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KNOWLEDGE OF MEMORY AGING IN ADULTHOOD*†

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ABSTRACT

The Knowledge of Memory Aging Questionnaire (KMAQ) measures laypersons' knowledge of memory changes in adulthood for research or educational purposes. Half of the questions pertain to normal memory aging and the other half cover pathological memory deficits due to non-normative factors, such as adult dementia. In this study, we compared memory knowledge in middle age adults (40-59 years), young-old adults (60-79 years) and very old adults (80 years and over). These data were collected as a part of the Louisiana Healthy Aging Study, a multidisciplinary population-based study that examines the determinants of healthy aging in adulthood. Results indicated that very old adults performed more poorly overall. Follow-up analyses revealed that they endorsed stereotyped views of normal memory aging more often than did the other age groups. Analyses of response accuracy by gender yielded comparable performance for men and women. Implications for research and the design of educational programs are considered.

An important demographic trend concerns the increasing number of older adults in today's society and projected increases in the number of older persons for the future. In fact, the United States Census predicts that by the year 2030, at least 20% of the population will be over age 65 (U.S. Census Bureau, 2000). As a result, the frequency of contact with older persons in everyday settings, such as in restaurants, doctors' offices, grocery stores and shopping malls will likely increase for us all. From an advocacy perspective, it is important for professionals as well as the general public to be aware of age-related changes in cognition and avoid ageist stereotypes that portray a negative image of cognitive competence in late life.

Recognizing the distinction between normal and pathological memory aging is a vitally important step in understanding adult cognition and having appropriate expectations for elderly persons. The *Knowledge of Memory Aging Questionnaire* (KMAQ; Cherry, West, Reese, Santa Maria, & Yassuda, 2000) was developed as an instrument of broad applicability to measure general knowledge of memory aging and abnormal memory deficits for research or educational purposes. The KMAQ contains 28 items in a true-false format, where half of the questions address knowledge of normal memory changes that occur in later life as a result of maturational processes (i.e., normal memory aging) and the other half address knowledge of pathological memory changes that may be due to non-normative factors that affect memory functioning in older adults (i.e., physiological or psychopathological conditions, pharmacological agents, and/or adult dementia) (see Appendix).

Cherry et al. (2000) conducted an initial series of four studies with the KMAQ using samples of mental health professionals, college students, and community-dwelling older adults. They found that items that were counter to common stereotypes of memory aging were more likely to be answered incorrectly, particularly with respect to normal memory aging items, suggesting

that the KMAQ is sensitive to common misperceptions of cognitive aging. They also found that specific training on memory changes in adulthood improved performance on the KMAQ in a sample of college students, confirming that the instrument is sensitive to instruction. Reese, Cherry, and Copeland (2000) found that community-dwelling older adults scored better on the KMAQ than did younger adults. Both age groups were more accurate on pathological compared to normal memory aging items. Cherry, Brigman, Hawley and Reese (2003) have since added a "don't know" (dk) response option to the KMAQ, enhancing the sensitivity of the instrument by reducing measurement error due to participants' use of guessing strategies. Using the revised KMAQ with the dk response option, Cherry et al. (2003, Experiment 3) replicated their earlier findings, showing that older adults were more accurate than college students overall and both age groups were more accurate on pathological compared to normal memory aging items.

Cherry et al.'s (2003) findings imply that memory knowledge increases in a linear fashion in adulthood. However, they did not include a comparison group of middle age adults or very old adults which is necessary to determine the form of the relationship between memory knowledge and age in adulthood. Moreover, the lack of information on middle age adults' knowledge of memory aging issues represents a serious gap in the research literature. Middle age adults are arguably in the greatest need of accurate information concerning normal and pathological memory deficits, as many individuals in this stage of the life course are caring for aging parents (Silverstein, Conroy, Wang, Giarrusso, & Bengston, 2002). In addition to caring for aging parents, middle age adults are often cognizant of their own cognitive aging and may have personal concerns or worries about the possibility of developing adult dementia (Reese & Cherry, 2004). Providing social support to one's aging parents may involve, among other things, listening to their complaints of memory loss while at the same time, acknowledging one's own apprehensions or personal worries about memory. Fear of pathological memory aging, especially Alzheimer's disease, may threaten well-being in middle age (Cutler & Hodgson, 2001) and undermine older adults' health status (Centofanti, 1998). Consequently, it is imperative to identify areas where middle age and older adults' memory knowledge is weak or incomplete to provide direction for the design of educational programs that focus on increasing knowledge of memory aging (e.g., Turner & Pinkston, 1993). Educational materials that target specific aspects of memory aging where accurate content knowledge is lacking would also be helpful for professionals as well as the general public (e.g., Commissaris, Ponds, Verhey, Jolles, Damoiseaux, & Kok, 1995).

