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PICTURE NAMING, MATCHING TO SAMPLE, AND HEAD INJURY: A STIMULUS CONTROL ANALYSIS

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Computer-based procedures were used to examine oral naming and matching-to-sample performances in an adult with a head injury. Relatively few errors occurred when pictures were (a) named, (b) matched to dictated names presented simultaneously, (c) matched to dictation after a delay, and (d) matched to identical pictures presented simultaneously. More errors occurred on delayed than on simultaneous identity matching. On delayed matching trials, fewer errors occurred when instructions to name the samples were given.

DESCRIPTORS: picture naming, matching to sample, stimulus control, head injury

Constantine and Sidman (1975) studied participants with mental retardation who named pictures orally and matched the pictures to dictation and to one another in simultaneous matching. In delayed matching, these individuals matched pictures to dictation but did not match identical pictures. The accuracy of delayed identity matching then improved when the participants were instructed to name each picture sample aloud. Without the instructions, accuracy returned to baseline levels. The participants thus could produce the verbal behavior (picture naming) that might have facilitated delayed picture-picture matching, but did not do so unless they were instructed. We explored the applicability of this analysis with an adult who had a head injury.

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METHOD

Participant, Apparatus, and Setting

Len (aged 40) resided at a rehabilitation facility and had been diagnosed with anoxic encephalopathy and cardiac arrest 6 years before the study. A Macintosh® computer with a touch-sensitive screen presented stimuli and recorded data. On matching trials, the screen displayed five white keys. Sample stimuli appeared on the center key, and comparison pictures appeared on the four outer keys. On naming trials, the picture to be named was presented on the center key. Two to four sessions (each taking about 15 min) occurred per week in a quiet area at the facility.

Procedure

Before this study, Len did simultaneous identity matching using the five-key computer display. The different stimuli used were 12 pictures (bed, bus, cat, car, dog, fan, hat, jar, owl, pig, saw, and tie) and recordings of their English names dictated by the computer. Each correct response was followed by a flashing computer display, a brief

melody, and the delivery of a token (exchanged for items like snacks, beverages, clothing, magazines, and toilet articles). An error was followed by a darkened screen for 3 s. The intertrial interval lasted 3 s with a white screen. Each session involved 60 trials with a separate block of 12 trials on each of five tasks.

Picture naming. Naming trials began with a picture on the sample key along with the computerized instruction, "name this picture." This instruction was repeated every 5 s until Len named the picture. The experimenter pressed K on the keyboard if the name was correct and pressed J after an error.

Picture-picture matching. On simultaneous picture-picture matching trials, each of the pictures appeared once as a sample stimulus on the center key. After the sample was touched, it remained on the center key and four comparison pictures were added to the display. The correct picture was identical to the sample, and the three incorrect pictures were selected randomly from the 11 remaining. For the delayed matching trials in this block, the sample disappeared from the screen after it was touched and the comparison pictures either appeared at the same time (0-s delay) or after delays of 2 or 4 s, during which all keys were blank.

Name-picture matching. Simultaneous name-picture matching trials began with a dictated picture name and a dark center key; the sample repeated every 3 s throughout the trial. The dark sample key turned to white after it was touched, and the correct picture, which corresponded to the dictated name, appeared along with three incorrect pictures. Delayed matching trials were the same, except that the touch that turned the dark sample key to white terminated the dictation of the sample. The comparison pictures then appeared after 0, 2, or 4 s.

Len was exposed to five-task protocols in three phases: Phase 1 assessed oral naming and matching using the original task order and presentation format. Phase 2 changed the task order and format in an attempt to improve performance. Phase 3 assessed the possible relationship between picture naming and accuracy of delayed matching.

Phase 1. The order of the five tasks in each session was (a) picture naming, (b) simultaneous name-picture matching, (c) delayed name-picture matching, (d) simultaneous picture-picture matching, and (e) delayed picture-picture matching. In Sessions 1 to 16, the delay durations were 0, 2, and then 4 s. This progression of delay values was repeated in Sessions 17 to 35 and again in Sessions 36 to 55. During these sessions, the keys had visible borders.

Phase 2. The order of the tasks was changed (Sessions 56 to 66) and became (a) picture naming, (b) simultaneous picture-picture matching, (c) delayed picture-picture matching, (d) simultaneous name-picture matching, and (e) delayed name-picture matching. The visible borders of the keys were also removed from the computer display (Sessions 67 to 76). These changes brought the critical delayed picture-picture trials closer in time to the picture-naming trials and simplified the display. Delays lasted 4 s.

Phase 3. Sessions 77 to 83 began with the block of picture-naming trials and then used 4-s delayed matching to examine the effects of instructions to name the sample pictures. After the sample was displayed on each matching trial, Len was told to "name this picture"; touching it then brought the comparison pictures to the screen. The instructions were given on both the simultaneous and the delayed matching trials to ensure that Len named the sample on every trial from the beginning of the session. The instructions then were withheld in Sessions 84 to 94, reinstated in Sessions 95 to 107, and withheld again in Sessions 108 to 112.

