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FINAL TECHNICAL REPORT

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TITLE OF PROJECT: People with Dementia as Witnesses to Emotional Events

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DATE: December 23, 2009

Abstract

Purpose:

Demented elders are often the only witnesses to crimes against them, such as physical or financial elder abuse, yet they are disparaged and discounted as unreliable. Clinical experience with this population indicates that significant emotional experiences may be salient to people with dementia, and that certain behaviors and characteristics enhance their credibility as historians. For example, someone in an early stage of the disease may be able to reliably report on an event with strong emotional content. This is the first systematic research to identify people with dementia with reliable emotional memory and their characteristics.

Design & Methods:

A cross-sectional study of 95 people with dementia (aged 55 and older) and a control group of 50 older adults was conducted. Memories of recent autobiographical events that have both positive and negative emotional content were elicited during a structured interview. Accurate recollection of these events was independently verified by a non-demented informant, usually a family member. In addition, both members of the dyad were interviewed independently to assess other characteristics of the older adult participant: demographics, depressive symptoms, functional and cognitive abilities, medications, health conditions, confabulation behaviors and characteristics of the dyadic relationship. Researchers also assessed people with dementia for disease stage, awareness of their cognitive impairment, and neuropsychiatric symptoms. A validated test of emotional memory was administered to qualified participants to verify the novel structured interviewing assessment developed for this study. The study assessments were conducted during a home visit by two researchers.

Results:

A significant subset of older adults with dementing illnesses can reliably report emotional events in their lives. Compared to people with dementia with less reliable emotional memory, these individuals are able to report details of the event accurately and to recall the same event again after a short time delay.

They are also likely to be an earlier stage of the disease, more aware of their own cognitive impairment, more likely to report negative events in their lives and to be able to recall an event without cues.

Implications:

Older adults with dementia who are victims of crime should be evaluated for their ability to remember emotional events in their lives, and based on the results, allowed to provide testimony about the criminal events.

Introduction

Five million Americans have Alzheimer's disease, a number that is expected to triple by the middle of this century (Hebert, Scherr, Bienias, Bennett, & Evans, 2003). It is estimated that as many as fifty percent of these people are also mistreated or neglected (Cooney & Mortimer, 1995). While the victimization rate of this vulnerable population is staggering, these crimes go undetected frequently and are prosecuted infrequently. Demented elders are often the only witnesses to their own abuse, yet they are disparaged and discounted as unreliable. Lacking other persuasive evidence, frustrated law enforcement personnel are stymied in their investigations and often feel compelled to close these cases, believing that a time-consuming investigation will not lead to a successful prosecution.

What is not widely known is that people with dementia frequently retain very specific cognitive function (cognitive reserve), while sustaining other very specific cognitive deficits. The evidence is growing that memory for an emotional event is one of the reserved cognitive abilities often retained through the early stages of Alzheimer's disease and related dementias (ADRD). Elder mistreatment clearly is an adverse emotional experience for those who endure it. Those who serve elders with dementia attest to their ability to retain emotional material (an outing, financial difficulties), while information that is more mundane (a meal, a phone conversation) is more readily forgotten. This project systematically explored that observation, and it adds to the body of knowledge that guides those who discover, mediate, investigate, and prosecute crimes against older adults.

Prevalence estimates for Alzheimer's disease and related dementias (ADRD) indicate there are 5.3 million Americans with the disease today and half a million new cases will develop annually (Alzheimer's Association, 2009). This is in part due to the rapid increase in the population aged 75 and up (Hebert et al., 2003). Prevalence of ADRD is directly associated with age and among the oldest Americans as many as half of the population are afflicted with a dementing illness. In addition, a high proportion of people in residential care facilities are diagnosed with ADRD. The population of older Americans with dementia has been of interest to elder abuse researchers because their cognitive impairments and dependency on others for their care and safety leave them vulnerable to mistreatment. Studies have found high prevalence of abuse and neglect of people with dementia that approaches 50% (VandeWeerd & Paveza, 2005; A. Wiglesworth et al., (In press)). Researched estimates for prevalence of physical aggression alone toward people with dementia range from 5.4% -19.7% in community settings (Compton, Flanagan, & Gregg, 1997; Coyne, Reichman, & Berbig, 1993; Hamel et al., 1990; Paveza et al., 1992; A. Wiglesworth et al., (In press)). Published data on reports of elder mistreatment substantiated by Adult Protective Services do not break down the proportion of victims who are demented since these data are seldom collected in social services databases (Teaster et al., 2006), but pilot data indicate a rate of about 10%, with the caveat that underreporting of these crimes is likely much higher than underreporting of crimes against non-demented victims (Rater, 2005). Regardless, with the projected growth in the population segment vulnerable to dementing illnesses, a parallel increase in elder mistreatment of these vulnerable people can be expected.

Dementia (or ADRD) is defined as a decline in intellectual ability involving significant impairment of memory and at least one other cognitive function, resulting in an inability to carry out everyday activities. A victim's ability to remember the events of a crime is frequently crucial to prosecuting the crime, and this is certainly the case in elder mistreatment since victims and perpetrators are often the only eyewitnesses. Even with financial abuse, although a paper trail may provide some evidence, the alleged perpetrator can counter an accusation with a statement that property was not stolen, but freely given, when the alleged victim cannot reliably state that no such permission was granted. Eyewitness

testimony in elder mistreatment cases often comes down to the victim, and if the victim has been diagnosed with dementia those in the criminal justice system may assume that the case cannot be pursued, either because they think they cannot rely on the victim's testimony or because they think that a jury will not do so. In fact, the kind of memory function that is tested to diagnose dementia (usually verbal memory for mundane information) differs from the kinds of memories generated by someone experiencing elder mistreatment. There is growing evidence that emotional memory is spared in many people with dementia.

Emotional memory

When emotion combines with memory, memories are more salient. This has been shown in studies of normal adults (Cahill & McGaugh, 1995; Dolan, 2002; S. B. Hamann, Cahill, & Squire, 1997; S. B. Hamann, Cahill, McGaugh, & Squire, 1997; E. A. Kensinger, Brierley, Medford, Growdon, & Corkin, 2002; E. Kensinger & Schacter, 2008; E. Kensinger, 2009), people with amnesia (S. B. Hamann, Cahill, & Squire, 1997; S. B. Hamann, Cahill, McGaugh et al., 1997) and people with dementing illnesses (H. Kazui et al., 2000; Moayeri, Cahill, Jin, & Potkin, 2000; Satler et al., 2007), though results are mixed with the latter (S. B. Hamann, Monarch, & Goldstein, 2000; E. A. Kensinger et al., 2002). One protocol involves recall of the details of short stories shown as slide shows, with some of the slides accompanying emotionally arousing plot details, while others contain neutral material. Emotional arousal promotes both short- and long-term memory of the story details (Cahill & McGaugh, 1995). Others have studied so-called flashbulb memories for major events (the Kennedy assassination, 9-11) and found these memories may be preserved better in older than in younger adults (Thomas-Antérion, Collomb, Borg, Nevers, & Laurent, 2006), and can be at least partially spared in AD as well (Budson et al., 2004; Ikeda et al., 1998). Most appropriate to the proposed project are studies of emotion related to autobiographical memory (Christianson & Safer, 1996; Davis & Follette, 2001; Rubin & Berntsen, 2009; Rubin & Berntsen, 2009; Schlagman, Kliegel, Schulz, & Kvavilashvili, 2009), and these are perhaps the most salient memories of all, since they engage all sensory channels and their potential to trigger an emotional response in the research participant is not due to fabricated research procedures, but to lived events. Directly experienced traumatic events are more resistant to forgetting over time than other types of memories (Pezdek & Taylor, 2002).

