

The relative value of environmental context reinstatement in free recall

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The effect of environmental context on episodic memory was examined in two free recall experiments with groups of old and young subjects. All subjects studied a list of unrelated words and were subsequently tested in the same room or in a different room. The results of Experiment 1 showed an advantage of being tested in the same context for the old subjects, but no effects of the context manipulation for the young subjects. Experiment 2 replicated this finding and additionally showed that old subjects (but not young subjects) benefited from instructions to mentally reinstate the learning context. The results of both experiments are discussed in terms of the relative value of contextual cues for subjects in each of the two age groups.

Key words: Environmental context, free recall, aging.

The incidental context in which information is acquired is usually associated to the learnt material, with the result that reinstatement of the original learning context can have a favorable effect on later retrieval attempts. The facilitatory effect of incidental context on the recall of verbal material was originally supported by the results of a number of classic experiments using environmental context manipulations of different sorts (for example, Godden & Baddeley, 1975; Smith, Glenberg & Bjork, 1978).

However, some subsequent studies using similar manipulations have failed to replicate earlier results. For example, Fernandez and Glenberg (1985) could not find contextual effects in recall in a lengthy series of experiments in which environmental context was manipulated by either changing rooms between study and test or keeping them constant. No reliable differences were found between subjects who learnt and recalled words in the same room and subjects who learnt in one room and were tested in a different one. This absence of contextual effects in situations in which they were expected to

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occur have also been reported in a number of other studies using the same type of context manipulations and the same type of learning material (for example, Alonso & Fernández, 1997; Bjork & Richardson-Klavehn, 1989; Fernández & Alonso, 1994).

The disparity in the data is difficult to explain at the present time, but some progress could be made along the lines of recently proposed theoretical accounts. Of particular interest is the "outshining hypothesis" (Smith 1988, 1994), according to which contextual retrieval cues have a relative value and are most effective when subjects have no better cues available. On the basis of this idea, it could be argued that, on certain occasions, subjects tested in a same context condition are not better than subjects tested in a different context condition simply because neither group makes a significant use of contextual cues at retrieval. Instead, subjects from both groups may rely more on alternative cues, either externally provided or internally generated. For example, the very nature of the memory test can render contextual cues irrelevant by providing subjects with particularly efficient non-contextual cues, such as copy cues in recognition tasks or experimentally associated cues in cued recall tasks. And even in free recall tests, much impoverished in terms of the external cues they explicitly provide, subjects have the possibility of applying strategies or retrieval plans that, without making use of contextual cues, could allow them to meet the demands of the memory task to a reasonable level.

The outshining hypothesis has been used as a broad interpretive framework in trying to account for the fact that environmental context effects are rarely observed in recognition and cued recall tests, and to justify why many times those effects have proved difficult to find in free recall situations (Smith, 1988). It has also been used to derive predictions about the effect of context on the free recall of verbal material previously learnt under different encoding conditions. For example, McDaniel, Anderson, Einstein and O'Halloran (1989) manipulated encoding conditions in a series of 5 experiments, hypothesizing that encoding operations that afforded the generation of richer internal cues (through the formation of visual images, organizing, self-referencing, etc.) would make recall less dependent on external context manipulations. They found some support for the predictions, but, because significant context effects were infrequent and also inconsistent, it is difficult to arrive at definitive conclusions regarding the adequacy of the outshining hypothesis on the basis of the results of this study.

The results of another attempt to empirically test the outshining hypothesis have been more recently reported by Cousins and Hanley (1996). In their study, subjects studied lists of words under two different encoding conditions. In the item-processing condition subjects rated individual words for pleasantness. In the relational-processing condition subjects sorted the words into pre-specified categories. After a short retention interval, subjects were given an unexpected free recall test either in the learning room or in a different one. It was expected that subjects in the relational-processing condition would be able to use a category-based retrieval strategy and would not be likely to be affected by the presence or absence of contextual cues at

