

Examining Perceptions of Graphic Symbols Across Cultures: Preliminary Study of the Impact of Culture/Ethnicity

Mary Blake Huer

Department of Speech Communication, California State University-Fullerton, Fullerton, California, USA

Perceptions of three aided graphic symbol sets used in augmentative and alternative communication (AAC) (Blissymbols, DynaSyms®, and Picture Communication Symbols) were examined across four groups of adult participants with differing cultural histories and life experiences. One hundred and forty-seven individuals who identified themselves as African American, Chinese, European American, or Mexican and who ranged in age from 30 to 64 years participated in the investigation. Graphic symbols with translated referents (in English, Mexican Spanish, and Mandarin Chinese) from a 41-item lexicon were rated on a 7-point scale of iconicity. Results suggest that individuals from different cultural/ethnic groups perceive graphic symbols differently. Methodological issues related to the study of the impact of culture/ethnicity on graphic symbol recognition are described, and implications for the practice of AAC across cultures are discussed.

KEY WORDS: augmentative and alternative communication (AAC), cross-cultural study, graphic symbols, iconicity, language

One of the most fundamental goals of clinical practice in augmentative and alternative communication (AAC) is to provide a meaningful way to represent the messages that an AAC user wants to communicate. One way to accomplish this is through the use of graphic symbols, which can be characterized as building blocks toward successful human communication within aided communicator-communication partner dyads. Because of their importance in AAC intervention, graphic symbols have been the focus of considerable research pertaining to issues such as symbol selection, learnability, and complexity, as well as the nature of symbol-referent relationships (e.g., Bloomberg, Karlan, & Lloyd, 1990; Fuller, & Lloyd, 1987, 1991; Fuller, Lloyd, & Schlosser, 1992; Fuller, Lloyd, & Stratton, 1997; Mizuko, 1987).

There are numerous variables beyond those related to the characteristics of symbols themselves that interact during the symbol learning process. One of these stems from the fact that language is a cultural phenomenon. Thus, as AAC practitioners seek ways to unlock the languages within the consumers they serve, it would seem important to focus on the relationship between language and culture. Soto, Huer, and Taylor (1997) noted that "an AAC system should include culturally appropriate vocabulary . . . and

meaningful means of representation (i.e., symbols)" (p. 411). Huer (1997) reported that "observations of communication across cultures reveal that nonsymbolic as well as symbolic forms of communication are culturally dependent" (p. 25). Beukelman and Mirenda (1998), in their description of the variables that may interact during the learning of symbols, noted that iconicity and symbol learning are (at least to some extent) "culture-bound, time-bound, and, in general, experience-bound." In acknowledgment of this issue, researchers have recently started to focus on the cultural and life experiences of AAC users, as well as on other variables that may impact on their perception of symbols (e.g., Carmeli & Shen, 1998; Hetzroni & Haris, 1996; Huer, 1994, 1997; Nakamura, Newell, Alm, & Waller, 1998; Soto et al., 1997). However, despite growing interest in this area, a review of the empirical literature pertaining to symbol research revealed only one focused study that incorporated participants from a non-European-American linguistic community (Nakamura et al., 1998). Thus, the primary goal of this preliminary investigation was to examine the impact of culture/ethnicity on participants' perceptions of graphic symbols.

The methodology used in this study was based on that of Bloomberg, Karlan, and Lloyd (1990), who

examined the comparative translucency of five graphic symbol sets (Picture Communication Symbols [PCS], rebuses, Pictogram Ideogram Communication symbols, Picsyms, and Blissymbols) across 41 items that were rated on a 7-point scale of iconicity. Bloomberg et al. found that target items represented by PCS and rebuses were rated higher in translucency across nouns, verbs, and modifiers than were items from the other three sets, with Blissymbols receiving the lowest ratings. Although this study provided valuable information regarding the relative translucency of the target symbol systems/sets, the participants were all students attending a large university in the midwestern part of the United States who probably shared similar world views; their ethnicities were not specified. The methodology of Bloomberg et al. was modified to incorporate three symbol sets that are currently in widespread use in North America: PCS (Johnson, 1994), DynaSyms®, and Blissymbols (Wood, Storr, & Reich, 1992).

Because of the scope of the study, concerted efforts were made to control as many variables as possible while remaining flexible enough in order to recruit a sufficient number of participants. Thus, after careful consideration of the limitations inherent in the use of nondisabled participants in AAC research (Bedrosian, 1995; Higginbotham, 1995a, b), a decision was made to use nondisabled adults in this preliminary study, which asked the question will adults from African-American, Chinese, European-American, and Mexican cultural/ethnic communities assign similar translucency ratings to symbols from the three target symbol sets?