In the present research, we address three primary issues with respect to the study of memory knowledge in adulthood. Our first goal was to examine adult age differences in knowledge of memory aging issues across a broader sample of ages than has been the case in previous research with the KMAQ. In all of our prior work, college students have been compared to community-dwelling older adults typically ranging in age from 60 to 80 years. Very little is known about memory

knowledge in middle age adults (defined as those in their 40's and 50's) and no prior studies have addressed memory knowledge in the oldest-old to date. The lack of research on memory knowledge in late senescence is compatible with the relatively limited understanding of cognitive characteristics of this age group, which has been historically neglected by cognitive aging researchers (Bäckman, Small, Wahlin, & Larsson, 2000). In the present investigation, we included middle age adults, young-old adults and very old adults (defined here as persons over age 80 years) who are participants in the Louisiana Healthy Aging Study, a population-based study that examines the determinants of longevity and healthy aging. These participants were sampled randomly from the Voters Registration 2000 files for those age 20 to 64 years old and from the Medicare Beneficiary Enrollment Data file of the Center for Medicare and Medicaid Services (CMS) for those age 65 years older and above for the eight parishes constituting the Greater Baton Rouge community. If the relationship between memory knowledge and age is linear as our earlier work implies, then the oldest-old should show the greatest level of knowledge, compared to the young old adults who should have greater knowledge than the middle age adults.

Our second goal was to provide new evidence on gender differences in knowledge of memory aging issues. Recent work by Hawley, Garrity and Cherry (2005) has shown that police officers were more accurate on pathological compared to normal memory aging questions. In addition, Hawley et al. found a significant interaction effect between gender and question type, where females answered more pathological memory aging items correctly than did the males. There was a trend for male officers to have somewhat greater knowledge of normal memory aging in comparison to female officers, but this difference was not statistically significant. Neither gender showed overall better memory aging knowledge. The large number of females who are the primary caregiver for a person with dementia may contribute to the females' greater knowledge of pathological memory aging observed in that study. Alternatively, other evidence has shown that females express greater personal concern about developing Alzheimer's disease then do males (Cutler & Hodgson, 2001), which may prompt women to seek objective information concerning pathological memory aging more often than men. In the present investigation, we further examine gender differences in knowledge of memory aging utilizing the KMAQ to provide a more definitive analysis of this issue.

Our third goal was to examine performance on those items in the KMAQ that reflect ageist stereotypes. Several questions in the KMAQ specifically pertain to stereotypes of adult cognition. For example, question 13 (Q13) reads, 'If an older adult is unable to recall a specific fact (e.g., remembering a person's name), then providing a cue to prompt or jog the memory is unlikely to help.' This question is false as cues and prompts can aid in recall of facts and other information (Cherry & Smith, 1998). This question is likely to be answered incorrectly if someone holds the ageist view that all older adults have poor memory. Analyses of response

accuracy for these specific items in the KMAQ should provide new evidence concerning the likelihood of ageist attitudes influencing peoples' performance on the KMAQ.

METHOD

Participants

A total of 150 individuals participated in the study. There were 3 age groups each consisting of 25 males and 25 females; middle age adults, aged 40-59 (M = 51.34 years, SD = 4.55), young-old adults, aged 60-79 (M = 71.46 years, SD = 3.74) and the oldest adults, aged 80 years and older (M = 89.92 years, SD = 4.52). All were participants in the Louisiana Healthy Aging Study, a population-based study conducted in collaboration with LSU Health Sciences Center and the Pennington Biomedical Research Center. Exclusion criteria for participation in the present investigation were adult dementia or other neurologic impairment; history of heart attack/stroke, any significant heart disease, and the inability to see or hear. All participants possessed at least 20/30 corrected visual acuity and were free of neurologic impairment due to stroke or adult dementia. All scored at least a 25 or higher on the Mini Mental State Exam (MMSE) (Folstein, Folstein, & McHugh, 1975). A summary of demographic and health characteristics of the sample appears in Table 1.

