# The Use of Context-Dependent Pictures in Aphasia Rehabilitation

Penelope S. Myers and Craig W. Linebaugh
The George Washington University, Washington, D.C.

## INTRODUCTION

Picture stimuli used in the evaluation and treatment of aphasic patients range from pictures of isolated objects, to straightforward action pictures, to pictures of scenes or events. The operational variable along this continuum is increasing context. Despite the fact that we call action pictures dynamic, all pictures are by nature static representations. The "action" can only be inferred, and the inference is based on contextual elements. In a straightforward action picture of a man cutting a steak, we must infer that he is cutting the steak because we do not actually see the cutting motion. The position of the knife and fork in his hands in relation to the steak leads us to this conclusion by calling up an internal association. We have seen a knife and fork so positioned before, and we then assume, based on prior life experience, that a certain action is taking place. A literal and equally accurate explanation of the picture might be that of a man holding a knife and fork which are embedded in a steak. Similarly, in a more complex picture, many elements are seen in relation to one another, and the context again helps us turn the picture from a static representation into one that appears more dynamic. We infer that the boy in the "Cookie Theft" picture from the Boston Diagnostic Aphasia Examination (Goodglass and Kaplan, 1972) is stealing cookies not because his hand is in the jar, but because of the furgive aspect of the other elements surrounding his action--his sister apparently saying "Shhhh," the precarious position of the stool, the fact that his mother's back is turned.

Increased context has been found to facilitate the verbal production of aphasic patients. Williams and Canter (1981), for example, found that naming scores for Wernicke's aphasic patients improved when isolated stimulus items were depicted in a contextually appropriate composite picture. Aten and Faber (1979) reported that pictures of broken or altered objects were more successful than their intact counterparts at eliciting topically related phrases from aphasic subjects. West (1977), seeking to explain the facilitating effects of more dynamic pictures on aphasic patients' verbal performance, suggested that such pictures heighten "action imagery" and thereby increase right hemisphere (RH) participation. Myers (1980) extended this concept by stressing the contextual aspects of dynamic pictures. She suggested that such pictures are effective, not because they evoke an iconic visual image, but because they stimulate more fundamental aspects of right hemisphere (RH) processing. Increased context and the inferential activity that context generates enlists the integrative and associative processing capabilities of the RH. To this end, Myers proposed that efforts aimed at strengthening RH participation in aphasia therapy should be directed at "developing stimuli that are rich in context, relationships, action, and interdependencies, and which require some level of interpretation by the patient" (p. 73).

Pictures of this type might appropriately be called "context-dependent" because context not only provides a familiar background for target items, but is crucial to understanding a picture's meaning. That is, the overall

meaning can only be arrived at by noting, evaluating, and understanding the multiple contextually based relationships depicted in the picture. Clinical experience, however, does not fully support the notion that increasing contextual information progressively facilitates aphasic patients' verbal performance. It has been our observation that some patients' verbal expression is inhibited by context-dependent pictures. While the contextual framework provided by simple action pictures may facilitate verbal expression, that in context-dependent pictures may overload some patients' cognitive or linguistic capacities. This overloading may then negate the potentially facilitating effects of context. Perhaps there exists a "threshold of contextual complexity" beyond which an individual aphasic patient cannot readily make inferences based on the contextual information available.

Experimental support for this possibility is provided by Waller and Darley (1978) who investigated the effects of various antecedent conditions on auditory retention of stories. Contrary to their expectations, pictures depicting the main theme and locale of stories had a negative effect on aphasic subjects' comprehension. Scores were significantly better when a verbal summary antecedent was provided than when a picture was presented prior to the stories. The authors suggested that rather than treating the pictures as strictly visual stimuli, their aphasic subjects may have attempted to use their impaired language systems to verbally recode the pictured information. That the subjects attempted to recode the pictured information seems a reasonable suggestion since the pictures were removed prior to presentation of the story. That the form of recoding was verbally based also seems plausible since the task was one which actively engaged the language system.

