Effects of Response Elaboration Training on Increased Length and Complexity of Utterances with Two Participants with Fluent Aphasia

Response Elaboration Training (RET; Kearns, 1985) is a treatment approach designed to increase the content and length of verbal productions in aphasia (Gaddie, Kearns, & Yedor, 1991; Kearns, 1985, 1997; Kearns & Scher, 1989; Kearns & Yedor, 1991; Yedor, Conlon, & Kearns, l993). RET has received a significant amount of study, particularly with nonfluent speakers (Gaddie, et al., l991; Kearns, l985; Kearns & Scher, l989; Kearns & Yedor, l991; Yedor, et al., l993). Although promising results have been reported with fluent aphasia (Kearns & Scher, 1989; Yedor, et al., l993), additional study is warranted with such speakers.

The purpose of this study was to examine the effects of RET with two persons with fluent aphasia. More specifically, RET was applied to picture descriptions and to personal recounts and its effects were evaluated in terms of production of correct information units (CIUs). CIU production (number of CIUs and efficiency) was measured in response to trained and untrained pictures, and in unrehearsed personal narratives. Of additional interest were changes in functional communication as measured by the *Communication Activities of Daily Living-Second Edition* (CADL-2; Holland, Fratalli, & Fromm, l999) and the *Communication Effectiveness Index* (CETI; Lomas, Pickard, Bester, Elbard, Finlayson, & Zoghaib, l989).

Method
Participants
Two stroke survivors with fluent aphasia (see Tables 1 & 2) served as the participants for this study. One male (Participant 1) who was 42 MPO and one female (Participant 2) who was 120 MPO were enrolled. They both were college educated and native speakers of English. Each had a negative medical history for mental illness and neurological problems other than CVA. In addition, they both passed pure-tone air conduction screenings. Participant 1 and 2's aphasia classifications were transcortical sensory aphasia and Wernicke's aphasia, respectively (WAB; Kertesz, 1982).

Experimental Design
A single subject, multiple baseline design across behaviors and subjects was implemented to evaluate the acquisition effects of treatment as well as response and stimulus generalization effects.

The following contexts comprised the multiple baseline behaviors: 1) description of a set of 10 pictures, 2) description of another set of 10 pictures, and 3) production of language in a personal recount. An additional context that was used to measure generalization effects, but did not receive treatment consisted of a description of a third set of 10 pictures.

In order to balance for effect of treatment order, the condition under treatment was quasi-randomly assigned for each participant (note: this report is a portion of a larger investigation involving additional participants). For the first participant, treatment was applied to the personal recount context. Following the personal recount condition treatment was applied to one set of pictures and subsequently to the second set of

pictures. The treatment order for the second participant was as follows: first set of pictures, second set of pictures, and then personal recount condition.

Experimental Stimuli

The experimental stimuli consisted of three sets of 10 black and white line drawings, each depicting a single, different action. The sets were matched on the basis of the actions for familiarity, argument structure, homophonous noun root, and image agreement, as well as for average number of CIUs elicited from non-brain-damaged speakers.

Baseline and Probe Procedures

Prior to the application of treatment, 8 baseline probes were conducted for Participant 1 and 10 baseline probes were completed for Participant 2 to attempt to ensure stability of responding. These probes consisted of elicitation of descriptions of the three sets of 10 pictures and the personal recount. The personal recount involved asking the participant to talk for 5 minutes about a topic of his/her choice. The order of presentation for the conditions was randomly assigned for each baseline. Each set of 10 pictures was randomized prior to presentation.

The schedule for probing during the treatment phase varied according to the condition being treated. Probes were conducted following every two treatment sessions for the picture set or the personal recount condition that was currently receiving treatment. Probes were conducted every three to four treatment sessions for all conditions not currently under treatment. At the end of each treatment phase all conditions were probed. Follow up probes were conducted at 3 and 6 weeks.

Dependent Measures

The dependent measures were number of CIUs produced and efficiency of CIU production. CIUs were calculated according to procedures described by Nicholas & Brookshire (1993). The number of words produced for each picture description was first calculated. All words that were correct in context, informative and relevant (i.e., CIU) were then calculated for each picture. Communicative efficiency was calculated as the percentage of CIUs per word.