Seeking to further analyze the emotional memory phenomenon, others have found that emotion enhances attention (Davis & Follette, 2001). Attention is a distinct cognitive construct necessary for the formation of memories. It is often spared with Alzheimer's disease (Dolan, 2002). One example of the role of attention in memory has been called "tunnel memory," which describes the propensity of those viewing an emotionally arousing traumatic event to automatically narrow attention to those critical details that were the source of the emotional arousal (Safer, Christianson, Autry, & Österlund, 1998).

Emotions have positive or negative valence and the same is true of emotional memories. A "negativity" bias for attention to stimuli exists in younger adults (Carretié, Mercado, Tapia, & Hinojosa, 2001), and this biases their memory toward negative rather than positive stimuli. Some evidence indicates that older adults have a "positivity" bias (Charles, Mather, & Carstensen, 2003). A study of young adults showed that memory for emotional and especially negative arousing items is less prone to distortion than is memory for neutral items, and that negative arousal enhances the vividness of memories (E. A. Kensinger, Garoff-Eaton, & Schacter, 2006).

Studies of the brain's mechanisms of emotional memory begin to explain its relative sparing with age and dementia. The memory loss of Alzheimer's disease is associated with damage to the hippocampus that impairs encoding or storage of new memories. Emotional arousal and encoding of emotional

memories activates the amygdala, which may modulate memory storage elsewhere in the brain (Canli, Zhao, Brewer, Gabrieli, & Cahill, 2000; S. B. Hamann, Ely, Grafton, & Kilts, 1999; McGaugh, Cahill, & Roozendaal, 1996). In addition to imaging studies, research with amnesiacs (S. B. Hamann, Cahill, & Squire, 1997; S. B. Hamann, Cahill, McGaugh et al., 1997) and people with amygdalar damage (Mori et al., 1999; Phelps, LaBar, & Spencer, 1997) indicate the importance of the amygdala to emotional memory.

Emotional memory and dementia

A variety of study protocols have shown that emotional memory may be spared in ADRD, despite the loss of verbal or declarative memory that is the hallmark of the disease. A successful protocol for enhancing memory in dementia patients introduced an environmental manipulation by associating memories with experiences that aroused positive emotions (e.g., a pleasant outing) instead of using classic memorization techniques, such as repetition (Moore, Sandman, McGrady, & Kesslak, 2001; Sandman, 1993). To augment the finding of partial sparing of flashbulb memories in AD patients (Budson et al., 2004; Ikeda et al., 1998; Thomas-Antérion et al., 2006), one group was able to relate amygdalar sparing in AD patients directly to emotional memory performance (Mori et al., 1999). Researchers also found improved memory for emotional items by AD patients when using neutral and arousing stories and slides (H. Kazui et al., 2000; Moayeri et al., 2000). One study found that the flashbulb memory enhancement was associated with visual rather than verbal memory (H. Kazui, Mori, Hashimoto, & Hirono, 2003). However, it is not clear that emotion improves AD patients verbal recall of emotional words (E. A. Kensinger et al., 2002; E. A. Kensinger, Anderson, Growdon, & Corkin, 2004), or emotional narratives (E. A. Kensinger et al., 2004). Synthesizing these findings, it appears that sparing of emotional memory in ADRD may rely on visual and/or autobiographical memory, rather than verbal memory, which is always impaired.

Some studies differentiate memory function in different types of dementia. Subjects with a fronto-temporal lobe Semantic Dementia had recognition memory, especially for pictorial items, that was associated with performance on frontal lobe tests and not with hippocampal atrophy (J. S. Simons, Graham, & Hodges, 2001; J. S. Simons et al., 2002) indicating the importance to memory of receiving information through non-verbal channels. (“Recognition” is cued memory as opposed to “recall”, which is uncued.) Recognition is better preserved in older adults than recall, for example they may not be able to recall a word from a list, but given the word, they can say that it was on the list.) Other studies found that people diagnosed with Semantic Dementia had better autobiographical memory for recent events than people with AD, but poorer remote memories (Hou, Miller, & Kramer, 2005; Ivanoiu, Cooper, Shanks, & Venneri, 2006). Frontal lobe function has also been associated with preserved ‘source’ memory – or memory for contextual information (time, place, peripheral details surrounding an event) (J. S. Simons, Dodson, Bell, & Schacter, 2004). To sum up, dementias are characterized by differentially preserved cognitive function and by differential sparing of brain structures that underlie cognitive function associated with emotional and autobiographical memory.

Other characteristics of ADRD may have an impact on reliable emotional memory. Neuropsychiatric symptoms can be quite common, for example, delusions occurred throughout the disease course (34-49% prevalence) in probable AD patients, peaking in the second year, before declining. Hallucinations (8-17% prevalence) were somewhat stable across the follow-up period and fairly persistent (Holtzer et al., 2003). Disinhibition, a relatively common characteristic of advancing dementia, can interfere with attention and therefore with memory storage (Davis & Loftus, 2003). Confabulation (the tendency to ‘make-up’ information rather than give accurate information or report that you do not remember or do not have reliable information) in AD has been associated with poor performance on episodic memory

measures but not on other measures of cognitive functioning (Cooper, Shanks, & Venneri, 2006). Also, some ADRD patients are unaware of their symptoms and illness, and level of awareness decreases with dementia progression, psychosis and apathy, but increases with depression and anxiety in AD (F. R. J. Verhey, Rozendaal, Ponds, R. W. H. M., & Jolles, 1993).

Some factors that occur with ADRD apply to aging adults in general and can interfere with emotional memory. For example hearing and vision loss, prevalent with aging, can block the registration of memories, even though the brain's cortical and subcortical structures for forming, storing, and retrieving memories are intact. Depression is common in early AD and can negatively impact memory (Jorm, 2000).

The current study hypothesized that some people with dementia have reliable emotional memory for events in their own lives and that they differ from people with dementia whose emotional memory is less reliable or unreliable in that they are at an earlier stage of the disease, they engage less in confabulation and neuropsychiatric behaviors that might interfere with memory formation such as delusions, hallucinations, illusions, disinhibition, anxiety, apathy and agitation and they are more aware of their cognitive impairment. In addition, those with reliable memory will be able to provide more details related to the memory, and to discuss the memory again with the same accuracy after a time delay.

