Visual Agnosic Misnaming:
Treatment of a Right CVA Patient One Year Post Onset

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STATEMENT OF THE PROBLEM

A surge of interest among aphasiologists and others in the right hemisphere and its impact on language is reflected in the recent literature (Collins, 1976; West, 1977; Rivers and Love, 1977; Searleman, 1977; Myers, 1978, 1979, 1980; Deal, Deal, Wertz, Kitselman and Dwyer, 1979). Visual agnosia and related deficits--notably visual spatial neglect--have been well described (Benton, 1969; DeRenzi, Faglioni and Scotti, 1970; Heilman and Watson, 1971; Brown, 1972; Heilman and Valenstein, 1972; Albert, 1973; Gardner, 1974; Colombo, DeRenzi and Faglioni, 1976; Bisiach and Luzzatti, 1978; Bouska and Biddle, 1979; Rubens, 1979). However, treatment techniques have been described by only a few (LaPoint and Culton, 1969; Weinberg, Diller, Gordon, Gerstman, Lieberman, Lakin, Hodges and Ezrachi, 1977; Metzler and Jelinek, 1977; West, 1978). Specific strategies for remediation of "visual agnosic misnaming" have not yet been described. The purposes of this paper are: (1) to review the classical definitions of "agnosia" (Brown, 1972; Rubens, 1979) in the context of related visual-spatial-constructive disorders (Benton, 1979), and (2) to describe the treatment of an adult male one year following a right hemisphere cerebrovascular accident who presented deficits in picture naming, reading and drawing.

HISTORICAL PERSPECTIVE

Appendix A provides a brief historical overview of pertinent literature. Lissauer (1889 in Brown, 1972) distinguished 3 forms of visual agnosia which are still recognized today: apperceptive, associative and mixed. Bay (1953), Geschwind (1965), and Luria (1966) are credited for 3 contemporary theories; these involve intellectual, disconnection and perceptual explanations, respectively. Brown (1972) advocates a classical view, i.e., that apperceptive agnosia is a sensory deficit; associative agnosia a conceptual deficit. He also hypothesizes about the pattern of recovery in the apperceptive and associative agnosias in terms of the dissimilarity, complexity and familiarity of stimuli.[1] Watson, Miller and Heilman (1978) have recently proposed a model of intentional neglect, which is pertinent to this case. They suggest that sensory appreciation for stimuli may be intact, while the intention to perform the motor act in the inattentive field is lost. They cite Turner (1973) who argues that both attentional and intentional attributes are prerequisite to visual recognition behaviors.

[1]Recovery patterns: apperceptive: first, visually similar; last, visually complex, e.g., faces, then objects, then words; associative: the reverse (Brown, 1972, p.219).

In Appendix B, Benton's (1979) classification of visual-spatial-constructive disorders is used as a framework for describing Mr. S' profile.

CASE DESCRIPTION

Mr. S., a 61 year old right-handed male suffered a right hemisphere CVA[2] one year prior to evaluation. He had a high school education and had been previously self-employed as a general contractor. He lived in a nursing home in the year prior to his admission to the Rehabilitation Unit at Duke University Medical Center. On admission, he presented slight dysarthria, left hemiparesis, and was wheelchair bound. He had a mild bilateral hearing loss and wore glasses. He was treated for 1-1/2 months for a total of 35 1/2-hour sessions. Physical, occupational and speech/language treatment were rendered during this period.

On initial evaluation, Mr. S. presented significant deficits in naming pictures, reading, and drawing and copying. In addition, O.T. described 2D-3D confusion on visual-constructive tasks, dressing apraxia and subtle deficits in topographical orientation. Auditory comprehension, verbal formulation, orientation and memory were within normal limits. Visually-related letter errors were made in writing but graphic formulation was otherwise nonaphasic.