Treatment Procedures

Treatment was conducted 3 times per week. When RET was applied to one of the picture sets, the pictures were submitted to the treatment hierarchy (see Appendix) one at a time in random order. A treatment session consisted of two trials with each picture. When RET was applied to the personal recount, the examiner asked the participant to provide a topic for elaboration. The treatment hierarchy was applied as with the pictures. A treatment session consisted of 12-20 topic elaborations. Treatment was applied to each condition until 20 treatment sessions were completed.

Reliability

All probes were independently scored by two separate examiners and results were compared. All scoring disagreements between the examiners were resolved by consensus.

Results

The number of CIUs produced and percentage of CIUs per words (efficiency) are represented in Figure 1 and 2 for Participant 1 and in Figures 3 and 4 for Participant 2. The data in these figures reflects performance on probes. The conservative dual criteria (CDC) method (Fisher, Kelley, & Lomas, 2003) was used to aid in analysis of probe data. In this method, two criterion lines (i.e., regression line & mean line) are raised by 0.25 standard deviations to create a conservative criteria for inspection and interpretation of results. A prespecified number of data points (e.g., 8 out of 10) must fall above both criterion lines to conclude a positive treatment effect.

For Participant 1, the *number* of CIUs produced did not reach CDC criteria in the three treatment conditions. However, the production of CIUs during the final treatment condition approached criteria with 7 of the 10 treatment probes above both lines. A positive treatment effect was found for *communicative efficiency* for Set 1 pictures for Participant 1. The other two treatment conditions did not reach criteria.

Probe performance for Participant 2 also did not reach CDC criteria for *number* of CIUs. However, a positive treatment effect was observed for *efficiency* of CIU production for Set 1 pictures. Significant treatment effects were not seen for either of the remaining two conditions for communicative efficiency.

Generalization to untrained picture sets was not observed for either participant (Figures 1-4). Post testing results with the CETI revealed modest gains for both participants. Increases in CADL-2 performance were also evident for Participant 1.

Discussion

Discussion will compare the results of this study to results obtained in previous studies with fluent aphasic speakers with respect to qualitative changes, expectation for generalization and outcome measures. Direction for future research will be addressed.

References

Brown, L., Sherbenou, R.J., & Johnsen, S.K. (1997). *Test of Nonverbal Intelligence* (3rd ed.). Austin, TX: Pro-Ed.

Fisher, W., Kelley, M., & Lomas, J. (2003). Visual aids and structured criteria for improving visual inspection and interpretation of single-case designs. *Journal of Applied Behavior Analysis, 36,* 387-406.

Gaddie, A., Kearns, K.P., & Yedor, K. (1991). A qualitative analysis of response elaboration training effects. *Clinical Aphasiology, 19,* 171-183.

Holland, A., Fratalli, C., & Fromm, D. (1999). *Communication Activities of Daily Living* (2nd ed.). Austin, TX: Pro-Ed, Inc.

Kearns, K.P. (1985). Response elaboration training for patient initiated utterances. In R.H. Brookshire (Ed.) *Clinical Aphasiology* (pp. 196-204). Minneapolis, MN: BRK.

Kearns, K.P. (1997). Broca's aphasia. In L.L. LaPointe (Ed.) *Aphasia and related neurogenic language disorders* (2nd ed., pp. 1-41). New York: Thieme.

Kearns, K.P., & Scher, G.P. (1989). The generalization of response elaboration training effects. *Clinical Aphasiology, 18,* 223-245.

Kearns, K.P., & Yedor, K. (1991). An alternating treatments comparison of loose training and a convergent treatment strategy. *Clinical Aphasiology, 20,* 223-238.

Kertesz, A. (1982). *The Western Aphasia Battery.* New York: Grune & Stratton.

Lomas, J., Pickard, L., Bester, S., Elbard, H., Finlayson, A., & Zoghaib, C. (1989). The communication effectiveness index: Development and psychometric evaluation of a functional measure for adult aphasia. *Journal of Speech and Hearing Disorders, 54,* 113-124.

Nicholas, L.E., & Brookshire, R.H. (1993). A system for quantifying the informativeness and efficiency of the connected speech of adults with aphasia. *Journal of Speech and Hearing Research, 36,* 338-350.

Porch, B. (2001). *Porch Index of Communicative Ability: Vol. 2. Administration, Scoring, and Interpretation* (4th ed.). Albuquerque, NM: PICA Programs.

Robey, R., Schultz, M., Crawford, A., & Sinner, C. (1999). Single-subject clinical-outcome research: designs, data, effect sizes, and analyses. *Aphasiology, 13,* 445-473.