Older adults as witnesses

Criminal justice investigators and jurors tend to stereotype older witnesses, assuming that their memories may be inaccurate. It is true that, compared to younger adults, older adults provide less accurate and less complete eyewitness reports, and make more errors (Davis & Follette, 2001). Not only with AD, but with all older witnesses, it is important to interview them as soon as possible after an event. Research on effects of age on serving as a witness as well as the practical difficulties of elders operating in the legal system raise a number of concerns about elders functioning as witnesses to crimes (Davis & Follette, 2001; Davis & Loftus, 2003; Nunez, McCoy, Clark, & Shaw, 1999; Wright & Holliday, 2005). Many of these difficulties - such as being overwhelmed by events, having mixed feelings about the perpetrator and letting the stress of or delays in testifying interfere with giving accurate testimony - parallel those of child witnesses and need to be addressed similarly (Task Force on Child Witnesses of the American Bar Association Criminal Justice Section, 2002).

Strategies for overcoming problems with witnesses relate to how questions are asked (Hyman & Loftus, 2002). Experts recommend using a structured interview protocol to improve the quality of information retrieved in investigative interviews. This helps ensure that suggestibility does not enter in, and interviewers do not influence outcomes. The protocol attempts to exhaust open-ended questioning strategies (Sternberg, Lamb, & Esplin, 2002).

In the current study, the researchers evaluated demented persons' memories of recent emotional experiences using structured interview techniques that began with open needed questioning and progressed to questioning using first category cues and then, if needed, cues of specific events as related by an informant to the person with dementia. A standard instrument for assessing adverse life events tailored for older adults provided a list of categories of events that happen to older adults and these were used to cue or trigger adverse memories. The list was supplemented with positive memory categories such as a family gathering and the birth of a grandchild. Similarly, the demented person's informant, usually a spouse or other family member, participated in a parallel, but independent, interview to verify whether the person with dementia was accurate in reporting emotional memories. This information was analyzed by raters, to allow ranking of the participants based on the reliability of

their memory for emotional events, and therefore their potential to serve as reliable witnesses to their own mistreatment. A control group of non-demented older adults and their informants provided a baseline of normative data for the study.

The underlying characteristics or variables for comparison between groups were based on the investigators clinical experience in leading an elder abuse forensic center.(A. Wigglesworth, Mosqueda, Burnight, Younglove, & Jeske, 2006) The characteristics of particular interest included: the stage of the dementia (early vs. moderate or severe); the presence or absence of neuropsychiatric symptoms (e.g., hallucinations, delusions, agitation); the individuals' awareness of their own memory deficits or dementia; confabulation behaviors (e.g., providing fictitious responses when confronted with questions about things they do not know); as well as the ability to provide details about the emotional memory and to recall the memory again after a delay. The researchers conducted a formal and rigorous study of these criteria as hypothetical predictor variables for identifying those people with dementia who are reliable witnesses to their own abuse. The findings have the potential to change the way elder mistreatment cases are handled by the criminal justice system.

Methods

The study design is a cross-sectional, one-time assessment of a convenience sample of Older Adults diagnosed with mild or moderate stage dementia and their Informants, as well as non-demented normal control Older Adult participants and their Informants. (The paired individuals are referred to as a dyad.) Data was collected in the home by a two-person research team. The study was fully enrolled with 103 dementia dyads and 50 normal controls.

Recruitment and consenting

Inclusion criteria for dementia participants were age 55 or greater, a diagnosis of mild to moderate dementia, established through review of medical records, and availability of an informant who is familiar with the patient's recent history. Normal control participants and their informants were matched for age and gender. Venues for recruitment included, participants in other research studies at the University of California, Irvine; families who contacted the local Alzheimer's Association chapter and clients of a senior health clinic, an adult day care facility and a participating senior center. Other resources included an online article in a local newspaper, an article in a newsletter for a senior education program and a broadcast email to UC Irvine employees. Details are available in Appendix 1.

ADRD patients and normal controls who were interested in participating in the study were asked to provide a release of recent medical records in order to confirm the presence or absence of a dementing illness. All informants and control participants were screened by telephone, using a modified version of the Short Portable Mental Status Questionnaire (SPMSQ; Erkinjuntti, Sulkava, Wilkström, & Autio, 1987) to assess for the absence of cognitive impairment. If all criteria were met, the study assessment itself was scheduled and conducted in participants' homes at a later date. At that time, dementia patients were assessed for their capacity to consent to research and a self-certified surrogate was sought when decision-making capacity was not present, as required by the state of California. Decision-making capacity was assessed using a tool modeled after the MacArthur Competence Assessment Tool for Clinical Research.(Applebaum & Grisso, 2001) Each dyad consented in writing prior to the initiation of data collection.

Data collection methods

A two person research team conducted assessments in the home (except for 3 conducted at a Senior Center). Data collection for each of the dyad members occurred in separate rooms, paired with a member of the research team. It was especially important that the autobiographical life events interviews be conducted independently, since the informant was asked to independently verify and discuss recent events in the Older Adult's life. The structured interview was recorded and lasted one and a half hours. Both participants in the dyad completed questionnaires and a structured interview designed to assess the following variables:

Outcome Variable (assessed in the person with dementia or older adult control participant, with informants participants providing parallel information and verification.)

1. Reliable or unreliable emotional memory: modified Geriatric Adverse Life Events Scale (GALES) (Devanand, Kim, Paykina, & Sackeim, 2002) and structured interviewing methodology (Sternberg et al., 2002).

Older adults were asked to recall (in general) life events with emotional content (pleasant, happy or unpleasant, sad) in the prior month or six months. Next, the GALES list of life events was supplemented to include categories of pleasant or happy events and used as a checklist to trigger or cue memory (recognition rather than recall) for recent (6 month) life events of the older adult and the informant. Events of both positive (pleasant, happy) and negative unpleasant, unhappy) valence were solicited. In addition, participants were asked to provide details about the event. Just prior to the end of the assessment, all events discussed were reviewed with the Older Adult participant by asking him or her to repeat the memory and the details.

Controlled variables:

Assessed in the Older Adult

1. Emotional memory: An audio-visual story consisting of 11 slides divided into 3 phases. The first 4 slides (phase 1) are neutral in emotional content, the next four slides (phase 2) have negative emotional content and the final phase is neutral, like phase 1. After a delay, a short questionnaire test detects if material from the emotional phase is remembered better (H. Kazui et al., 2003; Moayeri et al., 2000; Satler et al., 2007). The presence of emotional memory is detected if recognition and/or recall improve from the neutral to the emotional phase of the story. The purpose of this assessment was to collect additional data on emotional memory using normalized tools and standard methods.
2. Adequate hearing and vision
3. Mental status: The Montreal Cognitive Assessment: MoCA (Nasreddine et al., 2005)
4. Language (As assessed in MoCA using Repetition of 2 phrases and Letter Fluency (Rascovsky, Salmon, Hansen, Thal, & Galasko, 2007))
5. Attention (As assessed in MoCA, Digit Span and Serial Subtraction)