We conducted one-way analyses of variance (ANOVAs) on the participant characteristic data with age group as a between group factor. An ANOVA on the short form of the Wechsler Adult Intelligence Scale Vocabulary subtest (Jastak & Jastak, 1965) yielded a non- significant age group effect (p = .32). An ANOVA on the MMSE scores yielded a significant effect of age group, $F(2, 147) = 22.31$, $p < .001$, owing to the somewhat lower MMSE mean for the oldest-old adults compared to the middle age and young-old adults (see Table 1). However, the oldest-old adults' mean MMSE score was well above what is considered to be cognitively impaired. Participant's scores on the Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986) revealed that the majority (all but one middle age adult) were within the normal range and did not appear to be suffering from depression at the time of testing. An ANOVA on the GDS scores yielded a significant age group effect, $F(2, 146) = 5.58$, $p < 0.01$. Pairwise comparisons revealed that the oldest-old adults scored significantly higher than the other two age groups, however, the mean GDS was still below a score representing mild depression. Participants had comparable education levels as the ANOVA revealed no significant differences between groups. All of the middle age participants had completed high school (19 had completed some college, 8 held college degrees, and 4 held graduate degrees) except for one that indicated having a 7th-9th grade education level. The young-old adults had comparable education levels with all but one participant having completed high school (1 had completed the 10th-11th

Table 1. Summary of Participant Characteristics

	Middle Age	Young Old	Oldest-Old
Vocabulary			
M	24.82	25.71	23.66
SD	7.22	6.77	6.35
MMSE			
M	29.50	29.20	28.10
SD	0.81	0.81	1.53
GDS			
M	1.56	1.30	2.53
SD	2.13	1.47	2.11
Health at the present time[a]			
M	1.88	1.94	2.30
SD	0.69	0.59	0.68
Health prevents activities[b]			
M	1.46	1.50	1.96
SD	0.54	0.61	0.70
Health compared to others[c]			
M	1.58	1.40	1.12
SD	0.58	0.50	0.39
Years of education[d]			
M	4.90	5.01	4.84
SD	1.02	1.15	1.46
Number of clubs and social organizations[e]			
M	0.88	1.16	1.10
SD	0.56	0.51	0.58
Number of hours per week spent outside of home[f]			
M	3.70	2.64	2.38
SD	0.71	1.12	1.41

[a]Health at the present time on a 4-point Likert scale (1 = excellent to 4 = poor). [b]Health prevents activities (1 = not at all to 3 = a great deal). [c]Health compared to others (1 = better to 3 = poorer). [d]Years of education (1 = less than 7th grade, 2 = 7th to 9th grade, 3 = 10th - 11th grade, 4 = high school degree, 5 = partial college or specialized training, 6 = college degree, 7 = graduate degree). [e]Social clubs and organizations (0 = none to 3 = over 7). [f]Hours per week spent outside of the home (0 = none to 4 = over 20 hours).

grade, 12 had partial college training, 8 had obtained college degrees and 8 had obtained graduate degrees). The oldest-old adults were the most varied in their education levels; 9 had not completed high school (5 indicated completing 7th-9th grade, 4 indicated completed 10th-11th grade), the remaining had all obtained at least a high school degree (11 had completed some college, 15 held college degrees and 5 held graduate degrees). Participants' responses to a demographic questionnaire that contained a subset of self perceived health questions (Duke

University Center for the Study of Aging and Human Development, 1975) indicated that most rated their health as good or excellent. Six middle age adults, six young-old adults and eighteen oldest-old adults rated their health as fair, and only two participants rated their health as poor (1 middle age and 1 oldest-old adult). Inspection of Table 1 reveals that participants were active in the community, with the young-old and oldest-old adults reporting membership in more clubs and social organizations that the middle age adults, $F(2, 147) = 3.59$, $p = 0.03$. Regarding the number of hours per week spent outside of the home, middle age adults spent more time outside of their homes that the young-old and oldest-old adults who did not differ from each other, $F(2, 147) = 19.55$, $p < .001$.