The purpose of the present study was to investigate the nature of problems presented by context-dependent pictures and to determine if such pictures would create problems for aphasic patients even when performing a task that did not require the overt use of language. To that end, this study was designed in such a way as to demonstrate picture comprehension without requiring verbal production. Subjects were required to infer a picture's meaning and to demonstrate that understanding through a nonverbal sorting task.

## METHOD

The experimental subjects were 12 mild to moderately impaired adult aphasic patients ranging from six weeks to ten years post-onset with a mean of 5.1 years post-onset. There were seven male and five female subjects who ranged in age from 38 to 72 years with a mean age of 57. They averaged 14.2 years of education with a range of 9 to 20 years. The control subjects were 12 non-neurologically impaired adults ranging in age from 38 to 76 years with a mean age of 58.8. There were four males and eight females. They averaged 15.3 years of education with a range of 12 to 20 years. All subjects were right handed.

The experimental task in this study consisted of sorting context-dependent pictures into groups. Prior to presentation of the experimental task, each subject was given two pretask sets of nine pictured objects to sort in order to familiarize subjects with sorting and to insure that all subjects could perform a sorting task. The first of these pretask sets involved sorting objects into three disparate superordinate categories: foods, furniture, and clothing. The second set involved sorting members of the superordinate category "foods" into three subcategories: meat, fruit, and desserts. All aphasic and control subjects sorted these pretask sets without error.

The experimental stimuli for this study consisted of two sets (Sort A and Sort B) of nine pictures each which were to be sorted according to theme or general idea conveyed by the pictures into three groups of three pictures each. The nine pictures in each set were black and white 5" x 7" photographs. The themes expressed by the pictures in Sort A were: (1) Despair (Figure 1), (2) Work/Determination (Figure 2), and (3) Play/Gaiety (Figure 3). For Sort B the themes were: (1) Love/Affection (Figure 4), (2) Comfort/Suffering (Figure 5), and (3) Mistrust (Figure 6).* The pictures were carefully chosen so that context was as crucial as facial expression or body language in determining the gist of the picture. Care was taken to avoid stereotypic or predictable expressions of the theme so that subjects were forced to utilize contextual clues to deduce the picture's meaning. The nine pictures in each sort were presented in identical position in a 3 x 3 matrix to all subjects.

Subjects were given the following instruction before sorting the experimental pictures: "I want you to look at all of these pictures. Then sort them into three groups according to the theme or general idea conveyed by the picture. There will be three pictures in each group. Each picture must be placed in one of the groups." Instructions were repeated if necessary, and subjects were encouraged to pick up the pictures for close inspection. The pictures placed in each group and the time required to complete each sort were recorded for all subjects. After sorting, all subjects were asked to explain their groups ("Tell me why you feel these three pictures go together") using whatever modalities were available to them. These explanations were recorded and were used to help determine the basis on which the subjects had sorted the pictures.

Sort A was presented first to six of the subjects in each group, and Sort B was presented first to the remaining six subjects. The task was readministered to the experimental group 4 to 16 days after initial testing ($\overline{X}$ = 7.9 days).

## RESULTS

The mean number of errors and the mean time required to complete the task were computed for each sort and for the combined sorts (Sort A + Sort B) for both groups of subjects. A picture was considered to be in error if a subject failed to place it with at least one other picture depicting the same theme. Comparisons between the two groups, using two-tailed t-tests, revealed that the aphasic subjects made significantly more errors on the combined sorts ($t = 4.16$, $p < .002$) and on each individual sort (Sort A: $t = 3.22$, $p < .08$; Sort B: $t = 4.30$, $p < .001$) than did controls. Control subjects not only performed both sorts without error, they completed the two sorts in significantly less time than did the aphasic subjects ($t = 3.15$, $p < .003$). Results of these comparisons are summarized in Table 1.

Table 1. Means (standard deviations) and results of comparisons between the aphasic and control subjects.

| | Aphasic Subjects | Controls | t | p< |
|---|---|---|---|---|
| Errors on Sorts A + B | 3.4 (2.84) | 0.0 (0.00) | 4.16 | .002 |
| Time (min.) for Sorts A + B | 8.5 (5.26) | 2.5 (2.03) | 3.15 | .003 |
| Errors on Sort A | 1.3 (1.44) | 0.0 (0.00) | 3.22 | .008 |
| Errors on Sort B | 2.1 (1.68) | 0.0 (0.00) | 4.30 | .001 |

* We were unable to obtain permission to reproduce the photographs used in the experiment. A list of sources is provided on pages 156-158.