recall. On the other hand, subjects in the item-processing condition, lacking the opportunity of using the categorical retrieval strategy, were expected to be more dependent on the availability of contextual cues and, therefore, more likely to be affected by contextual manipulations. The data from two similar experiments showed that level of recall was higher following relational processing, but not affected by contextual changes in any of the experimental conditions. These results led Cousins and Hanley (1996) to conclude that the outshining hypothesis cannot offer an adequate account of the mechanisms that underlie environmental context effects, at least in free recall situations. However, it is possible that the procedure used by Cousins and Hanley (1996) does not allow for a clear test of the predictions derived from the outshining hypothesis. Their data certainly suggest that relational-processing instructions led to the use of a category-based retrieval strategy, as evidenced by higher recall scores and higher clustering scores. But there is no direct evidence regarding the strategies that could have been used by the subjects in the item-processing condition. The fact that one concrete internally-generated strategy was not available does not imply that other, non-contextual, internal strategies were not used by those subjects. Actually, both the type of material used (imageable nouns) and the type of processing required (pleasantness ratings) are likely to allow for the generation of rich internal cues at encoding that could be of use at retrieval (cf. McDaniel et al., 1989). Those cues can be less efficient than categorical cues in terms of the amount of recall they permit, but they can be equally effective in making contextual cues less relevant.

A more direct way of controlling the utilization of internally-generated retrieval cues in environmental context experiments could be the use of groups of subjects that are particularly impaired in the use of self-generated retrieval cues. In terms of the outshining hypothesis, this type of subjects should show a tendency to compensate for the lack of internal cues by relying more on contextual cues, and would therefore be more likely to show reliable effects of contextual manipulations. A review of the literature suggests that the elderly could be an interesting population in regard to the assessment of this idea. A consistent finding in studies of memory and aging is that older subjects show a poorer memory performance than young subjects in a variety of episodic memory tasks (Poon, 1985), and this difference between the two groups can be, in part, related to the fact that the elderly are more dependent on external retrieval support than are younger adults (Craik, 1986, 1992). Consequently, manipulations such as environmental context changes between study and test, which can have a direct effect on the availability of external cues, should have a noticeable impact on the memory performance of older subjects, particularly in free recall tests, when no much additional retrieval support is provided.

This prediction has been empirically tested in two studies. Phillips and Kausler (1992) had young and old subjects performing a series of actions in one room and later tested their memory for the content of the actions in a free recall test, either in the same room or in a different room. Young subjects recalled more actions than old subjects, but neither young nor old subjects were affected by changes in context. Earles, Smith and Park (1996) conducted two experiments in which young and old subjects studied line drawings of

common objects in one room. Later, subjects were given a free recall test on the names of the studied objects either in the same room or in a different one. As usual, young subjects outperformed old subjects. However, the level of recall in the two age groups was not affected by the change of location between study and test when subjects were left to process the learning context in an incidental manner.

The results of the two studies just described are inconsistent with the predictions derived from the aging and memory literature. And, more importantly for the issue of interest in this paper, they rest value to the suggestion that a comparison of young and old subjects on a free recall test could be an appropriate way of assessing the validity of the outshining hypothesis. However, it could still be argued that, in both studies, the nature of the learning activities could have led to the formation of rather rich internal cues that could provide the basis for the utilization of non-contextual cues at retrieval, even in the case of the older subjects. In the study by Phillips and Kausler (1992) learning required the performance of actions, which usually results in enhanced memory representations of the to-be-remembered material (Backman, Nilsson, & Chalom, 1986). In the study by Earles et al. (1996) subjects learnt pictorial material, a type of stimulus that is also known to promote particularly rich internal representations (Paivio, 1971). Therefore, and similarly to the studies by McDaniel et al. (1989) and by Cousins and Hanley (1996) reviewed earlier, there is a reasonable possibility that the learning conditions in these aging studies could have lead to a retrieval situation in which contextual cues are not likely to be used, to a significant degree, by neither the young nor the older subjects, and thus they do not allow for a clear test of the predictions derived from the outshining hypothesis.

