Younger-Old and Older-Old Adults' Recall of Medication Instructions*

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RÉSUMÉ

La présente étude a été menée dans le but d'appuyer des recherches selon lesquelles les attentes des aînés, pour ce qui est de se rappeler des instructions relatives à certains médicaments, ne coïncidaient pas avec leurs aptitudes réelles. Soixante et onze « jeunes aînés » (moyenne = 68,10 ans, fourchette = 57–74 ans), ainsi que soixante-douze aînés d'un âge plus avancé (moyenne = 80,31 ans, fourchette = 75–89 ans) ont émis des jugements à l'égard de la probabilité qu'ils se rappellent des instructions relatives à un médicament ainsi que de leur confiance envers leur mémoire. Les résultats indiquent que les aînés les plus âgés se sont souvenus des instructions moins fréquemment que les aînés moins âgés, et que les deux groupes ont surévalué leur aptitude à se souvenir des instructions. Cette recherche semble indiquer que les problèmes d'oubli de médicaments pourraient être dus, en partie, au fait que les aînés ont tendance à surestimer la facilité avec laquelle ils vont se souvenir des instructions relatives aux médicaments.

ABSTRACT

The present study was conducted to expand research showing that older adults' expectations that they will recall particular medication instructions do not coincide with their actual ability to do so. Seventy-one younger-old adults ($M = 68.10$ years, range = 57–74) and 62 older-old adults ($M = 80.31$ years, range = 75–89) made judgements about the likelihood of their recalling medication instructions and about their confidence in their recall. The results indicate that older-old adults recall fewer instructions than do younger-old adults and that both groups overestimate their ability to recall the instructions. This research suggests that problems remembering to take medication may be due, in part, to older adults' overestimating the ease with which they will remember medication instructions.

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It has been estimated that roughly half of all prescription drugs are taken by older adults, with over one third taking at least three medications (Park, Morrell, Frieske, & Kincaid, 1992). As many as 49 per cent to 75 per cent do not adhere to the medication regimen presented to them (Gray, Mahoney, & Blough, 2001; Murray et al., 2004; O'Brien, Petrie, & Raeburn, 1992), with some research indicating higher non-adherence rates for adults over age 75 (older-old) than for older adults in their sixties and early seventies (younger-old) (Morrell, Park, Kidder, & Martin, 1997; Park et al., 1992). Although there are numerous reasons for non-adherence to prescription medications, the present study focuses on younger-old and older-old adults' memory for medication instructions.

Patients' understanding of and memory for medication instructions can affect compliance either directly or indirectly (Ley, 1986). Remembering medication instructions is a complex cognitive task that involves processing (Morrow, Leirer, Altieri, & Tanke, 1991) and remembering important information (e.g., the name of the medication) (Morrow, Leirer, & Sheikh, 1988). Patients must remember to take the correct dosage of medication at the correct time for the prescribed length of time, and they often need to remember warnings about mixing or not mixing their new medication with existing medications or foods (Morrow et al., 1988).

Remembering medication instructions can be particularly taxing for older adults because the ability to understand and remember text often declines with age (Morrow et al., 1988; Stine & Wingfield, 1990). Indeed, declines in text recall have been shown to be greater in the oldest-old (Small, Dixon, Hultsch, & Hertzog, 1999). Age is expected to influence medication adherence primarily through cognitive factors, such as age-related slowing in information processing and working memory (Salthouse, 1991), factors that, in turn, have been hypothesized to influence whether a complex medication regimen can be comprehended and remembered (Neupert & McDonald-Miszczak, 2004; Park & Jones, 1997). Morrow, Leirer, Andrassy, Hier, and Menard (1998) have hypothesized that older adults' ability to create an accurate cognitive representation model of medication taking might be hampered by declining cognitive resources. Thus, it is important to examine age-related differences in recall of medication instructions and consider variables that might account for such differences.

