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San Jose State University, 1990

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THE EFFECT OF VOCALIZED, MOUTHED, AUDITORY, AND SILENT REHEARSAL ON ELDERS' NAME-FACE RECALL

A Thesis

Presented to

the Faculty of the Department of Psychology

San Jose State University

In Partial Fulfillment

of the Requirements of the Degree

Master of Arts

by

Grace Pariante

May 1990

APPROVED FOR THE DEPARTMENT OF PSYCHOLOGY

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APPROVED FOR THE UNIVERSITY

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The Effect of Vocalized, Mouthed, Auditory, and Silent Rehearsal on Elders' Name-Face Recall

Grace Pariante

San Jose State University

Running head: REHEARSAL AND ELDERS' NAME-FACE RECALL

Abstract

The present study tested the use of a vocalization rehearsal mnemonic, which was expected to facilitate elders' name-face recall. It was also expected that both articulatory and auditory components of vocalization would contribute to enhance recall. The 37 subjects, over age 60, viewed eight name-face pairs. Subjects practiced the names while viewing photographs of the associated faces using one of four rehearsal strategies. The VOCAL Group said the name aloud. The MOUTH Group articulated, but did not speak the name. The AUDITORY Group heard a prerecording of the name being spoken. The SILENT Group silently rehearsed the name. Subjects were asked to recall the names when presented with the associated faces, immediately, after 48 hours, and after seven days. The significant main effect of rehearsal strategy was opposite from the predicted direction. The results suggest that the auditory component of vocalization may inhibit elders' name-face recall when a high cognitive load is imposed by a secondary task.

The Effect of Vocalized, Mouthed, Auditory, and Silent Rehearsal on Elders' Name-Face Recall

There is a decline in the acquisition and retrieval of new information from memory as one ages (Craik, 1977; Poon, 1985; Salthouse, 1985). A gradual decline in performance on many memory tasks begins as early as 20 years of age, but the sharpest overall decline occurs after age 60 (Poon, 1985). Many older adults realize and report a loss of memory capabilities (Cavanaugh, 1986-87; Riege, 1982) that they find frustrating (Poon, Fozard, & Treat, 1978). Their concern about the age-related decline in memory abilities is evidenced by the popularity of memory training courses offered for elders.

Memory training programs for elders often use mnemonic techniques that rely on forming imagery of the to-be-recalled items (Robertson-Tchabo, Hausman, & Arenberg 1976; Wood & Pratt, 1987; Yesavage, Rose, & Bower, 1983). Although imagery techniques have been shown to work with aging populations, they are difficult to employ (Cermak, 1980) and often go unused by the elderly students (Poon, Walsh-Sweeney, & Fozard, 1980; Robertson-Tchabo et al., 1976; Wood & Pratt, 1987). Thus, there remains a need for practical memory enhancement techniques for the elderly. Leirer, Pariante, Morrow, and Sheikh (1990) suggest that easy-to-learn mnemonics addressing specific, everyday memory problems provide immediate relief for elders' existing

memory problems. Also, they provide frequent practice opportunities needed to maintain proficiency in the use of the mnemonic.

In a recent survey, memory for people's names was rated the most important memory skill elders want to improve (Leirer et al., 1990). An easy-to-learn and simple technique to improve name recall is to verbally repeat the name as often as is possible during the introductory conversation with a person. This is a technique used by many people in public contact occupations and often advocated in sales training courses for client name recall (Carnegie, 1981). It may be that elders can use this technique to improve their memory for names.

The present study tests a vocalized rehearsal strategy for elders' recall of names. A review of the previous research in memory and aging, mnemonic techniques, name-face recall, and the effects of vocalized rehearsal on memory will show why this technique may benefit elders' name recall.

Memory and Aging

Substantial research efforts have been made to investigate age-related effects on memory. The content of gerontological journals' psychology sections show as many as 70% of the papers in a given year to be on the subject of memory and aging (Poon, 1985). Considerable evidence exists that memory for new information declines with aging (Craik,

1977; Poon, 1985). A model of memory that divides memory into two categories, primary and secondary, is commonly used when describing the acquisition and retention of new information (Poon, 1985). Primary memory is defined as a limited-capacity store that contains the information currently being used and of which one is aware. Information enters secondary memory when it leaves awareness and is stored for subsequent retrieval.

Poon (1985) summarizes the research on aging and primary memory and writes, "The findings of all primary memory paradigms seem clear: except for differences in response time, primary memory is relatively unaffected by age" (p. 431). Much larger age differences are found when the paradigms used require accessing information from secondary memory. Therefore, secondary memory has been the focus of research on memory and aging.

A competing model of memory has been used to describe age-related effects on memory. Craik and Simon (1980) propose that age-related decrements in memory can be attributed to deficits in attentional resources and in the depth to which information is processed. Attentional resources are those human resources that are utilized when focusing one's attention. Deficits in attentional resources are revealed when elders are given divided-attention tasks. Their performance on memory tasks deteriorates markedly when they are asked to divide their attention between the memory

task and a secondary task. The same level of deterioration does not occur with younger subjects (Craik, 1977; Craik & McDowd, 1987). Craik offers these results as evidence of a reduction in attentional resources with aging.

This apparent reduction in resources may reduce the depth of elders' processing of new information. "Depth" is defined as qualitative differences in the type of analysis that input receives (Craik & Simon, 1980). "Shallow" processing means the information being processed remains very close to the form of the stimulus input, whereas "deep" processing requires a greater transformation. Studies involving primary memory tasks, without divided attention, and using shallow processing show no age decrements, but elders' performance declines as deeper processing is required (Craik & Simon, 1980).

"Elaboration" refers to the extensiveness of processing at a given depth (Craik & Simon, 1980). For example, one could elaborately encode a word by generating a list of all the words that rhyme with it. This is not deep processing because the elaboration occurs at the phonemic level, which is close to the stimulus input. Craik and Byrd (1982) suggest that the deeper and more elaborate encoding require greater attentional resources. If elders' have fewer attentional resources available, their capacity to process deeply and elaborately is limited. Whenever the limit of processing resources is exceeded, memory will suffer.

Support for this view was found in earlier research by Eysenck (1974). In Eysenck's research, subjects received one of five sets of task orienting instructions before viewing word lists. They were asked to count the letters in each list word, find a word that rhymed with each list word, find a suitable adjective for each list word, form an image of each list word, or intentionally learn each list word. Although both older and younger subjects recalled more words in the adjective or image formation condition than they did in the letter-count or the rhyme condition, elder subjects did not benefit as much as the younger subjects from the deeper levels of processing allowed by these two conditions. The results of Eysenck's research indicate that there are limits to elders' ability to process information deeply.

Dixon and von Eye (1984) investigated depth of processing and text recall in young and older adults. Subjects read a 500-word narrative and were given one of four orienting instructions. In the shallow processing condition, subjects were asked to read the story and circle all spelling errors. In two deep processing conditions, subjects read the story and rated it on stylistic features or wrote advice for the family depicted in the story. In the intentional condition, subjects were instructed to read and learn the story. All age groups displayed better recall in the deep processing conditions than in the shallow processing condition. Each age group's performance across

the orienting conditions showed a similar pattern of recall, differing only in level of recall. There was no additional decrement in recall performance for the 60-to-82-year-old group in the deep processing condition. Perhaps the task demands were not great enough to deplete attentional resources or, as the authors suggest, elders do not spontaneously encode as deeply, but will if they are explicitly instructed how to process the information. Other research findings demonstrate that elders engage in active elaboration when stimuli are presented in such a way that elaboration is encouraged (Puglisi & Park, 1987).

