Name and Face Learning in Older Adults: Effects of Level of Processing, Self-Generation, and Intention to Learn

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Many older adults are interested in strategies to help them learn new names. We examined the learning conditions that provide maximal benefit to name and face learning. In Experiment 1, consistent with levels-of-processing theory, name recall and recognition by 20 younger and 20 older adults was poorest with physical processing, intermediate with phonemic processing, and best with semantic processing. In Experiment 2, name and face learning in 20 younger and 20 older adults was maximized with semantic processing of names and physical processing of faces. Experiment 3 showed a benefit of self-generation and of intentional learning of name–face pairs in 24 older adults. Findings suggest that memory interventions should emphasize processing names semantically, processing faces physically, self-generating this information, and keeping in mind that memory for the names will be needed in the future.

With advancing age, many people notice changes in their ability to learn new information. The most common memory complaint is difficulty remembering proper names (Bolla, Lindgren, Bonaccursoy, & Bleecker, 1991; Cavanaugh, Grady, & Perlmuter, 1983; Reese & Cherry, 2004). Consistent with these self-reports, older adults have more difficulty learning new names on experimental face–name learning tests than do younger adults (Crook & West, 1990; Fraas et al., 2002). Recalling a name is fundamentally different from recalling other personal information about an individual. It is more difficult to remember a person’s name than occupation, and this is true even when words are used that could be either names or occupations (McWeeny, Young, Hay, & Ellis, 1987). For example, it is more difficult to remember the name Mr. Baker than to remember that he is a baker. This so-called Baker–baker effect is found in both young and older adults (e.g., Bruyer et al., 1992; James, 2004; Rendell, Castel, & Craik, 2005). One of the reasons for this effect is that names are typically processed without semantic associations, whereas information about occupation is meaningful (e.g., Cohen, 1990). These findings are consistent with early research on levels of processing (LOP, Craik & Tulving, 1975) that shows that lists of words are remembered better when they are processed semantically (e.g., rabbit is an animal) rather than phonemically (e.g., rhymes with habit) or physically (e.g., written in lowercase letters). This effect is found in both younger and older adults (Craik, 1977, Craik & Byrd, 1982).

Given these experimental findings, one would expect that, to improve name learning, it would be important to make the names meaningful. Past research on improving name–face learning has shown that encouraging the formation of semantic associations of names results in improved name–face learning (Schmidt, Dijkstra, Berg, & Deelman, 1999; Yesavage, Rose, & Bower, 1983). In addition to the semantic processing of information, there are other factors known to benefit memory that could be applied to name–face learning. It has long been known that intention to learn has a positive effect on subsequent recall (e.g., Kausler & Lair, 1965). In other words, at the time a person is exposed to new information, later recall of that information is better if the person knows that memory will be tested (i.e., intentional learning) than if he or she does not know that memory will be tested (i.e., incidental learning). Another factor that benefits subsequent recall is self-generation (e.g., Johnson, Schnitt, & Pietrukowicz, 1989). Information is remembered better if it is self-generated (e.g., by completing word stems) than if it is provided by the examiner (e.g., reading the words). This may indicate that self-generation induces semantic processing.

The purpose of our experiments was largely practical: to determine which variables maximize name–face learning by older adults. In addition, we wished to explore which types of initial processing were optimal for different retention tests (i.e., name recall and recognition, name recall given a face, and face recognition) and to tie the empirical findings to an established body of theory, the LOP literature. We examined the effect of LOP in Experiments 1 and 2 and the effects of intention to learn and self-generation in Experiment 3.

**EXPERIMENT 1**

We expected to find a LOP effect for learning proper names, with incrementally better recollection from physical to phonemic to semantic processing.

**METHODS**

**Participants**

Participants were 20 younger university students and 20 older community-dwelling adults. Demographic information is
presented in Table 1. All participants spoke English fluently. We screened all participants for neurological and psychiatric conditions that could affect cognition; we gave older adults the Mini-Mental State Examination (MMSE; Folstein, Folstein & McHugh, 1975) as a screen for cognitive impairment.

