More Pace, Less Fillers: A Verbal Strategy for a High-level Aphasic Patient

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Previous CAC proceedings (Wertz, 1978; Darley, Helm, Holland, and Linebaugh, 1980) have addressed the need to expand our understanding, appraisal repertoire, and treatment techniques for mildly aphasic patients. Linebaugh (1984) stressed there are few treatment procedures for these patients. Two of the three specific treatments for verbal expression included in his review--Semantic, Oppositional, and Rhyming Retrieval Training (Logue and Dixon, 1979) and Lexical Focus (Darley, Helm, Holland, and Linebaugh, 1980)--provide practice at the single word level rather than in connected speech.

Linebaugh (1984) characterized the verbal output of high-level aphasic patients by describing the occurrence of frequent disruptions such as verbal paraphasias, hesitations, and circumlocutions. He suggests that these can be decreased by having the mildly aphasic patient use a delay strategy when faced with an instance of anomia. Linebaugh supports the idea of training patients with mild aphasia to indicate their need for more time. One way of providing a delay is to decrease overall speech rate. An effective method for doing this is Helm's (1979) pacing board. It has been used with patients who have dysarthria, palilalia, and apraxia of speech (Helm, 1979; Rosenbek, 1984; Wertz, LaPointe and Rosenbek, 1984), but there is no report of its utility with high-level aphasic patients.

The purpose of this study was to seek answers to the following questions:

1. Will a pacing board decrease a mildly aphasic patient's speech rate in connected discourse?
2. Will decreasing the rate of speech decrease the amount of information conveyed?
3. Will decreasing the rate of speech improve accuracy and syntax?
4. Is the time required to analyze speech rate, content units, and adapted PICA score for responses to a picture description task clinically reasonable?

METHOD

Subject. D.L. was a 53-year-old male who had suffered a single left hemisphere thromboembolic infarct approximately four months prior to this study. He had completed 12 years of education and was a security guard prior to his stroke. He was not hemiplegic. There was no evidence of dysarthria or apraxia of speech. He had received six hours of treatment a week for one month before starting this program. Evaluation results supported the presence of mild aphasia. On the Western Aphasia Battery (Kertesz, 1982), his Aphasia Quotient was 90.3 and his Cortical Quotient was 88.3. His PICA Overall score was at the 89%ile and his Verbal Modality score was at the 81%ile (Porch, 1981). D.L.'s speech was fluent but contained frequent hesitations, revisions, and paraphasias. When having difficulty retrieving a word or conveying an idea, he produced a rapid succession of verbal

attempts. While displaying a mild deficit on single word retrieval tasks, his flow of verbal output in conversation showed moderate disruption.

Materials. Forty-five action pictures were used to collect a connected speech sample. All pictures were colored photographs found in popular magazines. The pictures were divided into 35 treated stimuli and 10 untreated stimuli. The pacing board, described by Helm (1979), is a 13-inch long strip of plastic with 8 colored squares separated by raised plastic dividers.

Treatment Design. D.L. was asked to "tell me what you see in the picture." He was given 15 seconds to describe each photograph. His responses were transcribed on-line. Ten of the 35 treatment pictures were randomly selected for a daily criterion run. During the treatment condition, the 10 untreated stimuli were administered in addition to the daily criterion run every third or fourth session. The patient was seen twice daily for an hour three days a week. Treatment involved rehearsing the pictures for two twenty minute periods, once in the morning and once in the afternoon. D.L. was instructed to tap a square of the pacing board for every word he said. His error responses received feedback from the clinician, usually in the form of questions. D.L.'s practice at revising his answers always included the use of the pacing board. Following the second practice session, the pacing board was set aside and the daily criterion run was administered.

Measures. Measures to analyze each picture description included number of verbalizations, number of content units, and an overall PICA score. A verbalization was defined as any word, incomplete phonemic attempt, or "semantic filler" such as "er" or "uh." Content units (Yorkston and Beukelman, 1977), were defined as any word or word group that conveyed a bit of information or content relevant to the picture. The guidelines developed for scoring content units are given in Appendix 1. A modified PICA score was given, based on the total response to each picture. Scoring criteria for subtest I of the PICA were used as a guideline. Additional rules developed to assist with the modified PICA scoring are listed in Appendix 2. Finally, the time needed by the clinician to score a response set was measured in 40% of the sessions.