Reported next are two experiments designed to more strictly test the hypothesis that old subjects would be more dependent than young subjects on the availability of environmental context cues in their attempt to recall previously learnt material. In order to minimize the formation of enhanced memory representations that could later favor a retrieval strategy based on the use of efficient internal cues, subjects were presented at study with long lists of unrelated words. In the two experiments, standard manipulations of environmental context were used (room consistency or room change between study and test) with groups of young and old subjects. The first experiment manipulated physical reinstatement of context, and the second experiment manipulated both physical and mental reinstatement.

EXPERIMENT 1

In this experiment young and old subjects learnt a list of unrelated words in one location and were later tested for free recall either in the same or in a different room. It was expected that, under these circumstances old subjects would benefit, to a larger extent than young subjects, from being tested in the same environment in which they previously learnt.

METHOD

Subjects. A total of 80 subjects, men and women, participated voluntarily in the experiment. The 40 subjects in the elderly group were all residents in a community center, had completed elementary school education, and were reported to be in relatively good health by their residential caregivers. They ranged in age from 62 to 89 years, with a mean age of 78.5. The 40 subjects in the younger group were all undergraduate students at the Nursing School or at the Education School of the University of La Laguna, and they ranged in age from 18 to 23 years, with a mean age of 18.9.

Materials. A set of 90 words, 2 and 3 syllable nouns, were randomly selected from the 500 most frequent words in Spanish (Alameda & Cuetos, 1995). Ten of these words were used as distractors in a short recognition test, and the other 80 words formed the to-be-remembered list. This list was pre-recorded by a female speaker and presented to the subjects by means of a tape recorder.

Contexts. Two different rooms were used in the context manipulation. Room A was located in the fourth floor of the elderly residence building, its walls were bare and painted in white, and it contained only a long table and two chairs. There was a window overlooking a garden that remained open during the experiment, allowing for natural light to illuminate the room. Room B was located in the third floor of the same building, its walls were painted in white and decorated with pictures, and it contained a white sketching board, 8 round tables, several chairs and 3 shelves filled with books. A window looked on to a hallway and the lighting was completely artificial. Room A was considerably smaller than Room B. There were two experimenters, one assigned to Room A and the other assigned to Room B.

Design. Both rooms were used as study and test environments with the two age groups. Half the subjects in the same context condition studied the words and went through the memory test in Room A, and the other half studied and was tested in Room B. For subjects in the different context condition, half of them studied the words in Room A and were tested in Room B; the other half studied the words in Room B and were tested in Room A. The resulting experimental situation can be described as a 2 x 2 factorial design, with Environmental Context (same, different) and Group (young, old) as between-subject factors.

Procedure. Subjects in each age group were randomly assigned to either the same or different context condition and individually run in a session that lasted around 20 minutes. The session had three consecutive phases: study, retention, and test. At the beginning of the study phase the experimenter met the subject in the waiting area, located at the main entrance of the building, and accompanied the subject to the corresponding study room. Once there, the

subject was orally instructed to listen and memorize a list of words played through a tape recorder. The 80 words were presented at a rate of 3 seconds per word. After hearing the last word, the subject went through a short word-recognition test. This test was introduced to make the subject believe that the memory part of the experiment was finished. The subject was given a sheet of paper containing 10 words from the to-be-remembered list and 10 new words and instructed to mark a YES or a NO response for each word, indicating whether the word had been presented in the list or not. The duration of this task was 2 minutes, and no analyses were performed on these data.

Next, there was a 10-minute retention interval. For this retention phase the subject left the study room and remained in the waiting area. With the aim of further preventing active rehearsing of the studied words, subjects engaged in a distractor task. Old subjects did a figure completion task and young subjects did a logical reasoning task.

After the 10 minute interval the subject was accompanied by the corresponding experimenter to the appropriate test room (same or different) to begin the test phase of the experiment. Once in the room an unexpected free recall test was administered. The subject was instructed to recall aloud, in whatever order they came to mind, and at his or her own pace, all the words that he or she could remember from the list of words presented in the study phase. The time allowed for the completion of this task was 3 minutes.

RESULTS AND DISCUSSION

The 10 words used as old items in the initial recognition test were excluded from the data analysis. Each subject's score was the percentage of recalled words out of the remaining 70 words in the to-be-remembered list. Figure 1 shows the mean recall scores in each of the four experimental conditions.

