

CHAPTER

20

**The Role of Perseveration
in Aphasic Confrontation
Naming Performance**

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Perseveration is the recurrence or continuation of a response in the face of changing task requirements. Perseveration occurs in a variety of neurological and psychiatric conditions, including dementia, epilepsy, depression, schizophrenia, and of course, aphasia. In fact, a growing body of evidence suggests that perseveration plays a major role in the communication breakdown in aphasia. Buckingham (1985), for example, has dedicated an entire chapter to this subject.

Although several types of perseveration have been described, the most common type associated with aphasia is the recurrent variety. Recurrent perseveration is defined as the inappropriate repetition of a previously emitted response following an intervening stimulus. According to Sandson and Albert (1984), of all the linguistic tasks we undertake with aphasic patients, the task of confrontation naming is most likely to elicit recurrent perseverative responses, particularly from patients with posterior lesions.

Because tests of confrontation naming are invariably a part of an aphasia diagnostic workup, it is important to examine more closely the role of perseveration in the patient's performance. We believe that such information will have important implications for diagnosis and treatment.

The primary purpose of this study, therefore, was to determine the extent to which confrontation naming performance is influenced by perseverative behavior. Our second goal was to examine the nature of perseverative responses in an attempt to understand the mechanisms that may underlie this phenomenon.

METHODS

SUBJECTS

Our subjects were 30 right-handed males with unilateral left-hemisphere lesions as confirmed by computed tomography (CT) scan. Aphasia classification was made according to the Boston Diagnostic Aphasia Examination (BDAE) (Goodglass and Kaplan, 1983) and represented all major syndromes including Broca's, Wernicke's, anomic, conduction, transcortical, and subcortical aphasia (N = 15 nonfluent, N = 15 fluent). Subjects ranged in age from 39 to 77 (\bar{X} = 64.4) and in time post-onset from 1 month to 120 months (\bar{X} = 23.9 months).

PROCEDURE

The visual confrontation naming subtest of the BDAE was administered to each subject in a single session. This subtest contains 38 items represent-

ing seven semantic categories. The categories were introduced according to test protocol order: objects, letters, geometric forms, actions, numbers, colors, and body parts. All categories contain six stimuli except for geometric forms (two stimuli). Examiners followed the same stimulus presentation order for each subject and recorded all responses for transcription.

All responses were scored and analyzed for correctness and promptness according to BDAE instructions and for perseverative behavior according to the following definitions:

A perseveration is an error response characterized by the recurrence of a whole word or part of a word that has been produced earlier. More specifically, recurrent perseveration can be divided into two types:

1. *Semantic perseveration* — the delayed recurrence of a whole word that is all or part of a previously produced response and that may or may not be related to the target category. (Asterisk indicates perseveration.)

Examples:

7	→	"7"
15	→	"15"
700	→	"700"
1936	→	"36 ... 1936"
43	→	"7"* ... s/c ... "42"
7,000	→	"700"*
shoulder	→	"shoulder"
ankle	→	"ankle"
wrist	→	"shoulder"*

2. *Phonemic carry-over* — the immediate or delayed recurrence of a part word or phoneme; the immediate recurrence of a whole word. (Asterisk indicates perseveration.)

Examples:

chair	→	"ready"
key	→	"rik"*
glove	→	"ratio"*
feather	→	"radio"*
hammock	→	"radio"*
nose	→	"nove"
elbow	→	"nuvle"*
shoulder	→	"shuvle"*

In some cases, several perseverations were produced for a single stimulus item as the patient attempted to target the correct word. To control for this factor, the number of perseverations was based on the number

of items eliciting at least one perseveration. If more than one perseveration was produced for any item, the first instance of perseveration for that item was used when analyzing type of perseverations.