Reliability. Interjudge and intrajudge reliability was obtained on 33% of the data and was 80% or better for PICA scores and 95% or better for verbalizations and content units. The reliability judge was a speech-language clinician who received training on adapted PICA scoring and content units.

RESULTS

Figure 1 displays the mean number of verbalizations obtained for each session. The subject displayed an immediate decrease in verbalizations following the first treatment session for both treated and untreated stimuli. This decrease was maintained throughout treatment and withdrawal. There was an average of 25.2 verbalizations per 15-second trial during baseline compared with an average of 15.8 verbalizations per 15-second trial during treatment.

Figure 2 shows the number of content units produced for each 10-picture response set. While there was variability in the number of content units following the initiation of treatment, the data indicate an overall increasing trend for the treated stimuli. A mean of 66 content units were
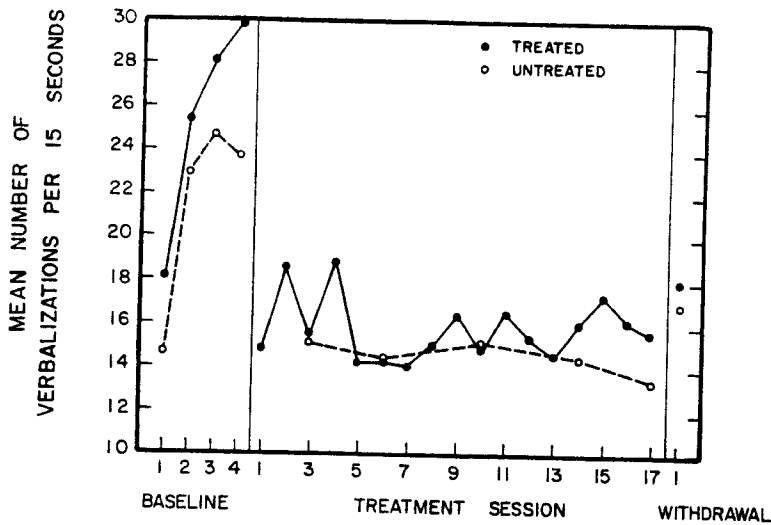
Figure 1. Speech rate: Mean number of verbalizations per 15-second interval.

produced during baseline compared with a mean of 62 content units generated during treatment. D.L. produced the same number of content units in 53% of the treatment sessions that he did during baseline, while maintaining a speech rate approximately one-third to one-half slower
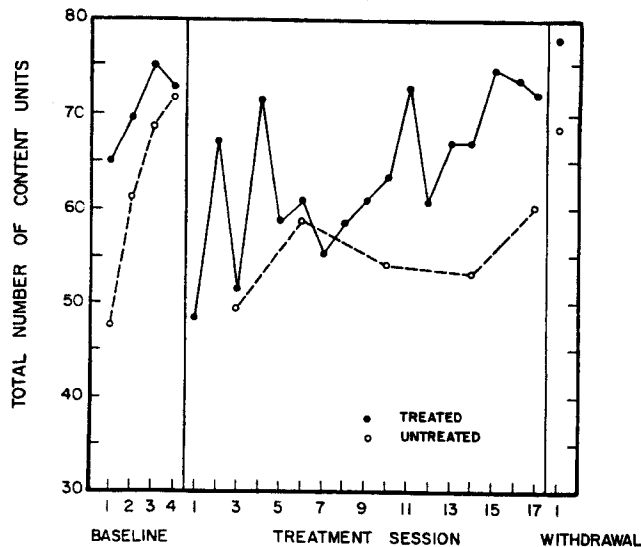

Figure 2. Total number of content units for each response set.

Figure 3 shows the number of verbalizations per content unit, and provides a measure of communicative efficiency. D.L.'s scores show a decreasing trend throughout treatment for both treated and untreated stimuli. The decreasing trend indicates that the patient became more efficient as treatment progressed. He used fewer verbalizations to convey each content unit. The mean number of verbalizations per content unit during baseline was 3.50 compared with 2.50 during treatment. Baseline scores ranged from 2.79 to 4.08 and treatment scores ranged from 2.16 to 3.10.