Saffran, E.M., Berndt, R.S., & Schwartz, M.F. (1989). The quantitative analysis of agrammatic production: Procedure and data. *Brain and Language, 37,* 440-479.

Yedor, K.E., Conlon, C.P., & Kearns, K.P. (1993). Measurements predictive of generalization of response elaboration training. *Clinical Aphasiology, 21,* 213-223.

Yorkston, K.M., & Beukelman, D.R. (1981). *Assessment of Intelligibility of Dysarthric Speech.* Austin TX: Pro-Ed.

Table 1.

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Participant 1. Pre and Post Treatment Assessment

Porch Index of Communicative Ability 4th Ed. (PICA; Porch, 2001)

Modality	Pre	Post
Verbal %ile	44	53
Auditory %ile	29	40
Overall %ile	36	47

Western Aphasia Battery (WAB; Kertesz, 1982)

Subtest	Pre	Post
Fluency	6	8
Spontaneous Speech	13	15
Comprehension	6.5	7.05
Repetition	8.2	10
Naming	4.3	6.4
Aphasia Quotient	64	76.9
Aphasia type	Transcortical Sensory	Anomic

Communication Activities of Daily Living-2nd Ed. (CADL-2; Holland, Frattali, & Fromm, 1999)

	Pre	Post
Percentile	25th	32nd

The Communicative Effectiveness Index (CETI; Lomas et al., 1989)

	Pre	Post
Mean	36	56

Test of Nonverbal Intelligence 3rd Ed. (TONI-3; Brown et al., 1997)

Nonverbal Intelligence Score	61%ile

Assessment of Intelligibility of Dysarthric Speech (AIDS; Yorkston & Beukelman, 1981)

Word level	74%

Table 2.

Participant 2. Pre and Post Treatment Assessment

Porch Index of Communicative Ability 4th Ed. (PICA; Porch, 2001)

Modality	Pre	Post
Verbal %ile	25	33
Auditory %ile	25	17
Overall %ile	33	35

Western Aphasia Battery (WAB; Kertesz, 1982)

Subtest	Pre	Post
Fluency	8	8
Spontaneous Speech	10	11
Comprehension	4	3.65
Repetition	1	1.2
Naming	1.3	1.3
Aphasia Quotient	32.6	34.3
Aphasia type	Wernicke's	Wernicke's

Communication Activities of Daily Living-2nd Ed. (CADL-2; Holland, Frattali, & Fromm, 1999)

	Pre	Post
Percentile	20th	7th

The Communicative Effectiveness Index (CETI; Lomas et al., 1989)

	Pre	Post
Mean	51.25	68.19

Test of Nonverbal Intelligence 3rd Ed. (TONI-3; Brown et al., 1997)

Nonverbal Intelligence Score	90%ile

Assessment of Intelligibility of Dysarthric Speech (AIDS; Yorkston & Beukelman, 1981)