To determine if one sort was more difficult than the other, the mean number of errors and the time taken by both groups on Sort A were compared with those for Sort B. The differences were not significant. To determine if there was an order effect, the results for both the mean number of errors and time for the aphasic groups and for time for the control group were compared between the first and second sorts conducted. None of these differences were significant. Test retest results were also compared for the aphasic group. The difference for mean number of errors on the combined sorts was not significant, but that for time was ($t = 3.09$, $p < .01$) with 10 out of the 12 subjects taking less time on the retest. These results are summarized in Table 2 (next page).

The aphasic subjects' error responses were analyzed on a picture-by-picture basis for Sorts A and B separately. Because the specific pictures on which errors occurred differed between the test and retest, results for both task administrations were analyzed. The relative frequencies of errors on each picture in the two administrations are shown in Table 3. Cochran Q tests (Siegel, 1956) were used to determine if there were any significant differences in the distribution of errors among the nine pictures in either administration of each sort. No significant Q values were obtained for sort A. A significant Q ($Q = 27.15$, $p < .001$) was obtained for the initial administration of Sort B, but that for the retest was not significant. The significant Q for the initial presentation of Sort B suggests that, at least on this administration of the task, some pictures were more difficult to place in a correct group than others were.

Table 3. Number of errors for each picture.

| | Picture | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Sort A | | | | | | | | | |
| Test | 1 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 3 |
| Retest | 2 | 2 | 0 | 4 | 1 | 1 | 2 | 0 | 0 |
| Sort B | | | | | | | | | |
| Test | 4 | 0 | 1 | 0 | 6 | 1 | 2 | 4 | 7 |
| Retest | 1 | 1 | 3 | 2 | 4 | 1 | 2 | 3 | 4 |

The three thematic groups in each sort were also analyzed to determine if they were of equal difficulty. A group was considered correct only if all three pictures in the group were placed together. A group was considered incorrect if only two pictures depicting a common theme were placed together, or if it consisted of one picture from each group. Cochran Q tests were performed, revealing no significant differences among the groups used in Sort A or Sort B on either the test or retest.

## DISCUSSION

The aphasic subjects in this study demonstrated impaired ability to manipulate context-dependent pictures in a task which did not require the overt use of language. Their errors could be attributed to several factors. First, they may have failed to understand the task requirements. Since all aphasic subjects were able to sort the pretask stimuli without error, it

Table 2. Means and results of comparisons between Sorts A and B and first versus second sorts for both subject groups and between test-retest results for the aphasic group.

| Subjects | Sort A | Sort B | t | p < | 1st Sort | 2nd Sort | t | p < | Test | Retest | t | p < |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aphasic | | | | | | | | | | | | |
| Errors | 1.5 | 2.0 | -0.80 | n.s. | 1.4 | 2.1 | -1.10 | n.s. | 3.4 | 2.8 | 1.88 | n.s. |
| Time (min.) | 3.6 | 4.8 | -1.23 | n.s. | 3.6 | 4.8 | -1.23 | n.s. | 8.5 | 3.8 | 3.09 | .01 |
| Control | | | | | | | | | | | | |
| Errors | 0 | 0 | --- | ---- | 0 | 0 | --- | ---- | --- | --- | ---- | ---- |
| Time (min.) | 1.3 | 1.2 | 0.35 | n.s. | 1.2 | 1.3 | -0.05 | n.s. | --- | --- | ---- | ---- |

appears that errors made in the experimental task were not the result of a failure to understand sorting. Furthermore, analysis of their explanations for their picture groups indicates that they understood that the pictures were to be sorted by theme. Ten of the 12 subjects explained at least some of their groups in each sort along thematic lines. Of the two who did not, one sorted all stimuli on a concrete, rather than thematic basis (i.e. number of people in a picture). The other only labeled each picture and not his groups as a whole. Although his picture placement indicated that he sorted some pictures by theme, he was unable to label them as such. Error responses in the experimental task, then, do not appear to be accounted for by failure to understand the task - either sorting per se, or sorting by theme.