Figure 4 displays the mean PICA score obtained for each session. D.L.'s scores show a gradual increasing trend throughout treatment for both treated and untreated stimuli. The mean PICA score during baseline was 10.2 compared with 12.6 during treatment. PICA scores for treated stimuli during baseline ranged from 9.7 to 10.8 and during treatment they ranged from 11.0 to 13.6.
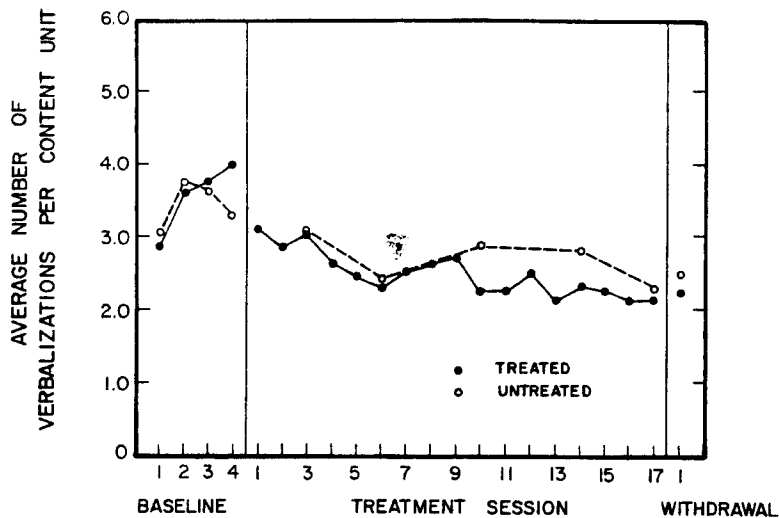
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Figure 3. Efficiency index: The average number of verbalizations per content unit.
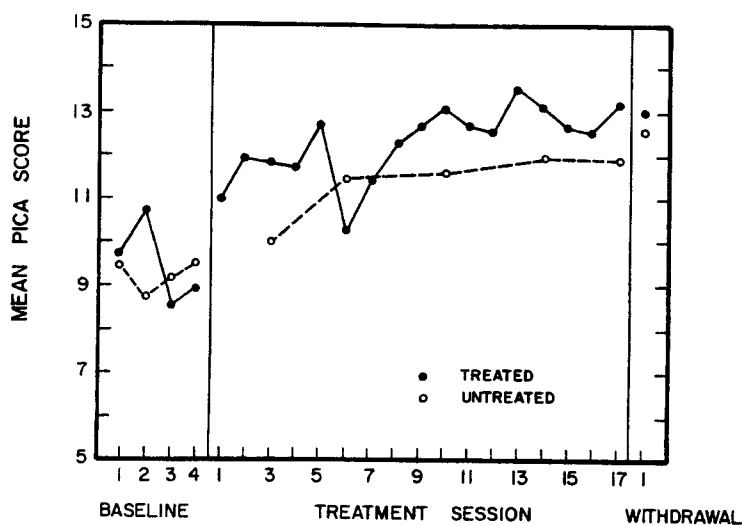

Figure 4. Mean PICA score for each response set.

Table 1 presents baseline data, treatment data for Sessions 1, 5, 10, 15, and withdrawal data, and indicates relationships among measures. As speech rate decreased, the number of content units remained consistent or increased, verbalizations per content unit decreased, and overall PICA score improved.

Table 2 shows the time necessary to judge 13 of the treatment or probe response sets. The mean time needed to score the stimuli was 12.5 minutes with a range of 8 to 15 minutes.

DISCUSSION

Because of a medical problem, D.L.'s treatment stopped several sessions before he reached the criterion of three consecutive sessions with a mean

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Table 1. Comparison of treatment measures across time for treated stimuli.

Session	X̄ # of Verbalizations per 15 seconds	Total # of Content Units	# of Verbalizations per Content Unit	X̄ PICA Score
Baseline	18.1	65	2.79	9.7
Baseline	25.4	70	3.63	10.8
Baseline	28.1	75	3.75	8.5
Baseline	29.8	73	4.08	8.9
Treatment #1	14.9	48	3.10	11.0
Treatment #5	14.2	58	2.49	12.7
Treatment #10	14.8	64	2.31	13.1
Treatment #15	17.3	75	2.31	12.6
Withdrawal	18.0	78	2.31	13.0

Table 2. Time required by clinician to analyze speech rate, content units, and modified PICA score.

Number of Sessions Analyzed	Time (In Minutes)	
	X̄	Range
13	12.5	8 – 15

PICA score of 13.0 or better, and only one withdrawal session was completed. However, the data obtained provide answers for the questions asked.