On initial evaluation, Mr. S. performed as follows. On the Western Aphasia Battery (Kertesz and Poole, 1974), he achieved an aphasia quotient of 94.8 out of 100.0; a cortical quotient of 86.7 out of 100.0. On the Token Test (DeRenzi and Vignolo, 1978, the 36-item version, he achieved 34 of 36 correct with no evidence of visual neglect. On Raven's Coloured Progressive Matrices (Raven, 1956), he achieved 18 of 36 correct. On the Reading Comprehension Battery for Aphasia (LaPointe and Horner, 1979), he achieved 20 of 100 correct. On the Boston Naming Test (Kaplan, Goodglass, and Weintraub, 1976), he achieved 25 of 85 correct. The emphasis of our treatment with Mr. S. was remediation of picture naming errors and reading impairment with remediation of drawing and copying as a complementary goal. The treatment strategies are described below.

Naming. The naming errors made by Mr. S. in response to Boston Naming Test pictures were primarily "visual agnosic misnaming," as these examples illustrate:

toothbrush	"broom"
stilts	"bars used in therapy"
igloo	"kiln"
telescope	"pop bottle"
dominoes	"license plates"
hourglass	"mannequin"
pyramid	"seats at a stadium"
noose	"necklace"

These errors appear to result from a combination of factors: left visual field inattention, impulsive scanning and exploration, omission of details,

[2]On 7/24/78, Mr. S. suffered a right internal carotid artery cerebral vascular accident and subsequently was comatose apparently secondary to tentorial herniation in association with cerebral edema. Other medical history includes cardiac disease of uncertain etiology, and severity, and hypertension. EEG and CT scan data were not available.

and inadequate analysis and synthesis of defining features. The techniques for remediation of visual agnosic misnaming included: picture tracing, left-side anchoring and verbal self-cueing. Figure 1 illustrates a disorientation of contour and omission of detail which was characteristic of tracing performance before treatment.

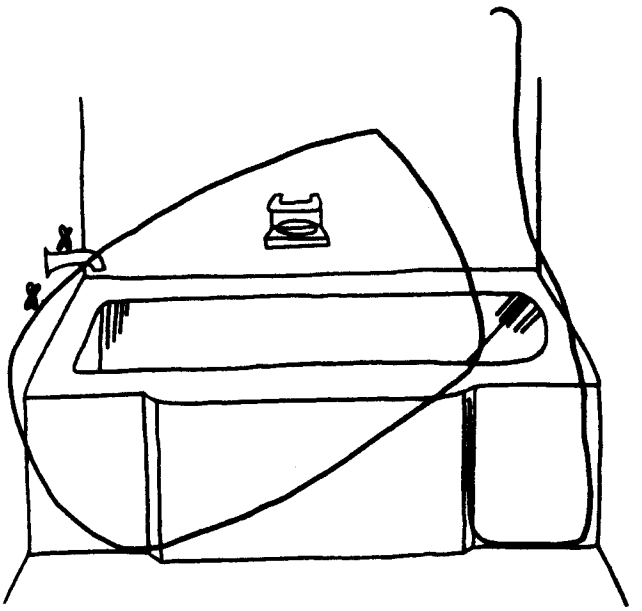

Figure 1. Pre-treatment tracing by Mr. S.

Figure 2 shows an example of improved tracing of both contour and detail. Supplementary strategies for naming and tracing pictures included left-side anchoring, whereby the clinician marked an "x" on the left, and the patient's verbal self-cueing, "look to the left."

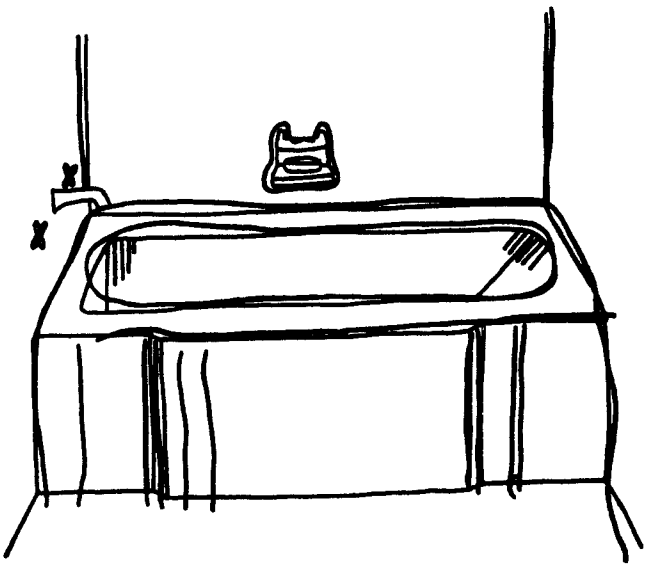

Figure 2. Post-treatment tracing by Mr. S.

