Ability of Subjects With Aphasia to Visually Analyze Written Language, Pantomime, and Iconographic Symbols

Laura Thorburn
Marilyn Newhoff
Scott S. Rubin
The University of Georgia, Athens

Considerable debate exists regarding aphasia and its relationship to deficits observed in the ability to analyze visual stimuli. In this investigation, the ability of patients with aphasia to comprehend various types of visual stimuli was compared to that of subjects with no known neurological impairment. The types of visual stimuli of interest were: written language, pantomime, and iconographic symbols. Results indicated that individuals with aphasia, in comparison to the controls, demonstrated inferior performance on their comprehension of pantomime and written language. However, for iconographs, patients with aphasia performed comparably to the controls. Directions for future research are discussed.

In order to better understand the nature of communication deficits in aphasia, verbal and nonverbal components of interactions of aphasic individuals have served as investigative concerns in the past. Studies have confirmed a deterioration of aphasic patients' ability to comprehend various types of stimuli and to express themselves effectively through verbal and nonverbal modes.

Communication concepts can be represented by a variety of stimuli that are received visually, such as pictures, iconographic symbols, gestures, pantomime, or written language. Although each is received visually, in this paper each stimulus type was conceived of as consisting of several differentiating *elements*. For example, pantomime is composed of a variety of elements such as (a) three dimensionality and (b) sequential components that are (c) conveyed through bodily movement. Each of the elements is uniquely combined to produce the individual pantomime. It was this realm of visual comprehension across varying stimuli that was of interest in the present study.

Early studies indicated that aphasic patients may demonstrate disordered visual scanning (Kirshner & Sidman, 1972) and defective visual matching skills (Tyler, 1969). Still other investigative results emphasized aphasic subjects' difficulties with various visually mediated tasks, such as matching colors to objects (Basso, Faglioni, & Spinnler, 1976; De Renzi & Spinnler, 1967), colors to forms (De Renzi, Faglioni, Scotti, & Spinnler, 1972), colors to pictures (Cohen & Kelter, 1970), and pantomime to pictures (Duffy & Buck, 1979; Duffy & Duffy, 1981; Duffy, Duffy, & Pearson, 1975; Ferro, Santos, Castro-Caldas, & Mariano, 1980; Varney, 1978, 1982; Wang & Goodglass, 1992). But the cause and the nature of these impairments remain controversial. Some researchers have suggested that aphasic deficits are the result of a central symbolic disorder (Bay 1964; Duffy & Buck, 1979; Duffy & Duffy, 1981; Duffy et al., 1975; Pickett, 1974), whereas other investigators have maintained that verbal and nonverbal types of communication are independent and are affected differentially in the presence of aphasia (Ferro et al., 1980; Seron, Van Der Kaa, Remitz, & Van Der Linden, 1979; Varney, 1978, 1982).

Although Duffy and colleagues (Duffy & Duffy, 1981; Duffy et al., 1975) have been the primary advocates for the theory of a central symbolic disorder, it was Pickett (1974) who initially showed that, among 28 aphasic patients, gestural ability was related to overall aphasia severity and was not independent of general communicative behavior. Similarly, Duffy et al. (1975) compared four groups of subjects on pantomime, verbal recognition, and naming; there were 44 patients with aphasia, 30 right-hemisphere-damaged individuals without evidence of aphasia, 26 subjects with subcortical damage, and 30 nonneurologically impaired subjects. In support of a central symbolic disorder theory, aphasic subjects performed significantly lower than all other groups on each ability tested. Further, scores on the pantomime recognition and verbal recognition tests were highly correlated with overall scores on the Porch Index of Communicative Ability (PICA; Porch, 1967). A comparable relationship was found during a replication study by Duffy and Duffy (1981). Finally, Cicone, Wapner, Foldi, Zurif, and Gardner (1979) compared Wernicke and Broca's type aphasic patients with control subjects on gesture use in spontaneous communication. Results of the investigation indicated that aphasic patients' use of gestures mirrored their spontaneous speech output. The researchers concluded that gestural ability and speech output must come from a "central organizer" (p. 347) and are equally affected in the presence of aphasia.