Materials
We took 32 surnames from the local telephone directory. All surnames had (a) moderate frequency in the directory, occupying from one half to six columns; (b) one or two syllables; (c) potential rhymes; and (d) semantic associations (i.e., English-language meanings or associations with famous people). We created four lists with eight names each and equated them for language meanings or associations with famous people. We randomized the order of the conditions within set parameters: (a) one or two syllables; (b) potential rhymes; (c) semantic associations (i.e., English-language meanings or associations with famous people). We had names presented in the same condition as the number of hits divided by 8.

In Experiment 1, participants were told to remember it. We did not block the four conditions, but we interspersed them throughout the 32-item list. We randomized the order of the conditions within set parameters: each condition was evenly distributed throughout the list (i.e., occurring once within items 1 to 4, once within items 5 to 8, etc.), and the same condition never occurred on two consecutive trials.

After all 32 names were presented, we had the examiner conduct a 20-s distracter task to minimize any recency effect (Glanzer & Cunitz, 1966). The examiner orally presented pairs of random digits, and participants stated the sums aloud.

The examiner then asked participants to recall all names, including those they were told they would not have to remember. Testing proceeded in this order: (a) free recall and (b) recognition. In free recall, participants wrote as many names as they could recall for 3 min. In recognition, participants circled names that they recognized on a page containing 32 target and 64 distracter names. We calculated the percentage of names correctly recalled and the percentage of names correctly recognized for each condition as the number of hits divided by 8.

We performed counterbalancing across participants so that each name appeared an equal number of times in each of the four encoding conditions. We had names presented in the same order but assigned them to different encoding conditions.

Analyses.—We performed a 2 (age group: young, old) × 4 (encoding condition: physical, phonemic, semantic, learn) repeated measures analysis of variance (ANOVA) for recall and recognition. We calculated effect sizes; $\eta^2 = 0.20, 0.50$, and 0.80 are considered to be small, medium, and large effect sizes, respectively (Cohen, 1988). We performed post hoc pairwise comparisons to test individual conditions.

Results

Recall
For recall (Figure 1, left panel), there was a significant main effect of encoding condition on recall, $F(3, 36) = 38.4, p < .001, \eta^2 = 0.50$, a significant main effect of age, $F(1, 38) = 18.9, p < .001, \eta^2 = 0.33$, and a significant interaction, $F(3, 36) = 7.5, p < .001, \eta^2 = 0.17$. Post hoc comparisons showed a significant overall LOP effect: recall was near floor and was lower in the physical than phonemic conditions, mean difference = −0.09, $SE = 0.02$, $p < .001$, and lower in the phonemic than semantic conditions, mean difference = −0.14, $SE = 0.03$, $p < .001$. We found this LOP effect for each age group. The Age × Condition interaction was driven by higher recall in the learn condition than in the semantic condition in

<table>
<thead>
<tr>
<th>Table 1. Demographic Information</th>
<th>Younger</th>
<th>Older</th>
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<tbody>
<tr>
<td><strong>Experiment</strong></td>
<td><strong>M (Range)</strong></td>
<td><strong>SD</strong></td>
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<tr>
<td>Experiment 1 ($n = 20$ in each age group)</td>
<td>Age 21.3 (19–26) 6.7</td>
<td>2.0</td>
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<td></td>
<td>Education, in years 15.3 (14–18) 3.0</td>
<td>1.3</td>
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<td></td>
<td>Male to female ratio 4/16</td>
<td>4/16</td>
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<tr>
<td></td>
<td>MMSE scores NA</td>
<td>28.3 (26–30)</td>
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<tr>
<td>Experiment 2 ($n = 20$ in each age group)</td>
<td>Age 19.4 (18–22) 4.0</td>
<td>1.0</td>
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<tr>
<td></td>
<td>Education, in years 14.3 (14–17) 2.9</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Male to female ratio 5/15</td>
<td>1.4</td>
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<tr>
<td></td>
<td>MMSE scores NA</td>
<td>28.5 (25–30)</td>
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<tr>
<td>Experiment 3 ($n = 24$)</td>
<td>Age NA</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>Education, in years NA</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>Male to female ratio NA</td>
<td>9/15</td>
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<tr>
<td></td>
<td>MMSE scores NA</td>
<td>0.8</td>
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Note: MMSE = Mini-Mental State Exam.
the young, mean difference = 0.19, SE = 0.06, p = .006, and equivalent recall in the learn and semantic conditions in the old, mean difference = 0.01, SE = 0.06, p = .919. We obtained significant age effects in the learn condition, t(38) = 4.72, p < .001, but not the remaining conditions (all ts < 1.5, ps > .14).