The results of these two studies have important implications for the use of mnemonics by elders. The discussion of mnemonics, later in this paper, presents several memory techniques that rely on semantic or elaborate encoding as all or part of the mnemonic strategy.

There are other areas of research on aging and memory that have relevance to the use of mnemonics by elders: visual memory and imagery processes. Winograd and Simon (1980) review the literature in this area and report evidence for a decline in both visual memory and imagery processing with age. They point to a frequently cited finding on elders' test scores on the Wechsler Adult Intelligence Scale which reveals a steeper decline in the performance subsections than the verbal subsections of the test.

Winograd, Simon, and Smith (in Winograd & Simon, 1980) compared recall of lists of words and pictures between young adults and elders. They found that memory for lists was facilitated when the lists were presented as pictures only for the younger subjects. There was no advantage for pictorial over word presentation of lists for the elder subjects. They conclude that elders "have difficulty forming pictorial codes, in utilizing them effectively at retrieval, or both" (p.494).

Winograd and Simon (1980) also report on research of Gaylord and Marsh, who compared young and older adults on the Shepard-Metzler paradigm. This task requires subjects to "mentally rotate" at least one of two figures to determine if they are the same or mirror images. They found that elders performance on the task displayed a difference in slope of the mental rotation curve, illustrating a slowing in cognitive processing required to manipulate the mental images, aside from any slowness associated with motor response or sensory processing. This supports the position that elders have difficulty processing visual information, real or imagined.

Mnemonic Techniques and Name-Face Recall

Names are particularly difficult to remember for many people (McWeeny, Young, Hay, & Ellis, 1987). One might remember another's occupation, how many children they have, even what kind of dog they own, and still not be able to

recall his or her name. McWeeny et al. suggest that the unusual difficulty in remembering people's names stems from the low meaningfulness of names and the lack of contextual cues. People's occupations may be reflected in their dress (e.g., a suit and briefcase, a white lab coat, a tool belt), or in the place one meets them (e.g., a university campus, the computer section in a bookstore), thus providing context for recall. Even if a person can generate an intuition about an unknown individual's proper name, there is no reason to place confidence in this intuition.

It is not the lack of context alone that makes names difficult to remember. McWeeny et al.(1987), studied the recall of names and occupations where no contextual cues were provided for occupation. They used ambiguous names, such as Carpenter and Baker, to be recalled both as names and as occupations. Thus, the names used in the memory task had incidental meanings in that they were also occupations. They found that these ambiguous names were more frequently recalled as occupations than as names. McWeeny et al., suggest that "any incidental meanings names can have are ignored, so that they are learned as purely arbitrary labels" (p. 148).

Mnemonic techniques for name recall often involve some cognitive transformation of the name to allow them to be processed more deeply. Transforming the name into a meaningful word or words is usually combined with creating

images. For example, if a person's name is Cooper, one might be told to transform the name to "coop," and picture that person picking eggs from a chicken coop. A visual association is formed between the transformed representation of the person's name, and his/her face.

Imagery-based mnemonics have been shown to work in limited ways with elders, when combined with other supportive techniques, when elders are explicitly instructed to make use of them, and when recall is not tested beyond 48-hours (Robertson-Tchabo, Hausman, & Arenberg, 1976; Yesavage & Jacob, 1984; Yesavage, Rose, & Bower, 1983).

McCarty (1980) tested an imagery-based technique for name-face recall found in a popular book on memory techniques by Lorayne and Lucas. The technique requires one to do the following: (a) pay attention to the name and the face, (b) choose a prominent feature of the face, (c) transform the name into words that can be represented as objects, and (d) form an image where the object interacts with the prominent feature. To recall the name, one must identify the prominent feature, think of the image of the object interacting with the feature, and transform the object back to the name. McCarty found this technique to be successful in improving name-face recall, but only when all steps in the technique were used. Just making the name meaningful, or imagining the face next to, but not

interacting with, the meaningful representation of the person's name did not facilitate name recall.

There are several studies which have assessed elders' use of this name-face mnemonic. Yesavage and Jacob (1984) tested the mnemonic on name-face recall of elders, whose mean age was 74.2 years old. The mnemonic was tested in conjunction with relaxation techniques. Relaxation techniques alone did not facilitate elders' name-face recall, but when relaxation was combined with the use of the name-face mnemonic, elders' performance on a name-recall task improved significantly. The authors' previous attempts to teach elders the name-face mnemonic, without relaxation techniques, created high levels of anxiety in the elder students. Therefore, Yesavage and Jacob did not include a condition in their study where subjects used the mnemonic without the relaxation techniques.

In 1983, Yesavage, Rose, and Bower had tested this name-face mnemonic with retired persons, whose mean age was 65.6 years old. They instructed the subjects to use the mnemonic in one of three ways. One group used the mnemonic without forming the image. The second group used the mnemonic as stated above, which includes the formation of an interacting image. The third group added a semantic elaboration component to the name-face mnemonic. Subjects in this group were instructed to make a pleasantness judgement about the face in addition to using the mnemonic.

The results were similar to McCarty's; use of part of the mnemonic did not facilitate recall. The no-image group did not perform significantly better than the control group on the name-face recall task. The image and the image-plus-judgement groups both recalled significantly more names on a test of immediate recall than the no-image and control groups. After 48 hours, name recall in the image group deteriorated to the level of the no-image group. Only the image-plus-judgement group maintained a high level of recall for names after a 48-hour delay. This research demonstrates that inducing greater elaboration of the face strengthens the beneficial effect of the name-face mnemonic on elders' memory. It also demonstrates the limited utility of the name-face mnemonic when used by elders without additional elaboration of the to-be-recalled name-face pair. There are many circumstances where elders will want to remember someone's name for longer than 48 hours, and this technique alone will not provide enhanced recall once a 48-hour time period has elapsed.

Poon, Walsh-Sweeney, and Fozard (1980) reviewed the research which tested elders' use of imagery-based memory techniques and found 17 studies, 14 of which reported facilitating effects on memory. None of the studies reviewed involved name-face recall, but their results do imply that imagery techniques can be used to achieve positive results in improving elders' recall.

Robertson-Tchabo, Hausman, and Arenberg (1976) evaluated elders' use of the Method of Loci to learn lists. This technique requires one to visualize a familiar place, like one's home. Then, imagine walking through the house and seeing the items on the to-be-recalled list in familiar locations. For example, if you are trying to remember a grocery list, you might imagine a container of milk hanging from the dining room chandelier, a dozen eggs floating in the bathtub, and a loaf of bread pinned to the light switch in the hall. The researchers found this method improved elders' list recall on an immediate recall task.