Procedure

All completed the KMAQ individually in a quiet testing area (see Appendix). The KMAQ was administered as part of a series of measures including age verification and demographic questionnaires, the short form of the WAIS vocabulary test (Jastak & Jastak, 1965), the GDS (Sheikh & Yesavage, 1986) and a detailed family history.

RESULTS

Overview of Scoring and Analyses

For each participant, separate proportion scores were calculated by dividing the number of correct normal and pathological memory aging items by the total in each category (14) minus the number of dk responses in each category. Proportions of dk responses in each category were also calculated by dividing the number of dk responses by the total items in each category (14). Means appear in Table 2. We conducted separate ANOVAs on the proportion correct scores and on the proportion of dk responses to examine age and gender differences in memory aging knowledge. In all cases where significant ANOVA effects were obtained, we conducted follow-up *t* tests to pinpoint the locus of significant differences in performance. To examine age and gender differences on memory aging stereotypes, we conducted separate ANOVAs on the proportion correct and the number of dk responses to items Q3, Q13, Q14, and Q27. These items were selected because the correct answer is in conflict with commonly held ageist stereotypes.

Analyses of Proportion Correct

A $3 \times 2 \times 2$ mixed ANOVA was conducted with age group and gender as between-group factors and question type (normal, pathological) as a repeated measures factor. Results yielded a significant main effect of age group, $F(2, 144) = 2.97$, $p = .05$. Mean proportion correct for the oldest-old adults (0.65)

Table 2. Mean Proportion Correct and "Don't Know" Responses as a Function of Age Group, Gender and Question Type

	Male		Female		
	M	*SD*	*M*	*SD*	*M*
Age Group/Question Type/dk option					
Middle age adults					
Normal	0.65	0.12	0.69	0.11	0.67
dk normal	0.15	0.14	0.18	0.15	
Pathological	0.71	0.19	0.73	0.17	0.72
dk pathological	0.24	0.18	0.15	0.17	
Young–Old Adults					
Normal	0.66	0.13	0.64	0.12	0.65
dk normal	0.16	0.11	0.13	0.16	
Pathological	0.75	0.16	0.71	0.14	0.73
dk pathological	0.23	0.22	0.17	0.20	
Oldest–Old Adults					
Normal	0.63	0.11	0.63	0.13	0.63
dk normal	0.11	0.13	0.13	0.10	
Pathological	0.63	0.16	0.70	0.14	0.66
dk pathological	0.17	0.21	0.16	0.15	

was lower than the middle age and young-old groups who did not differ from each other (means of 0.70 and 0.69, respectively). The gender main effect was non-significant, replicating Hawley et al. (2005). A significant main effect of question type also occurred, $F(1, 144) = 13.99$, $p < .001$. Pathological memory aging items ($M = 0.70$) were answered correctly more often than normal memory aging items ($M = 0.65$), replicating Cherry et al. (2000) and Reese et al.'s (2000) findings. Contrary to expectation, the Gender x Question Type interaction effect was non-significant.

Analyses of "Don't Know" Responses

A 3 × 2 × 2 mixed ANOVA on dk responses with age group and gender as between-group factors and question type (normal, pathological) as a repeated measures factor yielded non-significant main effects of age group and gender. The main effect of question type was significant, $F(1, 144) = 13.33$, $p < .001$. Participants were more likely to reply dk to pathological memory aging items compared to normal items, with means of 0.19 and 0.14, respectively. The interpretation of this result was qualified by a significant Gender x Question Type interaction effect, $F(1, 144) = 6.39$, $p = .013$, shown in Figure 1. Pairwise comparisons confirmed that males endorsed the dk option on the pathological