Drawing and Copying. As on tracing tasks, drawing and copying performance was characterized by omission of details on the left, asymmetry of contours, and distortion of shapes and features. The techniques for remediation of drawing and copying included: tracing pictures, as already described, drawing pictures, and writing labels on picture components during construction (see Figure 3).

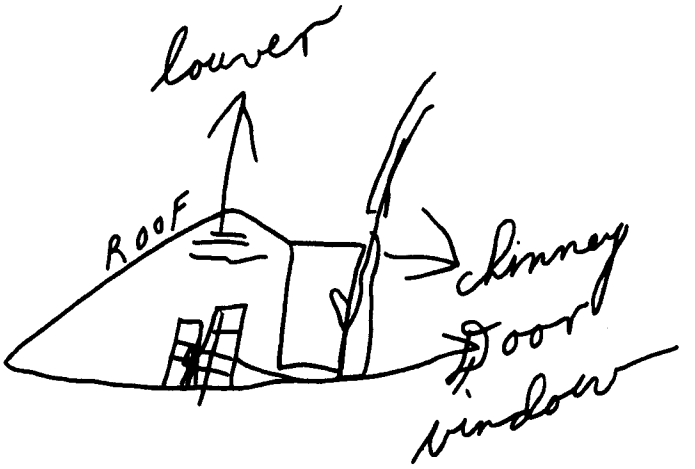

Figure 3. Example of the "draw and label" technique.

Reading. The third area of treatment was remediation of reading impairment. Errors were characterized by letter and word omissions and substitutions, and inadequate horizontal and vertical scanning. Paragraph reading was most impaired. Techniques for remediation of reading included: horizontal and vertical anchoring, multiple oral rereading (Moyer, 1979), and reading for meaning. Following a baseline measurement, a left margin anchor was used. As the patient read aloud, immediate feedback was provided by the clinician, who underlined omitted words. The same paragraph presented four times in succession yielded immediate improvement.

Results of Treatment

The results of treatment for each area will now be described. Tests were administered at approximately 3 week intervals.

Naming. Visual agnosic misnaming, as measured by the Boston Naming Test, improved as follows. Correctness was judged on the patient's first response to each of the 85 items on this test. On Test 1, he achieved 25 correct, on Test 2, 56, on Test 3, 58. Appendix C lists select responses by Mr. S. These are organized according to type of error and degree of improvement: visual errors/improved; visual errors/not improved; and miscellaneous errors/fluctuating responses.

Drawing and Copying. Mr. S.' best drawing performance is shown in Figure 4. Further examples of improvement are shown in Figures 5 and 6, which were obtained on initial evaluation in August 1979 and 4 months following termination of therapy. In Figure 5, classic errors of left visual neglect and disconfiguration of complex designs are manifest before treatment, with drawing from memory somewhat more impaired than copying. Figure 6 shows drawing and copying following treatment. Symmetry, orientation and detail

