced in the free-recall condition (9.48 events on average), followed by the forward-temporal condition (8.40 events), and the personal-importance condition (with 6.85 events produced on average). *A priori* comparisons revealed that participants accessed more life events from long-term memory given free-recall and forward-temporal instructions relative to participants given personal-importance instructions;  $t(78) = 4.91, p < .001$ , and  $t(78) = 3.38, p < .01$ , respectively. The number of events produced did not differ for the free recall and forward-temporal conditions,  $t(78) = 1.84$ . The fact that about 28% fewer events were produced in the personal-importance condition suggests that importance is not as strong a motivator to how one structures output of life events as ordering events sequentially across the life span. The similarity between the free recall and forward-temporal conditions supports again the contention that output is motivated by “traveling” forward in time, as would be predicted by use of the “*LIFE IS A JOURNEY*” metaphor.

## Clustering

We examined the thematic clustering observed in all three conditions and ARC scores were calculated using the 7 lower-level clusters described in Study 2. Recall that participants only recalled on average about 8 events in the 90-second recall period and, as such, about 25% of the sample tested here did not produce a sufficient number of the 40 canonical life events to provide useful data for clustering purposes. Consequently the ARC analysis reported here is based on 92 participants.

We computed ARC scores for each of the three instructional groups separately. Reliable thematic clustering above chance levels was observed in both the free-recall and the personal-importance conditions. The mean ARC scores were .53 [ $t(30) = 3.79, p = .001$ ] and .44 [ $t(33) = 3.17, p = .003$  respectively]. In contrast, reliable clustering was not observed when forward-temporal recall was induced by instructional manipulation,  $ARC = .29$ , a thematic clustering score that did not differ from chance [ $t(26) = 1.63, p = .116$ ].

Taken together, these data suggest the following: The high number of events output in the free-recall condition, along with the significant and high level of clustering observed for that condition, argues in favor of thematic representation in the life events and the use of these thematic categories in organizing the output of life events. The clustering in the importance condition, taken together with the overall low level of events produced, suggest that recall of one important item may serve as an additional cue to thematically related events (e.g., Cohen, 1966), but that importance *per se* is not a representational characteristic that motivates structuring output of life events.

Finally, the high number of events produced in the forward-temporal condition and the statistical equivalence with that obtained in free recall, in combination with the lack of clustering, suggests that forcing a temporal order output (perhaps in combination with the 90-second recall period) makes salient the overall “*LIFE IS A JOURNEY*” metaphor to the detriment of the submetaphors. These data also reinforce the earlier findings that a large component in free recall output in Study 1a is in a temporal-forward order as predicted by use of a “*JOURNEY*” source domain, though in that task with participants given as much time as needed to list life events, we found evidence, as we do here, that life themes (or lower level metaphors) are also activated.

## STUDY 4

The studies described previously have provided evidence for the “*LIFE IS A JOURNEY*” conceptual metaphor, that the metaphor can be deconstructed into a set of separable or thematic aspects, and that these specific aspects are active when one activates the metaphor in the context of reporting on an average or

idealized life course (but not when one forces a temporal forward strategy in a time-limited task). All of these studies can be seen as examinations of output from semantic memory. In Study 4, we will test for memory of “*LIFE*” events with an episodic memory task. The interest here will be to see whether in these conditions evidence for categorical clustering will occur (as would be expected if the lower-level “*LIFE*” themes are aroused during encoding) or whether recall is better explained by a single forward-order strategy (output items in the order they would be encountered along life’s path).

The task employed involved the use of a classic episodic-memory task. Participants were presented with a randomized list of the 40 events that constitute the life journey described in Table 1. After a 10-minute-filled delay period (to prevent rehearsal of the items presented), the participants were asked to recall as many of the presented life events as possible, *in whatever order they prefer*. If people use a unitary life-journey metaphor to aid in recall, then one would expect that order of recall would be positively correlated with age in which the event would occur (i.e., be recalled in a forward-temporal manner). However, if there are separable life themes to the life script, and these themes each act as retrieval cues, then one would expect significant thematic clustering in recall of the events.