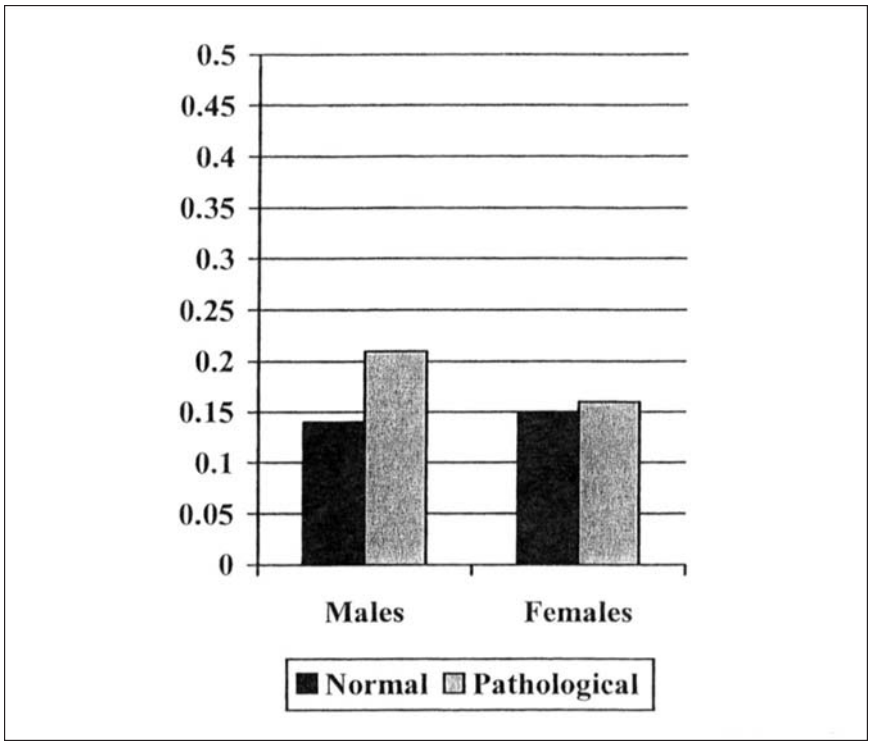

Figure 1. Gender × Question Type interaction effect in the analyses of "Don't Know" responses.

items more often than the normal items, whereas dk responses did not differ across question type for females. No other significant effects occurred in this analysis.

Analyses of Stereotype Questions

We conducted a 3 × 2 × 2 mixed ANOVA on the proportion correct scores for the subset of four normal memory aging items that tap into stereotyped views of cognitive competence in later life. Means appear in Table 3. Results yielded only a significant main effect of age group, $F(2, 144) = 10.47$, $p < .001$. Means for the middle age, young-old, and oldest-old adults, in order, were 0.78, 0.69, and 0.52. Pairwise comparisons confirmed that the difference in means for the middle age and young-old adults was marginally significant ($p = 0.08$) and both were significantly greater than the oldest-old adults' mean. Importantly, this result implies that the oldest-old performed more poorly

Table 3. Mean Proportion Correct and "Don't Know" Responses to Stereotype Questions as a Function of Age Group and Gender

	Proportion Correct		Proportion "dk"	
Age Group/Gender	*M*	*SD*	*M*	*SD*
Middle-age Adults				
Males	0.81	0.27	0.11	0.18
Females	0.76	0.27	0.18	0.21
Total	0.78	0.27	0.15	0.20
Young–Old Adults				
Males	0.72	0.30	0.15	0.16
Females	0.66	0.26	0.11	0.19
Total	0.68	0.28	0.13	0.18
Oldest–Old Adults				
Males	0.46	0.31	0.16	0.25
Females	0.58	0.32	0.17	0.20
Total	0.52	0.32	0.17	0.22

than the other groups overall due to a greater tendency to respond incorrectly to items tapping stereotyped views of cognitive aging. No other significant effects occurred in this analysis. An analysis of dk responses for these same items yielded no significant effects, confirming that all participants endorsed 'dk' on the stereotype questions comparably.

Item Analysis

To gain further insight into age group differences in performance on the KMAQ, we conducted an item analysis to identify the three highest knowledge items for each age group. Inspection of Table 4 reveals two noteworthy trends. First, similarities in high knowledge items were evident among the age groups. Middle age and young-old adults had two common high knowledge items, which is not surprising as these age groups were not differentiated in the analysis of proportion correct on the KMAQ. In particular, their high knowledge items were Q17 (refers to memory for well-learned things) and Q1 (refers to memory for pictures and words), both of which pertain to normal memory aging. Moreover, the majority of their high knowledge items were normal memory aging items, implying that middle age and young-old adults may be less susceptible to stereotyped views of cognitive competence in late life than the oldest-old adults (see Table 4).