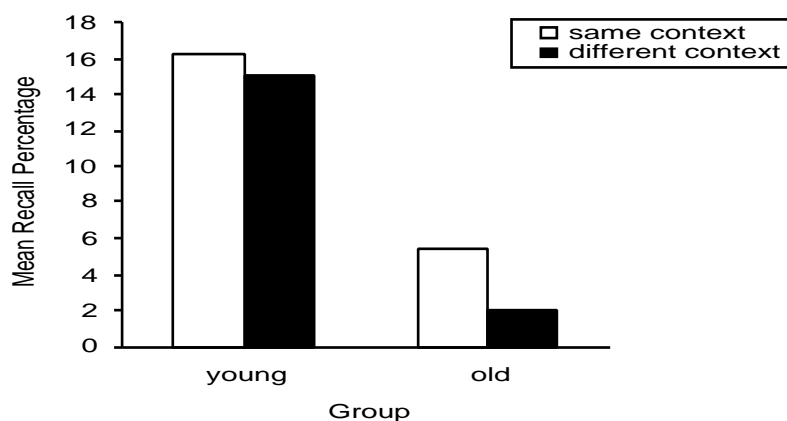


Figure 1. Mean recall scores as a function of age group and environmental context condition in Experiment 1.

There was an overall effect of group on free recall scores. The recall of young subjects ($M = 15.71$, $SD = 5.24$) was significantly higher than the recall of old subjects ($M = 3.75$, $SD = 2.64$), [$F(1,76) = 178.96$, $MSE = 15.99$, $p < .0001$]. The contextual manipulation also had a general effect on the recall scores. Subjects tested in the same environmental context recalled significantly more words ($M = 10.86$, $SD = 6.78$) than subjects tested in a different environmental context, ($M = 8.61$, $SD = 7.70$), [$F(1,76) = 6.33$, $MSE = 15.99$, $p < .02$]. The interaction between group and context did not reach significance [$F(1,76) = 1.53$, $p > .22$], but planned comparisons revealed that context manipulations had reliable effects only in one of the two age groups. As predicted, old subjects recalled significantly more words in the same context condition ($M = 5.43$, $SD = 2.52$) than in the different context condition ($M = 2.07$, $SD = 1.43$), [$t(38) = 5.18$, $p < .0001$]. On the contrary, the recall of young subjects in the same context condition ($M = 16.29$, $SD = 5.09$) was not significantly different from their recall in the different context condition ($M = 15.14$, $SD = 5.45$), [$t(38) = 0.69$, $p > .49$]. Effect-sizes for these two comparisons were estimated following Cohen's (1988) procedures. The size of the contextual effect was large ($d = 1.69$) in the group of old subjects, and considerably smaller ($d = .23$) in the group of young subjects.

EXPERIMENT 2

In this experiment, the same environmental context manipulations were used with similar groups of young and old subjects with the aim of replicating the findings of Experiment 1. Furthermore, a procedure for inducing mental reinstatement of the learning context (Smith, 1979) was used at the time of the test, with the aim of testing the predictions of the outshining hypothesis beyond the previously used physical reinstatement conditions. Consistently with the findings described above, it was expected that reinstatement of the original context, either physical or mental, would positively affect the recall performance of old subjects but not the performance of young subjects.

METHOD

Subjects. A total of 60 subjects, men and women, participated voluntarily in the experiment. The 30 subjects in the elderly group were community dwellers, recruited through a local senior citizens club. They ranged in age from 63 to 87 years, with a mean age of 74.6. Except for 3 subjects who had completed high school and 1 who had attended college, old subjects had only completed elementary school education. In response to a 5-category health questionnaire, 73% of the subjects in this group reported to be in good or very good health, and 27% reported their current health as fair. None of these subjects described their health as poor or very poor. The 30 subjects in the younger group were all third year psychology students, and they ranged in age from 20 to 23 years, with a mean age of 21.5. Ninety

percent of them rated their health as good or very good, 10% rated their health as fair, and none of them reported to be in poor or very poor health.