In the present study, we expand upon previous research examining the accuracy of older adults' expectations that they will remember specific medication instructions. The justification for this line of research is that, if expectations of remembering instructions are inaccurate, then useful strategies to aid remembering may not be employed. Gould, McDonald-Miszczak, and Gregory (1999) asked younger ($M = 20.3$ years) and older adults ($M = 73.7$ years) to rate the memorability of verbally presented medication instructions and then to recall the instructions during a surprise, cued recall test, given 24 hours later. The younger adults recalled 47 per cent of the information contained in the medication instructions, whereas older adults recalled 37 per cent, and both age groups tended to overestimate the likelihood of recalling important medication information. This study was the first to point out the mismatch between older adults' expectations of recalling instructions and their actual ability to do so.

In a follow-up study, Neupert and McDonald-Miszczak (2004) largely replicated the results of the Gould et al. (1999) study showing that both younger and older adults' expectations of recalling important medication information were significantly higher than their actual ability to do so. They concluded that such predictive inaccuracy might play a greater role in older adults' adherence because they took significantly more medication than younger adults. Further, they speculated that such inaccurate judgements might lower patients' motivation to encode and remember medication information. If patients inaccurately assess the difficulty of remembering instructions, then they are less likely to employ useful memory strategies because, before someone can take steps to aid recall, s/he must understand that the task requires such aids. Results from the study also showed that working memory ability played an especially important role in older adults' recall of medication instructions. Individuals with poorer working memory ability recalled fewer instructions than those with better working memory ability.

Although previous research (Gould et al., 1999; Neupert & McDonald-Miszczak, 2004) addressed relevant questions about aging and recall of medication instructions, the older age group was treated as a homogenous unit. Because working memory has been shown to decline in later life, thereby potentially putting older-old individuals at greater risk for forgetting medication instructions, it is important to examine age differences in recall of medication instructions in the younger-old and older-old age groups. Further, younger-old and older-old adults commonly differ in health and the number of medications they take. Thus, examining medication-instruction recall in younger-old and older-old adults is an important next step in this line of inquiry.

The Present Study

In the present study, we used materials similar to or the same as those used in previous studies (Gould et al., 1999; Neupert & McDonald-Miszczak, 2004). Written medication instructions were organized according to guidelines developed by Morrow et al. (1988), such that actions were presented in the order to be performed and important information was stressed (see Neupert & McDonald-Miszczak, 2004). In addition, we used the same cued recall test because patients are often asked specific questions about their medication instructions (e.g., What medication are you presently taking?) (Gould et al., 1999).

We extended the methodology of Gould et al. (1999) and Neupert and McDonald-Miszczak (2004) by breaking the older group into younger-old (under age 75) and older-old (75 years and over) groups. Also unique to this study was the inclusion of confidence ratings to be completed following recall. These rating were used to indicate older adults' awareness of their ability or inability to recall the instructions. We expected to find (a) age differences in the type of medication information recalled, with older-old adults less likely to recall key adherence information; and (b) both younger-old and older-old adults inaccurately judging their ability to recall medication information; and (c) both age groups rendering accurate confidence ratings following recall. While our first two expectations stemmed from the cognitive aging literature and previous work in this area, our expectation regarding the confidence ratings stemmed from the prediction studies. Such studies typically show that both younger and older adults monitor their performance during the study-test cycle and render fairly accurate post-dictions (e.g., Devolder, Brigham, & Pressley, 1990). Because of this, we expected ratings of confidence of recall to be similar.