On the final day of training, Robertson-Tchabo et al. gave elders a list to recall, similar to the lists with which they had been practicing the mnemonic on the prior three days. Elders' performance on the recall task dropped to baseline. The researchers found that elders did not use the mnemonic unless they were explicitly instructed to do so.

Wood and Pratt (1987) evaluated the use of the Pegword mnemonic by subjects ranging in age from 18 to 90 years. This mnemonic is similar to the Method of Loci, where one visually integrates items on a to-be-recalled list with a pre-established list of items (one is a bun, two is a shoe, etc.). They found use of the mnemonic significantly improved the performance of all age groups on a list learning task, but a follow-up survey, four months after

training, revealed very few of the students used the mnemonic beyond the training program.

In summary, it has been shown that imagery based mnemonics work in limited ways with elders. They work better when combined with relaxation training or semantic elaboration. Their usefulness as aids to recall names beyond 48 hours has not been demonstrated, even with the addition of supportive techniques. In addition, they may not be used beyond the classroom, which limits their practical application.

The literature on memory and aging indicates that age-related decline in elders' memory for nonverbal, visual information is greater than their decline for verbal information. After reviewing the literature on visual memory and imagery in the aged, Winograd and Simon (1980) state, "If older people in general do indeed manifest special problems with visual memory, than perhaps we are playing to a cognitive weakness in applying traditional mnemonics training" (p. 485). They suggest reliance on a verbal mnemonic might be more appropriate to the elderly.

There is another reason imagery-based mnemonics may not be practical for aiding elders name-face recall. They are difficult to use in social settings, which is exactly where one needs them most. Cermak (1980) found imagery techniques impractical for use in everyday memory tasks. He reported trying all of the techniques he had written about in his

book, "Improving Your Memory" and found only verbal mnemonics to have everyday utility.

The literature on the efficacy of verbal elaboration based mnemonics for elders' name-face recall is very limited. When Yesavage, Rose, and Bower (1983) tested the name-face mnemonic, they found that those elders using the mnemonic without the imagery did no better than the control group. This may not be a good test of a verbal elaboration mnemonic because the type of elaboration given to processing the name was designed for use with imagery.

Verbal elaboration based mnemonics which take into account the literature on elders' ability to elaborately encode information may be more effective than those that rely on visual processes. The type elaboration used will specify the amount of attentional resources required to process the name. As Robertson-Tchabo (1980) points out, "Elaboration encoding, adding a visual image or a verbal association to the item information, does make material more memorable; however, the additional information initially will increase the storage load and indeed may overload some older individuals' information-processing capacity" (p. 513).

Vocalization and Memory

The literature indicates a vocalized rehearsal technique should facilitate the recall of names (Conway & Gathercole, 1987; Crowder & Morton, 1969). Aside from the benefits of

repetition on memory (Rundus & Atkinson, 1970; Waugh, 1962), vocalization of visually-presented words has been shown to improve recall (Murray, 1965), learning (Mechanic & D'Andrea, 1966), and reading comprehension (Levy, 1978).

Improvements in comprehension can be attributed to phonemic encoding. Shankweiler and Liberman (in Levy, 1978) found that good readers were more likely to make acoustic errors in a short-term memory task than poor readers. These errors have been attributed to the better readers' use of phonemic processing. A phonemic representation "acts as a good memory representation from which message comprehension can occur" (Levy, 1978, p.127). Attempts to suppress subvocalizations during reading lead to poor comprehension (Hardyck & Petrinovich, 1970). These studies provide the empirical support for the assertions that vocalization during reading aids sentence memory, and that the positive effect of vocalization on memory may be attributed to phonemic encoding.

Research on modality and recall has shown that auditory presentation of consonants facilitates recall more than visual presentation (Murray, 1965). Murray (1965) instructed subjects in one condition to silently read consonants as they were presented. In another condition, subjects were instructed to vocalize the consonants as they read them. Subjects recalled the greatest number of consonants when they had been vocalized. Auditory

presentation has been shown to enhance word recall, particularly for the most recently presented words in a list (Crowder & Morton, 1969). The enhanced recall of the final words on a list has been referred to as the recency effect, and has been demonstrated to extend beyond what could be accounted for by either echoic or short term memory (Broadbent, Vines, & Broadbent, 1978; Conway & Gathercole, 1987; Watkins, Watkins, Craik, & Mazuryk, 1973). Thus, the acoustic properties of a vocalized rehearsal strategy should aid memory for names beyond immediate recall.

The mechanisms of the modality effect are still being debated. Several studies have shown that it is not simply the acoustic properties of the stimulus that enhance recall. Recency effects occur when subjects silently articulate, or "mouth," visually presented items (Campbell & Dodd, 1980; Green & Crowder, 1984). It is possible that the modality effect can be attributed to a speech-based but nonacoustical phonemic encoding.

There are several reasons why the repeated vocalization of a name might enhance memory for it. Initial vocalization assures that the subject has heard and phonemically encoded the input. Articulating the name provides a second speech-based, nonauditory code. Both auditory and articulatory processing provides more elaborate encoding of the name. Additionally, there is evidence that auditory presentation of a name in one's own voice may be encoded

differently than auditory presentation in another's voice (Crowder, 1970).

Enhanced recency effects due to auditory presentation can be diminished by the addition of a suffix to a word list. This is referred to as the negative suffix effect. The negative suffix effect is significantly diminished if the word list and suffix are spoken in two different voices (Crowder, 1970). It is possible that the two voices are being encoded differently, as one does not interfere with the other. Therefore, when a person is introduced, and his or her name is repeated in a different voice, additional phonemic code may be produced for that name. Thus, vocalizing a name may provide more elaborate encoding of the name being processed.

Need for Research

Perhaps vocalization improves recall for two reasons. First, auditory stimuli produce phonemically-encoded input, which can be more easily retrieved. For auditorily presented names, repetition of the name in one's own voice may produce an additional auditory code. Second, the production of one's own vocalizations creates an articulatory code corresponding to the muscle movements required for speech. The more elaborate encoding of the name could provide additional access nodes for memory retrieval.

A vocalization rehearsal strategy for elders' name-face recall may be useful for the following reasons: (a) it relies on elders' strengths, verbal processing, instead of their weaknesses, visual processing; (b) it provides a mechanism for more elaborate encoding that will not tax the cognitive processing resources of elders; (c) elaborate encoding, in concert with repetition, will strengthen the memory trace; and (d) the technique is easy to learn, easy to use, and highly appropriate to social settings, where the need for it is greatest.

Based on the above, the present study tests two hypotheses. First, elder subjects who perform repeated vocalization of a to-be-recalled name will recall correctly a greater number of names than elder subjects in a control group, who use a silent rehearsal strategy. Performance on a name-face paired-associate recall task will be compared between groups to test the hypothesis that it is the vocalization and not the rehearsal component of the mnemonic that enhances recall. Second, mouthed rehearsal and auditory-only rehearsal will facilitate recall more than silent rehearsal but not as much as vocalized rehearsal, which makes use of both articulatory and auditory encoding processes. Although no one study has directly compared these four rehearsal strategies, the set of data suggests that these hypotheses are plausible and that there is no

reason to believe that the pattern of recall would be different for younger and older adults.