Materials and Contexts. The same verbal materials used in Experiment 1 were used in this experiment. Two different rooms were used in the context manipulation. Room A was an office on the first floor of the building in which the local senior citizens club was located; its walls were painted in white and decorated with several pictures, and it contained a large table, 3 chairs, a computer, a bookshelf and some flowerpots. There was a large window overlooking the street providing natural light as the only source of illumination. Room B was a larger storage room located on the same floor of the same building, but spatially distant from Room A; its walls were painted in white, and it contained 2 small desks, 2 bookshelves, 6 chairs and several cardboard boxes. There were two small windows looking on to a narrow courtyard. The windows remained closed at all times and the lighting was always artificial in this room. A different experimenter was assigned to each of the two rooms.

Design. Both rooms were used as study and test environments with the two age groups. There were 3 context-related conditions in the experiment: same context, different context and reinstated context. Subjects in the same context condition studied the words and went through the memory test in the same location (either Room A or Room B). In the different context condition, subjects studied the words in one location (for example, Room A) and were tested in another (for example, Room B). In the reinstated context condition subjects were also tested in a different room, but were given specific instructions to mentally reinstate the study context. The resulting experimental situation can be described as 3 x 2 factorial design, with Environmental Context (same, different, reinstated) and Group (young, old) as between-subject factors.

Procedure. The experimental procedure was the same as in Experiment 1. The only difference was that, immediately before the free recall test, subjects in the reinstated context condition were instructed to write a short description of the room where they had heard the list of words and to name up to 5 objects present in that room. Then they were invited to mentally recreate the study room in their minds and to use that representation of the study context to help them in recalling the words. The reinstatement instructions closely followed the procedure used by Smith (1979, Experiment 2). All subjects had 4 minutes to do the verbal descriptions and the mental recreation of the rooms.

RESULTS AND DISCUSSION

The 10 words used in the initial recognition test were excluded from the analyses. Figure 2 shows the mean recall scores in each of the 6 experimental conditions.

Overall, young subjects recalled significantly more words ($M = 15.81$, $SD = 3.88$) than old subjects ($M = 5.19$, $SD = 4.37$), [$F(1,54) = 110.90$, $MSE = 15.25$, $p < .0001$]. The contextual manipulation also had a significant effect on recall, [$F(2,54) = 4.95$, $MSE = 15.25$, $p < .01$]. Mean recall percentages were 12.14 ($SD = 7.32$) in the same context condition, 8.36 ($SD = 6.59$) in the different context condition, and 11.00 ($SD = 6.01$) in the reinstated context condition. Protected Least Significant Difference (PLSD) tests showed that recall in the different context condition was significantly lower than in both the same context condition ($p < .003$) and the reinstated context condition ($p < .037$), and that there was not a significant difference between the same context and the reinstated context conditions ($p > .35$), demonstrating that reinstatement of context, either physical or mental, tended to increase recall. The interaction between group and context was not significant, $F < 1$.

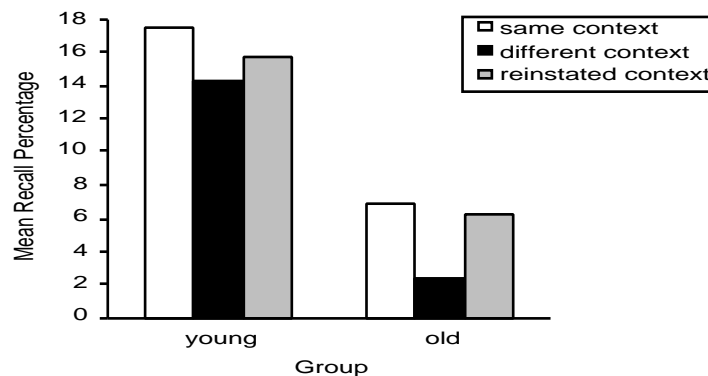


Figure 2. Mean recall scores as a function of age group and environmental context condition in Experiment 2.