Word level	95.6%

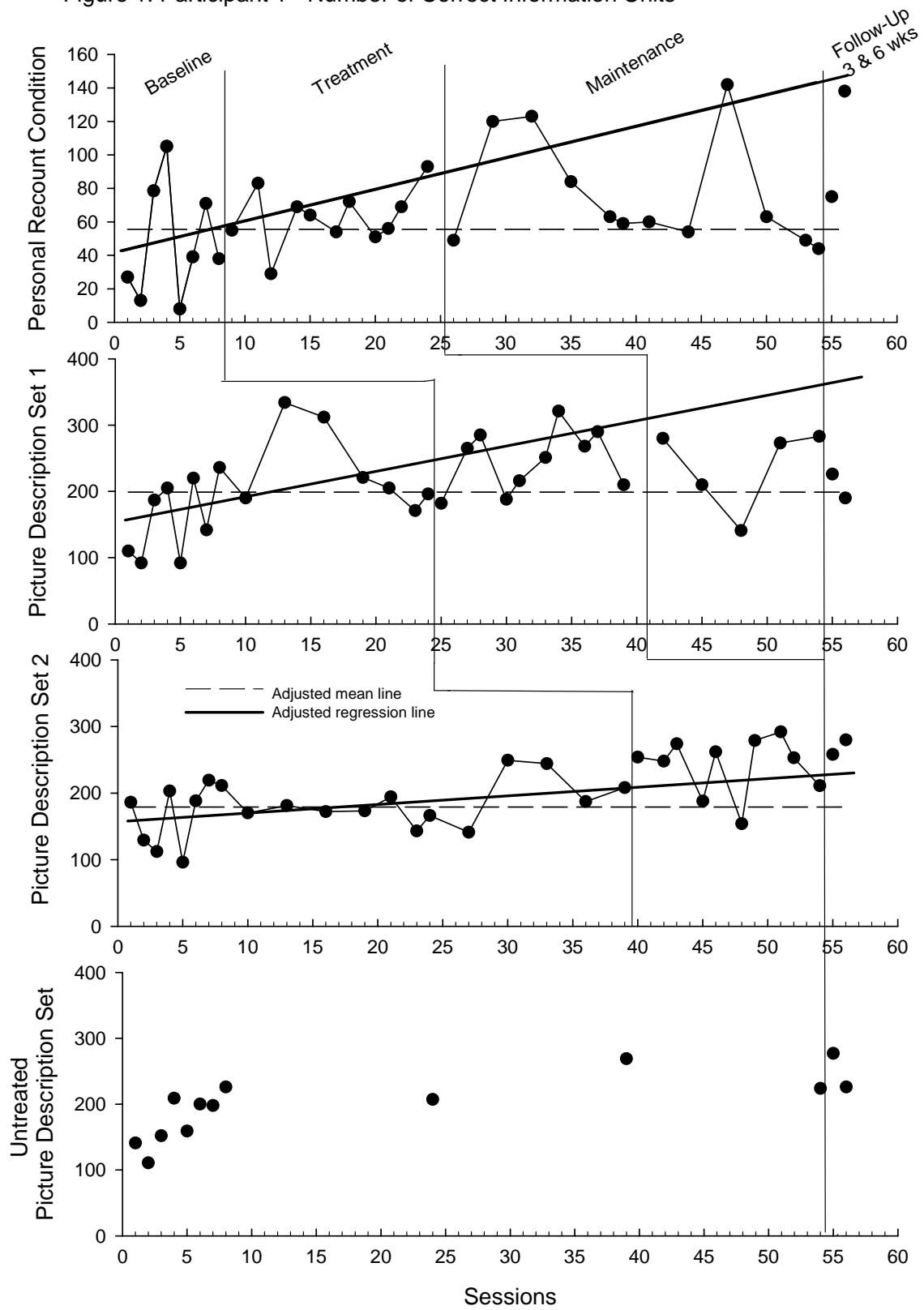Figure 1. Participant 1 - Number of Correct Information Units