This study is also designed to assess the effectiveness of these mnemonics over time. Previously, mnemonics for name-face recall have not been tested beyond 48-hours. To be useful, a name-face mnemonic should facilitate recall for at least a week. There is not enough research on modality and long-term memory reported in the literature (Penny, 1989) to allow a prediction on the duration of the effect of a vocalization rehearsal strategy. The effect of vocalized rehearsal on elders' memory of name-face associate pairs will be tested for immediate, 48-hour, and 7-day recall, to ascertain its utility as a mnemonic.

Method

Subjects

A total of 41 subjects were recruited through the Colonial Club Women's Club, in Boynton Beach, Florida. The club was paid $200.00 for the group's participation in this study. Four subjects did not complete the study: one became ill, one had to tend to the illness of her spouse, and two did not return for the second session. The 37 remaining subjects ranged in age from 61 to 83 years (M = 74.1 years), and 81% were female. Their education level ranged from 8 to 21 years (M = 12.5 years).

Subjects were given the Vocabulary Recognition and Object Rotation subsections of the Schaie-Thurstone Mental

Abilities Test (see Appendix B) after the final recall test, to screen for cognitive impairment. No subjects were excluded from the analysis based on this cognitive assessment. All subjects scored within two standard deviations of the mean on both the Recognition Vocabulary (RV) and Object Rotation (OR) subsections except for one subject, who scored within three standard deviations from the mean in the RV subsection. This subject was not excluded from the analysis based on more normal performance on the OR subsection, and a comparatively low level of education which could have explained the low RV score.

Materials

Photographs of eight people's faces were used for the name-face paired-associate recall task. The same stimuli were used for all subjects. For each of the eight stimulus people, four separate 4 inch by 6 inch color photographs, differing in position or expression, were used (see Appendix C). The four photos of an individual stimulus person were arranged into a block and glued onto a 10 inch by 12 inch, white, cardboard backing forming a photo set. The four separate views of each face were used because Bartlett and Leslie (1986) found this method of presentation to remove age differences in face recognition and because of the greater ecological validity of this method as compared with a single-view presentation.

Surnames were selected at random from the Los Altos, Los Altos Hills, Mountain View, Sunnyvale Pacific Bell Telephone Directory with the following constraints: the name must appear in that directory more than 10 and less than 50 times, the name would not also be the name of an object (e.g., Hood or Card), and the name could not have obvious ethnic origin (e.g., Hong or Alvarez). This method was employed to assure that the names were ones in which subjects were familiar and that they did not promote the spontaneous use of other mnemonics. First names were chosen from a list of the top ten first names given to children born in the USA in 1925 (Busse, 1984; Dunkling, 1977) to assure subjects' familiarity with the names. Eight surnames and eight first names were selected and randomly assigned to photo sets with the constraint that name gender and face gender matched. Names were printed in black ink on white paper in a large, easy-to-read font. The printed name was fixed to the center of the photo set.

Design

The variable of interest was rehearsal strategy. Subjects were assigned to one of four groups, each group using a different rehearsal strategy for the name-face recall task. One group vocally rehearsed the name. This group was referred to as the VOCAL Group and was included to test the effectiveness of a vocalization rehearsal strategy for name-face recall.

A second group was instructed to rehearse the name silently and to move their lips, articulating or "mouthing" the name without actually vocalizing it. This group was included to investigate the articulatory component of the vocalization technique and was referred to as the MOUTH Group.

A third group heard a prerecorded auditory presentation of the to-be-remembered name at rehearsal time. They were instructed to listen to the name silently, without vocalizing or articulating it. This group was referred to as the AUDITORY Group and was included to investigate the acoustical component of the vocalization strategy.

A fourth group was instructed to silently rehearse the name, without vocalizing or articulating it, and was referred to as the SILENT Group. This group served as a control for the vocalization rehearsal strategy.

The SILENT and AUDITORY Groups were closely monitored by the experimenters during rehearsal to assure that subjects in these two groups neither vocalized nor articulated the name. The MOUTH Group was similarly monitored to assure that subjects in this group did not vocalize the name.

Subjects were assigned to a group as they arrived for the study. The two experimenters each had a list of subject identification numbers, coded to specify group. Each list repeated the same sequence of the four groups: VOCAL, MOUTH, AUDITORY, and SILENT. One list started with the VOCAL Group

and the other list began with the AUDITORY Group. As subjects arrived, they were assigned the next number on the available experimenter's list. This procedure allowed us to randomly assign subjects to groups and to balance approximate start time, start day, and experimenter by experimental condition.

Procedure

All subjects received a consent form to complete prior to participation in this study (see Appendix D). Each subject performed the name-face associate-pair recall task independently. The experimenters instructed each subject on the appropriate rehearsal technique to be used during the study session and explained the timing of presentations and rehearsal cues (for a complete set of instructions given to subjects, see Appendix E).

Study Phase. Name-face pairs were presented in the same random order to each subject. Subjects in all groups were instructed to rehearse the to-be-recalled name, one time, each time they heard a tone. A tone sounded, and a photo set was presented along with a visual presentation of the associated name. The subjects rehearsed the name according to the instructions they had received. After rehearsing the name once, the photo set and the name were removed. After 5 s, a tone sounded, and the photo set and name were presented once again to the subject. The subject rehearsed the name, and the photo set and name were removed. The tone

sounded to cue presentation and rehearsal again at 15, 30, and 60 s. Each photo set was presented five times during a 60 s interval and was displayed for 2 s at each presentation. After the final presentation of a photo set, there was a 5 s rest before the next photo set and name were presented. This procedure was repeated until all eight name-face associate pairs were presented.

Subjects were asked to perform a secondary task between rehearsals to prevent unprompted rehearsal and to inhibit the use of other mnemonics. They were given several sheets of text and a pencil and were instructed to scan each line of text and determine if the letter "v" appeared in the line. If the letter "v" appeared in that line, they were to put a check mark at the end of the line (see Appendix F). This task was designed to provide sufficient, but not burdensome, distraction during the nonrehearsal portions of the study phase.

Test Phase. Subjects were tested for cued recall, immediately, 48 hours, and 7 days after presentation of the to-be-recalled name-face pairs. Photo sets presented in the test phase were the same photographs presented in the study phase, but the written name appearing in the center of the photo set was masked by a cardboard frame. Photo sets were presented in a new random order for each test trial, but order remained constant within test trials across subjects. For each test session, a photo set was presented, signaling

subjects to verbally respond with their best recollection of the name associated with the presented face. Subjects' responses were recorded on audio tape. The experimenter repeated each subject's response to assure this was the response the subject had intended and that the response was clearly recorded on tape. The photo set was removed after 60 s or after the subjects had made their response, whichever occurred first. Subjects were given a warning after 50 s that their time was running out, signaling them to give a response. The next photo set was presented immediately, and this process was repeated until all eight name-face associate pairs were tested.