In contrast, some studies have indicated evidence of differential impairment in pantomime, reading, and verbal language as a result of aphasia. Daniloff, Noll, Fristoe, and Lloyd (1982) examined 15 patients with varying degrees of aphasia (mild, moderate, or severe) on tests of gesture recognition. Results indicated that all aphasic subjects performed equally well on gesture recognition, regardless of aphasia severity. The gesture recognition test consisted of 24 test items. Fourteen of the 15 patients involved in this study correctly identified between 21 and 24 of the items. The remaining patient, the one most severely

 1058-0360/95/0404-0174

affected, identified 9 items correctly. Therefore, it appeared that the gesture stimuli were fairly easy for most subjects, including the mildly, moderately, and severely impaired patients. These researchers concluded that the aphasia was likely a disorder specific to the linguistic system. Seron et al. (1979) compared 27 aphasic subjects of varying degrees of severity to 20 control subjects. Their results demonstrated that aphasic subjects *did* have a pantomime recognition deficit. However, the level of pantomime impairment was significantly related only to reading comprehension and not to the overall severity of the aphasia. Similarly, Varney (1978, 1982) described pantomime recognition deficits in a variety of aphasic patients that consistently occurred in conjunction with reading deficits of at least comparable severity; but the pantomime deficits were not found to be related to sound recognition, visual naming, or aural comprehension. Varney concluded that aphasic deficits could not be the result of a central symbolic disorder, but could possibly result from a specific visual analyzing impairment limited to "previously learned associations which are semantically meaningful" (1982, p. 38). Ferro and colleagues (1980) had also determined that aphasic patients, specifically with "central alexia" and an inability to match words to objects, were unable to comprehend pantomime; yet aphasic subjects exhibiting "frontal alexia" had intact pantomime skills. Ferro and colleagues suggested, therefore, that pantomime and reading impairments may stem from an inability to visually analyze words, pictures, and pantomime appropriately.

The purpose of the present study was to describe aphasic subjects' ability to analyze and comprehend various types of visual stimuli, and, potentially, to examine the relationships among those abilities. Comparisons were made between the performance of aphasic subjects and individuals with no known neurological impairment on three visual matching tasks. The stimuli of interest were: *iconographs*, composed of two-dimensional, black and white, visually processed symbolic elements; *pantomime*, composed of three-dimensional, visually sequenced ongoing elements; and *written words and sentences*, composed of visually processed linguistic elements.

Method

Subjects

Two groups of subjects were examined. Group I included nine individuals with aphasia ranging in age from 31 to 79 with a mean age of 63.7. Aphasia classification was based on results obtained from the Western Aphasia Battery (WAB; Kertesz, 1982). Aphasia Quotients (AQ) ranged from 61.6 to 91.5 ($M = 81.1$, $SD = 7.7$) and Cortical Quotients (CQ) ranged from 65.1 to 90.3 ($M = 81.1$, $SD = 8.3$), indicating that subjects were of mild to moderate severity. Seven subjects were classified as anomic, one as conduction, and one as Broca's type aphasia (Table 1).

Group II served as the control group and included nine nonneurologically impaired subjects matched for gender, educational level, and age within 2 years of subjects in Group I (Table 1). All control subjects reported negative histories for neurological impairment and demonstrated intact cognitive abilities as indicated by a score of at least 27 out of 30 on the Mini-Mental State (Folstein, Folstein, & McHugh, 1975). Subjects in both groups also met the following criteria: (a) adequate hearing for conversational speech; (b) adequate vision for testing and experimental procedures, based on letter identification and line cancellation tasks; (c) right-handedness, as determined from self-report; (d) unimpaired reading skills, at least at the single word level; and (e) completion of at least an 8th grade education.

Experimental Procedures

To examine reading comprehension, the Reading Comprehension Battery for Aphasia (RCBA; LaPointe & Horner, 1979) was administered. The test contains 10 subtests designed to identify deficits in silent reading comprehension and relative performance levels among single word, sentence, and paragraph stimuli. Assessment of functional, factual, and inferential information is included, and response fields are either printed or pictorial. The RCBA requires the subject to silently read a word, sentence, or paragraph and point to the appropriate answer from a list of three choices.

To systematically assess subjects'

TABLE 1. Subjects' characteristics in Group I (aphasics) and Group II (controls) by assigned number, aphasic classification (as appropriate), aphasia quotient (as appropriate), age, gender, education level, and time post-onset (TPO, in months, as appropriate).