**Recognition**

For recognition (Figure 1, right panel), there was a significant main effect of encoding condition on recognition, F(3, 36) = 57.4, p < .001, no main effect of age, F(1, 38) < 1, η² < 0.01, and a significant interaction, F(3, 36) = 8.9, p < .001, η² = 0.15. Post hoc comparisons showed a significant overall LOP effect: recall was lower in the physical condition than in the phonemic condition, mean difference = −0.25, SE = 0.04, p < .001, and lower in the semantic condition than in the semantic condition, mean difference = −0.21, SE = 0.04, p < .001. We found this LOP effect for each age group. The Age × Condition interaction was driven by equivalent recognition in the semantic and learn conditions in the young, mean difference = −0.04, SE = 0.07, p = .581, and better recognition in the semantic condition than in the learn condition in the old, mean difference = 0.21, SE = 0.04, p < .001. We obtained significant age effects in the learn condition, t(38) = 2.92, p = .006, but not the remaining conditions (all ts < 1.9, ps > .06). Across all encoding conditions, the proportion of false alarms (out of 64) did not differ between the younger (M = 0.06) and older (M = 0.05) groups, t(38) = 0.82, p = .42.

**DISCUSSION**

As we expected, we obtained a LOP effect for learning names for both age groups. That is, name recollection improved from physical to phonemic to semantic processing. (Although scores were close to floor with physical processing, we still obtained significant differences.) This LOP pattern is similar to that in earlier research in which the information to be remembered was a list of nouns rather than names (Craik & Tulving, 1975) and in research in which LOP effects were obtained for younger and older adults (reviewed in Craik 1977; Craik & Byrd, 1982).

We obtained age differences in memory for new names when processing was not directed, in the learn condition. Thus, when allowed to process information however they chose, older adults neither recalled nor recognized the names as well as younger adults. In contrast, when all participants performed the same encoding processes (in the physical, phonemic, and semantic conditions), there were no age differences. Thus, older adults are able to perform semantic processing, and this benefits their memory in a similar way as it does younger adults.

Although this study demonstrated that a LOP effect could be obtained when the information to be learned is a list of names, the learning task was not similar to everyday learning situations, in which names are usually associated with faces. Our purpose in Experiment 2 was to determine whether we would obtain a LOP effect when participants were learning name–face pairs.

**EXPERIMENT 2**

To simplify the design, we dropped phonemic processing as a condition. In addition, we examined the benefit of generating a semantic link between the face and name. We expected to find incrementally better recollection under our experimental conditions of phonemic processing to semantic processing to semantic processing with link.

**METHODS**

**Participants**

Participants were 20 younger university students and 20 older community-dwelling adults. We used the same screening criteria from Experiment 1. Demographic information is presented in Table 1.

**Materials**

We took 32 target surnames from the same source as in Experiment 1. We obtained 32 faces from magazine photographs. The faces varied in age, race, and sex, and the photographs varied in pose (e.g., front view, profile view) and color (i.e., black and white or color). We varied these characteristics in order to reflect the everyday task of meeting new people (e.g., faces are normally seen from a variety of angles under different lighting conditions). We scanned the photographs into electronic files, and then we edited them to create head and shoulder views of the same size. We randomly paired the target names and faces, and we printed each name (preceded by Mr. or Ms.) and face on separate sheets of paper. We divided stimuli into four lists of eight items each.

**Design and procedure.**—The examiner provided detailed instructions and discussed two sample face–name pairs by using questions from each of the four encoding conditions. The examiner told the participants that they would be viewing pairs of faces and names, some of which they should remember for a later test (i.e., the names in the learn condition), and others of which they would not need to remember but for which they would answer specific questions. Pilot testing indicated that younger participants were considerably faster than older participants at answering the questions. In order to decrease the amount of time left after younger participants finished each trial and in order to allow older adults sufficient time to answer all questions, we used different exposure times for the younger and older participants (i.e., 15 and 30 s, respectively).