Control Older adults only

6. Depressive symptoms: Center for Epidemiological Studies Depression scale: CESD (Radloff, 1977), short form (Kohout et al., 1993) for Older Adult Normal Controls only

Older adult or relationship variables assessed in the Informant

People with dementia and controls

1. Functional status of the Older Adult: Functional Activity Questionnaire (FAQ) (Pfeffer, Kurosaki, Harrah, Chance, & Filos, 1982) short form
2. Health Conditions (As provided by UCI's Center for Health Policy and Research)
3. Medications list (especially a checklist of 26 categories of those that may improve or interfere with memory: e.g., cholinergics, antihistamines)
4. Demographic information
5. Informant Relationship (modified version of "Completed By" instrument provided by the UCI's Institute for Memory Impairments and Neurological Disorders (IMIND) and used in all of our studies involving caregivers)

Older adult with dementia variable assessed in the Informant:

1. Depression symptoms in the Older Adult: Structured Clinical Interview-Depression (SCID) (Segal, Hersen, & Van Hasselt, 1994)

Informant variables assessed in the Informant

1. Adequate Vision and Hearing
2. Demographic information
3. Health –(SF12) for self rated health (Ware, Kosinski, & Keller, 1996)

Variables hypothesized to differ in people with dementia with and without reliable emotional memory (predictors).

Assessed in the person with dementia:

1. Confabulation: Provoked Confabulation Test - questionnaire section (Cooper et al., 2006)
2. Awareness: Guidelines for Rating of Awareness Cognitive Deficits modified for the research setting (F. R. J. Verhey, Rozendaal, Ponds, & Jolles, 1993)
3. Ability to provide details of autobiographical memories: follow-up question (e.g., Can you tell me more about that, please?) during the structured interview for each reported recent life event.
4. Ability to repeat emotional memories with consistency: follow-up questions at the end of the assessment

Hypothesized predictor variables assessed in the Informant of the person with dementia dyad:

1. Disease Stage for the Older Adult Case: Dementia Severity Rating Scale (DSRS) (Clark & Ewbank, 1996)
2. Older Adult's Neuropsychiatric symptoms: Neuropsychiatric Inventory (J. L. Cummings, 1997)

Memory Scoring

After completion of the home visit, raters, sometimes one of whom was a researchers from the home visit, listened to the audio recording of the assessment to rate each memory for reliability, valence, the number of details provided by the older adult and the older adult's ability to recognize the memory after a delay (estimated as 30 to 60 minutes in duration). Because the researchers also scheduled and/or conducted the home visit, the researchers providing the memory rating were not blinded to the cognitive status of the subject. Reliable emotional memory was based on independently-derived, interrater agreement that the 'gist' of memories recounted by the patient or target subject and their informants were equivalent. Memories were rated using an 8 point Likert scale (Figure 1), subdivided into 4 levels with 1a being total agreement and 4a & b being confabulation and total denial.

To avoid duplicated efforts, Kappa was calculated for inter-rater reliability between the two research assistants. Once .08 Kappa was achieved, only one rater was needed to rate each assessment.

Each older adult subject's final scores (one for each reported memory) were averaged to result in final *average memory reliability* score ranging from 1.00-4.00, with 1.00 being very reliable and 4.00 being very unreliable emotional memory. In addition, raters assessed the *number of details* for each memory (none, 1 or 2, 3 or more), *ability to remember after a delay* (1=yes, 0 = no), *number of details after a delay* (as above), as well as the *valence* (Figure 2). These values per memory were each averaged over all of an individual's memories (number of memories per person = 6.6 ± 1.6 , range 2-11) to derive the individual outcomes. For the valence variable, proportions of negative, positive and neutral memories per individual were derived.

A follow-on pilot study is ongoing. Two polar groups (*average memory reliability* of <2 or >3) of five dementia patients each are being asked to participate in a physiological assessment of amygdalar volume via magnetic resonance brain imaging (MRI). It is hypothesized that dementia patients with reliable emotional memory will have significantly greater amygdalar volume than Dementia patients without reliable emotional memory. To date, 5 in the 'good' memory reliability polar group and 3 in the 'poor' group have completed MRIs.

Results

One-hundred-three people with dementia (cases) and 50 control subjects and their informants were assessed. Ten dyads did not complete the interview and had missing data for delayed recall segment of the event memory interview. Seven of these were excluded either because there was insufficient information to rate memories (3 cases) or data for at least two other hypothesized variables was missing (4 cases). One other case was excluded because of recording failure that precluded rating.

To avoid duplicated efforts, Kappa was calculated for interrater reliability between any two raters. Once .8 Kappa was achieved, only one rater was needed to rate each assessment. For all those assessments with only one rater, group comparison tests (One Way ANOVA) were performed for all rated outcome variables and no significant differences per rater were found for any outcome (i.e., the older adults' *mean* (averaged over all of an individual's rated memories) *memory reliability* ($p=.686$), *number of details for all memories* ($p=.400$), *ability to remember after a delay* ($p=.629$), *number of detail after a delay* ($p=.442$), as well as the *proportion of negative memories* ($p=.561$), *positive memories* ($p=.775$) and *neutral memories* ($p=.051$).

None of the controls had a dementia diagnosis as this was an exclusion criterion for that group. An independent samples T-test comparing the normal and control groups showed significant difference in memory reliability score across the two groups ($p<.001$). Among the cases of dementia, 60 (63%) had a diagnosis of possible or probable Alzheimer's disease. The remaining 35 participants had probable ischemic vascular dementia (5), Parkinson's disease (2), probable dementia with Lewy bodies (2), frontal temporal lobe degeneration (1) and other dementia diagnosis (25). An independent samples T-test of the participants with a dementing disorder showed no difference in memory reliability between the AD and 'all others' groups ($p=.704$).

The 95 case dyads were dichotomized with 48 people with dementia in the group with 'good' memory and 47 in the group with 'poor' memory. The cutpoint for the groups was equivalent to having an

average of a '2.0' for all reported memories on the 4 point scale for reliable memory (Figure 1). This rating indicates that on average, all memories related by the Older Adult were corroborated by the Informant. Only one normal control participant achieved a worse average rating (2.2), due to one event memory rating of possible or probable confabulation (level 4g). Overall the unadjusted group means (SD) for memory reliability were 1.1 ± 0.2 for controls, 1.6 ± 0.3 for the 'good' emotional memory group and 3.1 ± 0.6 for the 'poor' emotional memory group. The descriptive statistics and results are provided based on comparisons across these groupings.

Descriptive statistics of continuous and ordinal variables were computed to evaluate the characteristics of the samples (e.g., means, standard deviations) and to examine distribution properties of each variable). Characteristics of the participants and the dyads are provided in **Table 1**. The dementia groups and control groups matched on most demographic variables, however, the demented elders with poor emotional memory were older than both other groups ($p=.016$), and the controls had significantly more education than those with poor memory ($p=.044$). These 2 variables were used as covariates in the analyses of predictors or hypothesized independent variables. Other differences between the controls and the two dementia groups were to be expected: normal control participants differed in their employment status ($p=.007$), and they scored better on cognitive assessments ($p<.001$), and functional abilities ($p<.001$). Although the demented elders with good memory had better overall cognitive scores and functional ability than those with poor memory ($p<.001$ for both), they did not differ in the two areas crucial for registering and relating memories: attention (digit span, $p=.522$; serial subtraction, $p=.726$) and language (fluency, $p=.348$; repetition of phrases, $p=.854$).