Subject Number	Aphasia Classification	AQ	Age	Gender	Education Level	TPO
A01	Anomic	86.1	75	Male	17	36
A02	Anomic	76.6	71	Female	10	8
A03	Anomic	84.0	75	Female	8	31
A04	Anomic	77.5	76	Male	14	32
A05	Conduction	84.6	67	Female	14	7
A06	Anomic	84.6	42	Male	12	8
A07	Anomic	91.5	79	Male	8	12
A08	Broca	61.6	31	Female	11	8
A09	Anomic	83.6	57	Male	14	87
Range		61.6–91.5	31–79		8–17	7–87
Mean		81.12	63.67		12.0	23.44
SD		7.73	16.92		3.04	25.38
C01			74	Male	19	
C02			66	Female	16	
C03			70	Male	14	
C04			79	Male	12	
C05			77	Female	12	
C06			79	Male	10	
C07			30	Female	10	
C08			40	Female	8	
C09			58	Male	8	
Range			30–79		8–19	
Mean			63.67		12.1	
SD			17.76		3.68	

abilities to understand pantomime, the Pantomime Recognition Test (PRT: Wang & Goodglass, 1992) was administered. This multiple-choice test requires subjects to watch a videotape of 21 pantomimed events that involve the manipulation of imaginary objects. The pantomimed events all target nouns; some are common nouns (e.g., *apple*), and some are less salient nouns (e.g., *loaded handtruck*), yet all are concrete nouns (see Appendix A). According to Wang and Goodglass (1992), the internal reliability of this test is .70. This level was judged to be adequate for group analysis.

Following each pantomimed event, the subject is asked to choose its representation from a set of four pictured objects. The answer card contains one pictured object that is the target, and three types of foils. Semantically related foils are pictured objects that belong to the same class as the target object. For example, the semantically related foil for the target object *piano* is *trumpet*. A perceptually related foil resembles the target object in the direction and type of pantomimic action associated with it. Using the example of the target item *piano*, the perceptually related foil is *typewriter*, which has a corresponding, similar pantomimic action. Finally, an unrelated foil is an object that does not share an association with the target object, such as *hammer*, which is unrelated to *piano*. The various pantomime acts used in this test were divided into two types. The first 11 items were categorized as *functional pantomime*: actions that directly depicted the primary function of the object (e.g., playing a piano). The last 10 items were *action pantomime*; movements that reflected an action possibly associated with the target object, but not directly related to the object's primary function (e.g., breaking a pencil).

Finally, an Iconographic Symbol Recognition Test (ISRT) was developed by the investigators. So that a comparison between pantomime and iconographic symbol recognition could be made, this test was structured identically to the PRT. However, no attempt was made to establish a one-to-one correspondence among the test items. Each participant was asked to watch a videotape of 21 rebus symbols and, after each symbol presentation, to select the target object represented by the symbol from a series of four pictured objects. Multiple-choice answer cards were similar to those of the PRT; that is, they contained a target, as well as semantic, perceptual, and unrelated foils. The items on the ISRT were all common, concrete nouns (see Appendix B). Reliability measures for the ISRT were obtained from the control subjects. Each subject was administered the test in the order that was originally determined through randomization. The first administration of the test was considered the experimental procedure, and results were documented accordingly. The ISRT was subsequently administered a second time; at least one other task always intervened between the two administrations. Eight of the nine controls performed the same on the first and second test administrations, identifying correctly 21 out of 21. The remaining subject missed one item on the first administration and did not miss any items on the second test. This consistent performance by all control subjects across test administrations indicated that the ISRT can be judged a reliable measure.

Results

Raw scores (Table 2) were subjected to statistical analyses. In an attempt to determine relative task difficulty, multiple analyses of variance (ANOVA) were completed. Alpha level was set at .05 for all comparisons.

Analyses of Variance

Results indicated that aphasic subjects were comparable to controls on iconographic symbol understanding [$F(1,16) = .727$, $p > .406$], but lower on measures of reading [$F(1,16) = 15.02$, $p < .001$] and pantomime comprehension [$F(1,16) = 8.33$, $p < .01$]. To further understand the role the disability of aphasia played in these results, omega squares were computed for each of the dependent variables. Calculation of omega squares is another way to measure the contribution of the independent variable (aphasia) to predicting the respective dependent variable (reading, pantomime, or iconographic comprehension). The resultant percentage of variance explained by aphasia was: reading comprehension, 44% ($\omega^2 = .4378$), pantomime comprehension, 29% ($\omega^2 = .2894$), and iconographic understanding, 10% ($\omega^2 = .0975$).