RESULTS

All 30 subjects demonstrated perseverative behavior on the visual confrontation naming subtest. More specifically:

1. The incidence of perseveration was negatively correlated with the naming score ($r = -.681, p < .001$).
2. For the group, 50 percent of all naming errors were perseverative in nature. For individuals, this ratio ranged from 12 to 100 percent. In 26 of 30 cases, at least 35 percent of naming errors were perseverative in nature.
3. Severity of perseveration was not statistically significantly related to time post-onset of aphasia ($r = .053, p > .10$).
4. Perseveration was not more highly associated with fluent than nonfluent aphasia ($t = .77, p < .001$).
5. Phonemic perseverations occurred more frequently than semantic perseverations ($t = 4.3, p < .001$).
6. The number of perseverations elicited by various semantic categories differed statistically significantly ($F = 4.47, p < .001$). The order from most to least perseverations was as follows:

Most perseverations	1. Numbers and colors
	2. Objects and actions
	3. Body parts
Fewest perseverations:	4. Letters

This does not follow the BDAE order of presentation:

Presented first:	1. Objects
	2. Letters
	3. Actions
	4. Numbers
	5. Colors
Presented last:	6. Body parts

(Note: Geometric forms, with only two items, were omitted from this analysis.)

DISCUSSION

Sandson and Albert (1984) have speculated that perseveration may compose an integral part of aphasia. If this is correct, then it is important to determine the extent to which perseverative behavior may account for language test performance. This information in turn may lead to a better understanding of the mechanisms underlying aphasic misnaming and to more effective treatment approaches.

The primary finding of the present study, that is, that the incidence of perseveration was statistically significant but negatively correlated with naming scores, provides strong support for Sandson and Albert's contention. Furthermore, the fact that statistically significantly more perseveration responses were phonemic in nature suggests that memory traces may play a more powerful role than semantic traces as previously suggested by such investigators as Shindler, Caplan, and Hier (1984).

We found no statistically significant differences in incidence of perseveration for fluent versus nonfluent subjects. Although we used CT scan data to establish that lesion sites were confined to the left hemisphere in our subjects, we did not correlate site of lesion with incidence of perseveration. Thus, we were not able to address Sandson and Albert's suggestion that perseveration is associated more with posterior than anterior lesions. It should be pointed out, however, that nonfluent aphasia is commonly associated with anterior lesions and fluent aphasia with posterior lesions, and we found no difference between the two groups in incidence of perseveration.

Fatigue has been thought to play a role in perseveration. This cannot account for our findings, however, as the semantic category tested last (body parts) differed statistically significantly from the category tested first (objects). Instead, the more powerful variable seems to be the *nature* of the semantic category itself, with colors and letters eliciting statistically significantly more perseveration. Finally, there has been some controversy regarding the time course of perseveration. Allison and Hurwitz (1967) and Helmick and Berg (1976) reported that perseveration decreases as a function of time elapsed post-onset. Santo Pietro and Rigrodsky (1982) and Yamadori (1981), however, found as much perseveration in patients over 1 year post-onset as in the first year. Our study does not address the issue of individual recovery with a single test point per patient, although for the group, severity of perseveration was not related to time post-onset. To shed light on this issue, we did a post hoc analysis of three patients who had three administrations of the BDAE visual confrontation naming subtest, in which responses were transcribed and could be analyzed (Table 20-1).

TABLE 20-1. TIME COURSE OF PERSEVERATION ON BDAE

	<i>Onset</i>	<i>Test 1</i>	<i>Test 2</i>	<i>Test 3</i>
Subject 1	9/16/77	10/24/77	6/13/78	9/22/87
Raw score		2	36	92
Perseveration		7	7	3
Errors		37	18	3
Ratio		19%	39%	100%
Subject 2	7/26/83	10/6/83	3/17/84	3/25/88
Raw score		11	15	15
Perseveration		14	15	21
Errors		34	30	29
Ratio		41%	50%	72%
Subject 3	4/27/77	10/5/78	4/1/87 (TAP)	8/14/87 (TAP)
Raw score		7	19	42
Perseveration		16	18	4
Errors		34	31	21
Ratio		47%	58%	19%

As shown in Table 20-1, the ratio of perseveration increased as a function of time. The one exception to this occurred between the second and third testing of subject 3. This patient received a course of treatment with a program called Treatment of Aphasic Perseveration or TAP (Helm-Estabrooks, Emery, and Albert, 1987). This trial of therapy was successful in altering the course of perseveration.