## METHOD

### Participants, Stimuli, and Procedure

Fifty-three students (40 females, average age of the sample = 21.6 years of age) of a second-year class in Cognition at the University of Western Ontario participated. None had participated in any of the previous studies. The same 40 events depicted in Table 1 and used in the scaling study were employed again. These items were read aloud to the class in a random order. Participants were told that the list consisted of life events that could occur over a person’s life, tacitly evoking a time dimension and thus presumably engaging the “*LIFE IS A JOURNEY*” metaphor. They were then told that at some later time they would be asked some questions about what they had been presented; there was no reference explicitly to a subsequent memory test. After reading the list, the instructor lectured for 10 minutes. Following this delay, the students were given a response sheet onto which to record their age and gender, and were then told to recall as many of the events they had been read, in any order that came to mind. A time limit was not imposed but all participants had finished recalling what they could within five minutes.

## RESULTS AND DISCUSSION

A total of 968 events were recalled, an average of 18.3 events per person. Recall varied across life events, from 92% of the sample recalling the event "birth of first child" to only 9% recalling "first time playing a sport."

### Frequency Effects

We first were interested in the relation between the probability with which an event was recalled in the episodic test employed here and the output frequency effects observed in Study 1a. Consequently, the episodic recall observed across items here was correlated with the normative data obtained in Study 1a. The frequency with which the event was produced in Study 1a correlated with the overall episodic recall in this study,  $r = 0.42$ ,  $p < .01$ . That is, events that are major transitional life landmarks are more likely to be recalled episodically, although the effect is fairly weak, accounting only for less than 18% of the shared variance. There were no reliable associations between episodic recall probability and the age at which the event is expected to occur ( $r = .019$ ), or how confident one is about when the event will occur ( $r = -.063$ ), or how emotional the event is expected to be ( $r = -.245$ ,  $p < .10$ ) though, in this last case there is a suggestion that more emotional life events are more likely to be recalled on an episodic recall task.

### Order Effects

We find that order in which the events were presented for study is unrelated to the probability that they would be remembered on the memory task employed here ( $r = -.110$ ). Of greater interest was a comparison between the order in which events were recalled here and the order in which they were output in Study 1a. Recall that in Study 1a we found that events tended to be recalled in a forward order, evidence taken as supportive of the psychological reality of the "*LIFE IS A JOURNEY*" metaphor. When we compare the order in which events were produced in this study and in Study 1a, we find again a significant effect,  $r = .39$ ,  $p = .013$ , accounting for 15% of the shared variance. However, when we examine whether the events in this study were recalled in a forward manner, from earliest to events at the end of one's life, we find no such effect,  $r = .14$ . That is, in the episodic recall protocols, participants tended not to start at the beginning of one's life and work forward. In fact, examining again the order of recall in this study and the order of production in Study 1a, but now partialling out the age with which the event is expected to occur in one's life (from Study 1a), we find a strong effect,  $r = .46$ ,  $p < .01$ . That is, the order of landmark event production (Study 1a) and the order in which the events are

recalled here on an episodic test are reliably correlated, but this effect is not mediated by the age at which the events are expected to occur in one's life, with events occurring later in life being recalled later in output protocols. These data suggest that something other than mere chronological age underlies the output of life events in this study.

We sought to see whether that something else might be thematic aspects of the life script. To test this possibility, the episodic memory data was subjected to an ARC analysis, similar to those described in the earlier studies. A strong clustering effect was observed,  $t(51) = 16.3, p < .001$ . That is, the episodic recall we see here was clustered according to life themes, and not by age. Taken together, these data support the interpretation that episodic recall of life script events is structured around the various subdomains of the "*LIFE JOURNEY*" metaphor: The groupings involve journeys in love, with a life partner, education, and the like.