The dyads were well matched across all three groups. The majority were spouses (70-77%), and co-resident (79-89%). Over 90% of dyads had known each other for over 10 years, and 83-92% saw each other on a daily basis.

Because the measure of reliable emotional memory for life events was developed for this study, a validated laboratory tool for detecting emotional memory was used with a subset of the participants. (Cahill & McGaugh, 1995) Due to the emotional nature of the narrative used for this test (A boy injured in a traffic accident), participants with dementia had to pass a screen (Appendix 2) in order to qualify for this assessment. Sixty –seven (71%) of the 95 participants with dementia were assessed. Data comparing group performance across and within groups is in **Table 2**. Two tests of group comparison for recognition and recall from phase 1 to phase 2 were run: repeated measures ANCOVA adjusted for age, education and the time delay to questioning for the groups. Due to their ability to more efficiently perform the assessment during the delay period, the control group had a significantly shorter delay period ($p=.003$) between presentation of the story and the administration of the test (**Table 2**). Performance on measures of recognition and recall differ significantly among all groups in the predicted manner with controls out-performing the dementia groups and the 'good' memory group performing significantly better than the poor memory group, however the repeated measures comparisons were not significantly different (recognition: Sig=.269. recall: Sig=.423) Within groups tests (Paired samples t-tests) indicate that none of the groups improved significantly on the recognition questions (Do you remember this picture?) – probably due to the short delay time – but both the control ($p<.001$) and the 'good' memory ($p=.003$) groups improved significantly in their ability to recall – or respond to questions about the more emotional second phase the narrative compared to the neutral material in the first phase. It is interesting that even the 'poor' memory group approaches significance in the paired samples t-test ($p=.09$) and indeed the life events measure of reliable emotional memory also shows that many of these individuals retain some degree of emotional memory. In summary, the results are consistent with the findings from the novel measure developed for this study.

The variables selected to test the research hypotheses were based on the investigators clinical experience in leading an elder abuse forensic center.(A. Wiglesworth et al., 2006) The characteristics of particular interest included: the stage of the dementia (mild vs. moderate or severe), the presence or absence of neuropsychiatric symptoms (e.g., hallucinations, delusions, agitation, et al.), the individuals' awareness of their own memory deficits or dementia, confabulation behaviors, as well as the ability to provide details about the emotional life event memory and to recall the memory again after a delay.

Table 3 lists results of tests of the research hypotheses as well as other significant predictors. Tests of comparison are Chi-square for categorical variables and Univariate ANCOVA adjusted for age and education for continuous and ordinal variables (adjusted means and SE of the mean are reported in the table.) All but five (10%) in the 'good' memory group were able to report at least one recent life event in response to a general question about pleasant, happy or unpleasant, sad events in the last month or six months, while 18 (38%) of those in the 'poor' memory group were unable to recall a life event in response to a general question (that is without being cued as to a category of event such as a family gathering or financial difficulties) ($p < .001$). Although all three groups were matched for the proportion of positive memories they reported, those in the 'poor' memory group were less likely to report negative life events than either the control or the 'good' memory dementia group (Sig.<.001).

There was evidence for the hypotheses that people with dementia with reliable emotional memory (the 'good' memory group) were able to provide 3 or more details 47 (98%), and to remember and discuss the same event again after a delay 44 (96% of 46). These findings were not different from the controls, and significantly better than the 'poor' group ($p < .001$) for both number of details and memory after delay). Fewer people in all groups provided 3 or more details after the delay, and each group differed significantly from the other 2. The researchers observed that both the older adult's fatigue and a desire to finish the assessment may have interfered with the collection of this data at the end of the assessment.

The stage of dementia, assessed using the Dementia Severity Rating Scale (Clark & Ewbank, 1996) with Informants of the people with dementia was converted to disease stages consistent with the Clinical Dementia Rating (Morris, 1997). Seventy-seven percent of the 'good' memory group had mild cognitive impairment and the rest had moderate disease. This was significantly different from the 'poor' memory group with 49% mild, 47% moderate, and 4% severe ($p < .001$). This result also obtains when the DSRS scores are compares and adjusted for Older Adults age and education (Sig.<.001).

The measure of awareness of one's cognitive impairment had poor inter-rater reliability with the mean result for 2 researchers significantly lower than the mean for the other group of 3 researchers ($p = .033$). Without correction for this variance across raters, those in the 'good' memory group were more likely to have "adequate" awareness of their cognitive deficits, although there were individuals in either group in the 'severely disturbed' category, that is having no awareness of their memory problems (Sig. = .027).

The confabulation questionnaire (Cooper et al., 2006) consisted of 4 provoked confabulation questions¹ (for which the correct answer was "I don't know.") and 15 recognition questions (The correct answer was "yes" or "no.") about the story told while showing five illustrations. The results for all questions and

¹ One of the set of five questions that should have elicited an "I don't know" response had to be thrown out because it asked the model of a car and many participants tried to guess the model from a picture of a car although this information was not provided in the narrative.

for the recognition questions only showed significant groups differences ($p < .001$) and since this test predicts the participant's episodic memory, its results are significantly correlated with the *average memory reliability* findings ($p < .001$). The Chi-Square test of group differences for the provoked confabulation questions alone was not significant ($p = 1.22$). The other measure of confabulation looks at the tendency to respond 'yes' when the answer is not known. Figure 3 is a graph of incorrect responses to all of the questions for which 'yes' or 'no' was the correct response. Even the control group, though they had more correct responses overall, when they responded incorrectly were more likely to say 'yes.' The two dementia groups were equally likely to say 'yes' to a question for which the response was no, but the 'poor' memory group was more likely to respond 'I don't know' to a question for which the correct answer was 'yes' than either of the other group – which is not a confabulatory response. This test of confabulation shows that the two dementia groups are similar, and does not support the hypothesis.

Neuropsychiatric behaviors were present in both groups of people with dementia and there was no evidence that hypothesized categories of behavior predicted good or poor emotional memory. Neither the overall score for neuropsychiatric behaviors (Sig. = .534) nor chi-square tests for presence of any specific behavior showed significant group differences ($P > .05$ for all but one category). Although there appears to be an association with aberrant motor behavior, since there is no theoretical underpinning for this finding, it is more likely confounded with the association of disease stage with emotional memory.

Discussion

There is strong evidence that many people with dementia have cognitive reserve for remembering events in their lives that have emotional content. Most of the persons with dementia who participated in the study had some ability to recall recent emotional events. Event memories were confirmed with an informant who knew the participant well. A scale that indicated the level of agreement between the older adult with dementia and the informant was developed to accommodate a variety of levels and types of agreement or disagreement between the members of the dyads (Figure 1). Although some control participants achieved scores indicating perfect agreement, it was not surprising to find that some older adult controls had imperfect recollection of the events in their lives.