First, the results indicate that a pacing board assisted in decreasing the speech rate of this mildly aphasic patient. It is interesting to note the first baseline session (Figure 1). D.L. had been told that the second month of treatment would focus on slowing speech rate to improve his verbal output. He was able to slow his rate following this discussion, but he was unable to maintain the slower rate over the subsequent baseline sessions. Once the pacing board was introduced, he maintained a slowed speech rate throughout treatment and withdrawal.

D.L. posed the second question. He felt that if he slowed down his speech rate, he wouldn't have sufficient time to convey information. The results indicate the opposite. While initially there was variability in the number of content units produced, the second half of his treatment data indicated that the number of content units produced remained consistent with the baseline level, while he maintained a significant decrease in speech rate.

D.L. became a more efficient speaker. It took him fewer verbalizations to convey the same or a greater number of content units.

Third, decreasing speech rate coincided with an increase in PICA scores. The patient's responses contained fewer syntactic errors and paraphasias. The results suggest that slowing overall speech rate may be a successful delay strategy to help D.L. decrease the dysfluency in his verbal flow.

Last, computing the number of verbalizations, number of content units, and PICA scores took approximately 12½ minutes per response set. This appears to be a clinically reasonable investment of time.

Much of the challenge in managing mildly aphasic patients involves searching for clinically managable methods to track progress during treatment. This can be particularly difficult when the task involves connected discourse or simulates "realistic communication environments" as advocated by Wertz (1978). Recent efforts to provide qualitative analysis of connected speech (Ulatowska, 1980; Yorkston and Beukelman, 1977, 1978; Golper, Thorpe, Tompkins, Marshall, and Rau, 1980) have produced informative assessment measures. We found that one of these assessment measures, the content unit, provided daily treatment data. Perhaps more of these measures will find similar application.

ACKNOWLEDGMENT

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DISCUSSION

Q: I've worked with a couple of high level aphasic patients who used their hands a lot to gesture or who write the word they want in the air as a kind of self-cuing strategy. We always try to make the best of these types of things. Do you think using a pacing board would be a better thing to do, or do you think it would interfere with these types of processes?

A: The pacing board was used during treatment to train the patient how to maintain a slower rate. You may need to train the patient to progress from having to tap with a pacing board while they talk to being able to maintain a delay strategy without tapping. Our patient did not tap his fingers while he maintained the slower speech rate during the criterion runs. Therefore, a patient would be free to use his or her hands to gesture.

Q: Did you provide him specific instruction in self-regulatory techniques, like the kinds of things that Shames and Florance have talked about in Stutter Free Speech, to help transfer from tapping with the board to talking slowly without it?

A: No, we didn't.

Q: So he just took care of that all by himself?

A: Basically, yes. His speech rate showed a dramatic drop following one session with the pacing board. So, after one treatment session, he generalized the slowed rate to the criterion run where he did not use the board.

Q: Did you get any conspicuous disruptions in prosody as a direct result of using the board?

A: Yes. It slowed him down so much that I would have given him a PICA 14 for slowed rate. It didn't sound quite natural. However, when he was outside the room and tried to slow down, his rate was a little faster than when in treatment and it didn't sound so awkward. Also, his prosody while maintaining a slowed rate improved over time in treatment.

Q: You only had one withdrawal session but what do you know about how well he's maintained that rate?

A: Unfortunately, we've been unable to maintain contact with the patient.

Q: What was the nature of the verbalizations that the patient dropped out when he slowed down?

A: He decreased the number of fillers like "er" and "uh," false starts, phrase interruptions, and revisions. His self-interruptions were so frequent that it was difficult to follow his train of thought, and over the course of treatment he was able to decrease these interruptions.

Q: Did your patient seem convinced, at a cognitive level, that slowed rate was better? Do you think that he would use the treatment techniques outside of the clinic, and if not, do you think there are things that could help convince him of their utility?

A: Those are important questions. He was a little unhappy with the pacing board at first. He felt it was silly or childlike. He was afraid that if he significantly slowed his speech rate, people would get impatient and not wait for him to finish. He tried to compensate for his anomic episodes by speeding up, as if he could outrun his word-finding problems. However, as he decreased speech rate, he realized that he wasn't getting lost in a maze of verbal attempts when he tried to describe a picture. He started to say "I know, I have to slow down if I want to sound good." I think he reconciled himself to the fact that his speech production was better when he spoke slower. Verbal instructions alone weren't sufficient to help him modify his rate. The pacing board provided concrete practice in the control of his speech rate.