As an aside, we observed, across the sample, 32 intrusions in total. An intrusion is a false memory in the sense of a recall of an event not presented for later recall. These intrusions included events such as "birth of third child," "child begins to walk," "death of grandparent," "loss of job," and "becoming pregnant." These are all events that would be categorized to one or another of the seven observed life themes identified in Study 2 and provides additional support for the notion that the themes were being used as retrieval cues in the current study.

## GENERAL DISCUSSION

The aim of the study was to produce evidence for the psychological reality of one conceptual metaphor, "*LIFE IS A JOURNEY*," through the use of techniques other than those based on an analysis of the similarity between diverse linguistic expressions or the text in which they reside. The approach taken here was to employ procedures used in the psychological study of human memory.

The results of the four studies can be easily summarized. First, we identified the life events conceptualized by undergraduate participants to have occurred to a 70-year-old person over his/her life span. Evidence that these events were motivated by the conceptual metaphor "*LIFE IS A JOURNEY*" includes the strong temporal forward relation between average order of output and the age in which the landmark events were assumed would occur, the strong consensus on the landmarks that would be encountered, and the strong consensus on the affect associated with the events.

Examination of the content of the landmark events suggested that the "*LIFE IS A JOURNEY*" metaphor incorporates separable life themes, a suggestion confirmed in analysis of similarity sorting data (Study 2), which identified

seven distinct life clusters. These findings are consistent with the view that people conceptualize the life course into a higher-level "*LIFE IS A JOURNEY*" metaphor and a set of lower-level conceptual metaphors that inherit the basic structure from the higher-level; such metaphors would include: "*LOVE IS A JOURNEY*," "*OBTAINING ONE'S INDEPENDENCE IS A JOURNEY*," "*PARENTING IS A JOURNEY*."

Three further studies examined the psychological reality of these separable life themes and the conditions under which access from memory favors the higher-level "*LIFE IS A JOURNEY*" metaphor and those that encourage the access of the lower-level metaphors. Studies 2 and 3 indicated that these themes, or lower-level metaphors, were accessed when people listed important life events that occur across the life span. Study 3 also demonstrated that output from semantic memory of events across the life span is better explained as being motivated by a "*JOURNEY*" metaphor than by a model-based on output of personally important events. Finally, Study 3 also indicated that when constrained to fairly rapidly output life events in a forward-temporal manner, the higher-level metaphor is employed and the lower-level clusters are not accessed. Finally, in Study 4, based now on recall from episodic memory, performance is most efficient when structured around the specific life themes and there is little evidence that the higher-level metaphor is accessed at all.

We see these data add to the large literature on conceptual metaphors by examining the psychological reality of conceptual metaphors; that is, we asked the question "can one find evidence for the influence of conceptual metaphors in everyday tasks (such as thinking about what happens to a person during the life span, or remembering information that is presented)?" Moreover we ask the psychological question: Under what conditions might a conceptual metaphor be aroused? To that latter question we now have some answers, at least for the well-discussed "*LIFE IS A JOURNEY*" metaphor. It is aroused when people are explicitly asked to list events that makes salient the later parts of the life course and when people think of "*LIFE*" events as occurring in a linear or forward sequential manner (Study 1 and 3). It is not effective in episodic memory; possible because holding in memory the "*LIFE IS A JOURNEY*" script is nondiagnostic and better retrieval cues are available when specific chunks of life are considered (i.e., participants use a strategy in which they remember an event, most likely a highly salient one, and then attempt to remember other events similar to it).