A second possible source of errors lies in problems in determining the meaning of individual pictures. Our results suggest that the pictures used in Sort B were not homogeneous in terms of difficulty in placing them in an appropriate group. It seems reasonable that complex, contextually laden pictures should differ in degree of difficulty. For example, pictures that contain facial expression may be easier to understand than ones that do not. In pictures containing facial expression, those depicting clearly polarized emotions may be easier to understand than ones in which facial expression is absent, neutral, or passive. In addition, pictures in which some elements such as facial expression are in concert, rather than at odds with other contextual elements may be easier. For example, if a man, about to blow out the candles on a birthday cake, is depicted with a resigned, perhaps even sad, expression, while everyone around him is smiling, one must search the picture further to find out why. Cake, candles, and smiling guests stimulate an immediate association with birthdays, celebration and fun. The effort to determine the meaning of the man's doleful expression requires further analysis and second-order associations with birthdays which may, perhaps, stimulate us to count the candles on the cake. In other words, the more ironic a picture, the more at odds it is with immediate associations, and the more context must be used as a tool in search of meaning. Using context in this way may surpass the processing capabilities of some aphasic patients.

Understanding the meaning of individual pictures may also have been influenced by the task requirement of grouping pictures by theme. This effort required the extraction and manipulation of contextual information across pictures. That is, all pictures had to be surveyed for common thematic elements, so that context not only had to be used to understand each picture, but in the determination of commonality as well.

An additional source of error may have been the need to use context for the higher level decisions involved in arranging the experimental stimuli by theme. A study by Wapner and Gardner (1980) demonstrated that, when called upon to use context for higher level analysis, aphasic and RH subjects were significantly impaired relative to controls. In that study subjects had to select one of four pictures in which a familiar symbol such as a trademark was accurately displayed relative to background context. Their results suggested that both RH and aphasic subjects had difficulty using contextual information in further task decisions. In the present study, subjects not only had to use context to decide which pictures comprised a group, they also had to generate the themes which defined the groups. This effort may have required a level of analysis and type of decision making that presented particular problems for the aphasic subjects.

The rationale behind Myers' suggested use of context-dependent pictures was based on increasing the role of the RH in aphasia treatment. Numerous studies have demonstrated that the RH plays a crucial role in integrating

visually based information (Bogen, 1969; Cohen, 1973; Gazzaniga, 1978; Patterson and Bradshaw, 1975) and in using contextual clues to arrive at meaning. In light of the findings of Myers (1979), Wapner et al. (1981), Rivers and Love (1980), and Zaidel (1978), the suggestion that we should attempt to stimulate associations through context seems reasonable.

It may be, however, that both determining the meaning of context-dependent pictures and using that meaning to perform some high level task involves the active participation of both hemispheres. The common wisdom about the general processing modes of the two hemispheres holds that the right is more adept at synthesizing input in a more immediate and direct fashion than the left, which is more adept with the analysis of coded or symbolic behavior. Some of our pictures and the sorting task itself may have required a form of mediation or coding that necessitated processing by the left hemisphere as well as by the right.

In straightforward action pictures, context provides useful clues by generating direct associations from which conclusions can immediately be drawn. In context-dependent pictures, the associations may be less direct (as they were in the birthday cake example), and the process of inference-building more analytic in nature. It even may be that the contextual elements in some pictures must be coded, structured, and resynthesized in a way that goes beyond the immediate and integrative skills of the RH. Finally, the process of generating themes based on the larger field context and determining the members of thematically based groups may have involved a coding strategy (possibly verbal) and required the use of an analytic form of processing mediated by the LH. Though our task was not overtly linguistic, the nature of the task and the processes necessary for understanding individual context-dependent pictures may involve skills that are in some way compromised by left hemisphere damage.