Planned comparisons demonstrated that the contextual manipulations had a significant effect only with the group of old subjects, a clear replication of the findings of Experiment 1. The mean recall of young subjects was 17.43 ($SD = 4.80$) in the same context condition, 14.29 ($SD = 3.01$) in the different context condition, and 15.71 ($SD = 3.30$) in the reinstated context condition. These means were not significantly different from each other [$F(2,27) = 1.73$, $MSE = 14.33$, $p > .19$]. Nonetheless, and with the aim of providing additional information regarding the effectiveness of the contextual manipulations in this group of subjects, PLSD tests and effect-size estimations are reported next. Subjects tested in the same context condition showed a tendency to recall more words than subjects in the different context condition ($p > .07$; $d = .83$) and more words than those tested in the reinstated context condition ($p > .31$;

$d = .44$); and subjects tested in the reinstated context condition showed a tendency to recall more words than subjects tested in the different context condition ($p > .41$; $d = .48$).

The means for old subjects were 6.86 ($SD = 5.29$) in the same context condition, 2.43 ($SD = 2.14$) in the different context condition, and 6.29 ($SD = 4.00$) in the reinstated context condition, showing a reliable effect of context [$F(2,27) = 3.59$, $MSE = 16.18$, $p < .042$]. PLSD tests revealed that, for this age group, recall in the same context condition was reliably superior to recall in the different context condition ($p < .021$; $d = 1.15$), and also that recall in the reinstated context condition was superior to recall in the different context condition ($p < .041$; $d = 1.27$). The difference between the same context and the reinstated context conditions was not significant ($p > .75$; $d = .13$).

GENERAL DISCUSSION

The data collected in the two experiments reported here constitute evidence consistent with some previous findings showing that environmental context reinstatement can positively affect memory performance, and they also provide additional information regarding the conditions under which these sometimes elusive context effects are more likely to be observed.

Prior to the discussion of the issues more directly related to the specific contextual effects, a cautionary comment should be made regarding the interpretation of the group differences. The overall level of performance in the free recall task was reliably higher in the group of young subjects than in the group of old subjects. This pattern of results is consistent with well-established findings in the aging and memory literature, although the interpretation of these memory differences as pure effects of age cannot be warranted given that the young and old subjects participating in the present experiments differed not only on chronological age but also, and very importantly, in their level of formal education. It is certainly the case that age and memory tend to show a negative correlation even when the effects of educational level are experimentally or statistically controlled, and it has also been demonstrated that age-related effects on memory are present in highly educated subjects. However, the results of many other studies have shown that differences in educational level can significantly contribute to widen differences in memory performance when groups of young and old subjects are compared (see Kausler, 1991 for a review). Taking into account these considerations, there is a serious possibility that alternative explanations related to educational level could account for at least part of the overall differences found between the two groups, and therefore the main effects of the group variable found in the present experiments cannot be unequivocally ascribed to age.

Nevertheless, there are some reasons why the results of the present study are of interest. First of all, it is well known that, in the population at large, older people tend to have less years of formal education than younger people and, therefore, it could be argued that the samples used in the two experiments are, to a good extent, representative of their respective

populations. Second, the main idea behind the group manipulation was to select samples that could differ as much as possible in terms of their efficiency in the use of internally-generated retrieval cues, an attempt to maximize the opportunity for the less efficient subjects to show more dependency on environmental support. The fact that subjects in the older group had characteristics other than age that could also impair memory performance does not rest value to the assumption that they are more likely to show context dependency in recall tasks. And third, because the main goal was not that of investigating the ultimate nature of age differences on memory performance, the question of whether these differences reflect the pure effect of chronological age can be momentarily ignored, acknowledging that it is an issue of potential relevance and in need of further empirical and theoretical consideration. With these qualifications about the group differences in mind, the data collected in the two experiments reported here are still very relevant to the main problem under investigation, which is that of the relative value of context reinstatement as a facilitatory factor in free recall situations.

