Praxis on Verbal Command and Imitation

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Nondysfunctional 4-year-old and 6-year-old children were administered the Praxis on Verbal Command subtest of the Sensory Integration and Praxis Tests (SIPT) (Ayres, 1989) under two conditions. One condition was administered in the standardized manner on verbal command; the other involved administration of the same items on imitation. An analysis of variance indicated that the variables of age and condition were significant, whereas sex was not significant. The Age X Condition interaction was also significant. Scheffe multiple comparisons revealed a significant difference between 4-year-olds and 6-year-olds on verbal command but not on imitation. Verbal-command scores were significantly lower than imitation scores for the 4-year-olds but not for the 6-year-olds.

Ayres (1972, 1980a, 1985) viewed praxis as an important process that links brain and behavior and allows us to deal effectively with our physical environment. Praxis addresses what needs to be done and how to do it. “Praxis enables us to put together the components of the physical world and of our physical and intellectual selves in order to do, to act, to act purposefully and in that world effectively” (Ayres, 1985, p. 5).

Examiners have typically assessed praxis in children by having the child copy them in the performance of gestures or motor tasks. Tests frequently used include the Imitation of Postures subtest of the Southern California Sensory Integration Tests (SCSIT) (Ayres, 1980b), the Gublay Short Screening Test (Gublay, 1975), and the hand items by Berges and Lezine (1963). Conversely, the assessment of apraxia in adults typically involves the use of a verbal-command stimulus (e.g., “Show me how to brush your teeth”). If the adult is unable to perform in this mode, the examiner then demonstrates the action and asks the subject to copy or imitate the movement (Geschwind, 1975; Gonzalez-Rothi & Heilman, 1985; Goodglass & Kaplan, 1963; Kertesz, Ferro, & Shewan, 1984; Lehmkuhl, Poeck, & Willmes, 1983). One of the most frequently studied parameters in the literature on adults is whether performance differs as a function of method of presentation, specifically, if the stimulus is presented to verbal command or to imitation, and several researchers view the manner of response elicitation as relevant to response accuracy.

Liepmann (as cited by Kimura & Archibald, 1974) initially described apraxic patients as having characteristic patterns of behavior and theorized a sequence of task difficulty. He felt that the performance of movements to verbal command would be most difficult; performance of movements to imitation, less difficult; and actual object use, least difficult. Subsequent researchers supported this view and found that adults with apraxia were able to perform more accurately to imitation than to verbal command (DeRenzi, 1985; Geschwind, 1975; Heilman, 1973). DeRenzi, Motti, and Nichelli (1980) believed that the crucial aspect of apraxia was whether the subject had to perform his or her motor action to verbal or visual command. They found a “striking dissociation” (p. 10) among patients with apraxia who were unable to perform a motor act on verbal command yet who could accurately perform the same movement in an imitative or naturalistic situation.

Heilman and Gonzalez-Rothi (1985) suggested that the ability to perform actions on verbal command is more difficult than imitation, because in the verbal-command condition, the patient must evoke the image of the gesture, whereas in the imitation condition, the gestural image is provided. Geschwind

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Iliamsetics by the right hemisphere. The Postural Praxis subtest of the SCSIT, formerly the Imitation of Postures subtest of the SCSIT, assesses the child's ability to imitate the examiner, but the items on the two tests are different and thus performance between the two conditions is not directly comparable. Because the parameter of mode of elicitation, namely, verbal command versus imitation, seems to be important, a direct comparison between responses to verbal command and to imitation would broaden our knowledge of praxic abilities in children.

Our purpose in this study was to compare the verbal-command condition with the imitation condition using the test items from the Praxis on Verbal Command subtest, with one condition administered as standardized on verbal command and the other condition administered on imitation. We hypothesized that the imitation condition would show significantly higher accuracy and lower time scores for both age groups tested.

Method

Subjects

Forty-five children participated in this study, 23 four-year-olds (mean age = 55.6 months, SD = 3.4 months) and 22 six-year-olds (mean age = 78.1 months, SD = 3.6 months). The 4-year-olds were from several greater Worcester, Massachusetts, area preschools. The 6-year-olds were from the kindergarten and first-grade classes in the Shrewsbury Public School system, part of the greater Worcester area. Only children who were not receiving or requiring special services and who were believed by their teachers to be normal learners were included.