As each name–face pair was presented, the examiner gave instructions to direct the encoding processes. The four encoding conditions were (a) physical analysis, (b) semantic analysis, (c) semantic analysis with link, and (d) the learn condition. In physical analysis, participants stated the first letter of the name, and described a prominent physical feature of the face (e.g., dark eyes). In semantic analysis, participants provided a definition or association for the name and described an activity, such as a hobby or occupation, in which the person looked like he or she might engage. In semantic analysis with link, participants provided a definition or association for the name and then generated an activity for the face that was semantically related to the name. For example, for a face with the name Mr. Page, the participant might say, “A page is a piece of paper. This man looks like someone who would read books with lots of pages.” In the learn condition, participants read the name out loud and tried to remember the name and face.

As in Experiment 1, we presented the four encoding conditions in a single trial in pseudorandom order. After all
name–face pairs were presented, the examiner gave a 20-s distracter task.

The examiner then asked participants to remember all the names and faces. Testing proceeded in this order: (a) free recall of names, (b) recognition of faces, (c) cued recall of names, and (d) face–name matching. In free recall of names, participants wrote as many names as they could recall for 3 min. In recognition of faces, the examiner individually presented 32 target faces and 32 distracters. Participants indicated whether each face had been presented on the initial list by saying “yes” or “no.” In cued recall of names, for each of the 32 target faces, the examiner asked the participants to provide the associated name. In face–name matching, the examiner gave participants all of the faces and all of the names and asked them to write the name that went with each face.

Counterbalancing across participants ensured that we presented each face–name pair an equal number of times in each of the four encoding conditions. Across counterbalancing conditions, we paired the faces with the same names, and we presented the face–name pairs in the same temporal order, but under different encoding conditions.

Analyses.—We performed a 2 (age group: younger, older) × 4 (encoding condition: physical, semantic, semantic link, learn) ANOVA. We do not report main effects of age group here, as we used different exposure durations for the younger and older participants, making the absolute levels of performance not comparable. Rather, we tested for a main effect of encoding condition and an Age × Condition interaction. We calculated effect sizes and performed post hoc comparisons as in Experiment 1.

RESULTS

Free Recall of Names

For free recall of names (Figure 2, left panel), there was a significant main effect of encoding condition on name recall, $F(3, 36) = 39.24, p < .001, \eta^2 = 0.51$, and no Age × Condition interaction, $F(3, 36) = 1.67, p = .177, \eta^2 = 0.04$. A post hoc $2 \times 2$ ANOVA comparing the semantic and semantic link conditions showed a significant interaction with age, $F(1, 38) = 4.80, p = .035, \eta^2 = 0.112$, suggesting that, despite an overall lack of significance, young participants can apparently make better use of link information. Post hoc comparisons of conditions indicated that recall was lower in the physical condition than in the semantic condition, mean difference $= -0.14, SE = 0.03, p < .001$, lower in the semantic condition than in the semantic link condition, mean difference $= -0.09, SE = 0.03, p = .004$, and lower in the semantic link condition than in the learn condition, mean difference $= -0.20, SE = 0.05, p = .001$.

Face Recognition

For face recognition (Figure 2, right panel), there was a significant main effect of encoding condition on face recognition, $F(3, 36) = 10.22, p < .001, \eta^2 = 0.21$, and no Age × Condition interaction, $F(3, 36) < 1, \eta^2 = 0.01$. Post hoc comparisons of conditions indicated that recognition was better in the physical condition than in the semantic condition, mean difference $= 0.06, SE = 0.03, p = .047$, better in the semantic than in the semantic link condition, mean difference $= 0.09, SE = 0.03, p = .003$, and poorer in the semantic link condition than in the learn condition, mean difference $= -0.11, SE = 0.03, p = .001$. The proportions of false alarms across all conditions, which we calculated from the 32 distracters, were identical ($M = 0.01$) in the two age groups.