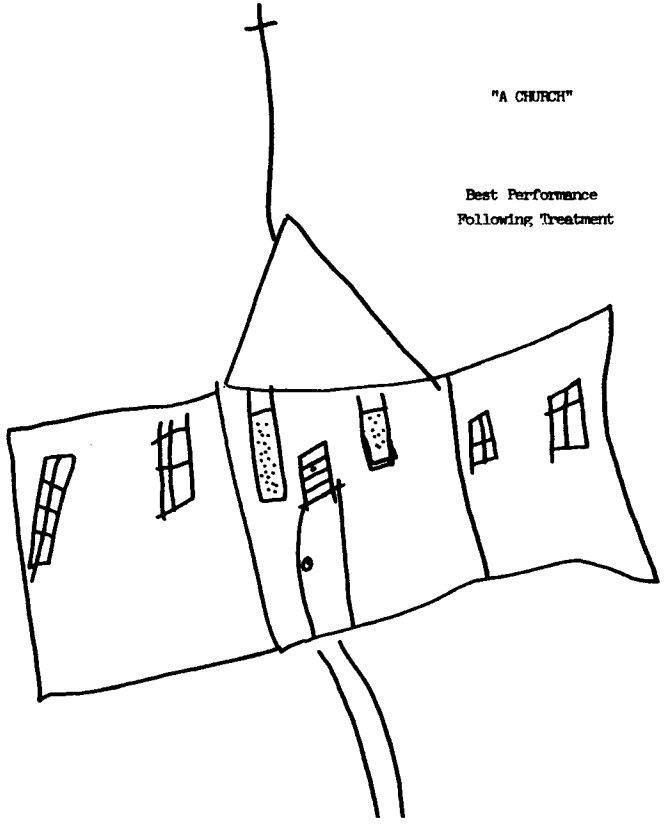

Figure 4. Drawing of a church by Mr. S. following treatment.

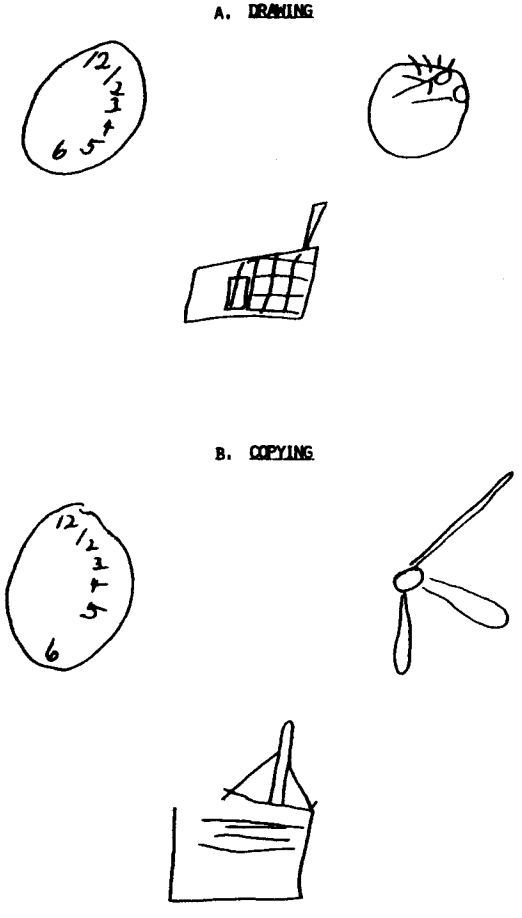

Figure 5. Errors of neglect and disconfiguration of symmetrical designs exhibited before treatment.