Additionally, middle age and young-old adults each had one common item with the oldest-old adults. These items, in order, were Q18 (refers to the

Table 4. Number and Percentage of Correct Responses by Age Group

		Correct responses	Percentage correct	Question type	Topical rubric
Middle-age Adults					
	Q18	45	.90	Pathological	Adult Dementia/Alzheimer's disease
	Q17	44	.88	Normal	Episodic Memory Phenomena
	Q1	42	.84	Normal	Episodic Memory Phenomena
	Q13	42	.84	Normal	Encoding and Retrieval Factors
Young–Old Adults					
	Q17	45	.90	Normal	Episodic Memory Phenomena
	Q1	43	.86	Normal	Episodic Memory Phenomena
	Q21	43	.86	Normal	Individual difference/context influences
	Q4	43	.86	Pathological	Physical conditions and memory
Oldest–Old Adults					
	Q21	48	.96	Normal	Individual difference/context influences
	Q18	47	.94	Pathological	Adult Dementia/Alzheimer's disease
	Q28	44	.88	Pathological	Physical conditions and memory

insidious onset of Alzheimer's disease) for the middle age adults and Q21 (concerns environmental context effects on memory) for the young-old adults. Interestingly, this aspect of the data implies that the oldest-old may be qualitatively similar to the other age groups for knowledge that they may have accrued across a lifetime, despite being quantitatively lower in overall performance on the KMAQ.

The second interesting trend that emerged from the item analysis was that each age group had one unique high knowledge item, suggesting that certain aspects of what middle age, young-old and oldest-old adults know about memory issues in adulthood differ. Inspection of Table 4 indicates that Q13 (refers to use of cues to aid memory) was unique to the middle age adults. For the young-old adults, the unique item was Q4 (refers to the dementia-like symptoms due to treatable physical conditions). For the oldest-old adults, Q28 (refers to lifelong alcoholism causing severe memory problems) was unique. The finding that the oldest-old appeared more knowledgeable than the others about non-normative cognitive impairment may be due to their own observations of the clinical course and outcomes associated with lifelong alcoholism in others.

DISCUSSION

In the present study, we compared middle age, young-old, and oldest-old adults' knowledge of normal and pathological memory aging using the KMAQ (Cherry et al., 2003). Three major findings emerged from the analyses. First, we found that the oldest-old adults performed more poorly overall compared to the other two age groups, suggesting that the relationship between memory knowledge and age is non-linear in adulthood. Our results also indicated that participants had greater knowledge of pathological memory aging in comparison to normal memory aging, replicating our earlier work (Cherry et al., 2003; Hawley et al., 2005; Reese et al., 2000). Second, we found that response accuracy was comparable for men and women, although men were more likely than women to answer dk for pathological aging items. Third, the oldest-old adults were more likely to incorrectly answer questions tapping stereotypical views of normal memory aging. These findings are discussed more fully in the paragraphs that follow.

The first finding of interest was the age effect in response accuracy on the KMAQ. On the assumption of a linear relationship between memory knowledge and age, we had expected the very old adults to be more accurate overall compared to the other age groups. Because the prevalence of Alzheimer's disease increases in late adulthood, one might reasonably expect that cognitively intact and socially engaged elderly adults would be especially knowledgeable about memory issues in late senescence by virtue of their own life experience and perhaps having watched friends, family members or other acquaintances develop dementia in late life. On the contrary, our findings revealed that the oldest-old adults performed more poorly on the KMAQ than did the other two groups who did not differ from

each other in mean response accuracy (see Table 2). One explanation for this result concerns possible differences in the cognitive status among the three age groups. The assessment protocol used in the Louisiana Healthy Aging Study includes the Mini-Mental State Exam (MMSE, Folstein et al., 1975), among other individual difference measures. All participants in the present investigation scored at least a 25 or higher on the MMSE. An analysis of the MMSE scores revealed that the oldest-old adults' mean score were significantly lower than that of the middle age and young-old adults, but the magnitude of the difference was very slight (see Table 1). Thus, it seems unlikely that the age effect was due wholly to cognitive status differences in late senescence.