C: We did a study somewhat similar to yours that looked at the effect of oral reading on slowing spontaneous speech rate. We also looked to see if literal paraphasias and repetitions declined as rate of speech declined. We were not able to get stable rates on those; they were very erratic. But we were able, like you, to get somewhat stable rates on information units divided by total output.

APPENDIX 1

GUIDELINES FOR SCORING CONTENT UNITS*

1. A content unit was defined as any word or word group that conveys information relevant to the picture. In terms of syntactic units, a content unit can be a noun, verb, adjective, pronoun, adverb, or preposition.
   EXAMPLE:
      a. The little boy is quietly watching television = 5 content units (c.u.)

2. A content unit is counted more than once if it is used in the process of adding information about the picture. Redundant information is not counted.
   EXAMPLES:
      a. The man is on the bus. The bus is full of people. The man has a briefcase = 8 c.u.
      b. The woman is in her garden. She is picking flowers in her garden = 5 c.u.
      c. The woman, looks like she is picking flowers in her garden = 4 c.u.

3. Paraphasias and inaccurate information do not receive credit as content units.
   EXAMPLES:
       Picture: A man in a work apron is transplanting flowers from small containers into a large ceramic planter.
   a. The <u>man</u> is transtranting his <u>flowers</u> = 2 c.u.
   b. The <u>man</u> in a vest <u>is transplanting</u> his pants, I mean <u>plants</u> = 3 c.u.
   c. The <u>man</u> is translating his powers into a <u>big pot</u> = 3 c.u.

4. Only lexical verbs, such as "walk," "play," and "eat" (Quirk, Greenbaum, Leech, and Svartvik, 1972), are counted as content units. Auxiliary verbs, such as "have," "be," "do," and "can" which function as the sole verb in a sentence, are not counted as individual content units. Auxiliary verbs paired with a lexical verb form one content unit.
   EXAMPLES:
   a. <u>She</u> <u>wears</u> a <u>hat</u> = 3 c.u.
   b. <u>She</u> has a <u>hat</u> = 2 c.u.
   c. <u>They</u> <u>drink</u> <u>lemonade</u> = 3 c.u.
   d. <u>They</u> <u>are drinking</u> <u>lemonade</u> = 3 c.u.
   e. <u>They</u> are having <u>lemonade</u> = 2 c.u.
   f. <u>He</u> <u>feels</u> <u>sad</u> = 3 c.u.
   g. <u>He</u> is <u>sad</u> = 2 c.u.

5. Pronouns are scored as content units with or without a previous noun referent. A pronoun is counted more than once if it is appropriate or essential to the sentence. A pronoun is not counted if it is redundant within the sentence structure.
   EXAMPLES:
   a. the <u>man</u> is <u>on</u> a <u>bus</u>. <u>He</u> <u>is carrying</u> a <u>briefcase</u> = 6 c.u.
   b. <u>He</u> is <u>on</u> a <u>bus</u>. <u>He</u> <u>is carrying</u> a <u>briefcase</u> = 6 c.u.
   c. The <u>man</u> is <u>on</u> a <u>bus</u>. <u>He</u> <u>is carrying</u> a <u>briefcase</u>. <u>He</u> <u>is</u> <u>going to</u> <u>work</u> = 9 c.u.
   d. The <u>man</u>, looks like he is <u>on</u> the <u>bus</u>. <u>He</u> <u>is going to</u> <u>work</u> = 6 c.u.

6. Prepositions which function as prepositional adverbs are not counted as separate content units from their associated verbs.
   EXAMPLES:
   a. The <u>car</u> <u>broke down</u> = 2 c.u.
   b. The <u>girl</u> <u>looked at</u> the <u>dog</u> = 3 c.u.
   c. He <u>turned on</u> the <u>radio</u> = 3 c.u.
   d. The <u>mailclerk</u> <u>brought in</u> the <u>mail</u> = 3 c.u.
   Prepositions which convey a conventional relationship, such that it would be semantically awkward to substitute other prepositions, are not counted as separate content units from the associated noun in the prepositional phrase.
   EXAMPLES:
   a. She had a <u>smile</u> <u>on her face</u> = 3 c.u.
   b. <u>They</u> are <u>out in the backyard</u> = 2 c.u.
   c. The <u>sun</u> was <u>in her eyes</u> = 2 c.u.