METHOD

Participants

One hundred and forty-seven participants between the ages of 30 and 64 who resided in the Los Angeles area of California participated in the study; this group included 60 males (41%) and 87 females (59%). Overall, 9 (6%) of the participants had completed school up to the middle years (i.e., grade 8), 53 (36%) had completed high school, 53 (36%) had completed a 4-year college or university program, and 26 (18%) had attended graduate school. No educational information was available for 6 (4%) participants. There were four groups of participants: European American (n = 56), African American (n = 31), Chinese (n = 33), and Mexican (n = 27).

Participants within each cultural group were selected to control and match for probable life experiences and language dialects. Because of the potential for multiple languages, residences, and educational and literacy levels, it was likely that some of the participants were bilingual. Therefore, each participant was assigned to one of the four cultural/ethnic groups based on his or her first language, current spoken (predominant use) language, and life experi-

ences, as determined from participant information sheets. In addition, multiple criteria for participant selection were established by a team of multicultural experts to ensure that participants' responses would be equivalent across groups. All participants had normal vision and hearing and had no speech or language problems, as determined by self-reports. None of the participants were familiar with the symbol sets used during the investigation. Specific additional criteria were established for each language/cultural group, as follows:

- *European-American participants.* All European-American participants were native speakers of American English who were born in the United States and who had graduated from a US high school.
- *African-American participants.* All African-American participants spoke English, resided in urban Los Angeles County, were born in the USA, and graduated from a US high school.
- *Chinese participants.* All Chinese participants were native speakers of Mandarin Chinese. They all graduated from high school in a Mandarin-speaking country. Most were from Taiwan, but participants from Mainland China were also included if they had emigrated from China prior to 1950 (in this year, the simplified Chinese writing system, Ping Ying, was introduced by the Communist regime, so that persons educated after 1950 had different educational experiences than those educated prior to that year). These stringent criteria were selected to ensure that all participants used similar spoken and written dialects.
- *Mexican participants.* All Mexican participants were native speakers of Mexican Spanish who had completed at least elementary school (i.e., grade 6) in Mexico. This educational level was selected because few Mexican immigrants in Southern California have had the opportunity to attend school beyond grade 6, which was considered sufficient for the reading tasks used in the study.

Symbols and Lexical Items

Three symbol sets were selected for the present study: PCS, DynaSyms, and Blissymbols. According to Fuller et al.'s (1997) categorization of aided symbols according to their functional similarities, the stimuli used during the present investigation included (1) a primarily picture-based symbol set without linguistic characteristics (PCS), (2) a primarily picture-based symbol set currently used on a dedicated voice output communication aid (DynaSyms), and (3) a partially picture-based symbol set with linguistic characteristics (Blissymbols).

Symbols were selected from each set to represent the 41-word corpus used by Bloomberg et al. (1990).

(The entire corpus is listed in the Appendix). Symbols from all three sets were manipulated by computer, sized to a uniform 1.5 × 1.5-inch format, and printed on plain white paper.

Symbol Translations

Prior to compiling the research instruments, it was necessary to translate the entire 41-word corpus into Mandarin Chinese and Mexican Spanish. For Mandarin Chinese, dictionary translations were deemed inappropriate because they did not reflect the contextual cues of “everyday” conversational discourse. For example, “fall” in the Chinese language can be interpreted to mean the season, the action of falling, or the action of pushing. Since the participants in the study were native speakers of Mandarin who originated from Taiwan, translators were recruited from an identical linguistic pool. Thus, 20 individuals who were native Mandarin speakers and who had received at least a bachelor’s degree from a university in Taiwan were selected as translators. The second of these two criteria ensured that all translators had adequate language competency skills in both Chinese and English, since all Taiwanese universities require competence in both languages prior to graduation. The translators were presented with the 41-word corpus (without accompanying symbols) and asked to provide translations in Mandarin for each word. Their responses were tallied, and the most frequently occurring translation for each word was selected for use during the investigation. A computer software program was used to generate the Chinese characters.

The 41 lexical items (without symbols) were also sent to 14 translators who were native speakers of Mexican Spanish. As with the Chinese translations, the most frequent translation assigned to each referent was selected from the responses submitted by the translators. When questions arose with regard to the translations, the translators were consulted by telephone to discuss the best selection.

Design of the Research Instrument

The research instrument was designed after that used by Bloomberg et al. (1990). Symbols corresponding to the 41 referents were selected from each of the three target symbol sets, for a total of 123 symbols. In addition, one noun, one verb, one modifier, and the symbol for “wheelchair” appeared twice in each symbol format to assess reliability. Thus, there were 45 symbols from each set in the research instrument, for a total of 135 items.