Methods

Participants

The data from a total of 71 younger-old adults ($M = 68.10$ years, range = 57–74, 8 men, 63 women), and 62 older-old adults ($M = 80.31$ years, range = 75–89, 9 men, 53 women) were used. These data were collected as part of a study examining medication adherence in older adults diagnosed with arthritis. All subjects were recruited from a Vancouver, BC, community and received a CAN$10 honorarium for their participation. Approximately half of the younger-old and older-old groups rated their health as *good* or *very good*. Participants were asked to report the number of years of education they had attained (younger-old: $M = 12.99$, $SD = 3.17$; older-old: $M = 13.51$, $SD = 2.90$), the number of times they had visited the doctor in the past year (younger-old: $M = 3.59$, $SD = 1.28$; older-old: $M = 3.45$, $SD = 1.96$), the number of prescription medications they were taking at the time of the study (younger-old: $M = 5.21$, $SD = 3.16$; older-old: $M = 5.15$, $SD = 2.82$), and their health status on a 5-point scale, ranging from 1 (*very poor*) to 5 (*very good*) (younger-old: $M = 3.42$, $SD = 0.90$; older-old: $M = 3.55$, $SD = 0.84$). A MANOVA was conducted, with age group as the independent variable and the demographic characteristics mentioned earlier as the dependent variables. The multivariate age effect was not statistically significant (Wilks's $\lambda = 0.97$, F [4, 125] = 3.89, $p > 0.05$, $\eta^2 = 0.03$), and none of the univariate between-subjects effects were statistically significant. The number of medications taken by participants was not significantly correlated with recall of medication instructions (Pearson's $r = 0.095$, $p = 0.287$). It should also be noted that participants were asked if they had dementia and all reported that they did not.

Measures

Medication Instructions

The stimulus used for the recall task was comprised of medication instructions for a fictitious medication used to combat a fictitious ailment. Ley and Spelman (1965) found that the recall of fictitious medical information by volunteer subjects closely mirrors recall of true information by real patients. The instructions used in the present study were modelled after actual medication instructions. A research assistant visited a pharmacy and requested numerous medication pamphlets that are routinely given to patients. The information in those pamphlets was mixed to disguise any particular ailment and a fictitious medication name was created. The medication instructions included (a) the name of the medication, (b) what the medication was used to treat, (c) when to take the medication, (d) how to use the medication, (e) what to do if a dose were missed, (f) cautions regarding non-prescription medications, and (g) possible side effects of the medication. A complete script of the medication instructions can be found in Neupert and McDonald-Miszczak (2004). This information was presented in written form and participants were given as long as they needed to read the text.

Judgements of Learning (JOL) Ratings

After participants finished reading the medication instructions, they were asked to rate the likelihood of recalling (a) the name of the medication, (b) what the medication was used to treat, (c) when to take the medication, (d) how to use the medication, (e) what to do if a dose were missed, (f) cautions regarding non-prescription medication, and (g) possible side effects of the medication. Ratings were made using a 5-point Likert-type scale ranging from 1 (*very unlikely to recall*) to 5 (*very likely to recall*). Participants' ratings across the seven questions were used separately as well as summed resulting in composite scores ranging from 7 to 35. This measure was intended to tap participants' beliefs about their ability to remember the information contained in the instructions.

Cued Recall of Medication Instructions

A surprise, cued recall memory test of the medication instructions was given to each participant immediately after they performed an unexpected written free recall of the medication instructions (younger-old = 21.81%; older-old = 14.95%, $t = 3.99$, $p < 0.001$). Participants were not informed that they would be asked to recall the medication instructions, but they were asked to attend to the medication information because they would be asked some questions following the presentation. We believe the surprise nature of the recall test was realistic because patients are often caught unprepared to answer questions regarding their medications (Gould et al., 1999). For the cued recall test, participants were asked to recall orally the same seven medication instructions outlined earlier. Based on the scoring scheme used by Gould et al. (1999), participants received 0-to-2 points for each answer, depending upon the amount of information recalled from the cued questions. A score of 0 was given for *no recall or incorrect information*, a score of 1 was given for *partial recall* (e.g., recalling Mosepin instead of Mosetidimide, for the name of the medication), and a score of 2 was given for *complete recall* (e.g., recalling that the medication is commonly used to treat intestinal conditions and other conditions determined by one's doctor). Composite scores ranged from 0 to 14, with a higher score indicating a higher level of recall.

Confidence of Recall (COR) Ratings

Following each cued recall question, participants were asked to rate their confidence in their recall using a 5-point, Likert-type scale, ranging from 1 (*not confident*) to 5 (*very confident*). It should be noted that these questions were only asked if the participant remembered anything about the medication instruction. Scores for each recall item were used separately as well as summed, resulting in a composite score that ranged from 0 (*did not recall anything*) to 35.