Correlational Analyses

Pearson's correlational analyses were conducted in an attempt to examine possible relationships among aphasic subjects' reading comprehension, pantomime recognition, and iconographic understanding. No relationship was found to be strong. The correlations ranged from $r = -.4439$ between pantomime recognition and iconographic understanding, to $r = .3160$ between pantomime recognition and reading comprehension, but neither was statistically different from zero. This study represented a preliminary undertaking with a small number of subjects who were relatively homogeneous in their aphasia type and severity. How these factors may have influenced the observed weak relationships is not immediately discernible.

The Pearson correlation coefficient was also used to analyze relationships between each type of visual stimuli and aphasia severity as measured by the WAB Aphasia Quotient (AQ). Results indicated that performance on the PRT, ISRT, and RCBA were not significantly related to

TABLE 2. Subject performance by number for Group I (aphasic) and Group II (control), for the Reading Comprehension Battery for Aphasia, Pantomime Recognition Test, and Iconographic Symbol Recognition Test.

Subject	RCBA		PRT		ISRT	
GI/GII	Aphasic	Control	Aphasic	Control	Aphasic	Control
A01/C01	86	97	17	17	21	21
A02/C02	86	97	18	19	19	21
A03/C03	70	98	15	15	20	21
A04/C04	95	91	13	15	21	21
A05/C05	90	93	13	19	21	20
A06/C06	81	94	13	19	21	21
A07/C07	81	96	14	20	21	21
A08/C08	76	99	12	19	21	21
A09/C09	95	97	19	18	21	21
Mean	84.44	95.78	14.89	17.89	20.67	20.89
Range	70–95	91–99	12–19	15–20	19–21	20–21
SD	8.38	2.59	2.52	1.83	.71	.33

aphasia severity (r = .2769, .1455, and .1273, respectively). Again, this correlation may have been limited as a result of the homogeneous sample used within the current study.

Error Analyses

Subject errors on the various tests were analyzed to determine the predominant type of errors. Individuals with aphasia performed significantly more poorly than control participants on the RCBA. Analysis of the types of errors made by aphasic subjects revealed that reading at the single word level (the first three subtests) was relatively unimpaired. Only four of the nine aphasic subjects missed any items on these subtests. Three of the four subjects made a visual confusion error when selecting target answers (e.g., *hassle* for *tassel*). The remaining subject made one visual (see prior example) and one semantic error (e.g., *smoke* for *cigar*). An independent t-test was applied to compare combined scores on the three single word subtests; results indicated that there was not a significant difference in performance between the aphasic and control groups, $t(16) = 1.31$, $p > .05$. The last seven subtests from the RCBA proved more difficult for the individuals with aphasia. These subtests are composed of functional reading, synonym identification, paragraph inferences, and morphosyntactic understanding. The items are longer and considered to be more difficult than reading a word and matching it to a picture. Comparison of combined group means on these seven remaining reading comprehension subtests revealed that controls performed significantly better than subjects with aphasia, $t(16) = 2.67$, $p < .01$.

Participants with aphasia, however, demonstrated iconographic symbol understanding comparable to that of the controls. Seven of the nine subjects with aphasia received a perfect score on the ISRT. Of the remaining two subjects, one made a perceptual error (e.g., choosing *brush* instead of *toothbrush*), and the other made one perceptual (see prior example) and one semantic error (e.g., *glasses* for *eye*).

Examination of the errors made on the PRT by the aphasic participants indicated that 43% of the errors were semantic (*arrow* for *stone*), 39% of the errors were perceptual (*ski pole* for *rowing*), and 18% were unrelated (*filing cabinet* for *book*). This suggests that most aphasic subjects usually understood some aspects of the pantomime and, thus, were able to choose an answer that either perceptually or semantically resembled the target. The percentage of unrelated errors occurred primarily during action pantomime; this suggests that some of the subjects were essentially unaware of the intended target on some items.