Scoring. Subjects' correct recall of names was evaluated using the following scoring method. Subjects received a maximum of two points per stimulus person, one point for correctly recalling the first name and one point for correctly recalling the surname. Subjects were given a point for acceptable derivatives of a first name, but were not given a point for an acoustically similar name (e.g., "Charlie" was scored as a correct response for "Charles," but "Joan" was not scored as a correct response for "Jean"). Points were only awarded when a name was recalled with its appropriate face counterpart. Subjects could attain a maximum of 16 points if they correctly recalled all 8 first names and all 8 surnames, when presented with the associated faces.

Results

Name recall scores were compared using a 4 x 3 (Rehearsal Strategy x Time of Recall) mixed Analysis of Variance, with repeated measures on the latter factor. This analysis was designed to test the hypothesis that vocalized rehearsal of names would have a significant positive effect on the number of names recalled correctly by elders, (ie., the number of names correctly recalled was expected to be greater for the VOCAL Group than for the SILENT Control Group). There was a significant main effect for rehearsal strategy, $F(3,31) = 2.92$, $p<.05$, and significant main effect for time of recall, $F(2, 62) = 3.37$, $p<.04$. However, there was no significant Rehearsal Strategy x Time of Recall interaction, $F(6, 62) = 0.48$, $p>.25$, suggesting no differential performance between groups across time.

Group means are reported in Table 1. Average recall scores were highest for the SILENT Group and lowest for the VOCAL Group, on all three test trials. This finding directly contradicts the hypothesis that elders using a vocalization rehearsal strategy would perform better on a name-face paired-associate recall task than elders using silent rehearsal. Post hoc Least Significant Difference (LSD) t tests revealed that the mean recall scores for both the SILENT and MOUTH Groups differed reliably from the mean recall scores of the VOCAL Group, on all three recall trials (all $p < .05$).

Table 1

Mean Performance Scores on Three Test Trials of Name-Face Recall by Elders Using Four Rehearsal Strategies

Rehearsal strategy	n	Recall		
		Immediate	48-hour	7-day
VOCAL	11			
M		1.5	1.5	1.1
SD		1.1	1.7	1.3
MOUTH	8			
M		3.7	2.8	2.9
SD		3.1	2.4	2.8
AUDITORY	10			
M		2.2	2.4	1.8
SD		1.8	2.0	1.3
SILENT	8			
M		3.9	3.0	2.9
SD		2.8	2.0	2.2

Note. Maximum recall score is 16.

No group did well on the task. Mean recall scores for each group were converted to mean percentage-correct scores and are reported in Figure 1. The best performance was displayed by the SILENT Group on the immediate recall task, who recalled fewer than 25% of the name-face paired associates.

A one-way Analysis of Variance was executed to test for group differences in performance on the text scanning task. Rehearsal strategy did not affect performance on the secondary task, $F(3, 29) = 0.64$, $p > .25$.

Additional Analyses

Groups were not matched by age, level of education, or cognitive functioning, because this information was only obtained from subjects during the last experimental session. Mean age, education level, and cognitive test scores are reported in Table 2. To test the possibility that these variables might account for the differences among groups, a 4 x 3 (Rehearsal Strategy x Time of Recall) Analysis of Covariance, with repeated measures on the latter factor, was performed to adjust group mean recall scores, and the overall F test, for the variance between groups that can be attributed to differences in age, number of years of formal education, or scores on the two subsections of the Schaie-Thurstone Adult Mental Abilities Test.

Both Age, $F(1, 26) = 9.32$, $p < .005$, and Object Rotation Subtest scores, $F(1, 26) = 6.98$, $p < .01$, accounted for

Figure 1. Percent of names correctly recalled on three trials by elders using four rehearsal strategies.

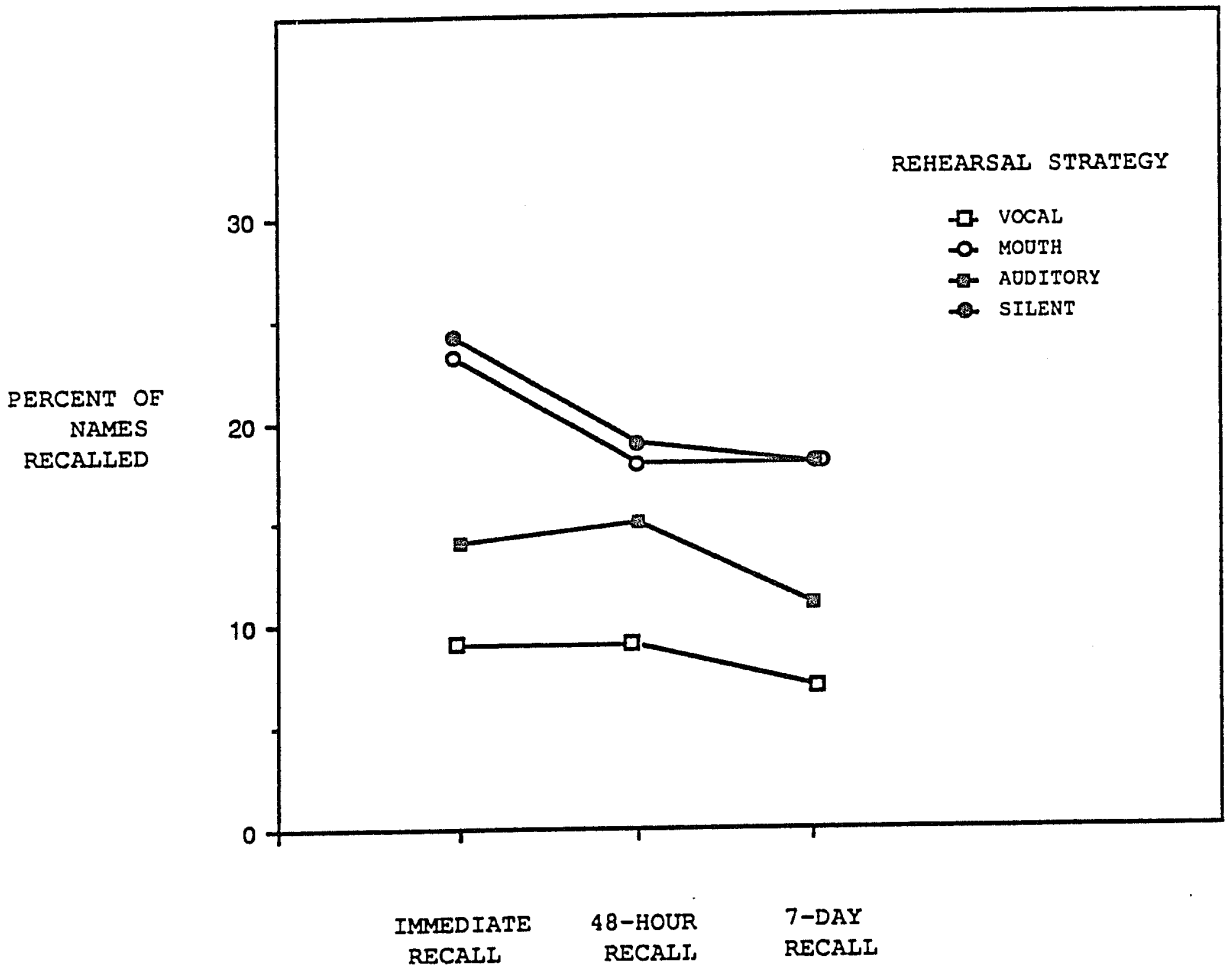

Table 2

Rehearsal Strategy Group Mean Subject Variables

Rehearsal strategy	n	Age	Education	Cognitive test scores: Recognition Vocabulary	Cognitive test scores: Object Rotation
VOCAL	11				
M		76.0	11.2	33.8	12.1
SD		4.8	2.1	13.0	11.4
MOUTH	8				
M		73.1	11.4	42.3	18.0
SD		5.5	2.2	6.1	13.5
AUDITORY	10				
M		72.0	13.6	39.1	20.6
SD		7.9	2.9	8.2	10.4
SILENT	8				
M		75.4	14.4	39.4	13.4
SD		1.0	3.2	10.4	9.0

Note. Education is reported as number of years of formal education.