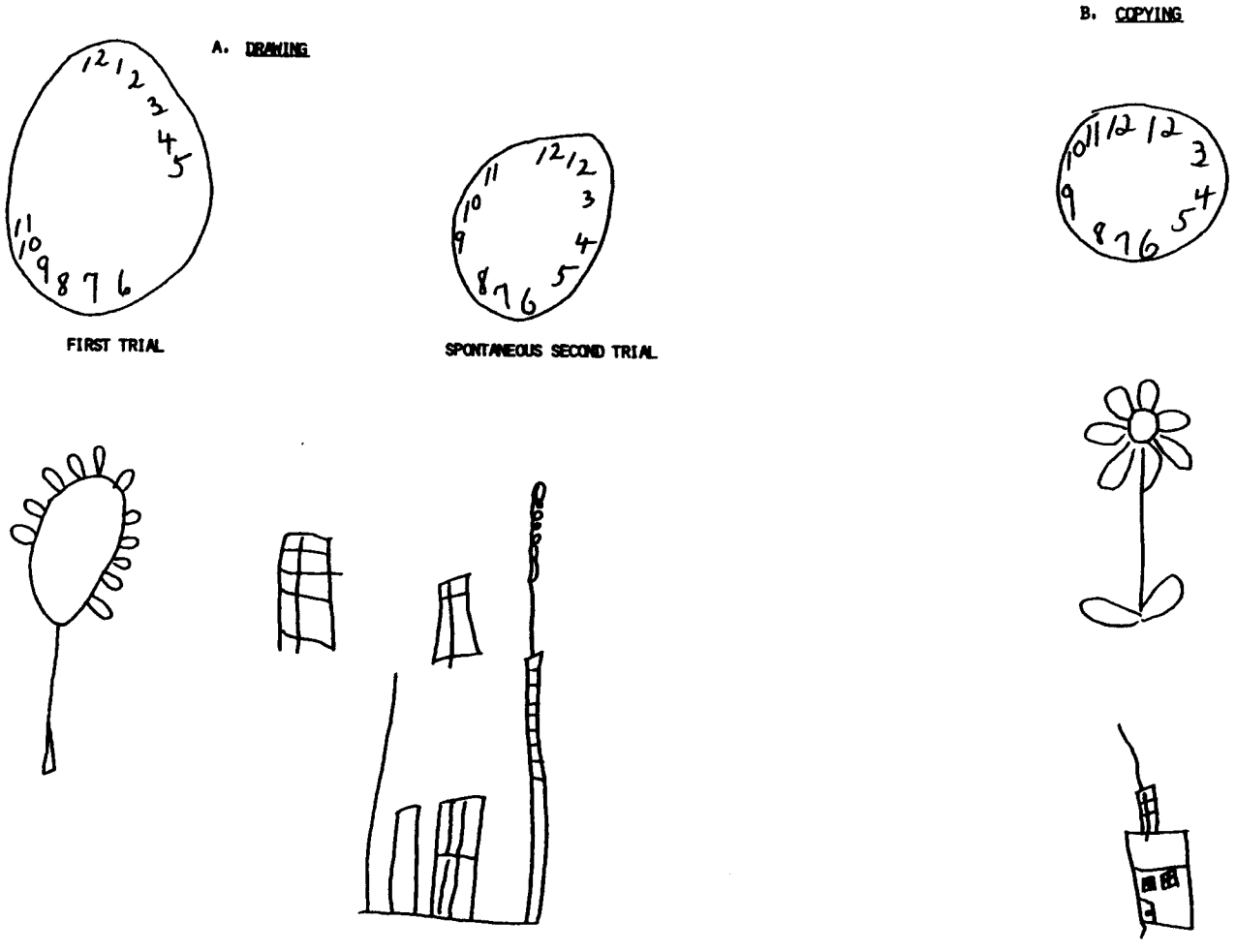

Figure 6. Drawing and copying from memory following treatment.

are significantly improved on the clock and flower, while omission of detail and lack of perspective are still evident to some degree on the more complex task, drawing of a house.

Reading. The final area of treatment, reading, was evaluated by repeated administrations of the Reading Comprehension Battery for Aphasia, as shown in Figure 7. On Test 1, 20 of 100 responses were correct; on Test 2, 51 and on Test 3, 61 out of 100 items. (The reading tasks, from left to right are: I, word reading (visual); II, word reading (auditory); III, word reading (semantic); IV, functional reading; V, synonyms; VI, sentence-picture matching; VII, paragraph-picture matching; VIII, paragraph-factual; IX, paragraph-inferential, and X, syntactically varied sentences.) Complex paragraphs requiring comprehension of factual and inferential comprehension--subtests VIII and IX--remained severely impaired. However, following direct involvement of the patient's family in the latter stages of therapy, we were confident that Mr. S. was able to read and interpret messages and notes pertaining to familiar and meaningful events.