Results

Cued Recall of Medication Instructions

Age differences in the averaged composite score of the medication recall items were examined using an independent samples t test. Younger-old adults recalled significantly more medication information ($M = 1.09$) compared to older-old adults ($M = 0.91$) (t [128] = 3.23, $p < 0.01$). A MANOVA was conducted with age group as the independent variable and participants' recall of the seven separate medication instruction items as the dependent variables. There was a significant multivariate age effect (Wilks's $\lambda = 0.88$, F [7,122] = 2.46, $p < 0.05$, $\eta^2 = 0.12$). Younger-old adults recalled information pertaining to when (F [1,128] = 8.88, $p < 0.01$) and how (F [1,128] = 9.76, $p < 0.01$) the medication should be taken more often than did older-old adults. Items regarding the name of the medication (F [1,128] = 1.26, $p > 0.05$), what the medication was used to treat (F [1,128] = 3.11, $p > 0.05$), what to do if a dose were missed (F [1,128] = 0.85, $p > 0.05$), cautions regarding non-prescription medications (F [1,128] = 1.15, $p > 0.05$), and the possible side effects (F [1,128] = 0.01, $p > 0.05$) did not differ significantly by age. The means and standard deviations from the analysis are reported at the top of Table 1.

JOL Ratings

When age differences in the averaged composite score of likelihood ratings were examined using an independent samples t test, there were no age differences in ratings (t [130] = −1.30, $p > 0.05$). In order to examine age differences in participants' expectations of recall across the different medication questions, an additional MANOVA was conducted, with age group as the independent variable and participants' ratings as the dependent variables. Neither the multivariate age effect (Wilks's $\lambda = 0.96$, F [7, 122] = 0.69, $p > 0.05$, $\eta^2 = 0.04$) nor any of the univariate between-subjects effects were statistically significant. Table 1 reports the means and standard deviations from this analysis.

COR Ratings

According to t tests, younger-old adults were more confident that their answers were correct ($M = 3.34$) compared to older-old adults ($M = 2.94$) (t [128] = 2.88, $p < 0.01$). In order to examine age differences in participants' confidence ratings for remembering the instructions across the different medication questions, an additional MANOVA was conducted, with age group as the independent variable and participants' confidence ratings as the dependent variables. There was a significant multivariate age effect (Wilks's $\lambda = 0.90$, F [7, 122] = 2.04, $p = 0.05$, $\eta^2 = 0.11$). Younger-old adults reported significantly higher confidence ratings for items pertaining to when (F [1,128] = 9.24, $p < 0.01$) and how (F [1,128] = 5.08, $p < 0.05$) to take the medication. Items regarding the name of the medication (F [1,128] = 2.38, $p > 0.05$), what the medication was used to treat (F [1,128] = 5.51, $p > 0.05$), what to do if a dose were missed (F [1,128] = 0.48, $p > 0.05$), cautions regarding

Table 1: Means and standard deviations for MANOVAs conducted on individual recall, JOL ratings, and COR ratings, by age category ($N = 71$ younger-old adults, 62 older-old adults)

Variables	Younger-old		Older-old	
	M	*SD*	*M*	*SD*
Recall				
Name of the medication	0.54	0.65	0.41	0.65
What it is used to treat	1.00	0.89	0.73	0.85
When to take the medication**	1.46	0.56	1.15	0.64
How to use the medication**	1.48	0.71	1.07	0.79
What to do if a dose is missed	1.23	0.59	1.14	0.51
Cautions regarding non-prescription meds	0.93	0.56	0.85	0.41
Side effects	1.03	0.29	1.03	0.32
JOL Rating				
Name of the medication	2.62	1.02	2.62	1.00
What it is used to treat	4.00	0.96	4.10	1.00
When to take the medication	3.78	1.03	4.02	0.72
How to use the medication	3.70	0.93	3.74	0.84
What to do if a dose is missed	3.19	1.12	3.46	1.12
Cautions regarding non-prescription meds	2.77	1.00	2.79	1.08
Side effects	2.99	1.06	3.15	1.11
COR Rating				
Name of the medication	1.52	1.84	1.05	1.59
What it is used to treat	2.52	2.18	1.92	2.15
When to take the medication**	4.15	1.05	3.44	1.61
How to use the medication*	3.73	1.69	3.00	2.02
What to do if a dose is missed	4.17	1.40	4.00	1.35
Cautions regarding non-prescription meds	3.73	1.64	3.61	1.78
Side effects	3.73	1.00	3.59	1.22