Procedure

Praxis on Verbal Command is one of the new subtests in the revised and restandardized SIPT. The purpose of this subtest is to assess the child's ability to assume unfamiliar body postures after he or she is given a descriptive verbal command, such as “Put one arm in front and one arm in back.” The test consists of 24 items.

For the present study, the Praxis on Verbal Command subtest was administered under two conditions. The first was according to the standardized directions, in which the examiner (the second author) verbally asked the child to assume the test position. In the second condition, the examiner assumed the same
positions and the child imitated the examiner. Each child was tested under both conditions, with a 2-week interval between conditions. The presentation order of each of the conditions was counterbalanced, with half of the children being tested under the verbal-command condition first and half being tested under the imitation condition first.

For the verbal-command condition, each child was given the verbal command as written on the protocol sheet. The 4-year-olds had a maximum of 15 sec to respond, with the command repeated at 5 sec if the position had not yet been assumed. The 6-year-olds had a maximum of 10 sec to respond, with no repetition of command. Two scores were attained—one for time (a stopwatch was used) and one for accuracy. The time score was the number of seconds taken to correctly assume the posture, with a maximum of 15 sec per item for 4-year-olds and 10 sec per item for 6-year-olds. Accuracy for each item was marked correct (1) or incorrect (0), with a possible range of scores from 0 to 24.

For the imitation condition, the examiner assumed the position from the protocol sheet, having initially instructed the child, “I want you to put your arms and legs like mine.” The examiner held the position until the child assumed it correctly (even if an inappropriate response had been assumed initially) or until the maximum amount of time elapsed (even with an incorrect response). After each position was assumed and scored, the examiner returned to a neutral starting position and said, “Now we’ll do another.” No other verbal instruction or encouragement was given. Time and accuracy scores were recorded. As in the verbal-command condition, 4-year-olds were given 15 sec for each item; 6-year-olds were given 10 sec per item.

Results

The data were first analyzed to examine the effect of order of testing (i.e., verbal-command condition administered first or imitation condition administered first) on the accuracy and time scores. No significant differences were found for order of testing, thus order was not considered as a variable for further analysis.

A 2 X 2 (Age X Sex) repeated measures analysis of variance was performed on the accuracy scores for the conditions of verbal command and imitation. Age was significant [F(1, 41) = 25.36, p < .001], sex was not significant [F(1, 41) < 1, p = .95], and condition was significant [F(1, 41) = 61.59, p < .001]. The Age X Condition interaction was significant [F(1, 41) = 21.68, p < .001]. No other interactions were significant. The mean accuracy scores (out of 24 possible points) for the 4-year-olds was 17.49 (SD = 3.69) on verbal command and 22.04 (SD = 1.55) on imitation; for the 6-year-olds, 22.00 (SD = 1.35) on verbal command and 23.14 (SD = 0.74) on imitation. Scheffé multiple comparisons revealed a significant difference (p < .05) between 4-year-olds and 6-year-olds on verbal command but not on imitation. The verbal-command scores were significantly lower than the imitation scores for the 4-year-olds but not for the 6-year-olds.

To more fully examine the Age X Condition interaction, the children who received the highest possible score for each condition were examined to explore the possibility of a ceiling effect. In the sample of 4-year-olds, no children attained the highest accuracy score of 24 on the verbal-command condition. Thirteen percent (n = 3) of the 4-year-olds, however, attained a perfect accuracy score on the imitation condition. In the sample of 6-year-olds, 14% (n = 3) attained a perfect accuracy score of 24 on the verbal-command condition, and 40% (n = 9) attained a perfect accuracy score on the imitation condition. An alternate way of examining this was to consider the number of items in which more than 90% of the subjects performed correctly. Of the 4-year-olds, more than 90% of the subjects performed 5 of the 24 verbal-command items and 15 of the 24 imitation items correctly. Of the 6-year-olds, more than 90% of the subjects performed 14 of the 24 verbal-command items and 21 of the 24 imitation items correctly.