Cued Recall of Names

For the cued recall of names (Figure 3, left panel), there was a significant main effect of encoding condition on cued name recall, $F(3, 36) = 32.88, p < .001, \eta^2 = 0.46$, and no Age × Condition interaction, $F(3, 36) < 1, \eta^2 = 0.02$. Post hoc comparisons of conditions indicated that recall was lower in the physical condition than in the semantic condition, mean difference $= -0.04, SE = 0.02, p = .037$, lower in the semantic condition than in the semantic link condition, mean difference $= -0.08, SE = 0.03, p = .016$, and lower in the semantic link condition than in the learn condition, mean difference $= -0.23, SE = 0.05, p < .001$.

Name–Face Matching

For face–name matching (Figure 3, right panel), there was a significant main effect of encoding condition on face–name
matching, $F(3, 36) = 25.51, p < .001, \eta^2 = 0.40$, and no Age $\times$ Condition interaction, $F(3, 36) < 1, \eta^2 = 0.02$. Post hoc comparisons of conditions indicated that performance was the same in the physical and semantic conditions, mean difference $= -0.01$, $SE = 0.03, p = .77$, poorer in the semantic condition than in the semantic link condition, mean difference $= -0.15$, $SE = 0.04, p = .001$, and poorer in the semantic link condition than in the learn condition, mean difference $= -0.16$, $SE = 0.05, p = .002$.

**DISCUSSION**

In this experiment, patterns of performance were of more interest than absolute performance levels. To ensure that the appropriate encoding processes were performed, we allowed older participants more time to generate their responses at encoding than we did younger participants. Across all analyses, there were no interactions with age, demonstrating that the younger and older groups showed the same patterns of performance. As in Experiment 1, names were recalled better when they were processed semantically (i.e., by meaning) rather than physically (i.e., by first letter). This was true both when the names were recalled alone and when the name was recalled in response to the associated face. In addition, recall of names was better when a semantic link between the name and face was generated.

In contrast to name recall, face recognition was better when faces were processed physically (i.e., by a prominent facial feature) rather than semantically (i.e., by an activity). Although some previous studies have shown that semantic analysis (e.g., character or trait judgments) promote better face recognition than physical analysis (e.g., judging facial features; e.g., Sporer, 1991), other studies have shown equivalent recognition (e.g., Parkin & Hayward, 1983).

Across most of the memory tasks (i.e., free and cued name recall, name–face matching), participants performed better in the learn condition than they did in the other conditions. The learn condition was the only one in which participants were aware there would be a memory test. This is consistent with other research showing superior memory under intentional than under incidental learning.

**EXPERIMENT 3**

Our purpose in this experiment was to determine the additional benefits to face–name learning of intentionality and self-generation. We expected better recollection under intentional than under incidental learning conditions. Furthermore, we expected a benefit of self-generation to recall (but not necessarily recognition, as reviewed previously; see Begg et al., 1989). Because our purpose was to determine the best learning conditions for older adults, we included only older participants.

**METHODS**

**Participants**

Participants were 24 community-dwelling older adults. We used the same screening criteria as in the previous experiments. Demographic information is presented in Table 1.

**Materials**

We took 30 face–name stimuli from Experiment 2.

**Design and procedure.**—The examiner provided detailed instructions and discussed sample face–name pairs by using questions from each of the six encoding conditions. The examiner told the participants that they would be viewing pairs of faces and names, that they would be asked questions or given information about each face and name, and that they would have to remember some of the names and faces but not others for a later test. The examiner presented the 30 target face–name pairs during a single trial. On the basis of pilot testing, we used an exposure duration of 20 s.