*$p < 0.05$; **$p < 0.01$

non-prescription medications ($F\,[1,128] = 0.17, p > 0.05$), and possible side effects ($F\,[1,128] = 0.51$, $p > 0.05$) did not differ significantly by age. Table 1 reports the means and standard deviations from this analysis.

Accuracy of JOLs

Kendall's Tau correlations were calculated between the composite ratings and the composite recall items for each age group in order to assess accuracy of the ratings. Younger-old adults who had higher ratings were also more likely to recall more of the medication instructions, but the correlation is very small ($r = 0.18$, $p < 0.05$). There was no relationship between the composite of the ratings and the composite of the recall items for the older-old adults ($r = 0.01$, $p > 0.05$). When the difference between these two correlations was calculated, it was not statistically significant ($z = 1.38$, $p > 0.05$). Kendall's Tau correlations were then conducted between the ratings and recall scores for each of the seven recall items (see Table 2). The purpose of these analyses was to determine whether predictions of recalling certain items were relatively more accurate than for other items. The correlations for the younger-old adults ranged from −0.10 to 0.45. Only two correlations were statistically significant: (a) the name of the medication and (b) when to take the medication. The correlations for the older-old adults ranged from −0.17 to 0.26. The only statistically significant correlation was related to side effects. When we examined whether the correlations were

Table 2: Tau correlations for different sections of text ($N = 71$ younger-old adults, 62 older-old adults)

Item	JOL Ratings		COR Ratings	
	Younger-old	Older-old	Younger-old	Older-old
Name of the medication	0.27*	0.05	0.88***	0.90***
What it is used to treat	0.08	0.18	0.77_a^{***}	0.86_b^{***}
When to take the medication	0.45_a^{***}	-0.01_b	0.38***	0.44***
How to use the medication	0.04	0.11	0.64***	0.71***
What to do if a dose is missed	0.08	0.06	0.41***	0.26*
Cautions regarding non-prescription meds	-0.11_a	-0.17_b	0.47_a^{***}	0.64_b^{***}
Side effects	-0.10_a	0.26_b^{*}	0.21	0.39***

*$p < 0.05$; ***$p < 0.001$.
a, b Subscripts indicate age differences in tau correlations.

significantly different from each other, we found that younger-old adults had significantly higher correlations for when to take the medication ($z = 3.70$, $p < 0.001$) and cautions regarding non-prescription medications ($z = 2.24$, $p < 0.05$), but that older-old adults had a significantly higher correlation for side effects ($z = 2.88$, $p < 0.01$).

Another method for assessing the accuracy of the ratings was the Goodman-Kruskal gamma correlation coefficient. Unlike Kendall's Tau, this statistic allows for different interpretations of the Likert scale to be analysed relative to individual recall scores (see Nelson, 1984; Nelson & Dunlosky, 1991). A gamma correlation was calculated for each individual across the seven item ratings and recall scores and was then treated as a dependent variable to compare the age groups on accuracy of the ratings. The results indicated that the mean gamma score for the younger-old adults ($M = 0.32$, $SD = 0.62$) was not significantly different from the mean score for the older-old adults ($M = 0.24$, $SD = 0.58$) (t [127] $= 0.73$, $p = 0.47$). Given that Gamma is interpreted between 0 and +/−1, the gamma scores for both age groups were very low. However, t tests revealed that both groups' scores were significantly different from 0 (younger-old: t [70] $= 4.33$, $p < 0.001$; older-old: t [57] $= 3.12$, $p < 0.01$). These analyses indicate that the age groups were similar to each other in the accuracy or inaccuracy of their ratings, and that both groups' ratings, while not completely inaccurate, were very poor.