In conclusion, we found that perseveration is an important feature of naming test performance in aphasia. We believe, therefore, that clinicians should carefully examine the nature of incorrect naming responses and identify the prevalence and the type of perseverations produced. This information can lead, in turn, to a more precise evaluation of the patient's strengths and weaknesses and to more effective treatment programs.

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DISCUSSION

Q = question; A = answer; C = comments.

- Q.** From a clinical point of view, as I see patients who produce phonemic perseverations as opposed to more semantic perseverations, I tend to look at those patients as more likely having an anterior motor-type dysfunction resulting in motor perseveration versus a language-based perseveration. You said perseveration didn't correlate with fluent versus nonfluent aphasia. When you looked at all of the perseverative errors, did you look at those patients who have predominantly semantic perseveration?
- A.** No, we haven't, and that's a very good issue that should be explored. However, as a group, fluent and nonfluent aphasic patients tended to produce more phonemic carry-over. I'll tell you, though, some of the best examples of phonemic carry-over I've seen have come from patients who had a severe form of conduction aphasia. So, my sense is that you're going to see phonemic carry-over from both groups, but both types of perseveration do have to be looked at more systematically to ascertain their exact nature. This may have important ramifications.
- Q.** I applaud your perseveration on trying to figure out what perseveration is. I also agree that it's very important, and I believe it forms a whole bunch of what aphasic patients do that we call aphasia, and it may or may not be aphasia. My question is, if you have any reliability

data on the measures; that is, if you test a patient today and you test him tomorrow or next week, before he's had a chance to have lots of treatment or change physiologically, do you get the same result distributed across the same types of perseverations? If you don't, then you can't really conclude anything about the effects of your treatment or the effects of testing him in 1977, then 1988.

- A. No, we haven't looked at it in the way you're suggesting. That's not the only patient we've tried our treatment program on however, and I know that you can reduce perseveration. We have looked at the nature of the responses they're making, but not at consistency over time in a group of patients, and I think that would be important to do. A lot of this study was retrospective in that we're using former test results, and it's a very good lesson for all of us, when we're administering a test, never just to put a checkmark unless it's immediately, wholly correct with nothing else going on. You do miss a lot of important information if you don't record the patient's error responses.
- C. Well, that actually introduces another form of reliability that I hadn't even thought of; interjudge and intrajudge reliability would also, of course, be equally important.
- A. And it's very hard too. Other people have talked about this. Buckingham, for example, talked about deciding whether a perseverative error is some sort of phonemic motor programming error, or if it's semantic. At some point you have to say, "O.K., this is what we're going to call that type of error," then establish rules and score responses accordingly.
- C. Right, writing the rules of course is the first step. My other comment is about whether fatigue really was a factor. I understand the design, you administered the BDAE in its normal form . . . in the order that it always goes in. But if you do that, then you can't decide whether fatigue really was a factor. If you know that the last thing you did, they made the fewest errors on, but that doesn't tell you that fatigue didn't create all of those errors or some of the errors on some of the others. So in order to conclude that, I think you're going to have to scramble the order . . . randomize all of the subtests, then administer it. And then take the last, no matter what it was, and test it against the first or the middle.
- A. Yes. Clearly you have to do a prospective study on this; however, objects tended to elicit a lot of perseveration, and those were the first ones given. And the thing clinicians should do is to decide the order of administration of test items and always do them in that order. You can't see if a response is a perseveration unless you know the response that was previously produced each time. We've

done this on the BDAE word discrimination subtest where you randomly present stimuli. We've set up a standard random order for all the clinicians to follow because we're looking at perseveration of pointing response in word discrimination.

- Q. Regarding those three patients that you went back and pulled out the data on . . . since those were all given in the same order and since you had recorded patients' responses, were the same perseverations produced from test to test over time?
- A. I'm not sure. That's something we can look at, but didn't have time to do. Because we've been looking at perseveration over so many protocols and on so many things, we're amazed at the consistency. I think all of us have seen consistency in naming responses, for example, like the patient who got a raw score of 15, and then 4 years later got a raw score of 15 again, had named the same items. It makes us feel better when we intervene and something really happens. But we didn't look at whether the perseverations were the same.