A serendipitous finding was the evidence that themes or lower-level metaphors appear to be aroused when listing life events in a task with no time limit imposed, and in episodic memory but do not seem to be aroused when participants are "stressed," in the sense that a noncompatible strategy is imposed (forward-temporal) and a 90-second recall period employed. These last findings would suggest that the higher-level "*LIFE IS A JOURNEY*" metaphor predominates in

most situations. Finally, evidence for specific themes, in the case here of 7 lower-level clusters in the life event production, suggests specific consideration of how the various lower level metaphors are slave to the more general "*LIFE IS A JOURNEY*." For instance, previous work has argued for "*LOVE IS A JOURNEY*" as a lower-level metaphor (e.g., Lakoff, 1993). The data presented here suggest that this lower-level metaphor subsumes, in turn, even lower-level metaphors involving "*YOUNG LOVE IS A JOURNEY*" (a journey from "young love" to "true" love) and "*LOVE WITH ONE'S MATE IS A JOURNEY*." Similarly, the data suggest the lower-level metaphor "*CAREER IS A JOURNEY*" might be a specific instantiation of a higher-level conceptual metaphor, "*BECOMING INDEPENDENT IS A JOURNEY*." Consequently, the data presented here point to the need to consider the entailments and practical implications of these and other distinctions for even well-analyzed conceptual metaphors.

Finally, we wish to discuss two additional issues. First, we have assumed that in considering life from the perspective of the "*LIFE*" is a "*JOURNEY*" metaphor one unravels the future in a linear manner, with the future ahead of us on life's path and the past behind us. Indeed this is the mode of thought that predominates in Western and, in fact, most cultures. It would be perhaps easy to assume that this conceptualization is a natural consequence of embodied experience. Such an explanation however would denigrate the important contribution that cultural factors play. For instance, there are good examples that not all cultures encode the future ahead of us (see, for instance, Nunez and Sweetzer, 2006, who demonstrate with both linguistic and gestural evidence that a South American people encode the future as behind us and the past in front of us).

Moreover, there are cultures that do not have a simple linear conception of time at all, and thus movements in time across space can follow multiple routes. Examples of this can be found in certain indigenous mesoamerican cultures in which time is neither singular nor linear, but multifaceted and cyclical. For instance, Elzey (1991) analyzes a traditional Aztec legend which takes as its chief narrative device a set of often simultaneously occurring cyclical journeys: across the surface of the earth from place A to place B (analogous to what we usually consider in the "*LIFE IS A JOURNEY*" metaphor) and back again, along a sacred vertical dimension, along a space of symbolic importance in the Aztec cosmology, and finally as a "journey into the distant past where knowledge was obtained about the future" (p.126). Clearly we should not be blinded by the salience of a linear forward-moving metaphor to the creative possibilities available in other cultures, or even within our own culture. For instance there are creative artists who have adopted the "*LIFE*" is a "*JOURNEY*" metaphor in ways reminiscent of the Aztec legend described above. Consider for instance Luis Bunuel's great 1969 film about the search for truth in a world of heresy, "*La voie lactee*" (*The Milky Way*), which follows the journey of two modern



day vagabonds walking from Paris to the shrine at Santiago de Compostela, which, as they follow the path, move not only across a spatial landscape they move also back in time, and with their experience, move spiritually. We see as a general important point, the need to disentangle the role(s) played by physical characteristics of humans in the genesis of conceptual metaphors from the roles played by social and cultural factors.

The second and last point is that in the studies presented here we examined only one target domain (“*JOURNEY*”) to which “*LIFE*” can be mapped. Other conceptual metaphors can structure our understanding of “*LIFE*,” such as “*LIFE IS A CONTAINER*” (in which one’s life can be full or empty) or “*LIFE IS A GAMBLE*” (in which one can consider the person’s life to be one of a winner or loser). We evoked one such instantiation (the “*JOURNEY*”) by structuring task demands to invite consideration of the importance of time. A working hypothesis would be that just as the “*JOURNEY*” metaphor can be invoked by specific task demands, other source domains can also be judiciously invoked, perhaps by asking participants to list life events that exemplify ways in which a person’s life could be said to be “full” or “empty” (“*CONTAINER*”), or to list events that exemplify ways in which living can be considered “risky” (“*GAMBLE*”). In our lab we are beginning to examine these possibilities, both with semantic and episodic memory tasks.

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