Accuracy of CORs

Kendall's Tau correlations were calculated between the composite of confidence ratings and the composite of the recall items for each age group. Both younger-old adults ($r = 0.68$, $p < 0.001$) and older-old adults ($r = 0.69$, $p < 0.001$) who were more confident in their responses were also more likely to recall more of the medication instructions. The difference between these two correlations was not statistically significant ($z = 0.15$, $p > 0.05$). To determine whether confidence of recalling certain items was relatively more accurate than for other items, Kendall's Tau correlations were calculated between the confidence ratings and the recall scores for each of the seven recall items (see Table 2). The correlations for the younger-old adults ranged from 0.21 to 0.88. Six correlations were statistically significant: (a) the name of the medication, (b) what the medication was used to treat, (c) when to take the medication, (d) how to take the medication, (e) what to do if a dose were missed, and (f) cautions regarding non-prescription medications. The correlation for side effects was not significant. The correlations for the older-old adults ranged from 0.26 to 0.90 and all correlations were significant. Older-old adults had significantly higher correlations for what the medication was used to treat ($z = 2.18$, $p < 0.05$) and cautions regarding non-prescription medications ($z = 4.36$, $p < 0.001$) than younger-old adults.

Again, Gamma correlations were also conducted to assess age differences in the accuracy of ratings, allowing for different interpretations of the rating scale. The results mirrored those obtained using Kendall's Tau. No age differences in Gamma were found (younger-old: $M = 0.83$; older-old: $M = 0.81$) (t [128] $= -0.84$, $p = 0.40$) and both age groups' scores were high and significantly different from zero (younger-old: t [70] $= 20.82$, $p < 0.001$; older-old: t [58] $= 15.25$, $p < 0.001$).

Discussion

These results expand previous research showing that older adults' expectations of recalling particular

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medication instructions did not coincide with their actual ability to do so (Gould et al., 1999; Neupert & McDonald-Miszczak, 2004). Previous research showed that older adults overestimate the likelihood that they will remember specific pieces of information, but in those studies, the older group was treated as a homogeneous unit. In the present study, we divided the older age group into younger-old and older-old subgroups to assess whether (a) recall differences existed, (b) expectations coincided with recall in both groups, and (c) confidence in recall mirrored recall for both groups.

Examination of age differences for cued recall of the medication instructions indicated that younger-old adults' composite score was significantly higher than that of older-old adults'. When the individual instructions were examined, these analyses indicated that younger-old adults remembered when to take the medication and how to use the medication better than did older-old adults. These findings are important, as these two instructions are crucial to proper adherence. It should be noted that cued recall was not very good overall, with both age groups scoring 1 or below on four of the seven instructions, which supports previous research by Gould et al. (1999) and Neupert and McDonald-Miszczak (2004).

Older-old adults appear to be at a disadvantage more than the younger-old adults. Although we did not measure basic cognitive abilities, one likely explanation for these age differences is the well-documented decline of working memory in later life. Because working memory declines with age (e.g., Salthouse, Babcock, & Shaw, 1991) and predicts recall of medication instructions (Neupert & McDonald-Miszczak, 2004), it is likely that such age differences exist in our study.

In order to improve adherence to medication instructions, health practitioners should be sensitive to such declines with age. This may require that they spend more time with their older patients when reviewing medication instructions, review the instructions more slowly, and repeat important information, especially when the patient is over the age of 75. If poor recall is apparent after a few minutes, it is likely that recall is much poorer after a more significant delay (i.e., a few weeks). This is significant because the unexpected need to recall medication instructions often arises in emergency situations or when needing to refill prescriptions a few months later.