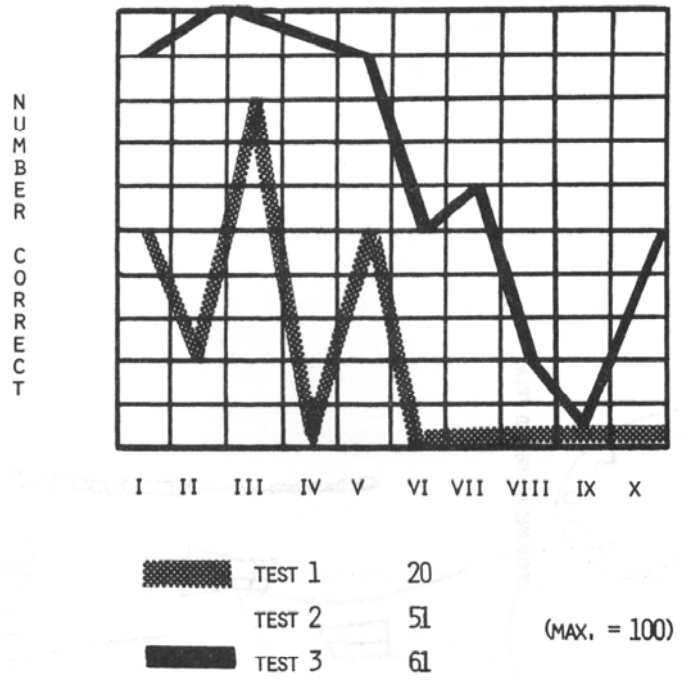

Figure 7. Performance on The Reading Comprehension Battery for Aphasia pre- and post-treatment.

SUMMARY

This paper described the case of a 61 year old male who began treatment one year post onset of a right CVA. Techniques for remediation of naming, drawing, and reading deficits were described. Clinically significant improvement in these 3 treatment areas was supported by both quantitative and qualitative changes on a variety of tasks. The efficacy of proposed treatment strategies for other patients with right CVA's who present visually-based language and language-related deficits remain to be explored. For Mr. S., improvement in performance may have resulted from at least two factors: (1) enhancing the attention to stimuli and (2) enhancing the intention to respond to stimuli in the inattentive field. All of the

techniques emphasized increased scanning, increased processing time, and active participation of the patient in the task, either through overt verbalization, or through constructive activities such as drawing, tracing, copying and labelling. It is hoped that future research will study the differential effects of strategies such as these for remediation of the right-hemisphere damaged patient with visual-spatial-constructive deficits affecting language and language-related behaviors.

APPENDIX A

HISTORICAL OVERVIEW

Munk, 1877	"Psychic Blindness"
Wernicke, 1874	Distinguished visual awareness from conceptual identification
Lissauer, 1889	Distinguished 3 forms of agnosia: Apperceptive: Distortion of the sensory impression of the object in consciousness; CF. Synthesis deficit (Luria) Associative: Intact vision but impairment of the pathways leading from sensory impressions to memory images; CF. Analysis deficit (Luria) Mixed
Liepmann, 1900	Distinguished the agnosias (visuo-perceptive) from the apraxias (motor - executive)
Bay, 1953	Visual object agnosia coexists with reduced intellectual capacities and defects in the system of spatio-temporal transformations which the stimulus goes through on its way to perception.
Geschwind, 1965	Visual object agnosia is a disruption (disconnection) of modality-specific sensori-verbal linkages, resulting in isolation of speech area and area of visual perception.
Luria, 1966	Visual object agnosia is a defect of 'simultaneous synthesis,' i.e., the synthesis of isolated elements of visual perception and the integration of these elements into simultaneously perceived groups.
Brown, 1972	Apperceptive Agnosia: Sensory deficit. Associative Agnosia: Conceptual Deficit. The apperceptive agnosic cannot visually name, select or command, match, copy, draw from memory: he can tactually and auditorily name. The associative agnosic cannot visually name. He can select on command, match, copy, draw, tactually and auditorily name.
Watson, Miller, Heilman, 1978	Intentional Neglect: Sensory appreciation is intact, but the intention to perform the motor act in the inattentive field is lost.

APPENDIX B

MR. S.'S DEFICIT PROFILE WITH REFERENCE TO BENTON'S CURRENT MODEL*

Classification of Visuoperceptual, Visuospatial, and Visuoconstructive Disorders

	Mr. S.
I. Visuoperceptual	
A. Visual object agnosia	
B. Defective visual analysis and synthesis	"Visual agnosic misnaming"
C. Impairment in facial recognition	(pictures)
1. facial agnosia (prosopagnosia)	
2. defective discrimination of unfamiliar faces	
D. Impairment in color recognition	
II. Visuospatial	
A. Defective localization of points in space	2-D / 3-D confusion
B. Defective judgment of direction and distance	
C. Defective topographical orientation	
D. Unilateral visual neglect	visual dyslexia
III. Visuoconstructive	
A. Defective assembling performance	
B. Defective graphomotor performance	drawing & copying deficit

*Benton, A., 'Visuoperceptive, Visuospatial, and Visuoconstructive Disorders.' In K.M. Heilman and E. Valenstein (Eds.), Clinical Neuropsychology. New York: Oxford University Press, 1979.