As each name–face pair was presented, the examiner gave instructions in order to direct the encoding processes. There were six conditions: two intentionality conditions (i.e., incidental learning and intentional learning) by three generation conditions (i.e., provided, self-generated, and control). For the intentionality conditions, on intentional learning trials, the examiner told participants that they would remember the names for a later test. On incidental learning trials, the examiner told participants that they need not remember the names. For the generation conditions, in the provided condition, the experimenter described a semantic meaning of the name, a prominent facial feature, and a link between the name and face. For example, for a woman’s face and the name Ms. Rowe, the experimenter might say, “A row is a line of things. This person’s prominent feature is her teeth: they are in a very straight row.” In the generated condition, the examiner guided participants to generate a semantic meaning of the name, a prominent facial feature, and a link between the name and face. In the control condition, the examiner asked participants to learn the name and face (for intentional learning) or to read the name and look at the face (for incidental learning). We had five face–name pairs presented in each of the six conditions. We had the conditions presented in an intermixed pseudorandom order, as in Experiments 1 and 2. After all 30 stimuli were presented, the examiner gave a 20-s distracter task, as in the previous experiments.

The examiner then asked participants to remember all the names and faces, including the ones they were told they would not have to remember. Similar to the testing in Experiment 2, testing consisted of free recall of names, yes–no recognition of faces, cued recall of names, and name–face matching. We calculated the percentage of correct responses for each encoding condition and each recall–recognition task. We performed counterbalancing as in Experiment 2.

**Analyses.**—We performed a 2 (learning condition: intentional, incidental) $\times$ 3 (generation condition: provided, self-generated, control) ANOVA for each of the four tests. We calculated effect sizes and performed post hoc comparisons as in the previous experiments.

**RESULTS**

**Free Recall of Names**

For free recall of names (Figure 4, left panel), there was a significant main effect of learning condition favoring
intentional learning, $F(1, 23) = 5.91, p = .023, \eta^2 = 0.20$, a significant main effect of generation, $F(2, 22) = 10.26, p < .001, \eta^2 = 0.31$, and no interaction between learning condition and generation, $F(2, 22) = 1.56, p = .221, \eta^2 = 0.06$. Post hoc comparisons indicated better performance under the generated condition than under the provided conditions, mean difference = 0.77, SE = 0.19, $p = .001$, better performance under the generated condition than under the control condition, mean difference = 0.79, SE = 0.22, $p = .002$, and equivalent performance under the provided condition versus the control condition, mean difference = 0.02, SE = 0.18, $p = .910$.

**Face Recognition**

For face recognition (Figure 4, right panel), possibly because of ceiling effects, there was no main effect of learning condition, $F(1, 23) = 2.16, p = .156, \eta^2 = 0.09$, or generation, $F(2, 22) = 1.44, p = .247, \eta^2 = 0.06$, and no interaction between learning condition and generation, $F(2, 22) = 3.06, p = .056, \eta^2 = 0.12$.

**Cued Recall of Names**

For cued recall of names (Figure 5, left panel), there was a main effect of learning condition favoring intentional learning, $F(1, 23) = 5.01, p = .035, \eta^2 = 0.18$, a main effect of generation, $F(2, 22) = 10.16, p < .001, \eta^2 = 0.31$, and an interaction between learning condition and generation, $F(2, 22) = 3.53, p = .038, \eta^2 = 0.13$. Post hoc analyses showed that, within incidental learning, there was a main effect of generation, $F(2, 22) = 13.41, p < .001, \eta^2 = 0.37$; performance was equivalent under generated and provided conditions, mean difference = -0.07, SE = 0.07, $p = .376$, better under the generated condition than under the control condition, mean difference = 0.33, SE = 0.06, $p < .001$, and better under the provided condition than under the control condition, mean difference = 0.26, SE = 0.06, $p < .001$. In contrast, within intentional learning, there was no main effect of generation, $F(2, 22) = 2.38, p = .104, \eta^2 = 0.09$. There was a significant beneficial effect of intentional learning over incidental learning under control conditions, $t(23) = -3.72, p = .001$, but not under provided conditions, $t(23) = -.38, p = .71$, or generated conditions, $t(23) = 1.23, p = .23$.

**Name–Face Matching**

For name–face matching (Figure 5, right panel), there was no main effect of learning condition, $F(1, 23) = 1.93, p = .178, \eta^2 = 0.08$, a significant main effect of generation, $F(2, 22) = 10.16, p < .001, \eta^2 = 0.31$, and no interaction between learning condition and generation, $F(2, 22) = 3.07, p = .056, \eta^2 = 0.12$. Post hoc comparisons indicated equivalent performance under generated and provided conditions, mean difference = -0.01, SE = 0.05, $p = .786$, better performance under the generated condition than under the control condition, mean difference = 0.20, SE = 0.05, $p = .001$, and better performance under the provided condition than under the control condition, mean difference = 0.19, SE = 0.05, $p = .001$.