Note. Cognitive test scores are reported as raw scores on two subsections of the Schaie-Thurstone Adult Mental Abilities Test.

significant variation in recall scores. Neither Level of Education, $F(1, 26) = 2.06$, $p>.10$, nor Recognition Vocabulary Subtest scores, $F(1, 26) = 0.27$, $p>.25$, accounted for significant variation in recall scores. A significant main effect was found for Rehearsal Strategy, $F(3, 26) = 4.25$, $p<.01$. Adjusted group means are reported in Table 3. The same pattern of group recall remained the same after adjusting for the covariates. Thus, the difference in performance among groups was not a result of these individual differences.

These results indicate that vocalizing the name actually retarded elders' recall performance on this task. Two types of information, auditory and articulatory, are processed when one vocalizes a name. Perhaps the processing of one or both of these types of information interferes with elders' recall. To explore this possibility, groups were rated according to the presence or absence of these two components (i.e., the VOCAL Group used a rehearsal strategy that has both an articulatory and an auditory component, the MOUTH Group's strategy has only the articulatory component, the AUDITORY Group's strategy has only the auditory component, and the SILENT Group's strategy has neither component). Then, a 2 x 2 x 3 (Auditory Processing x Articulatory Processing x Time of Recall) mixed Analysis of Variance, with repeated measures on the last factor, was performed to test if either the auditory or articulatory processing of

Table 3

Adjusted Mean Performance Scores on Name-Face Recall, After Accounting for Between Groups Variance Attributed by Age, Education, and Cognitive Test Scores

Rehearsal strategy	*n*	Recall		
		Immediate	48-hour	7-day
VOCAL	11			
M		1.7	1.5	1.2
SE		0.62	0.47	0.53
MOUTH	8			
M		3.7	2.9	3.5
SE		0.77	0.57	0.65
AUDITORY	10			
M		2.1	2.1	1.5
SE		0.61	0.46	0.52
SILENT	8			
M		4.2	3.4	2.8
SE		0.76	0.57	0.64

vocalization could be affecting elders' recall performance. Results of this analysis indicate a significant main effect of Auditory Processing, $F(1, 31) = 7.18$, $p<.01$, and a significant main effect of Time of Recall, $F(2, 62) = p<.04$. There was no significant main effect of Articulatory Processing, $F(1, 31) = 0.63$, $p>.25$, and no significant 2-way or 3-way interactions. Means are reported in Table 4. These results indicate that the processing of auditory information interfered with elders' recall in this task.

Discussion

A vocalization rehearsal mnemonic was tested for use by elders in name-face recall. It was expected that use of this strategy would facilitate elders' recall of name-face associate pairs. According to the conclusions drawn from the earlier literature review, vocalization allows more elaborate encoding of the to-be-remembered name. It adds additional phonemic code and an articulatory code to the processing of the name, which should strengthen the memory trace and provide additional access nodes for recall. Furthermore, vocalization as a technique to induce elaboration does not require an undue amount of attentional resources, making the technique appropriate for use by elders. The results of this study suggest that vocalization may actually retard elders' recall. The analysis of auditory and articulatory processing effects on recall indicates that it is the auditory component of vocalization

Table 4

Mean Performance Scores on Name-Face Recall by the Presence or Absence of Two Vocalization Components in the Rehearsal Strategy Used by Elders

Vocalization component	*n*	Recall		
		Immediate	48-hour	7-day
AUDITORY				
Present	20			
M		1.9	1.8	1.3
SD		1.5	1.7	1.2
AUDITORY				
Absent	15			
M		3.8	3.0	3.0
SD		2.9	2.1	2.5
ARTICULATORY				
Present	17			
M		2.4	1.9	1.8
SD		2.4	1.9	2.3
ARTICULATORY				
Absent	18			
M		2.9	2.7	2.3
SD		2.4	2.0	1.8

that negatively impacted elders' recall of names. Previous research has produced beneficial effects of auditory processing on elders' recall (Arenberg, 1977; Craik, 1977). It is not clear why this task did not yield the same result.

One conjecture is that the secondary task, included to prevent elders from using other recall strategies during the study session, provided an excessive cognitive load. Subjects were instructed to scan text between presentations of the name-face pairs. Several subjects reported that they had become so involved with scanning text that they forgot to concentrate on the names or faces. Although rehearsal strategy did not affect performance on the secondary task, it is possible that the cognitive load produced by a demanding secondary task interacted with rehearsal strategy. The cognitive load imposed by the secondary task may have impaired recall performance for only those subjects using a mnemonic that allows auditory processing of the to-be-recalled information. Therefore, two areas that need to be discussed in light of these results are cognitive load and auditory processing.

Cognitive Load

Research has shown that elders are particularly penalized under conditions of high cognitive load (Morrell, Park, & Poon, 1989) or when their attention is divided between two tasks (Brinley & Fitcher, 1970; Craik, 1977). If elders' attentional resources are already limited, the

additional attention required to manage two tasks simultaneously can be unavailable.

Macht and Buschke (1983) used a divided attention task to measure cognitive load on a memory task and found that it was elders' performance on the secondary task that deteriorated when cognitive load on the memory task was high. They had attempted to show that a secondary task methodology can be used with elders to measure cognitive demands of memory tasks. Therefore, the tasks may have been structured in such a way to prevent the secondary task from interfering with the memory task.

Undue distraction from the name-face recall task produced by text scanning had not been anticipated. Although subjects clearly understood that the primary focus of the study was to test various rehearsal strategies for name recall, several reported becoming overly involved with text scanning. This may be similar to what occurs in a social setting which makes names so difficult to recall. On introduction to a person, one becomes distracted by the task demands of conversing with a stranger and forgets to attend to his or her name. It appears that the demands of the text scanning task created excessive distraction and a high cognitive load, which taxed elders' ability to perform the memory task. The overall low level of recall is consistent with this interpretation.

Auditory Processing

Auditory presentation on a memory task has been shown to reduce the harmful effects of divided attention on elders' performance (McGhie, Chapman, & Lawson, 1965). Craik (1977) contends that, for visual tasks, auditory input need not be attended to immediately, but could be held briefly until the subject can attend to it. Auditory input takes advantage of the longer duration of an echoic store than an iconic store (Crowder & Morton, 1969). This longer duration offers flexibility in timing of attention to input, which allows subjects to manage two tasks, without having to expend additional cognitive resources on the management function.