Although there is good evidence that stage of the dementing disease is a factor in reliability of emotional memory, there are older adults with mild emotional memory who are less reliable than some people with dementia at a moderate stage. An effort was made to exclude people with severe dementia during recruitment and indeed, the two that did participate were among the most unreliable reporters of their own life events. Although stage of disease may indicate that the person with dementia could witness to their own life events, better tests are available using structured interviewing techniques. Reliable witnesses were more likely to be able to recall an event without being given a specific cue (that is the interviewer provides a category of event (e.g., family gathering) or even some event details provided by another informant). All but five of those in the reliable memory group were able to relate a remembered life event after being asked a general question about pleasant or unpleasant things that had happened to them in the past month or six months. Another encouraging finding was that people with dementia with reliable emotional memory were just as likely as normal control subjects to report negative life events, while the proportion of negative memories reported by those with 'poor' memory was significantly less than the other two groups.

Two hypotheses that were well-supported by the study relate to the interview itself rather than to any pre-existing characteristics of the person with dementia. Those with reliable memory could not only

report on a life event, but nearly all of them could give 3 or more details about the memory, and they were also able to reconfirm the information about the memory after a delay. In a sense, people with dementia who repeat a memory are even more credible than anyone else. Indeed, it would be difficult to explain how someone with clinically- established impaired verbal memory could remember and repeat false information, though if the person is delusional or hallucinatory, the situation becomes more complicated. Fortunately these behaviors can be evaluated clinically.

People with mild or moderate dementia should be considered and evaluated for their ability to serve as witnesses to criminal events just as other older adults, children and people with other disabilities have that opportunity. Competence of a witness with cognitive deficits involves a number of factors including the understanding of one's obligation to tell the truth and the ability to give a clear, consistent, accurate account (Uglow, 2003). The ability to stand up under cross examination and risk of further cognitive deterioration needs to be managed with reforms similar to those already in place for child witnesses, such as multidisciplinary teams, speedy trials and vertical prosecution (Task Force on Child Witnesses of the American Bar Association Criminal Justice Section, 2002). In addition, investigation and prosecution strategies that take into consideration the ways older adults remember things (e.g., emotional, 'gist' and recognition memory vs. verbal and contextual memory) have potential not only for improving the delivery of criminal justice to older adults, but to people with dementia as well.

Getting reliable information about emotional events in their lives from people who have limited memory, a tendency to confabulate, potential neuropsychiatric symptoms and who may not be aware of their own cognitive impairment is a challenge, but the results of this study imply that it can be done. The approach is key – a structured interview that begins with open ended questions and continues using cuing methods, probing questioning for details and repeat questioning after a delay. People who may not remember the conversation or who may err on some of the details are often able to call up these salient memories. Preliminary analyses indicate that recency of these emotional memories adds to their salience, and deposition of people with dementia who are victims of crime should happen as soon as possible after the event. In addition, validated brief instruments used in this study provide results consistent with the assessment of reliable emotional memory and could provide supporting evidence of the preservation of episodic and emotional memory in persons with dementia.

The researchers conducted a formal and rigorous study of hypothetical predictor variables for identifying those people with dementia who are reliable witnesses to their own abuse. The findings have the potential to change the way elder mistreatment cases are handled by the criminal justice system.

Limitations and Future Research

None of the participants in this study reported criminal events, so that these methods have not yet been utilized in ascertaining information about a criminal elder abuse. A controlled study incorporating these methods with alleged victims of crime is needed.

There is good evidence that abused elders who retain cognitive capacity withhold information about their own abuse and neglect, and this issue is not resolved in this study. Reasons for this effect are usually attributed to protection of the perpetrator who is often a family member.

In addition use of brief tools that show promise in selecting those people with dementia who have reliable emotional memory could be tested in a larger and more diverse sample. Our own follow-on pilot study may indicate a physiological measure (amygdalar volume) for reliable emotional memory, but would require extension to a broad population. Also, comparison of significant samples of people with

different dementia diagnosis may show that some diagnoses are characterized by greater resistance to changes in emotional memory. All of these studies need to take into consideration the potentially complicating effects of neuropsychiatric and confabulating behaviors.

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Table 1. Participant Characteristics

NUMBER (%) or MEAN ± STANDARD DEVIATION				
	Good Memory N=48	Poor Memory N=57	Controls N=50	p ²
Older Adult Participant Characteristics				
Sex: female	16 (33)	24 (32)	23 (35)	.198
Age: years	77.9±8.2 ^a	81.2±7.5 ^{ab}	76.6±8.4 ^b	.016
Marital Status: married	37 (79)	35 (75)	35 (71)	.092
Income ³	4.5±1.5	4.5±2.0	4.9±1.7	.391
Education: years	14.6±2.5	14.0±2.7 ^a	15.2±2.3 ^a	.044
Ethnicity: Hispanic	6 (13)	4 (9)	3 (6)	.534
Race: Caucasian	41 (87)	35 (76)	41 (82)	.228
Employment: retired / homemaking	43 (90) / 1 (2) ^a	42 (89) / 4 (9) ^b	37(74) / 3(6) ^{ab}	.007
Vision: worse than 14pt	2 (4)	4 (9)	1 (2)	.310
Hearing: cannot hear in one ear/ either ear	6 (13 / 3 (6)	11 (24) / 1 (2)	4 (8) / 2 (4)	.191
Number of Health Conditions ⁴	2.7±1.7 ^a	2.1±1.5	2.1±1.2 ^a	.114
Number of meds that interfere with memory ⁵	1.4±1.7	1.1±1.0	1.2±1.2	.327
Cognitive Assessment: MOCA total score ⁶	15.5±5.5 ^{ab}	11.6±5.8 ^{ac}	25.3±3.1 ^{bc}	<.001
Language: unable to repeat 2 phrases	20 (42) ^a	19 (40) ^b	5 (10) ^{ab}	<.001
Language fluency: words/1 minute	9.0±3.6 ^a	7.1±4.9 ^b	13.4±5.2 ^{ab}	<.001
Attention: % unable to do digit span / serial subtraction	5(10) ^a / 13(27) ^a	7(15) ^b / 15(32) ^b	1(2) ^{ab} / 3(6) ^{ab}	.022 / <.001
Depression symptoms scale (0-100) ⁷	25±20	31±22	30±11	.215

² Pearson's Chi Square for categorical variables, One-way ANOVA or Kruskal-Wallis H non-parametric test for k independent variables tests for continuous and ordinal variables.

³ 7-point Likert scale with 4 = \$35-49,999, don't know or refused to answer for 6 'good' cases, 7 'poor' cases and 6 controls.

⁴ Checklist of 12 conditions not including dementia: missing data for 2 'good' cases, 1 'poor' case and 4 controls, checklist of

⁵ Missing data for 1 'poor' case and 2 controls.

⁶ MOCA = Montreal Cognitive Assessment (Nasreddine et al., 2005).