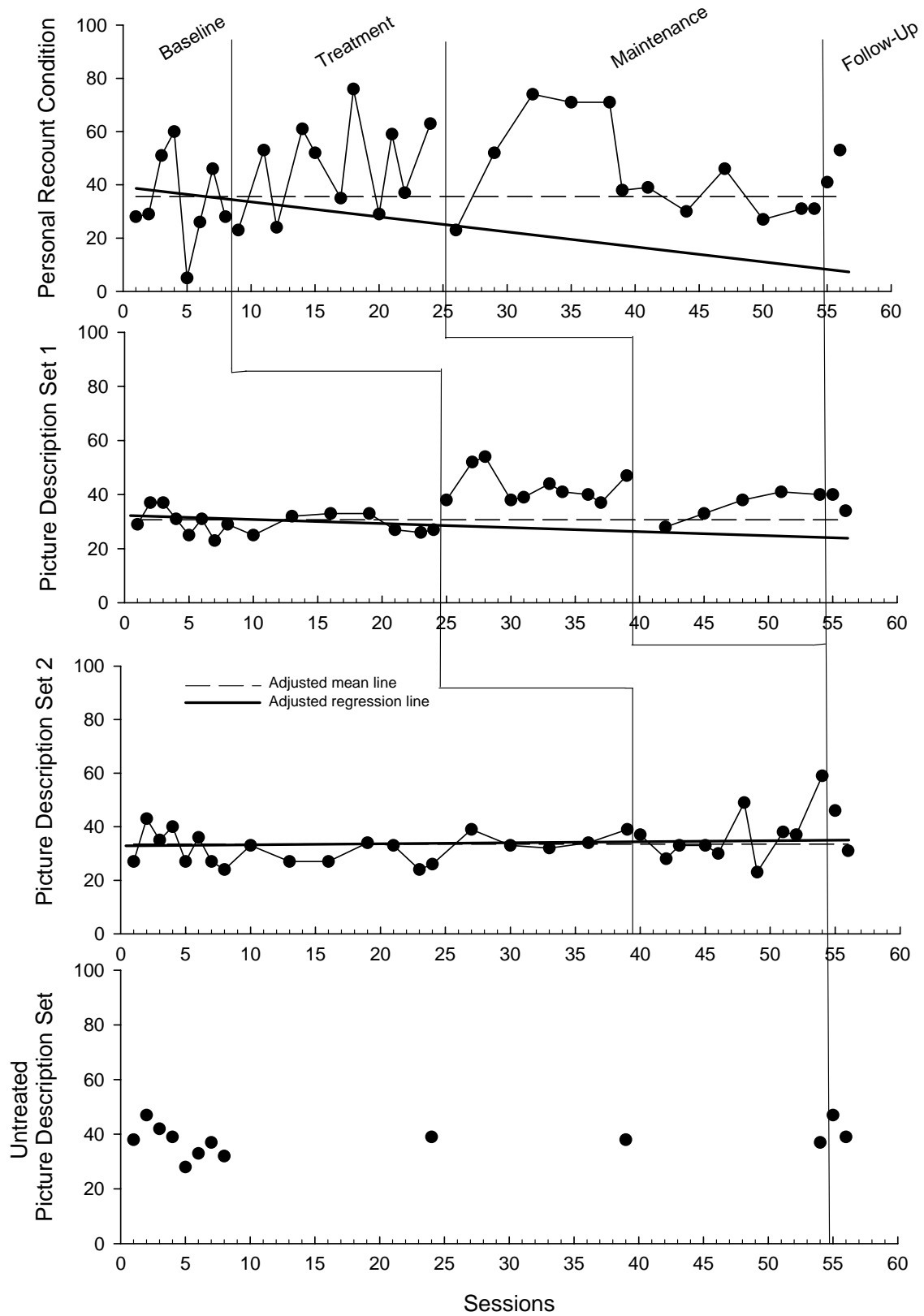
Figure 2. Particpant 1 - Percentage of CIUs vs. Words