**DISCUSSION**

Our expectations regarding learning intentionality were confirmed, with better name–face recollection under intentional learning conditions than under incidental ones. The effects of intentionality were especially evident under control conditions when encoding was not directed. Thus, similar to learning other types of information, when older adults learn names, they do so significantly better when they know that their memory for the names will be tested later. Generally, information (either self-generated or provided) about the meaning of the name, a prominent facial feature, and a link between the name and face resulted in better learning than occurred in control conditions in which participants’ cognitive operations were not directed. Thus, it is apparent that participants were able to perform these types of analyses and that doing so resulted in better memory for the names, although the participants do not appear to be doing this type of analysis when they are not directed to do so.

We obtained a generation effect (with better memory following self-generation) for one of the conditions in which this effect was expected (i.e., for free recall of names), and we found a trend toward this effect in the other condition (i.e., recall of names in response to faces). The reason for not obtaining a stronger effect could relate to the quality of the
responses provided versus generated. That is, because we had unlimited time to create meaningful definitions and links for the provided condition, we may have provided responses that were more helpful to subsequent recall than those of participants who had only 20 s to generate this information. We found no effect of intentionality or generation on face recognition, but this may be attributable to a ceiling effect.

**GENERAL DISCUSSION**

In terms of theoretical implications, these data provide interesting contrasts between the relative effectiveness of semantic orienting tasks performed “incidentally” and intentional learning performed without a specific strategy being suggested. The results show that intentional learning is particularly good for free and cued name recall (Figures 1, 2, 3), although older adults need time to make good use of this type of encoding (compare Figures 1 and 2). In contrast, semantic orienting is effective for name recognition tests (Figure 1). For young adults, name recognition is equivalent following generation and incidental learning, but for older adults the semantic task leads to higher performance. This pattern of results was also found in an experiment by White, cited in Craik (1977). Intentional learning is apparently appropriate for recall because participants can chunk and organize new information and relate it to existing knowledge; in contrast, semantic orienting tasks induce distinctive encodings that are later recognized well (Craik & Tulving, 1977). Similarly, face recognition benefits from a type of encoding relevant to the recognition modality, namely processing physical features (Figure 2). Combined encoding strategies may afford the best of both worlds, as seen by the successful performance with the combination of generation and intentional learning (Figures 4 and 5).

In terms of practical applications, a number of memory-training programs for older adults exist (e.g., Troyer, 2001; Woolverton, Scogin, Shackelford, Black, & Duke, 2001). The memory skill that older adults are most interested in improving is their ability to learn names and faces (Leirer, Morrow, Sheikh & Pariente, 1990). Anecdotally, we hear from older adults involved in our research or memory programs that they have used a variety of techniques to learn new names, such as spelling the name, generating a rhyme, or creating a visual image. The present experiments provide information about the learning conditions that result in optimal face–name learning for older adults. Of all the memory conditions in the present series of studies, cued recall of names is the most lifelike. That is, we see a familiar face and need to recall the associated name. Our findings indicate a benefit to cued name recall when (a) the individual is aware that there will be a subsequent memory test, (b) detailed information (i.e., meaning of the name, a prominent facial feature, and a link) is available, and (c) this information is self-generated. Thus, to improve older adults’ ability to recall names associated with faces, they should be encouraged to act as though they will need to remember the name later, for example, in order to introduce the new person to others or to use the name in conversation. In addition, they should be told to note important aspects of the name and face (i.e., the meaning and prominent features, respectively). Strategies such as noting the first letter or generating a rhyme are less effective. Another practical issue is that strategy use is effortful and newly learned strategies are frequently not used in real-life memory situations (Scogin & Bienias, 1988). Our findings indicate a benefit to name recall with even partial use of strategies (e.g., semantic processing without generating a link; see Figure 2). Thus, to increase compliance, participants should understand that using even some of these strategies is better than not using any.

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