In some memory tasks, auditory presentation of the to-be-recalled information has had deleterious effects on elder's recall. Corgiat, Templer, and Newell (1989) studied the effects of presentation modality and task demand on age-related memory differences for the recall of prose. They found that written presentation produced higher recall than did auditory presentation for both young and old. The authors point out that, "a prose learning task has many of the same characteristics of a divided attention task in that the learner must attend to this incoming message while simultaneously retrieving old information in order to integrate newly presented information into the general meaning of the text" (p. 54). Many primary tasks can be

characterized as divided attention tasks when one views the management techniques that each task allows.

In a prose learning task, attentional resources needed to manage the two tasks are greater when the information is presented auditorily. Elders can stop attending to visual input when they need to shift to integrating the information being processed, and then shift back for more visual input. When the information is presented auditorily, the management task becomes more complex. They can not control the timing of input beyond the duration of an echoic store. At times they will have to forego integration to attend to input, or vice versa. Attentional resources may be taxed when they are forced to manage a shift before completing a meaningful segment of the task on which they are focused.

It is possible that a more difficult dual-task management function was required of the AUDITORY Group, but this is not true of the VOCAL Group. Rehearsal time for subjects in the AUDITORY Group occurred when they heard the tone that cued rehearsal, immediately followed by the auditory presentation of the name via cassette tape. Subjects had no control over timing of rehearsal. On the other hand, the VOCAL group heard the tone that cued rehearsal time and had a second or two to respond and shift their attention from text scanning to rehearsing the name. Therefore, it is not this facet of dual-task management that depressed performance in the both of the two groups that

received auditory input. It may be some other aspect of task load that interacted with auditory processing to produce decreased performance in name recall by elders.

Arenberg (1977) offers an explanation of why auditory augmentation of visual input may fail to improve recall. He states that the auditory input may interfere with a person's attempt to organize the information in some meaningful way. The benefits of auditory input are dependent on how the person processes the visual information without auditory augmentation. Auditory processing of a name could be interfering with elders' organization of the visual information provided by the photos and the written name. Although this is unlikely, it is possible.

Future Research

The interaction between task load and auditory processing of input needs to be investigated further before conclusions can be made about the effectiveness of a vocalization mnemonic for elders' name recall. These results suggest that a vocalization mnemonic may only improve elders' name-face recall under low task load conditions.

Additionally, the four rehearsal strategies used in the present study need to be tested using a younger subject population. The set of data reported in the literature suggests that, under normal task load, younger subjects' recall is improved by vocalizing, mouthing, and hearing the

to-be-recalled information, but these three strategies have not been tested together, in a single study.

To summarize, elders experience and report a significant memory loss with aging. Mnemonic techniques need to be developed specifically for an elderly population that take into account their cognitive strengths and weaknesses, do not require excessive attentional resources, and address their specific, everyday memory problems. A vocalized rehearsal strategy has been proposed for aid with elders' name-face recall. This study does not support the efficacy of the mnemonic. It tested the use of the mnemonic under conditions that may have imposed an excessively high cognitive load and found that vocalization actually reduced elders' name-face recall. Further study of task load and input modality is needed before the vocalization rehearsal strategy can be fairly evaluated for use by elders in name-face recall.

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Footnotes

Requests for reprints should be sent to Grace Pariante, Department of Psychology, San Jose State University, San Jose California 95192.

Appendix A

Thesis Proposal Approval Forms (see following pages):

1. Thesis Committee Review and Design and Analysis Review Approval Form
2. Human Subjects Institutional Review Board Project Proposal Review Approval Form

APPROVED BY THE MASTER'S THESIS COMMITTEE

(Robert G. Cooper, Ph.D.)

(Kevin Jordan, Ph.D.)

(Von O. Leirer, Ph.D.)

APPROVED BY THE DESIGN AND ANALYSIS COMMITTEE

SAN JOSE STATE UNIVERSITY
GRADUATE STUDIES AND RESEARCH

HUMAN SUBJECTS INSTITUTIONAL REVIEW BOARD
PROJECT PROPOSAL REVIEW

Regular Review ☐ Expedited Review ☐ Deadline Date _____

I, the undersigned member of the San Jose State University Human Subjects Institutional Review Board, have reviewed the following proposal submitted to the Board on 7/14/89 by:

PRINCIPAL INVESTIGATOR: Grace Pariante
PROTOCOL #: 7544 DEPT: Psychology
PROJECT TITLE: The Effect of Vocalized, Mouthed, Auditory, and Silent Rehearsal on Elders' Name-Face Recall

I recommend the following action (indicate one):

1. Approved for clearance as involving minimal risk to Human Subjects. ☒

2. Approved for clearance with risk to Human Subjects. ☐

3. Approval depends upon the satisfactory completion of the following conditions. ☐
_____
_____
_____
_____

4. I have serious concerns about this protocol and it should go before the full committee to review. ☐
_____

Signature of IRB-HS member 7/26/89 Date

5. Not Approved. ☐ Approved. ☑

OFFICIALS SIGNING FOR INSTITUTION

Chair, Human Subjects Institutional Review Board 8/6/89 Date

Serena Stanford, Ph.D. 8/9/89 Date
AAVP for Graduate Studies & Research

Please return to: Graduate Studies and Research Office, Administration Building 150, San Jose State University, One Washington Square, San Jose, CA 95192-0139
(408) 924-2480

Appendix B

Schaie-Thurstone Adult Mental Abilities Test: Recognition Vocabulary and Object Rotation subsections (see following pages).

PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

55-61

U·M·I

Appendix C

Sample Photo Set: (see following page)

Margaret Kasper

Appendix D

Subject Consent Form:

AGREEMENT TO PARTICIPATE IN RESEARCH
SAN JOSE STATE UNIVERSITY

RESPONSIBLE INVESTIGATOR: Grace Pariante

TITLE OF PROTOCOL: The Effect of Vocalized, Mouthed, Auditory, and Silent Rehearsal on Elders' Name-Face Recall

I understand that I am being asked to participate as a volunteer in a research study that is investigating memory for people's names of adults over age 60. I also understand that should I choose to participate in this study I will be asked to view several photographs of people's faces and to recall their names immediately, after 48 hours and after 7 days.

Results of this study will add to our understanding of memory improvement techniques that can be used by adults over age 60 to better recall names.

I also understand that:

1) I will meet with the researcher three times. During our first meeting I will be given instruction on a mnemonic that I will use to help recall names. Next, I will be shown photographs of eight people and their associated names. Then, I will be presented with the photos once again and be asked to recall the associated names. My responses will be recorded on audio tape. The first meeting should take 30 minutes. I will be asked to recall the names again after 48 hours. This second meeting should take 15 minutes. Finally, I will be asked to recall the names after seven days. I will also be asked to complete two subsections of the Schaie-Thurstone Adult Mental Abilities Test. The final meeting should take 30 minutes.

2) Possible risks from participating in this study are minimal. The nature of the recall task is not threatening to most people. Furthermore, I may decline to answer any, or as many, questions as I choose not to respond to and can refuse to participate or withdraw from this study at any time without consequence.