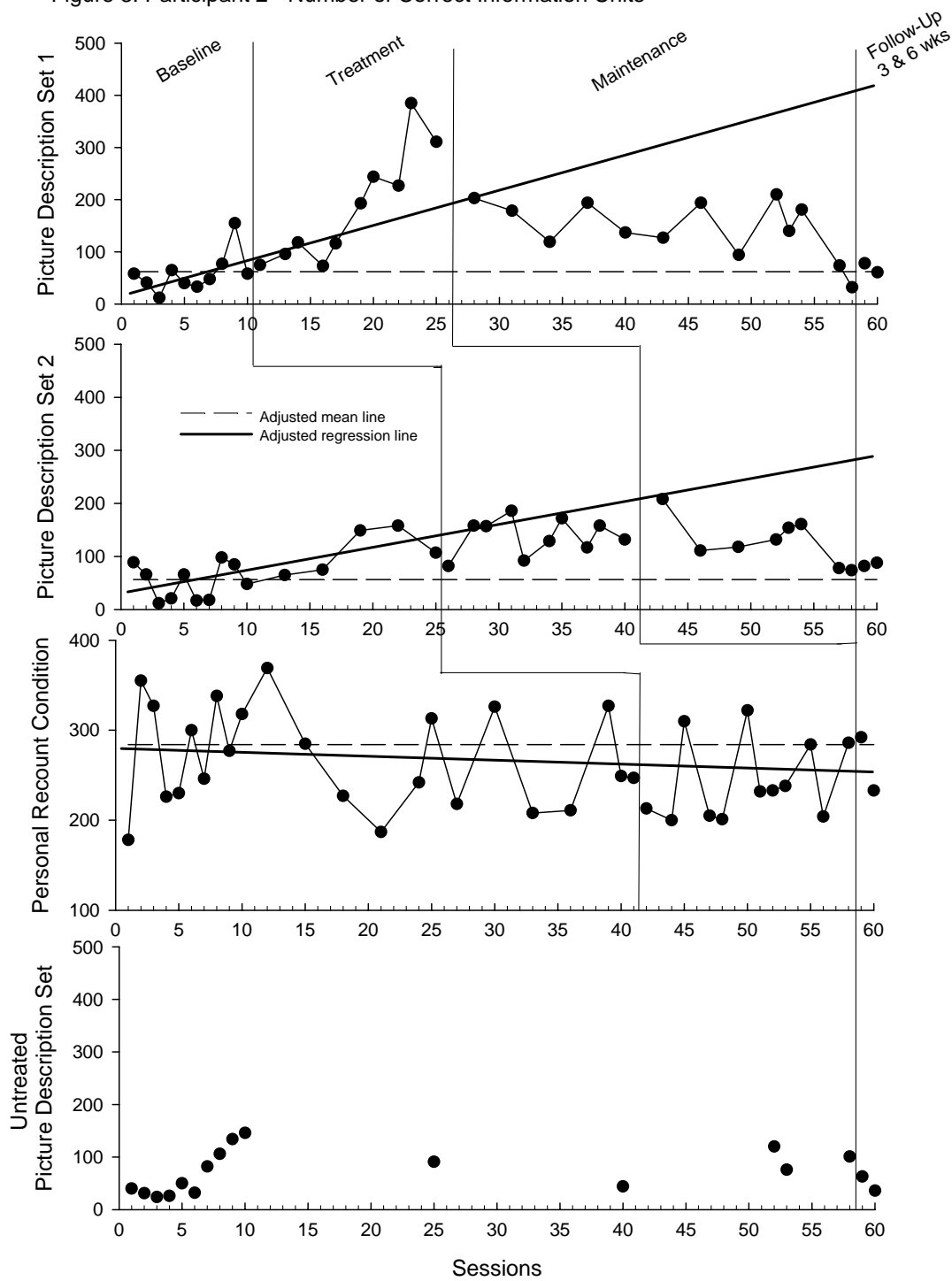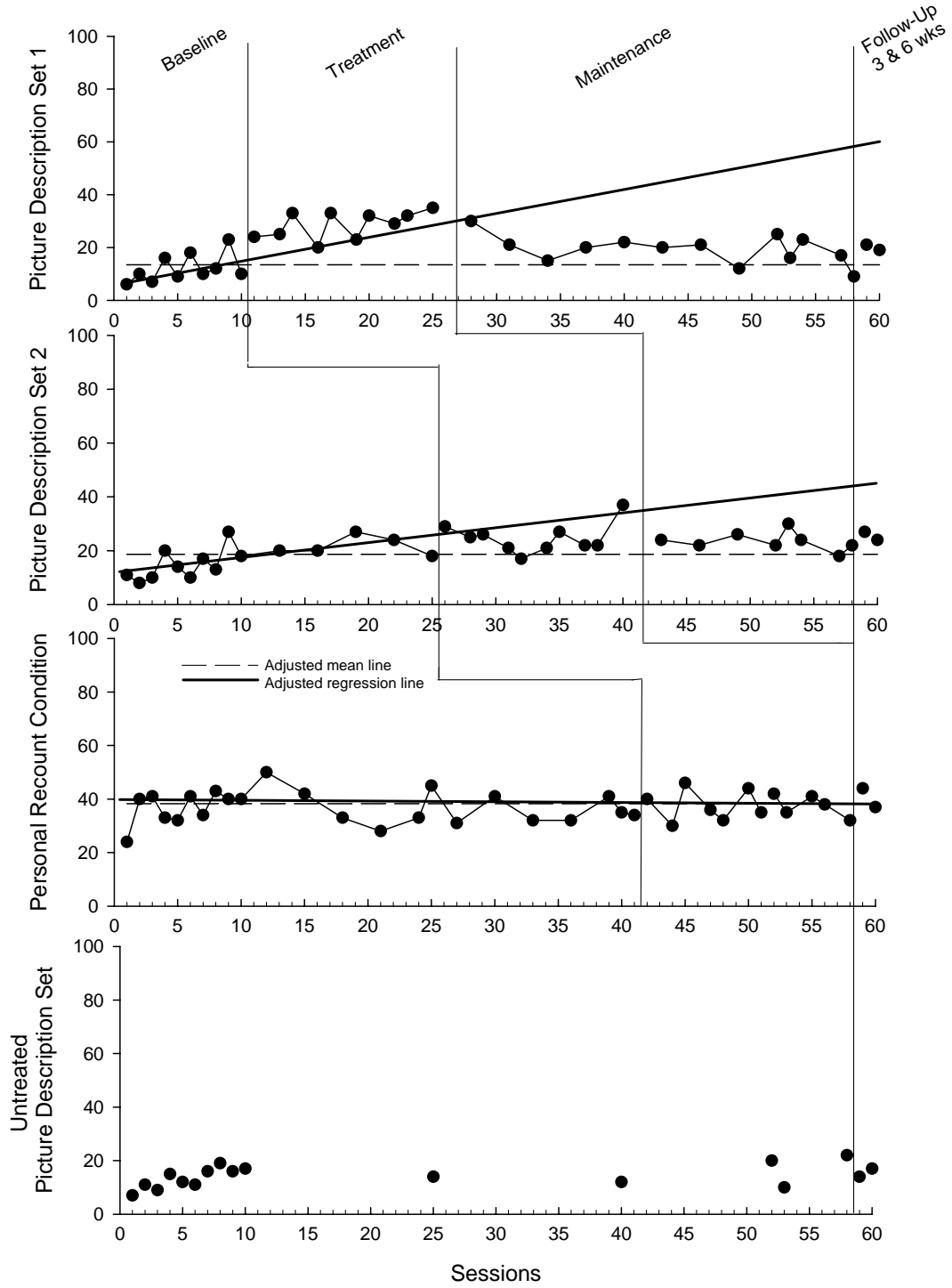Figure 3. Participant 2 - Number of Correct Information Units