Four sets of research instruments, one for each of the four cultural/ethnic groups represented in the study, were then prepared. Each 27-page instrument consisted of (a) a one-page consent form in either English, Mandarin, or Spanish; (b) a one-page survey in the same language with questions related to participant demographics (e.g., age, ethnicity, native lan-

guage, educational level, etc.); (c) two pages with directions and eight practice symbols; and (d) 23 test pages of six symbols each. The six symbols were placed on the left side of each test page, and computer-generated words or characters in the appropriate language corresponding to each referent were placed to the right of each symbol near the middle of the page. A 7-point rating scale appeared next to each referent on the right side of the page. All research instruments were checked for symbol-referent accuracy by native speakers of each language prior to use.

Data Collection

Graduate research assistants who were native speakers of English, Mandarin, or Spanish were trained to administer the research instrument during a 3-hour workshop conducted by the author. The research assistants made appointments with individuals or groups in their respective linguistic communities to administer the instrument. At the beginning of each appointment, the assistant read the following instructions out loud (the instructions were identical to those used by Bloomberg et al., 1990):

You will see a series of symbols and their corresponding word meanings. Please rate how closely the symbol and its word meaning is related. A rating of 1 indicates there is no relationship between the symbol and its meaning. A rating of 7 indicates a very strong relationship. The numbers 2–6 indicate some degree of relationship between “none” and “very strong”. There is no correct or incorrect response.

Any questions regarding the response format were answered while participants completed the practice pages. Participants were instructed not to change their answers during testing.

RESULTS

Reliability

Intrasubject (i.e., test–retest) reliability was calculated for 10 pairs of symbols that were distributed across the three symbol sets. Following the procedures similar to Bloomberg et al. (1990), intrasubject reliability was assessed by “comparing the score for the first occurrence of an item with the score for its second occurrence. If the second score was within ± 1.0 of the first score (on the 7-point score), an agreement was tallied for that item” (p. 719). The percentage agreement was determined by dividing the total number of agreements by 10 and multiplying by 100. The mean intrasubject reliability was 85.9% (range = 76.3% to 95.1%).

Translucency Ratings

A comparison of the translucency ratings provided by participants within and across each of four cultural

groups was of interest in this investigation. The mean translucency ratings and standard deviations for the three symbol sets (Blissymbols, DynaSylms, and PCS) are reported in Table 1.

As can be seen from this table, PCS were assigned the highest translucency ratings by participants in all four cultural groups, that is, they were perceived to have the strongest relationship to their associated referent words or characters. In contrast, Blissymbols were judged to be the least translucent symbol set. The order of translucency rankings was the same across all four participant groups and referents.

Impact of Culture/Ethnicity on Translucency Ratings

Differences in the mean translucency ratings for the three symbol sets were noted across participant groups (see Table 1). For example, the translucency rating for Blissymbols by European-American participants was 1.58, whereas the mean rating by Mexican participants was 1.93. In order to determine whether the differences were significant, a 4 (Ethnicity, the between-subjects factor) \times 3 (Symbol set, the within-subjects factor) split-plot (mixed) analysis of variance was undertaken. The SPSS software program (Version 10.0, SPSS, Inc., 1999) was used to run a general linear model/repeated-measures (GLM) analysis. For a repeated-measures analysis, the GLM tests the effects from a multivariate and a univariate approach. Results of this procedure revealed significant differences with regard to both Ethnicity, $F(3, 143) = 4.12$, $p < .01$, and Symbol set, $F(2, 142) = 1024.82$, $p < .001$, Wilk's lambda = .07. The Ethnicity \times Symbol set interaction was not significant, $F(6, 284) = 2.57$, $p > .01$, Wilk's lambda = .90, indicating that the pattern of translucency ratings was consistent across cultural/ethnic groups and within symbol sets. In the present investigation, Mauchly's Test of Sphericity (Mauchly, 1940) was significant, so an epsilon adjustment was used to evaluate the relevant statistics. Using the most conservative epsilon adjustment available in SPSS Version 10.0, the results were significant for Symbol, $F(1, 143) = 1744.52$, $p < .001$, but not significant for the interaction of Symbol \times Ethnicity, $F(3, 143) = 2.41$, $p = .069$.

Comparison of Symbol Sets

The within-subjects variable (symbol set) was subjected to further analysis during the GLM repeated-measures procedure through the introduction of Helmert contrasts. This procedure provided for a closer examination of Blissymbols versus DynaSylms and PCS and DynaSylms versus PCS. As expected, there was a significant difference in the mean translucency rating assigned to Blissymbols compared to the other two symbol sets, $F(1, 143) = 2004.43$, $p < .001$. There was also a significant difference in the mean ratings for DynaSylms and PCS, $F(1, 143) = 176.58$, $p < .001$. None of the Ethnicity \times Symbol set interactions were significant at $p < .05$.