More work needs to be done to determine the validity of these speculations. Regardless of the source of error, however, the present results suggest that clinicians should exercise caution in using complex, context-dependent pictures as stimuli in therapy. As suggested earlier, there may be a threshold of contextual complexity that is based not on the number of salient elements in a given picture, but on the degree to which meaning is embedded in those elements. In addition, clinicians should consider the potential effects of task demands on determining the meaning of such pictures. If the task requires making decisions based on contextual information (to sequence or categorize pictures, for example), clinicians should be aware that such manipulation may involve a form of analytic processing which necessitates recoding contextual features. It is hoped these results will help clinicians to choose pictures that facilitate rather than hinder a patient's performance.

## REFERENCES


Aten, J.L. and Faber, M.M., Verbal performance in aphasic patients in response to intact and altered pictorial stimuli. In R.H. Brookshire (Ed.), Clinical Aphasiology: Conference Proceedings, 1977. Minneapolis, MN: BRK Publishers, 1977.

Benton, A.L. and VanAllen, M.W., Facial recognition in patients with cerebral disease. Cortex, 4, 344-358, 1968.

Bogen, J., The other side of the brain. II Bulletin of the Los Angeles Neurological Society, 34, 1969.

Cohen, G., Hemispheric differences in serial vs parallel processing. Journal of Experimental Psychology, 97, 349-356, 1973.
Gazzaniga, M., The Bisected Brain. New York: Appleton-Century-Crofts, 1970.
Goldberg, E. and Costa, L., Hemispheric differences in the acquisition and use of descriptive systems. Brain and Language, 14, 144-173, 1981.
Goodglass, H. and Kaplan, E., The Boston Diagnostic Aphasia Examination. Philadelphia: Lea and Febiger, 1967.
Myers, P.S., Visual imagery in aphasia treatment: a new look. In R.H. Brookshire (Ed.), Clinical Aphasiology: Conference Proceedings, 1980. Minneapolis, MN: BRK Publishers, 1980.
Myers, P.S. and Linebaugh, C.W., The perception of contextually conveyed relationships by right brain damaged patients. Paper presented to American Speech Language and Hearing Association Annual Convention, Detroit, November, 1980.
Patterson, K. and Bradshaw, J., Differential hemispheric mediation of non-verbal visual stimuli. Journal of Experimental Psychology, 1, 246-252, 1975.
Rivers, D.L. and Love, R.J., Language performance on visual processing tasks in right hemisphere lesion cases. Brain and Language, 10, 348-366, 1980.
Seigel, S., Nonparametric Statistics for Behavioral Sciences. New York: McGraw Hill, 1956.
Waller, M.R. and Darley, F.L., The influence of context on the auditory comprehension of aphasic subjects. In R.H. Brookshire (Ed.), Clinical Aphasiology: Conference Proceedings, 1978. Minneapolis, MN: BRK Publishers, 1978.
Wapner, W. and Gardner, H., Profiles of symbol reading skills in organic patients. Brain and Language, 12, 303-312, 1980.
Wapner, W., Hamby, S. and Gardner, H., The role of the right hemisphere in the apprehension of complex linguistic materials. Brain and Language, 14, 15-33, 1981.
West, J.F., Heightening the action imagery of materials used in aphasia treatment. In R.H. Brookshire (Ed.), Clinical Aphasiology: Conference Proceedings, 1978. Minneapolis, MN: BRK Publishers, 1978.
Williams, S. and Canter, G., Comparing confrontation naming and contextual naming in aphasics. Paper presented at the American Speech Language and Hearing Association Annual Convention, Atlanta, November, 1977.
Zaidel, E., The elusive right hemisphere of the brain. Engineering and Science, Sept.-Oct., 1978.

## DISCUSSION

Q: Did you have some measure of the severity of aphasia for your subjects? Did you find that some of your mildly impaired subjects, if you had such ratings, performed more like the normals? Did you have a correlation between them?