Figure 4. Participant 2 - Percentage of CIUs vs. Words

Appendix
Modified Response Elaboration Training – Picture Level Application (after Wambaugh & Martinez, 2000)

1. The clinician presents a picture and elicits a response (e.g., "Tell me about this picture.", What does this remind you of?", "Tell me what's happening.")

    A. If the response is appropriate, the clinician moves to Step 2.

    B. If there is no or an inappropriate response, the clinician models two response options (e.g., "You could say something like…noun phrase [NP] or verb phrase [VP].") If the response is appropriate, the clinician moves to Step 2.

    C. If there is no or an inappropriate response, the clinician models a one-word response and requests a repetition (e.g., "Say noun." or "Say verb.") If the response is appropriate, the clinician moves to Step 2.

    D. If there is no or an inappropriate response, the clinician uses integral stimulation, with a maximum of 4 attempts, to elicit the noun or verb production. If the response is appropriate, the clinician moves to Step 2. In the event of an inappropriate or no response, the next item is presented.

2. The clinician models and reinforces the participant's production from Step 1 (e.g., "Shoe. Great. That's a shoe.")

3. The clinician requests an elaboration of the response from Step #1 (e.g., "What's happening with the shoe?")

    A. If the response is appropriate, the clinician moves to Step 4.

    B. If there is no or an inappropriate response, the clinician models two response options (e.g., "You could say something like…noun phrase [NP] or verb phrase [VP].") and requests a response. If the response is appropriate, the clinician moves to Step 4.

    C. If there is no or an inappropriate response, the clinician models a one-word response and requests a repetition (e.g., "Say noun." or "Say verb.") If the response is appropriate, the clinician moves to Step 4.

    D. If there is no or an inappropriate response, the clinician uses integral stimulation, with a maximum of 4 attempts, to elicit the noun or verb production. If the response is appropriate, the clinician moves to Step 4. In the event of an inappropriate or no response, the next item is presented.

4. The clinician reinforces the production from Step 3 and models a phrase/sentence that combines the participant's productions from Steps 1 and 3 (e.g., "Right, tie. Tie shoe.")

5. The clinician models the combined production again and requests a repetition.

    A. If the response is appropriate, the clinician requests 3 more productions, using integral stimulation as necessary. The clinician moves to Step 6.

    B. If there is an inappropriate or no response, the clinician attempts to elicit 4 productions of the target, using integral stimulation. The clinician moves to Step 6.

6. The clinician waits for at least 5 seconds and requests that the participant again describe the picture.

    A. If the entire elaborated response is produced, the clinician reinforces the production and moves to the next item (omission of functors was not considered incorrect).

B. If a partial elaborated response is produced; the clinician reinforces the production, models the entire elaboration, and requests a production with integral stimulation. The clinician then moves to the next item.

C. If no response, the clinician reinforces the production, models the entire elaboration, and requests a production with integral stimulation. The clinician then moves to the next item.

D. If an alternate appropriate response is produced, the clinician reinforces the production and moves to the next item.