Discussion

The purpose of this study was to compare aphasic patients' performances to that of individuals without neurological impairment on three types of visual stimuli that varied in their composite elements: iconographs, pantomime, and written language. Analysis of the ANOVAs and omega squares indicated that the aphasic patients' performance was equivalent to the controls' performance on iconographic symbol understanding, and inferior to the performance of controls on pantomime recognition and reading comprehension. These results are not clearly consistent with either a theory of a central symbolic disorder or a theory of verbal/nonverbal independence. Although the data appear to support the verbal/nonverbal independence theory, the sample used in this study consisted of subjects who were relatively homogeneous in terms of type and degree of aphasia severity. It could be the case that individuals with more severe aphasia have central symbolic involvement. Further, due to the disparity of performance among aphasic subjects' comprehension of the three types of visual stimuli, the data do not support Varney's (1982) conclusion that deficits may be due to a specific visual analyzing impairment. As evidenced in the error analysis, the subjects with aphasia involved in the current study made few unrelated errors. Instead, their errors were either perceptually or semantically related, indicating that some elements of the visual stimuli *were* analyzed correctly. Yet the combination of elements necessary to reach the target response was not available to them.

It was beyond the scope of this investigation to determine precisely what element of each visual stimulus either facilitated or presented difficulty for aphasic patients' comprehension. The results indicate that iconographs, which are composed of two-dimensional, visually processed symbolic elements, were easier for subjects with aphasia to comprehend than written words, composed of visually processed linguistic elements, and pantomime, composed of three-dimensional visually sequenced ongoing elements. These findings stimulate a series of questions regarding how these elements (e.g., the level of abstraction, the dimensional presentation, or the sequential nature of these visual stimuli) conspire to increase complexity. Therefore, it seems important to continue attempts to determine what elements facilitate or hinder aphasic patients' abilities to comprehend visual stimuli during communication. In future studies, it would be necessary to attempt to determine if the present findings hold over increasingly severe groups of aphasic subjects, as well as to attempt to isolate what elements of the visual stimuli promote success for aphasic subjects during communication.

In spite of the fact that this work focused on reading, pantomime, and iconographic symbol understanding, the tests used to assess these skills may not have been sufficiently complex to allow significant differences to emerge between the groups' performances. If the experimental procedures lacked sufficient sensitivity for the relatively mildly impaired subjects, that could account for the lack of detectable deficits on the ISRT, as well as the narrow range of scores of the PRT and RCBA. A more difficult set of stimuli might challenge the aphasic subjects' abilities sufficiently to better view relationships among the visual stimuli of interest in this study. The results from this preliminary work did provide some initial insight into the complexities of visual stimuli. It seems evident that this is an important line of inquiry. The possible inadequacies of the PRT and ISRT could be addressed by modifications to ensure that a more comprehensive assessment of pantomime and symbol recognition abilities is obtained. Further studies with more difficult stimuli, and involving larger and more heterogeneous samples, might further elucidate possible associations among iconographic understanding, reading comprehension, and pantomime recognition.

References

Basso, A., Faglioni, P., & Spinnler, H. (1976). Non-verbal colour impairment of aphasics. *Neuropsychologia, 14*, 183–193.

Bay, E. (1964). Present concepts of aphasia. *Geriatrics, 19*, 319–331.

Cicone, M., Wapner, W., Foldi, N., Zurif, E., & Gardner, H. (1979). The relation between gesture and language in aphasic communication. *Brain and Language, 8*, 324–349.

Cohen, R., & Kelter, S. (1970). Cognitive impairment of aphasics in a colour-to-picture matching task. *Cortex, 15*, 235–245.

Daniloff, J. K., Noll, J. D., Fristoe, M., & Lloyd, L. L. (1982). Gesture recognition in patients with aphasia. *Journal of Speech and Hearing Disorders, 47*, 43–49.