A more likely explanation for the observed age effect concerns differences in educational attainment among the participants. The oldest-old were no different in mean educational attainment compared to the middle age and young-old adults (see Table 1). Upon closer examination, however, the educational attainment of the very old adults was more varied in comparison to the other groups. To be precise, 9 of the oldest-old did not complete high school, but 20 of them had a post-secondary education (15 had college degrees, 5 had graduate degrees). In contrast, only 1 middle age and 1 young-old adult did not complete high school. Interestingly, the educational attainment of the oldest-old group is fairly representative of the Louisiana population as a whole for the percentage of high school graduates over age 25, but the educational attainment of the middle age and young-old adults is not. Thus, sampling bias in the direction of greater education in the younger groups may be contributing to the overall age effect. The finding that the oldest-old were more likely to answer incorrectly the questions that tap into stereotypical views of cognitive aging compared to the other age groups is consistent with the explanation that lower education among a subset of the oldest-old adults is driving the age effect observed here, as discussed later. One must also consider the possibility of a cohort effect, where the oldest-old endorse stereotypes about memory aging more often than the other groups because they may have experienced them or because they use ageist stereotypes of adult cognition as a cover for their self-perceived declines. Very old adults today likely had less exposure to objective information regarding adult cognition than their younger counterparts, as the scientific study of adult development and aging is relatively new. Further research to address these possibilities is needed.

The results of the item analysis yielded further insight into age group similarities and differences in memory knowledge (see Table 4). Regarding similarities, the middle age and young-old adults had two high knowledge items in common, both of which were normal memory aging items (Q17, Q1, see Table 4). This aspect of the data implies that middle age and young-old adults may be less likely to endorse stereotypical views of cognitive competence in late life, relative to the oldest-old adults. Interpretative caution is warranted, however, because age group did not interact with question type in the overall analysis of response accuracy. One direction for future research would be to systematically examine the role of

attitudes toward aging as a contributing factor in persons' knowledge of memory issues indexed by the KMAQ. The item analyses also revealed that the oldest-old had a common high knowledge item with the middle age adults (Q18) and young-old adults (Q21), implying similar levels of knowledge for certain memory issues, despite poorer overall performance on the KMAQ. Regarding age group differences in memory knowledge, unique high knowledge items emerged for the middle age adults (Q13), young-old adults (Q4) and oldest-old adults (Q28), highlighting subtle differences in precisely what the age groups know about these various memory issues.

The second finding of interest concerned the issue of gender differences in memory knowledge in adulthood. We found that response accuracy on the KMAQ was comparable for males and females generally, although males endorsed dk more often than females on pathological memory aging items (see Figure1). In Hawley et al. (2005), female police officers had greater knowledge of pathological memory aging than did the male officers. The female officers also endorsed the "don't know" response option more than did the male officers. In the present investigation, males had a greater frequency of dk responses for the pathological items than the females did, suggesting that male participants were unwilling to guess incorrectly on these items. Taken together, the present findings, along with those of the Hawley et al., support the idea that females may have a greater breadth of knowledge of pathological memory issues than do men, but further research is needed.

The third interesting finding occurred in the analyses of normal memory aging items that are susceptible to ageist stereotypes in responding. Results indicated that the oldest-old adults were the least accurate on these items compared to the middle age and young-old adults, which may be contributing to their overall poorer performance on the KMAQ. This result also implies that very old adults may be basing their responses to these KMAQ items on ageist stereotypes reflecting a universal decrementalist perspective of adult cognition. It is possible that today's very old adults may have had a pessimistic appraisal of adult cognition throughout the course of their lives. The fact that nearly half of all people over 85 today suffer from adult dementia characteristic of Alzheimer's disease is a statistic that may also color very old adults' impressions of adult cognition. Educational programs or materials developed specifically for the oldest-old to improve their knowledge of memory issues would be desirable and may have important implications for promoting quality of life in late senescence (Commissaris et al., 1995).

In closing, the results of the present research clearly provide new evidence of age-related differences in memory knowledge in adulthood. Several methodological limitations of the study warrant brief mention. First, we have assumed that ageist attitudes concerning cognitive competence in late life may be contributing to the lower level of performance on normal memory aging items compared to pathological items on the KMAQ overall. Our data also imply that the oldest-old

may be more susceptible to stereotyped views that portray negative images of cognitive competence in late life than middle age and young-old adults. However, we did not include a direct measure of attitudes regarding adult cognition, which is necessary to empirically support this inference. Future research that includes an objective measure of attitudes toward aging is needed to provide insight into the dynamic relationship between attitudes and knowledge of memory aging. Second, previous research indicates that the KMAQ possesses adequate test-retest reliability and modest convergent and discriminant validity. Estimates of internal consistency reliability have been somewhat low, likely due to the diversity of topics chosen to represent normal and pathological memory aging (Cherry et al., 2000, Exp. 4). Further research to more fully develop the psychometric characteristics of the KMAQ is needed. Finally, future research incorporating samples of high school students and community-dwelling young adults would be desirable to provide a more comprehensive assessment of the form of the relationship between memory knowledge and age.