A: The normals made no errors and almost all the aphasic subjects did. The only aphasic subject who didn't make errors was one who was in a moderately severe range. All subjects had been recently tested on the Boston (BDAE) or the Western Aphasia Battery (WAB), and we used the Boston aphasia rating scale to determine severity. The subjects were of all types - some Brocas, some anomics, some who just had apraxia, one global and so on. We didn't find any patterns. We didn't analyze it statistically since there weren't enough members in each group. There was no particular pattern other than when you look at the raw data, the most

severely impaired made the most errors. Even some very mildly impaired subjects made errors, while some who were in the middle range made fewer errors. We don't have enough subjects yet to make a comment on type or severity.

Q: Penny, I think you have really got a very interesting point for a clinical task. That is, when do you draw the line between using context to get the right hemisphere (RH) involved to the point where it gets so complex that the curve or the advantage seems to be falling off? What I'd like to have you comment on is what is the nature of that complexity? For instance, in the Williams and Canter study, their use of context was pretty physical. For instance, the farm scene was one of the ones that was presented in a very straightforward context and seemed to give patients an advantage. Your pictures are of emotional themes and are fairly non-concrete. Your pictures show a different type of context as opposed to more complex or physical or busy situational pictures. I'm trying to figure out what kinds of things you chose and are they really the same as the Williams and Canter type of context.

A: No, no, it's definitely not the same as Williams and Canter. I would call their pictures straightforward. I think of a context-dependent picture as one in which you have to use context to figure out the meaning of the picture. In a straightforward action picture you don't need to use it in that sense. In other words, there are some steps in between... Norman Rockwell pictures, for example, often are ironic or depict themes like pathos. In order to understand the picture you have to understand the relationships of all the elements in the picture. In the birthday cake example you have to look at that picture and use the context to figure out why the man is looking sad. See what I'm saying? It's different from a picture of a cake or a woman cutting a cake or pouring coffee or something.

Q: Yes. So your caution about complexity would be along the lines of the relationships that are depicted rather than how physically busy or how much stuff is in the picture.

A: Yes, yes. It's not related to the amount of stuff in the picture. It's related to how much meaning is embedded in the context. How much do you have to understand all of those relationships in order to understand the picture. The notion I like is how much do you have to use context as a tool. When you start using it as a tool to understand meaning, there's going to be some sort of coding strategy that takes place - or at least it's not going to be immediately understood or known in quite the same way that pouring a cup of coffee in a kitchen is understood. The issue is how much is meaning embedded in the elements that constitute the surrounding context.

Q: Do you think the personal relevance of the picture or the familiarity with the type of context would make a difference if the person were older and had had experience being depressed at a birthday party - that is, would he pick up more meaning from that?

A: Yes, I definitely think that personal context can create a much more immediate association so that you might not have to step back and create second order associations. If you've had an immediate association like that, then it's a reaction that's more - I'm going out on a limb here - that uses more right hemisphere processing because it's more immediate

and so much more direct. It doesn't require manipulating the data or symbolizing things. It doesn't require distancing. It doesn't require analysis. It doesn't require coding. I don't think one can comment on what kind of coding strategies people use. I suspect they use various ones. Verbal is certainly one.

Q: Penny, my exposure to the word "context" usually implies that something is situated in that context. An item of information is somewhere in that context. We talk about context relative to that item of information. It strokes me that your pictures maybe aren't like that, in that they're all context. Maybe a better term to use would be something like inference or implication.

A: Inferential pictures?

Q: Yes, because there's not really anything there that's located within that context.

A: When you say there's not anything there - there's something there, but it's more abstract. It's not an object that is there - it's not something concrete. It's a theme. If you look at the picture of the girl looking depressed, with her hands and head resting on her knees, what you see is a depiction of despair. The context is not just her bodily attitude that shows despair, but dark and light in the picture, the shadows. The whole picture is set up -- all those elements -- to give you the idea that she's not just resting, but that she's pretty unhappy. The abstract thing contained in the elements is despair.

Q: Well, I would argue that it's not contained in the context, but implied by the context.

A: Yes...yes.

Q: And I think there is a crucial difference there. We use the expression, "to take something out of context." It strikes me that in your pictures you can't take anything out of context because it's all rather amorphous-- all part of the context -- that there's nothing that one can extract from that background.