De Renzi, E., Faglioni, P., Scotti, G., & Spinnler, H. (1972). Impairment in associating colour to form, concomitant with aphasia. *Brain, 95*, 293–304.
De Renzi, E., & Spinnler, H. (1967). Impaired performance on color tasks in patients with hemispheric damage. *Cortex, 3*, 194–217.
Duffy, R. J., & Buck, R. B. (1979). A study of the relationship between propositional (pantomime) and subpropositional (facial expression) behaviors in aphasia. *Folia Phoniatrica, 31*, 129–136.
Duffy, R. J., & Duffy, J. R. (1981). Three studies of deficits in pantomimic expression and pantomimic recognition in aphasia. *Journal of Speech and Hearing Research, 64*, 70–84.
Duffy, R. J., Duffy, J. R., & Pearson, K. L. (1975). Pantomime recognition in aphasics. *Journal of Speech and Hearing Research, 18*, 115–132.
Ferro, J. M., Santos, M. E., Castro-Caldas, A., & Mariano, M. G. (1980). Gesture recognition in aphasia. *Journal of Clinical Neuropsychology, 2*, 277–292.
Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatry and Research, 12*, 189–198.
Kertesz, A. (1982). *The Western Aphasia Battery*. New York: Grune & Stratton.
Kirshner, H., & Sidman, M. (1972). Scanning patterns in aphasic patients during matching-to-sample tests. *Neuropsychologia, 10*, 179–184.
LaPointe, L. L., & Horner, J. (1979). *The Reading Comprehension Battery of Aphasia*. Tegoid, OR: C.C. Publications.
Pickett, L. W. (1974). An assessment of gestural and pantomimic deficit in aphasic patients. *Acta Symbolica, 5*, 69–86.
Porch, B. (1967). *Porch index of Communicative Ability*. Palo Alto, CA: Consulting Psychologists Press.
Seron, X., Van Der Kaa, A., Remitz, A., & Van Der Linden, M. (1979). Pantomime interpretation and aphasia. *Neuropsychologia, 17*, 661–668.
Tyler, H. R. (1969). Defective stimulus exploration in aphasic patients. *Neurology, 19*, 105–112.
Varney, N. R. (1978). Linguistic correlates of pantomime recognition in aphasic patients. *Journal of Neurology, Neurosurgery, and Psychiatry, 41*, 560–568.
Varney, N. R. (1982). Pantomime recognition defect in aphasia: Implications for the concept of asymbolia. *Brain and Language, 15*, 32–39.
Wang, L., & Goodglass, H. (1992). Pantomime, praxis, and aphasia. *Brain and Language, 2*, 402–418.

Contact author: Marilyn Newhoff, PhD, Department of Communication Sciences and Disorders, 576 Aderhold Hall, The University of Georgia, Athens, GA 30602

Key Words: aphasia, pantomime, reading comprehension, iconographic symbols, visual stimuli

Appendix A

Pantomime Recognition Test (PRT)

Action	Target	Semantic foil	Perceptual foil	Unrelated foil
shoveling	shovel	front loader	mop	piano
sawing	saw	pocket knife	cello	pencil sharpener
cutting	scissors	paper cutter	nail clipper	comb
piano playing	piano	trumpet	typewriter	hammer
stirring	spoon	egg beater	pencil	bottle
dialing	wall phone	microphone	pencil	piano
combing	comb	toothbrush	shoe brush	pencil
beating eggs	egg beater	electric mixer	screwdriver	skillet
playing tennis	tennis racket	football	oar	hammer
rowing	boat	sail boat	ski pole	saw
blowing	candle	windmill	banana	flower
pushing	hand truck	stroller	window	suitcase
dropping	bowl	parachute	accordion	cup
placing down	pile of books	folded newspaper	attache case	filing cabinet
throwing	stone	arrow	flyswatter	chair
pulling	bureau drawer	small desk drawer	chair	ball
plucking	apple	potato	window blind	pumpkin
placing delicately	wine glass	house of cards	suitcase	ball
breaking	pencil	broken cup	heavy shear	flower
crumpling	scrap of newspaper	cigarette butt	nail clipper	comb

Appendix B

Iconographic Symbol Recognition Test (ISRT)

Target	Semantic foil	Perceptual foil	Unrelated foil
[a]cup	spoon	bucket	tricycle
[a]pencil	eraser	clarinet	extension cord
eye	glasses	football	stapler
piano	guitar	dresser	flashlight
fork	plate	wrench	blanket
globe	map	fan	bottle
flower	flower pot	pinwheel	papertowel roll
bone	dog	rolling pin	paint bucket
purse	lipstick	skirt	potholder
wheel	car	cymbal	soap
watch	clock	belt	toaster
peach	watermelon	ball	electric razor
belt	pants	ring	milk
shovel	bucket	spoon	chalk eraser
scissors	paper	airplane	sweater
bucket	shovel	glass	hanger
pen	paper	screwdriver	robe
pear	grapes	guitar	pencil sharpener
ruler	scissors	comb	bowl
sled	scarf	iron	paint brush
thread	sewing machine	garbage can	sponge
toothbrush	toothpaste	brush	jumprope
saddle	horse	duck	lamp

[a]Items given as training items