Reliability. Analyses of 46% of the tape

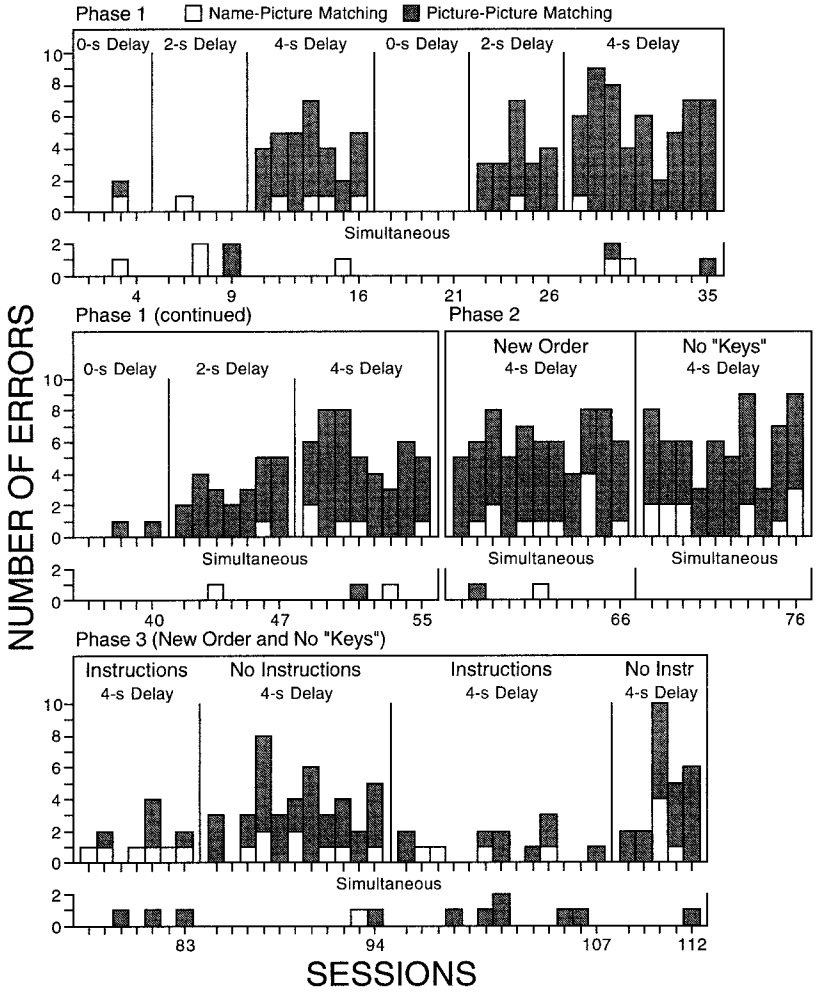

Figure 1. Len's errors during each phase of sessions involving two delayed (top of each panel) and two simultaneous (bottom of each panel) matching-to-sample tasks. An unshaded bar reflects errors that occurred during a session on trials with dictated names as sample stimuli and pictures as comparison stimuli; a shaded bar reflects errors during the same session on trials with pictures as samples and comparisons. The absence of a bar reflects no errors. During Phase 1, performances with delays of 0, 2, and 4 s were examined. During Phase 2, the order of some tasks was changed, and the matching display was simplified by removing the borders of the sample and comparison keys. During Phase 3, performances were examined with and without instructions to name the sample picture orally on each matching trial.

recordings yielded a mean reliability of 94% (range, 83% to 100%) for the blocks of naming trials. Across the two instructions conditions, 50% of the blocks (10 of 20 sessions) of delayed picture-picture matching trials were scored. The observers always agreed that (a) the experimenter provided the appropriate verbal instructions and end-of-trial consequences and (b) Len named the pictures.

RESULTS AND DISCUSSION

Figure 1 shows Len's errors on the four matching tasks during Phase 1 (picture naming was always perfect). More errors occurred on delayed than on simultaneous identity matching. Initially, Len made few errors on delayed picture-picture matching with delays of 0 and 2 s; more errors then occurred when the delay was 4 s. Next, ac-

curate matching was recovered in the 0-s delay condition, but errors now occurred on trials with the 2-s delay and then continued to occur on the 4-s delay trials (Sessions 27 to 35) just as before. Finally, errors were infrequent when the 0-s delay was used again (Sessions 36 to 40), but then increased when the 2- and 4-s delays were repeated. In Phase 2, errors continued to occur consistently during the 4-s delay conditions both when the order of tasks was changed and when the borders of the keys were removed. Phase 3 shows that errors on trials with 4-s delays were relatively infrequent when Len named the sample pictures following instructions to do so. However, errors reappeared in both sets of sessions when the naming instructions were withheld.

Len's results suggest a mediation production deficiency, a term that describes the functional independence of verbal and nonverbal repertoires. Len's pattern of naming and matching is consistent with Constantine and Sidman's (1975) analysis of such deficits in individuals with mental retardation: Errors occurred on the delayed identity matching of pictures even though Len could name the pictures orally and match them to their dictated names after delays. Moreover, Len showed improved performance when he named the sample stimuli on the delayed picture-matching task. The results replicate prior research suggesting that differential sample naming may facilitate performance on delayed matching tasks (see reviews by Stromer & Mackay, 1996; Stromer, Mackay, & Remington, 1996). The occurrence of errors in the absence of instructions to name raises the question of how one might program the maintenance and generalization of oral naming on tasks such as delayed matching.

As discussed elsewhere (Stromer & Mackay, 1996; Stromer et al., 1996), procedures like those used in the present study do not clarify the basis of the positive outcomes. Len's improved performance may have resulted because naming ensured observation of the picture samples, or the spoken names (rather than pictures) may have controlled comparison selection on those trials when naming occurred. Moreover, whether Len's oral naming functioned as a rehearsal to mediate the delay between sample offset and the appearance of the comparisons will require further study. Such research will help to clarify the circumstances under which individuals with head injuries may resemble individuals with mental retardation and other disabilities who exhibit difficulties in bringing their verbal behavior to bear on tasks on which it might help in meeting the relevant reinforcement contingencies.

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