3) Two hundred dollars will be paid to the Colonial Club Women's Club for the group's participation in this study. Additionally, I may benefit from the personal understanding I gain of my own recall abilities, and from the mnemonic on which I will receive instruction. I may also benefit from

the practical experience in participating in an organized research study.

4) No better or alternative procedures are available to conduct this type of research.

5) The results from this study may be published, but any information from this study that can be identified with me will remain strictly confidential and will be disclosed only with my permission or as required by law.

6) Any questions about my participation in this study will be answered by Grace Pariante, who can be reached by calling: (415) 966-1703. In addition, complaints about the procedures may be presented to Robert Cooper, Ph.D., Professor of Psychology, who can be reached by calling: (408) 924-5651, or by writing: San Jose State University, Department of Psychology, One Washington Square, San Jose, CA 95192-0139. For questions or complaints about research subjects' rights, or in the event of a research related injury, contact Serena Stanford, Ph.D., Associate Academic Vice President for Graduate Studies and Research, at (408) 924-2480.

7) My consent is given voluntarily without being coerced; I may refuse to participate in this study or in any part of this study, and I may withdraw at any time, without prejudice to my relations with SJSU.

8) I have received a copy of this consent form for my file.

I HAVE MADE A DECISION WHETHER OR NOT TO PARTICIPATE. MY SIGNATURE INDICATES THAT I HAVE READ THE INFORMATION PROVIDED ABOVE AND THAT I HAVE DECIDED TO PARTICIPATE.

_____ _____

Participant's Signature Date

_____ _____

Investigator's Signature Date

Appendix E

EXPERIMENTERS' SCRIPT (for Session One):

INTRODUCTION:

My name is . . . .
This research is being conducted in conjunction with the Department of Psychology at San Jose State University.
The purpose of this study is to develop memory techniques that can be used to help you remember people's names.

CONSENT:

Participation in this study requires that you be available to meet with me on three separate occasions over the next eight days: today for 45 minutes, the day after tomorrow for 15 minutes, and finally, a week from today for 30 minutes.
Go through the sign up list and confirm next two appointments. Fill out an appointment slip and give it to them.
Give them two copies of the consent form.
This is an agreement to participate in this study. Please read it over and sign it. The second copy is for your own personal records.

TASK INTRODUCTION:

I will ask you to do two tasks at the same time.
One task is called a name/face paired associate recall task.
The other task is called a text scanning task.
I will explain each task separately, then I will explain how to do them both at the same time.

NAME-FACE TASK:

I will show you pictures of 8 people and will give you their names to remember.
You will be asked to recall these names later today, in two days, and again, after a week.
You will see each name face pair 5 times in one minute.
Illustrate with hand motions the timing of presentations and the idea of paired associates.
After the first pair has been presented for the fifth time, the next pair will be presented five times . . . and so on until all 8 name face pairs have been presented.
At each presentation you will practice a specific memory technique to help you remember the name.
You will:

V: say the name out loud.
M: move your lips like you were saying the name without actually making a sound.
A: listen to someone saying the name on audio cassette tape.
S: silently rehearse the name to yourself.

At no other time during this study session should you practice any other memory techniques. So, for the moment,

forget any other techniques you usually use to Remember people's names.

TEXT SCANNING TASK:

I will give you several pages of text.
You are to visually scan each line of text and place a check mark at the end of the line if the letter "V" as in vegetable appears in that line.
Once you have determined if the line does or does not have a V in it, mark the end of the line if appropriate and go on to the next line.
You do not need to read the text to complete this task.
Just scan down the line looking for the letter V.
You will not be asked to recall any information about the text.
You should work as quickly as possible, while trying not to make errors.

PUTTING THE TWO TASKS TOGETHER:

A sound will go off. Play sample sound.
And a name face pair will be presented. Present Mister Name.
When you hear the tone, look at the name and face being presented and

V: Say the name once, out loud. Then return the tongue depressor to your mouth.

M: Move your lips as if you were saying the name once, out loud, but make sure not to make any sounds. If you see me pointing to my ear, that means I can hear you making sounds.

A: You will hear the name spoken out loud on audio cassette tape. You should remain silent. Do not speak or move your lips, but listen carefully to the name.

S: Repeat the name to yourself, once, silently. Do not speak or move your lips.

Play the next two sample sounds and have them practice their memory technique with Mister Name. Make sure they are doing it correctly.
Give them the sample text.
Once you have finished practicing the name, begin scanning the text.
Look for V's and check the end of the line if one appears in it.
When you hear the sound again, look up, practice the name, once, and return to the text scanning task.
Play the final two sample sounds while you finish explaining the task.
The first three sounds occur rapidly. Do not worry if you are unable to return to the text scanning task between practices.
The last two sounds are spaced further apart, so you will have plenty of time to do the text scanning task.

You will be shown more name face pairs than you will be able to remember. This makes the task seem difficult. Don't worry about it, just do the best you can.
Do you have any questions before we begin? Answer them. If you think the person didn't get it, ask them to explain to you what it is that they're supposed to do.

STUDY SESSION:

Are you ready?
Play tone tape. When the tone sounds, present the first card for two seconds or until the person is done practicing the name. Then remove the card.
Present the card in the same manner each time the tone sounds.
After the fifth tone, listen for the click. Then switch to the next card . . . and so on until all 8 faces are presented.
Please circle the number at the end of the last line of text scanned.

RECALL SESSION:

I will show you the faces again.
You will be given up to 60 seconds to recall each name.
Give any part of the name that you remember.
You can change your answer as many times as you like up until you tell me it is your final answer.
When you give your final answer we will go on to the next one.
Your answers will be recorded on audio cassette tape.
Reorder the pictures.
Switch tapes to DATA tape. Make sure there is enough room on the tape for a complete recall session.
Press record. Say the person number and the recall session number.
Put the first picture in the folder and present it to the person.
Press the start button on the timer.
Do you remember who this is?
When the person gives an answer and pauses ask if it is their final answer. If yes, repeat the answer.
"---- -----" is your final answer.
Give no indication if their answer is right or wrong.
Lightly encourage them to guess if they have no answer.
If they want to go on to the next one without guessing say:
No guess is your final answer.
If they are running out of time give them a warning at 50 seconds.
Remove the picture, stop and zero the timer.
Place the next picture in the folder and continue until all 8 faces have been presented.

WRAP UP:

Say something encouraging about their performance.

You will see the faces and be asked to recall the names two more times, when we meet again on ----- and again on ------.
Reconfirm their appointments.
After you recall the names the final time, you can see the names and see how much you remembered.
Please do not discuss any part of this study with your friends until we have finished. Then I would encourage you to share your experiences with them, especially if they participated in the study too. But please wait until we are done.
Thank you very much.

APPENDIX F

Secondary Distractor Task:

Subjects were instructed scan each line of text to determine if the letter "v" appeared in the line. If the letter "v" appeared in a line of text, they were to put a check mark at the end of that line (see following reprint from Shepard, Romney, & Nerlove, 1972, p. 128). Subjects were told that they did not need to read, comprehend, or remember the text. They were assured that memory for the information appearing in the text was unimportant and would not be tested.

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