APPENDIX C

VISUAL AGNOSIC MISNAMING

Select Responses by Mr. S. on the Boston Naming Test

	Visual Errors/Improved		
	Test #1	Test #2	Test #3
Toothbrush	Broom	+	+
Stilts	Bars used in therapy	+	+
Igloo	Kiln	+	+
Telescope	Pop bottle	+	+
Dominoes	License plates	+	+
Hourglass	Mannequin	+	+
Pyramid	Seats at a stadium	+	+
Noose	Necklace	+	+

Appendix C, continued

	Test #1	Test #2	Test #3
		Visual Errors/Not Improved	
Volcano	Train	Water shooting in air	Smoke Stack or chimney
Harmonica	Manufacturing plant	Top of a building	Garage or factory
Asparagus	NR	Candle	A tree or is it a candle holder
Maze	Parking lot	A bunch of jumbled up stuff	Basketball court
Abacus	Broom closet	Bars on a window	Bars on a jail
Palette	NR	A couple of pencils	Chopsticks
		Miscellaneous Errors/Fluctuating Responses	
Snail	Couple of ducks	Geese	+
Pretzel	Snake	+	A bunch of snails
Antlers	Deer	Cactus, or reindeer, deer horns	Cactus
Muzzle	Scales	+	Highway
Pinwheel	Coal Yard	+	Windmill
Yoke	NR	A gate	Use to put 'em on oxen

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DISCUSSION

Q: I'm uncomfortable with the diagnosis of visual agnosia in this patient. Classically, a patient with poor visual naming of objects, but with preserved tactile naming is visually agnosic. How did the patient do with tactile naming?

A: Visual naming and tactile naming of objects was fine. On the Western Aphasia Battery, the objects are presented visually first, and he did not require a tactile cue. Tactile naming without visual input was equally proficient.

Q: Was the patient able to name objects on tactile presentation which he was unable to name when presented pictorially? For example, a toothbrush: could he name the object tactually and visually, but not the corresponding picture?

A: Yes.

Q: How did he name the actual object, toothbrush, without actually feeling it?

A: Fine. On the Western Aphasia Battery, out of 20 objects, he named all 20, with only one self-correction.

Q: The fact that the patient can name objects visually, but not name the corresponding pictures is the reason I am uncomfortable with the diagnosis of visual agnosia. Though there is no doubt that the patient has visual

spatial impairment of the highest order, I would not call it visual agnosia.

A: You're questioning the fact that he can name objects visually but not the pictures and this concerned me, too. After reviewing the literature, this issue may be pertinent to the level of severity or perhaps to the stage of recovery (Brown, 1972, p.219; Campbell and Oxburg, 1976).

Q: Rubens and Benson's patient (1971) could not name objects on the PICA just looking at them, which is more typical of visual agnosia, but when he picked them up and started gesturing with them, he got the right name. I think some of the naming errors that you got on the Boston Naming Test could be accounted for just on the basis of visual perceptual or visual spatial problems rather than visual agnosia.

A: Thank you for your comments. (Note: Geschwind's definition, based on disconnection theory appears to be the basis for the commenter's remarks; Luria's model of visual agnosia which relies on perceptual explanations should also be considered when describing visually-based naming errors.)

Q: I like what you're doing with this patient's problem, and I can see how it has indirect ramifications for his ability to communicate with others. Do you find that you ever have to defend what you're doing as a speech pathologist and, if so, what do you say?

A: Fortunately, in the rehabilitation setting that I'm in, we have complete independence with regard to patient management. I feel that the evidence I reported to the physician and the other staff members was very much supported. I admit that much of it was exploratory but particularly in the area of reading, the improvement was functional and did benefit the patient in terms of his leisure activity.

Q: Did you coordinate with O.T. in any way?

A: We communicated at length about the patient and we were given some insights into the visual problem in terms of 2D-3D difficulty, which I think may reflect on his drawing performance, but their tasks were somewhat distinct--parquet designs, pegboards and dressing.