Functional Activities ⁸	12.7±7.0 ^{ab}	17.5±6.0 ^{ac}	0.5±1.1 ^{bc}	<.001
Informant Characteristics				
Sex: female	39 (81)	33 (70)	31 (62)	.109
Age: years	68.4±12.2	68.1±13.1	66.4±15.5	.495
Marital Status: married	42 (88)	43 (92)	37 (74)	.330
Income ⁹	5.0±1.5	5.3±1.8	5.2±1.5	.220
Education (years)	14.5±2.5	14.6±2.8	15.2±2.0	.290
Ethnicity: Hispanic	2 (4)	5 (11)	3 (6)	.439
Race: Caucasian	45 (94)	37 (80)	45 (90)	.263
Health Status: very good or excellent ¹⁰	31 (64)	24 (54)	27 (54)	.990
Dyad Characteristics				
Relationship: Spouse	37 (77)	34 (72)	35 (70)	.278
Length of time known: >10 years	46 (96)	45 (96)	46 (92)	.717
Co-residence	38 (79)	42 (89)	42 (84)	.439
Frequency seen: Daily	40 (83)	43 (92)	42 (86)	.739

⁷ CES-D (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993; Radloff, 1977) short form for Controls, Structured Clinical Interview-Depression by the Informant for Cases, normalized to a 100 point scale for comparison. Missing data for 2 'good' cases, 3 'poor' cases and 2 controls.

⁸ Functional Activities Questionnaire - scale = 0-36. Missing data for 2 'good' cases, 4 'poor' cases and 2 controls.

⁹ 7-point Likert scale with 5 = \$50-74,999, missing or refused to answer for 5 'good' cases, 7 'poor' cases and 6 controls.

¹⁰ Five-point Likert scale: Poor to Excellent.

Table 2. Group Comparison: Three-phase emotional memory test

MEAN ± STANDARD ERROR of the MEAN (SEM)				
	Good Memory N=32 of 48	Poor Memory N=35 of 47	Controls N=49 of 50	Sig.¹¹
Time delay to questioning (seconds)	443±25 ^a	421±25 ^b	334±21 ^{ab}	.002 ¹²
Phase1 recognition %	88±4	77±3 ^a	96±3 ^a	<.001
Phase 1 recall %	66±4 ^{ab}	48±4 ^{ac}	86±4 ^{bc}	<.001
Phase2 recognition %	90±4 ^a	76±3 ^{ab}	98±3 ^b	<.001 ¹³
Phase 2 recall %	73±4 ^{ab}	52±4 ^{ac}	94±4 ^{bc}	<.001 ¹⁴
Phase 1 / phase 2 % difference in recognition / paired samples T-test within group ¹⁵	2±3 / p=.476	3±4 / p=.422	3±1 / p=.058	..269
Phase 1 / phase 2 % difference in recall / p paired samples T-test within group ¹⁶	15±5 / p=.003	9±5 / p=.090	12±3 / p<.001	.423

¹¹ Repeated measures ANCOVA with Older Adult *age* and *years of education* and *time delay to questioning* as covariates, unless otherwise indicated.

¹² Univariate ANCOVA with Older Adult *age* and *education* as covariates.

¹³ Univariate ANCOVA with Older Adult *age* and *education time delay to questioning* as covariates

¹⁴ Univariate ANCOVA with Older Adult *age* and *education time delay to questioning* as covariates

¹⁵ Within group tests and unadjusted values.

¹⁶ Within group tests and unadjusted values.

Table 3. Memory Groups: Hypothesized predictors

	Good Memory N=48	Poor Memory N=47	Controls N=50	p¹⁷ or Sig.¹⁸
NUMBER (%) or MEAN ± STANDARD ERROR				
Outcome Variable:				
Memory for recent life events.				
Average Memory reliability ¹⁹	1.58±0.05 ^{ab}	3.07±0.05 ^{ac}	1.08±0.05 ^{bc}	<.001
% Failed to recall events (i.e., without cues)	5 (10) ^{ab}	18 (38) ^{ac}	0 (0) ^{bc}	<.001
Proportion (%) of memories: positive	49±3	52±3	51±3	<.692
Proportion (%) of memories: negative	29±2 ^a	13±2 ^{ab}	34±2 ^b	<.001
Hypothesized Predictor Variables				
Ability to provide credible details: 3 or more details ²⁰	47 (98) ^a	28(62) ^{ab}	50(100) ^b	<.001
Ability to repeat a memory after a delay : all events ²¹	44 (96) ^a	31 (72) ^{ab}	48 (100) ^b	<.001
Number of details after a delay: 3 or more ²²	18 (39) ^{ab}	6 (14) ^{ac}	40 (83) ^{bc}	<.001
Stage of Disease: mild /severe disease ²³	37(77) / 0(0)	22(47) / 2(4)	N/A	<.001
Awareness of deficits: adequate / severely disturbed ²⁴	24(50) / 6(12)	12(26) / 16(34)	N/A	.027
Confabulation: % all questions correct ²⁵	76±2 ^{ab}	60±2 ^{ac}	90±2 ^{bc}	<.001
Recognition: % questions correct	75±2 ^{ab}	56±2 ^{ac}	90±2 ^{bc}	<.001
Provoked Confabulation: 0 or 1 incorrect / 2 to 4 incorrect ²⁶	39(87) / 6(13)	33(71) / 13(29)	44(90 / 5(10)	.122
Neuropsychiatric behaviors: Total score	11.0±2.6	13.3±2.6	N/A	.534
Delusions	10 (21)	1 (19)	N/A	.521

¹⁷ Pearson's Chi-square for categorical variables.

¹⁸ Univariate ANOVA with Older Adult age and education as Co-variates for continuous variables.

¹⁹ On a four point Likert scale per memory, averaged over each participant.

²⁰ Missing data for 2 cases in the 'poor' group.

²¹ Missing data for 2 cases in the 'good' group, 4 cases in the 'poor' group and 2 controls due to insufficient time to finish the assessment.

²² Same scale as above, missing data for 2 'good' cases, 5 'poor' cases and 2 controls: unfinished assessment due to time.

²³ Dementia Severity rating score converted to Clinical Dementia Rating.

²⁴ Data are provided for best and worst categories on a 4-point Likert scale

²⁵ Missing data for 3 'good' cases, 1 'poor' case and 1 control.

²⁶ I don't know was the correct response to the questions.

Illusions	5 (10)	6 (13)	N/A	.485
Hallucinations	1 (2)	2 (4)	N/A	.508
Agitation/Aggression	20 (42)	22 (47)	N/A	.383
Anxiety	15 (31)	15 (32)	N/A	.560
Elation/Euphoria	3 (6)	2 (4)	N/A	.510
Apathy/Indifference	29 (60)	31 (66)	N/A	.364
Disinhibition	7 (15)	9 (19)	N/A	.375
Irritability/Lability	13 (27)	10 (21)	N/A	.337
Aberrant Motor Behavior	6 (13)	15 (32)	N/A	.020

Figures

Figure 1: Memory Reliability ratings for life events in the last six months.