Analyses were conducted on participants' judgements of learning to see if significant age differences were found and if such differences mirrored the age differences in cued recall. The mean-level analyses did not result in any significant age differences, unlike for the recall scores. Immediately, one can see a difference between participants' expectations of recalling the medication instructions and their actual ability to do so. Kendall's Tau and Gamma correlations largely supported this observation, showing that correlations for both age groups were very small and were not statistically different from each other. When individual instructions were examined, only two ratings (the name of the medication and when to take the medication) significantly correlated with younger-old adults' recall and only one of the older-old adults' ratings correlated with their recall (side effects). Taken together, the correlational findings indicate that the participants' ratings were not strong predictors of their ability to recall the medication instructions. These results support previous research by Gould et al. (1999) and Neupert and McDonald-Miszczak (2004).

Because participants' ratings were largely inaccurate, they may be particularly susceptible to poor delayed recall in a real-life setting. The authors have suggested that expectations for recalling important information will drive decisions to use memory strategies that aid recall (Gould et al., 1999, Neupert & McDonald-Miszczak, 2004). If participants' believe the information is fairly easy to recall, then it is less likely they will utilize such strategies. Thus, we suggest that when health practitioners are explaining older adults' medication instructions, they should also stress to their patients the difficulty of the task and provide some memory strategies (e.g., using a pill organizer, keeping pills in a prominent place, linking pill taking to daily routine, using an alarm to remember when to take the next dose).

The confidence ratings were analysed in a manner similar to the judgements of learning. In this case, we clearly found that COR ratings did mirror cued recall. Mean-level analyses conducted on the composite scores showed that younger-old adults rated their confidence significantly higher than did older-old adults following cued recall. This was also true for the two specific instructions that resulted in age differences for recall. Kendall's Tau and Gamma correlations between COR ratings and recall indicated that both younger-old and older-old adults' composite ratings and their ratings for recall of individual instructions were high and statistically significant. These results indicate that both age groups were able to assess accurately their ability to recall medication instructions, suggesting that when such need arises in real-life settings, both younger-old and older-old adults are able to track the accuracy of their memory. However, it remains to be seen if such awareness prompts older adults to take precautions in future cases where recall is needed.

Limitations

This study focused exclusively on older adults' ability to recall new prescription information and this may not accurately reflect actual medication-taking behaviours or recall of real prescription information. Although our study points to a potential gap between expectations of recall and ability to do so, learning can certainly take place over time and as the need for information arises. The data from the COR analyses clearly indicate that older adults can accurately monitor memory failures for medication instructions, so one might assume that they will take steps to ensure such failures do not take place again in the future. Indeed, many older adults use memory aids and develop procedures (e.g., keeping their pills in a prominent place) to help them adhere. Although we argue that expectations for remembering will determine the use of aids and procedures, future research is needed to assess the relationship between expectations, strategy use, and actual adherence over time.

This study used a well-organized medication text. While we believe the poor recall observed in this study is very interesting in light of the high level of organization, future research should examine how ratings and recall might differ across texts with the same content but different levels of organization.

Another limitation of the present study stemmed from our decision to exclude measures of basic cognition. While age-related differences in speed of processing and working memory are well documented, measurement of such abilities would have enhanced our discussion of and interpretation of the age-related differences in recall. The authors did examine the role of cognition in another study (see Neupert & McDonald-Miszczak, 2004) and found that working memory significantly influenced older adults' recall of medication instructions, but a distinction between younger-old and older-old adults was not made. Further research should be conducted to assess the role of basic cognitive abilities in older adults' recall of medication instructions.

Conclusion

The results of this study extend previous research and emphasize the complexity of recall of medication instructions through the examination of age differences in ratings and recall for older adults. In general, younger-old adults recall more medication information compared to older-old adults. Although participants' expectations for recall were not closely tied to their recall, they were aware of the accuracy of their recall performance after it was tested. In terms of practical importance, we believe health practitioners should be sensitive to (a) the propensity of older adults to overestimate the memorability of medication instructions and (b) age differences within the older adult age group.

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