Q: Would you expand on the relationship of attention and intention?

A: Let's go back to the Boston Naming Test for a second. One of the reasons I chose to score only the first response was that any type of cue was facilitative. The patient was a bright man, so any type of semantic cue, phonetic cue, or any indication at all to him that his response was in error would cause him to begin a compensatory process such as spending more time on the task and scanning more adequately. I think this had to do with increasing his intention, or motivation, you might call it, and thereby facilitating attention. I think that there's an interaction between attention and intention. I agree with Turner (1973) that they are closely intertwined. You must have an intention to deal with stimuli in the inattentive field, as well as an ability to maintain attention.

Q: Did this patient have left hemiinattention in the early stages of recovery? Did he deny his left side?

A: Unfortunately, he had been in a nursing home, and we don't have any records.

Q: On the reading of paragraphs, did the left side anchor really work immediately? Patients I see with visual spatial problems fail to track the lines even when an anchor is provided.
A: We had a number of tasks and he showed improvement on the second trial in all cases to some extent. Again, he responded to the idea of practice and raising his interest and understanding of the task. Carryover was not always as good as I have described on treatment tasks, as we can see from the scores on the R.C.B.A. For example, when we presented paragraphs in that context, he still had quite a bit of difficulty. On treatment tasks he showed immediate improvement.

Q: What kind of compensatory strategies did he generate himself?
A: On initial evaluation, the patient appeared normal, and compensatory strategies were not particularly evident. For example, on the Token Test he achieved 34 of 36 correct with no apparent difficulty. Only through supplementary testing using the Boston Naming Test and the Reading Comprehension Battery for Aphasia did his problem become apparent to me. I think he was using semantic cues as a means of compensating, but it was not immediately evident.

Q: What kinds of changes do you think you could have made in the areas of performance deficits if you had relied solely on giving him fairly natural kinds of feedback and allowed him to evolve his own strategies? Do you think that alone would have effected a change?
A: If we had used reading for meaning independently of anchoring, I think that might have worked by itself. He may have recognized that he needed to improve his scanning in order to read for meaning. We were trying to maximize performance as quickly as we could by using a combination of techniques. I think in the rehabilitation setting he very likely could have developed strategies of his own. It wouldn't have surprised me in this patient.

Q: Did the patient have left hemiinattention when you saw him?
A: Inattention in the left visual field appeared to be task-specific.

Q: Did you happen to try Muma's subtest that asks people to group things according to color, function and visual configurations? Further exploration of salient cues for this individual and loading treatment stimuli with salient dimensions may be a way of shortcutting some of these other therapy strategies.
A: No, we did not use Muma's approach. I agree with your comments.

Q: Review his physical and educational status and his reason for being in therapy at one year post onset.
A: The patient had a left flaccid hemiplegia. He was high school educated and had been self-employed as a general contractor. Estimated premorbid intelligence was above average. The patient was brought to the rehabilitation unit at the motivation of his family. He returned home at the time of discharge.

Q: We had a similar patient with whom we worked on headline and paragraph reading, and found tactile scanning (finger pointing) to be facilitative. Did you try this?
A: No, we didn't, but could have.

Q: Do you know if the patient had optical nystagmus?
A: No, I don't.

Q: What was this man's spontaneous communication like?
A: It was normal in terms of fluency, content and grammatical diversity. It was somewhat rambling, but nothing significant was noted in the verbal modality.

Q: The types of errors the patient made on naming are the sort we often see with large right frontal lesions, which result from focusing on one aspect of the picture and naming that. On the toothbrush, he could have been looking at the bristle, and "bars used in therapy" for stilts may have resulted from rotation. "Kiln" we get all the time for igloo. So I would suggest, after looking over his errors, that a lot of them are consonant with a large right frontal lobe lesion rather than a visual agnosia.
A: I agree with your interpretation of the error pattern; attention to salient characteristics and failure to scan in association with impulsivity, etc. may account for these visual errors. However, if you accept Luria's explanation of visual agnosia as a manifestation of a deficit in analysis and synthesis of visual information, the label "visual agnosia" may be appropriate in this case.