Prepositions which convey specific information about the position of an object, such that changing the preposition would alter the meaning of the picture, are scored as separate content units.
EXAMPLES:
    a. The <u>cat</u> is <u>under</u> the <u>table</u> = 3 c.u.
    b. The <u>cat</u> is <u>on</u> the <u>table</u> = 3 c.u.
    c. <u>Six</u> <u>people</u> are <u>by</u> the <u>raft</u> = 4 c.u.
    d. <u>Six</u> <u>people</u> are <u>in</u> the <u>raft</u> = 4 c.u.

7. Indicators of possession such as "their," "his," "her," and "'s," are not counted as content units.
    EXAMPLES:
    a. The <u>man</u> <u>liked</u> his <u>ice cream</u> = 3 c.u.
    b. The <u>child</u>'s <u>dog</u> <u>was barking</u> = 3 c.u.
    c. Their <u>car</u> had a <u>flat tire</u> = 3 c.u.

8. Indicators of negation such as "no," "not," or "none," are counted as content units. Negation markers are counted whether they stand alone in a sentence or form part of a contraction.
    EXAMPLES:
    a. <u>She</u> has <u>no</u> <u>interest in</u> the <u>book</u> = 4 c.u.
    b. <u>She</u> isn't <u>(not)</u> <u>interested in</u> the <u>book</u> = 4 c.u.
    c. The <u>man</u> is <u>not happy</u> = 3 c.u.

9. Numbers, other than the number "one," that are paired with a noun are counted as separate content units. The number "one" is not counted as a content unit since it conveys the same information as "the" or "a."
    EXAMPLES:
    a. One <u>skier</u> <u>fell down</u> = 2 c.u.
    b. <u>Four</u> <u>skiers</u> <u>fell down</u> = 3 c.u.

*Guidelines for the scoring of content units were taken in part from those suggested by Yorkston and Beukelman (1977). Additional guidelines were developed for this study. While some of our guidelines would be modified for use in future investigations, they are offered here as an aid in the interpretation of the data and as a starting point for additional adaptation.

APPENDIX 2

ADAPTED PICA SCORING GUIDELINES

1. The patient's total response during the 15-second response period is given a single score. If an error occurs during the response, the final score should reflect the occurrence of that error. In a response that contains multiple errors, the final score should reflect the poorest performance, unless self-corrections occur.

2. Delays indicated by fillers such as "uh or "Well, let's see," pauses, or phrase repetitions should be scored as 13 or 11 as appropriate to the total response.

EXAMPLES:
- a. Patient Response: The boy, well let's see, he's riding a horse = 13.
- b. Patient Response: The girl is fixing her, fixing her hair = 13.

3. Scoring a 6 vs. 7: If the patient's total response provides only related information to the picture, then a score of 7 is given. If the patient's total response conveys more inaccurate information than accurate information, is too vague to suggest what the topic of the picture might be, or completely misleads the listener as to the main theme or intent of the picture, then a score of 6 is given.

    EXAMPLES:
    Picture: Three high school girls are sitting outside on the steps of an auditorium. One student is dressed in a cheerleaders uniform. They are conversing and laughing.
    - a. Patient Response: Okay, I see young ladies. One may like to yell. Maybe they're having fun = 7
    - b. Patient Response: I see ladies inside and they're sitting and waiting for work. They could be serious or funny = 6.
    - c. Patient Response: They all have to wait. Maybe they will like it = 6.

4. Scoring a 12 vs. 15: If the patient's response embellishes beyond what is evident in the picture without providing a basic description of the main theme or action, then a score of 12 is given. If the patient's response embellishes on the picture but includes a description of the main theme or action, then scored as a 15.

    EXAMPLES:
    Picture: A young boy wearing a baseball cap is hugging his dog.
    - a. Patient Response: The boy is so happy that his dog has won the dog show. The dog knows that it is a champion. The boy is very proud of winning first place = 12.
    - b. Patient Response: The boy is hugging his dog. He likes his dog very much. The dog just won first place in a dog show. The dog looks like a champion = 15.

5. Prepositional errors that provide misinformation are given a score of 7. If the prepositional error is syntactically or semantically awkward, but not wrong, then give a score of 12.

    EXAMPLES:
    - a. Correct Response: The cat is in the box.
         Patient Response: The cat is behind the box = 7.
    - b. Correct Response: The man is going to the office.
         Patient Response: The man is going at the office = 12.

6. Pronoun errors in number or gender should be scored as a 7.

    EXAMPLES:
    - a. Correct Response: He is drinking water.
         Patient Response: They is drinking water = 7.
    - b. Correct Response: He is a very nice boy.
         Patient Response: She is a very nice boy = 7.