APPENDIX: KNOWLEDGE OF MEMORY AGING QUESTIONNAIRE

1. ____ "A picture is worth a thousand words" in that it is easier for both younger and older people to remember pictures than to remember words. (N-true)
2. ___ Older people tend to have more trouble concentrating than younger people. That is, older people are more likely to be distracted by background noises and other happenings around them. (N-true)
3. ____ Regardless of how memory is tested, younger adults will remember far more material than older adults. (N-false)
4. ____ Confusion and memory lapses in older people can sometimes be due to physical conditions that doctors can treat so that these symptoms go away over time. (P-true)
5. ____ Becoming disoriented (such as getting lost or losing track of what day it is) happens to persons with Alzheimer's Disease, but only in the later stages of the disease (P-false)
6. ____ Older people remember to do future planned activities (such as returning a book to the library) better than they remember past actions that they have already completed. (N-true)
7. ____ Medications that are prescribed by doctors for heart and circulation problems do not affect memory in older adults. (P-false)
8. ____ Sometimes the effects of intense grief over the loss of a loved one may be mistaken for early Alzheimer's Disease in older adults. (P-true)
9. ____ A complete physical exam by a doctor is routinely recommended, if a diagnosis of Alzheimer's Disease is suspected. (P-true)

10. ____ Older people tend to remember specific past events in their daily life better than they remember the meanings of words (vocabulary) and general facts (such as the capital of the United States). (N-false)
11. ____ Frequent complaining about memory problems is an early sign of Alzheimer's Disease. (P-false)
12. ____ The only way to tell for sure if an individual has Alzheimer's Disease is to do an autopsy after that person has died. (P-true)
13. ____ If an older adult is unable to recall a specific fact (e.g., remembering a person's name), then providing a cue to prompt or jog the memory is unlikely to help. (N-false)
14. ____ When older people are trying to memorize new information, the way they study it does not affect how much they will remember later. (N-false)
15. ____ If one has lived to be 85 years old and shows no signs of Alzheimer's Disease, then the chances are very high that this person will live out the rest of his or her life without developing the disease. (P-false)
16. ____ For older adults, the ability to remember something is unrelated to the number of other thoughts or issues on their mind when trying to recall this information. (N-false)
17. ____ Memory for how to do well-learned things, such as reading a map or riding a bike, does not change very much, if at all, in later adulthood. (N-true)
18. ____ Signs and symptoms of Alzheimer's Disease show up gradually and become more noticeable to family members and close friends over time. (P-true)
19. ____ When an older adult comes in for a checkup, doctors and psychologists can now clearly tell the difference between the symptoms of mental health problems and the symptoms of physical illness. (P-false)
20. ____ Immediate memory (such as repeating a telephone number) is about the same for younger and older people, but an older person's memory for things that happened days, weeks, or months ago is typically worse than that of a younger person. (N-true)
21. ____ If an older person has gone into another room and cannot remember what he or she had intended to do there, going back to the place where the thought first come to mind will often help one recall what he or she had intended to do. (N-true)
22. ____ Alzheimer's Disease is the only illness that leads to confusion and memory problems in older adults. (P-false)
23. ____ For older people, education, occupation, and verbal skills tend to have little influence on their memory. (N-false)
24. ____ Modern day memory improvement methods that are based on organization (e.g., grouping similar items together) and association (e.g., linking new information to what is already known) can actually be traced back to the ancient Greek scholars, such as Aristotle and Plato. (N-true)

25. ____ Healthy older adults have trouble remembering how to use familiar gadgets (like a key chain) and appliances (like a can opener). (P-false)
26. ____ Dramatic changes in personality and relationships with others may be seen in persons who have Alzheimer's Disease. (P-true)
27. ____ Memory training programs are not helpful for older persons, because the memory problems that occur in old age cannot be improved by educational methods. (N-false)
28. ____ Lifelong alcoholism may result in severe memory problems in old age. (P-true)

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