To examine the variable of time, repeated (dependent) t tests were computed to examine whether mean time per correct item differed as a function of condition (i.e., verbal command or imitation). Because the standardized test protocol allowed different maximum amounts of time per item for the two age groups, we believed that the time scores of the 4-year-olds and 6-year-olds could not be compared directly. We therefore performed separate t tests for each group. Time was significant at both ages, with imitation being performed more quickly than verbal command (for the 4-year-olds, t = -3.58, p < .01; for 6-year-olds, t = -2.79, p < .05). For the 4-year-olds, the mean time per correct item was 2.56 sec (SD = 1.06) on the verbal-command condition and 1.80 sec (SD = 0.49) on the imitation condition. For the 6-year-olds, the mean time per correct item was 1.86 sec (SD = 0.68) for the verbal-command condition and 1.45 sec (SD = 0.40) for the imitation condition.

Discussion

It appears that 4-year-olds perform less accurately than 6-year-olds, but this is true only on the verbal-command condition, not on the imitation condition. Moreover, performance on verbal command was significantly less accurate than performance on imitation only for the 4-year-olds, not for the 6-year-olds. A
likely explanation of these results relates to the possibility of a ceiling effect.

As reported earlier, 90% of the 4-year-olds performed correctly on only 5 of the 24 verbal-command items and on 15 of the 24 imitation items, whereas, 90% of the 6 year-olds performed correctly on 14 of the 24 verbal-command items and on 21 of the 24 imitation items. The imitation items do not appear to be sufficiently difficult for the 6-year-olds to show a difference between imitation and verbal command. Alternatively, perhaps the scoring system developed by the authors for the imitation condition was not sufficiently stringent to discriminate between subtle differences in the performance of the 6-year-olds.

The finding of a significant difference between verbal command and imitation in the 4-year-olds in this study supports earlier works by Kaplan (1968), Kools and Tweedie (1975), and Cermak et al. (1980) and would be more consistent with the interpretation of a ceiling effect for the 6-year-olds. It would be interesting to look at more difficult items for the 6-year-olds to determine if indeed there is a difference between verbal command and imitation.

An alternative interpretation for consideration, as suggested by Overton and Jackson (1973), is that there is no difference between verbal command and imitation. Perhaps by age 6 years, language skills have sufficiently emerged so that no difference exists between the two conditions.

When time was considered, both the 4-year-old and 6-year-old age groups performed more quickly on the imitation condition than on the verbal-command condition. The time scores of the two groups could not be directly compared because the manner in which the test is standardized allows the 4-year-olds a maximum of 15 sec per item and the 6-year-olds only 10 sec per item. This biases the test toward longer possible response times for 4-year-olds. Thus, only the condition (i.e., verbal command versus imitation) but not the age comparison is valid. An examination of individual subjects’ data for the 4-year-olds, however, indicated that for all 23 subjects, only four items (less than 1% of the possible items) took more than 10 sec yet were performed correctly. Thus, it appears that if a nondysfunctional 4-year-old child is going to get an item correct, he or she will do so in 10 sec or less. In fact, the mean time per correct item was much shorter (2.56 sec on verbal command, 1.80 sec on imitation).

Our use of the time scores differed from that on the SIPT in that, on the latter, total time for correct items is reported, whereas we used mean time per correct item. We did not use total time because it would allow a child who got only a few items correct but who took a long time to respond to each item to obtain the same time score as a child who performed many items correctly and quickly. A disadvantage of the mean time score that we used, however, is that a child who performed only a few items correctly and quickly would get the same score as a child who performed many items correctly and quickly. Perhaps a time-adjusted accuracy score could be used in future research.

Conclusion

We believe that clinicians testing praxis skills in children must be aware of the differential effects of mode of elicitation, specifically, verbal command and imitation. Knowing whether a child can better use his or her body to interact and perform in the environment when shown how to do things or told how to do things will help occupational therapists design better programs to tap an individual child's strengths and remediate areas of deficit. We believe that the new SIPT will prove to be a more discriminating tool in assessing praxis deficits in children due to the inclusion of the Praxis on Verbal Command subtest.

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References