In agreement with the results of a number of other studies using identical manipulations, learning tasks and memory tests (for example, Alonso & Fernández, 1997; Fernandez & Glenberg, 1985), the results of the two experiments show that there was not a significant effect of context in the group of young subjects. Additional statistical analyses were conducted to assess the possibility that the failure to produce significant context-related differences in this group could be a consequence of low power in the experiments. Across the two experiments, physical and mental reinstatement of context produced remarkable effects in the group of old subjects, with consistently large effect sizes (average $d = 1.37$ for the 3 critical conditions). Using this value as an estimate of the expected size, the power to detect a similar effect in the group of young subjects was .98 in Experiment 1 and .82 in Experiment 2. Therefore, the absence of context-reinstatement effects in this group of subjects is unlikely to be the result of low power.

On the other hand, the positive effects of contextual reinstatement in the group of old subjects were clearly demonstrated in the two experiments. In Experiment 1, taking the memory test in the same room in which the words had been learnt led to better recall than taking the test in a different room. This finding was replicated in Experiment 2 under the same conditions, and it was also extended by demonstrating that the same type of facilitatory effects can be obtained when the physically absent context is mentally reinstated. These results are contradictory with the findings reported in two previous studies (Earles et al., 1996; Phillips & Kausler, 1992) in which no context dependency in free recall was found with groups of aged subjects. This disparity in the data can be assumed to be the consequence of an important difference regarding the type of information that the subjects had to acquire for later recall. In contrast with the two earlier studies, in which subjects learnt actions or pictures, in the present study subjects had to learn a relatively large number of unrelated words, a set of stimuli that is likely to result in poorer internal memory representations, and therefore reduce the availability of internal retrieval cues at the time of the test.

The overall pattern of results described above is broadly consistent with an account of environmental context effects based on the outshining hypothesis (Smith, 1988, 1994), a view that assumes that this type of contextual cues have a relative value as retrieval cues, being most effective when no better alternative cues are available. As expected from this assumption, only old subjects, who are likely to be less efficient than young subjects in using internal retrieval cues and therefore more dependent on external and readily available cues, proved to be affected by contextual manipulations. At the same time, the present data do not preclude other interpretations, such as the possibility that subjects in the two groups could differ in their likelihood to spontaneously use the strategy of mentally reinstating the original context when they are tested in a different room, or the possibility that the two groups differ in their way of processing the incidental context during the study phase. These and other specific issues related to the relationship between encoding/retrieval processes and context dependency in different age groups cannot be adequately resolved on the basis of the data collected in the present experiments, which were designed to address more primary and limited questions.

From a more general perspective, the results of the two experiments constitute evidence that, as widely assumed, the environmental context can play an important role in memory, facilitating recall when it is physically or mentally reinstated. However, and more importantly, the results also demonstrate that environmental context consistency between study and test does not guarantee that memory will be reliably affected under all circumstances. As evidenced by the data reported here and elsewhere (see Smith & Vela, *in press*, for a recent meta-analysis), context effects can vary in a predictable and systematic way, in response to particular experimental conditions. One major implication of this finding is that cases in which context effects have not been detected should not be taken as peculiar exceptions to a well established and general phenomenon, but rather as strong indication that a finer and more detailed analysis of the mechanisms underlying the effects is still needed.

RESUMEN

El valor relativo de la reinstauración del contexto ambiental en el recuerdo libre. Se investigó el efecto del contexto ambiental en dos experimentos de recuerdo libre con grupos de sujetos jóvenes y viejos. Todos los sujetos estudiaron una lista de palabras no relacionadas y posteriormente hicieron pruebas de recuerdo libre en la misma habitación o en una habitación diferente. Los resultados del Experimento 1 demostraron la ventaja de hacer el test en el mismo contexto para el grupo de sujetos viejos, pero no se encontraron efectos de la manipulación contextual con los sujetos jóvenes. En el Experimento 2 se replicó este hallazgo y, además, se demostró que los sujetos viejos (pero no los jóvenes) se beneficiaban de instrucciones de reinstauración mental del contexto de aprendizaje. Los resultados de ambos experimentos se discuten en términos del valor relativo de los indicios contextuales para los sujetos de cada uno de los dos grupos de edad.

Palabras clave: Contexto ambiental, recuerdo libre, envejecimiento.

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