1. Good Memory Reliability ratings
 - a. The Older Adult (OA) and Informant (IN) agree that the event occurred and agree on its details.
 - b. The OA and IN agree that the event occurred but disagree about minor details.
 2. Medium-high Memory Reliability ratings
 - c. The OA and IN agree that the event occurred but disagree about major details.
 - d. The OA and IN agree that an event or a repeated event occurred, but it is not clear they are recalling the same specific event.
 3. Medium-low Memory Reliability ratings
 - e. The OA related a memory that the IN could not corroborate but could not deny.
 - f. The OA related a memory that the IN could not corroborate, and the IN denied it happening, or it did not happen in the last year.
 4. Poor Memory Reliability ratings
 - g. The IN related a memory that the OA agreed to but the OA could not relate details or the details conflict with the IN's details; possible or probable confabulation.
 - h. The IN related a memory that the OA denied or could not corroborate.
- Excluded from analysis
- i. None of the categories above applies.

Figure 2: Memory valence ratings

Negative valence

1. Very unpleasant
2. Unpleasant

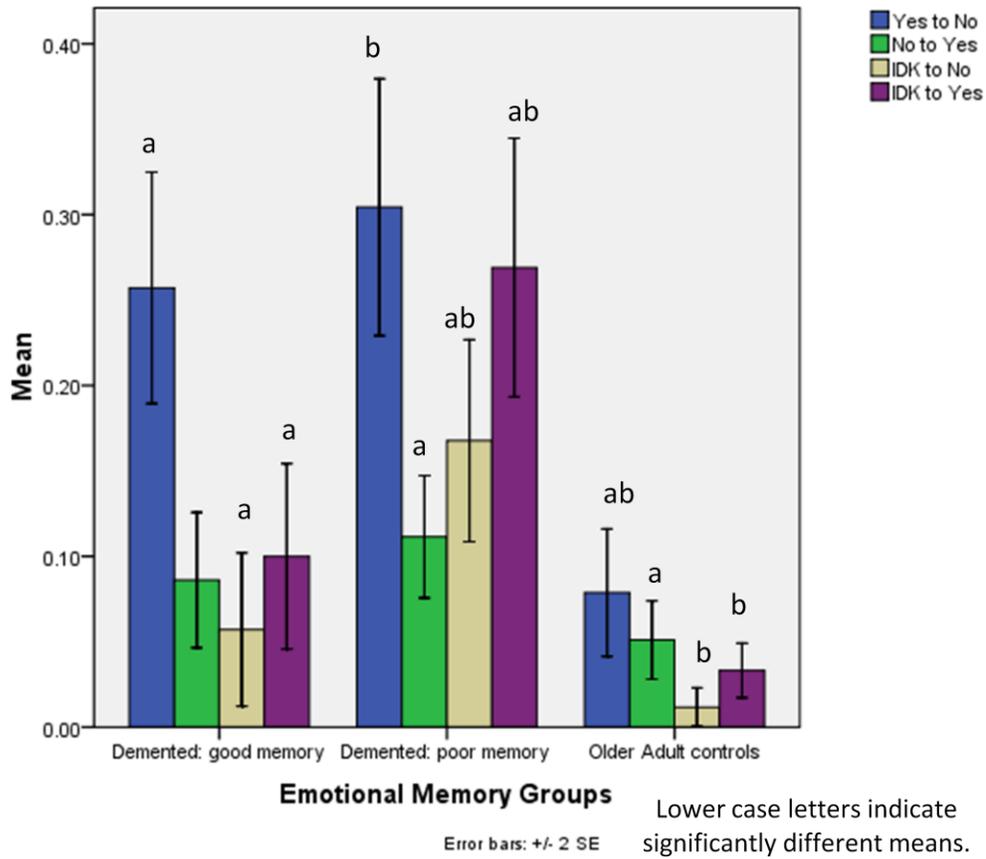
Neutral valence

3. Neither pleasant nor unpleasant
4. Both pleasant and unpleasant

Positive valence

5. Pleasant
6. Very pleasant

Figure 3: Mean (and 2 X standard error of the mean) normalized scores of incorrect responses to the confabulation test.



APPENDIX A

Screen for Use of Three-Phase Story

Use this when you are talking with the informant or caregiver of a person with dementia.

We vary what we do based on the experiences and vulnerability of the participant with dementia, so I need to ask you a few questions about your (spouse/parent/sibling/friend).

If the answer is Yes to any of the following questions, skip the remaining screening questions in this section and delete the Three-Phase Story from this dyad's visit packet.

1. Does (the older adult) get very upset while watching TV news, or have you decided not to let him/her watch the news?

Yes No

If No:

2. Has a doctor told you that (the older adult) has hallucinations or delusions?

Yes No

If No:

3. Does (the older adult) believe that others are stealing from him or her, or planning to harm him or her in some way, when you know this is not true?

Yes No

If No:

4. Does (the older adult) act as if he or she hears voices? Does he or she talk to people who are not there?

Yes No

If No:

5. Has (the older adult) or Have you (if spouse) lost a child in any way at a young age, or (has the older adult/have you) lost a child to accidental death at any age?

Yes No

If No:

6. Has (the older adult) been in a traumatic accident that s/he mentions often and is still upset about?

Yes No

If No:

Check if the dyad was recruited through AAOC. If so, follow-up with them Conner as to whether we should exclude the Three-Phase Story with the participant. If not, use the Three-Phase Story at their visit.

APPENDIX B

Recruitment Sources

People with Dementia and their Informants

- 20 (19.4%) - Participants in prior studies with our group.
- 16 (15.5%) - Alzheimer's Association of Orange County (AAOC)
- 15 (12.6%) - UCI's Institute for Memory Impairments and Neurological Disorders (IMIND)²⁷
- 12 (11.7%) – A news article posted online by the Orange County Register
- 10 (9.7%) - Alzheimer's Family Service Center (AFSC - one of California's Alzheimer's Day Care Resource Centers)
- 10 (9.7%) A broadcast email to UC Irvine employees
- 10 (9.7%) University of California, Irvine (UCI) Senior Health Center
- 6 (5.8%) – an article in the Osher Life Long Learning Institute (OLLI) Newsletter.
- 5(4.9%) – The Norwalk (California) Senior Center
- 1 (1%) – A flyer distributed at an assisted living facility

Normal Control participants and their Informants

- 20 (40%) - UCI's Institute for Memory Impairments and Neurological Disorders (IMIND)
- 7(14%) – A news article posted online by the Orange County Register
- 6 (12%) - Alzheimer's Association of Orange County (AAOC)
- 5(10) – The Norwalk, CA senior Center
- 3 (6%) - Alzheimer's Family Service Center
- 3 (6%) A broadcast email to UC Irvine employees
- 3 (6%) University of California, Irvine (UCI) Senior Health Center

²⁷ IMIND houses both a federally-supported Alzheimer's Disease Research Center and a state of California-supported Alzheimer's Disease Research Center of California)).