C: The word "context" in this case is probably not being used the way we customarily use it. I'd have no argument with your conclusions about the effects of using pictures like this, defined as you define them. My argument is with your use of the word "context." I think it's not being used the way it's traditionally used. It might be misleading to someone who's reading the summary -- not the body of your paper.

Q: I just want to ask you about the right hemisphere participation issue. You mentioned a threshold of contextual complexity that aphasic individuals seem to have. Is the RH, in your opinion, participating below that threshold and not above it?

A: My point was that this kind of picture requires some left hemisphere mediation to understand the meaning, so it doesn't matter whether or not the right hemisphere is operating normally. I didn't mean to imply that it was either interfering nor that it was operating at a level below normal. I meant to imply that some of the activity generated by such pictures was left hemisphere based, and that once you had to use the contextual background as a tool, had to code the information and so on, the operation of the right hemisphere is not as critical.

Q: This is related somewhat to what Dr. Ulatowska has found. She found that discourse structure remained intact in some subjects and that they retained the essential elements, but that they did have problems getting the global meaning or morals. This seems to be what you're saying. Maybe the aphasic subjects can say a few of the events or tell what's happening, but they have difficulty with more global cognitive tasks. I wonder if you did some cognitive testing as well because it's such a complex task. Subjects may be able to say what's happening in the context, but they are not able to tie it under a theme.

A: They didn't have to say what the theme was, but, yes, they did have to apprehend the theme. I'm not sure what cognitive tests we could have used that would have correlated with this ability or tested it directly. Maybe you could suggest some for future research.

Q: I'd like to go back to what was previously brought up about context. If you have to make an inference, it's not there (in the picture), it's here (in your mind). Otherwise it would be an implication. But your data show that you and your normals chose the themes and figured out how the pictures should be sorted. So, there had to be something there that you saw and the normals saw.

A: That's right. And the normals were incredibly consistent. We didn't necessarily have a term or label in mind for the themes. Those terms came out of what the normals almost without fail used to describe the picture groups.

## Picture References

Figure 1: Despair

1) Lang, Dorothea, Photojournalism. New York: Time-Life Books, 1971, p. 123.

2) Cooke, Jerry, The Family of Man. Jerry Mason (Ed.), New York: Maco Publishing Co., Inc., 1955, p. 144.

3) Statler, Alfred, Ibid., p. 145 (lower right).

Figure 2: Work/Determination

1) Parks, Gordon, Ibid., p. 135 (lower left).

2) Sanders, Walter, Ibid., p. 73 (upper right).

3) Sander, August, Ibid., p. 74 (middle left).

Picture References (cont.)

Figure 3: Play/Gaiety

1) Lapow, Harry, Ibid., p. 117 (upper center).

2) Talkington, Lester, Skipping rope. In Documentary Photography. New York: Time-Life Books, 1972, p. 118.

3) Ruohomaa, Kosti, The Family of Man. Jerry Mason (Ed.), New York: Maco Publishing Co., Inc., 1955, p. 114.

Figure 4: Love/Affection

1) Erwitt, Elliot, Ibid., p. 27 (upper center).

2) Kalischer, Clemens, Ibid., p. 38 (lower right).

3) Mark, Mary Ellen, Man and wife on Staten Island Ferry. In The Great Themes, New York: Time-Life Books, 1970, p. 23.

Picture References (cont.)

Figure 5: Suffering

1) Chang, Al, U.S. Signal Corps, Korea. In The Family of Man. Jerry Mason (Ed.). New York: Maco Publishing Co., Inc., 1955, p. 149 (upper center).

2) Smith, W. Eugene, Ibid., p. 148.

3) Jakobson, Bob, Ibid., p. 53 (upper center).

Figure 6: Mistrust

1) Shan, Ben, Cotton Pickers. In Documentary Photography. New York: Time-Life Books, 1972, p. 75.

2) Marquis, Jean, The Family of Man. Jerry Mason (Ed.), New York: Maco Publishing Co., Inc., 1955, p. 135 (upper center).

3) Shan, Ben, Man, Woman and Child, Smithland Kentucky. In Documentary Photography. New York: Time-Life Books, 1972, p. 73.