Post hoc tests using Tukey B comparisons (given unequal n's) were performed on the data. The rating means for the cultural/ethnic groups fell into two subsets: the European-American, Chinese, and Mexican translucency ratings (in that order) tended to group together ($\alpha = .05$), as did the Mexican and African-American ratings.

DISCUSSION

The results of this preliminary investigation suggest that culture/ethnicity had an impact on the translucency ratings assigned to symbols in three graphic symbol sets by participants in four groups. It appears from these data that individuals with different language and life experiences do not perceive graphic symbols in the same manner. However, although there were differences in participant perceptions across the four cultural/ethnic groups, there were also similarities. Overall, all four groups perceived PCS as the most translucent and Blissymbols as the least so. DynaSylms were judged to be more translucent than Blissymbols but less translucent than PCS. These findings are generally consistent with those of Bloomberg et al. (1990), although that study did not include DynaSylms as a symbol set.¹ The relatively

¹However, the Bloomberg et al. (1990) study did include Pic-sylms, which were a precursor to DynaSylms (Beukelman & Mirenda, 1998).

TABLE 1: Mean Ratings of Translucency of Three Symbol Sets/Systems by Four Cultural/Ethnic Groups

	<i>European-American</i> (<i>n</i> = 56)	<i>Mexican</i> (<i>n</i> = 27)	<i>Chinese</i> (<i>n</i> = 33)	<i>African-American</i> (<i>n</i> = 31)	<i>All</i> (<i>N</i> = 147)
<i>Symbol Set</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>
Blissymbols	1.58 (0.61)	1.93 (1.21)	1.95 (0.71)	2.16 (1.10)	1.85 (0.90)
DynaSylms	4.92 (0.80)	5.36 (0.71)	4.81 (0.80)	5.31 (0.89)	5.06 (0.82)
PCS	5.48 (0.64)	5.66 (0.59)	5.32 (0.65)	5.86 (0.91)	5.56 (0.72)
Total	3.99 (0.68)	4.32 (0.84)	4.03 (0.72)	4.44 (0.97)	

low translucency ratings across the four groups for Blissymbols may be a function of the visual processing requirements that appear to be unique to this partially picture-based symbol set with linguistic characteristics (McNaughton, 1993, 1998; McNaughton & Lindsay, 1995).

It is interesting to note the lack of an Ethnicity \times Symbol set interaction in the results, indicating a high degree of consistency across the ratings of the four participant groups. However, further inspection of the data suggests that there may have been somewhat more similarity in the ratings provided by the African-American and Mexican groups, as suggested by the slightly larger mean standard deviations for these two groups and the fact that the Tukey B tests indicated that their ratings were in the same subset. The Tukey B results also suggest that the African-American group perceived the symbols somewhat differently than the other three groups, but further research is warranted to confirm and explore the clinical significance of these findings.

These preliminary data suggest that developers of commercially available AAC symbol sets should consider the impact of culture as they develop future products, since it appears that perceptions of symbol meanings are likely to vary as a function of culture/ethnicity. In addition, the results have implications for AAC practitioners in North America in particular, in that they suggest that consumers, families, and clinicians from some cultural backgrounds may not perceive symbols in the same way as they are perceived within the dominant European-American culture. It is common practice for clinicians to introduce different graphic symbols during intervention as they attempt to find those that are most meaningful and functional for the consumers they support. What might be the consequence if a consumer and a clinician are interpreting the meanings of the graphic symbols differently? How might differences in their perceptions impact the success of the therapy effort? Might their differences in perception negatively impact the consumer's acquisition, generalization, and/or maintenance of newly acquired symbol skills? It seems clear from the results of this study that, at a minimum, AAC symbols should be selected (and, if necessary, modified) in consultation with consumers and families, especially in situations where practitioners provide support to individuals with cultural/ethnic backgrounds different than their own.

Future investigators interested in cross-cultural symbol research should take note of several methodological issues that surfaced in the present study. First, participant recruitment across cultural/ethnic groups must be undertaken with a great deal of sensitivity, since individuals from some cultural groups may perceive research as an intrusion on their privacy and may be less willing to participate as a result. In addition, access to some populations for the purpose of recruitment may be limited, especially when those populations are from cultural/ethnic communities

other than that of the researcher. In the present study, the impact of these combined issues was that, although the research plan originally called for 200 participants (50 in each group), it was possible to recruit only 147 because of the stringent selection criteria. This, in turn, necessitated the use of specific statistical analyses to accommodate unequal *n*'s. Second, it is important to note that the meanings of lexical items are often not literal translations from one language to another, and there may be multiple opinions regarding the best translation of a given referent. This issue was addressed in the present study by using a "translator jury," as described in the Method section. Third, it may be impossible to recruit participants who are homogeneous with regard to demographic factors such as education, age, socioeconomic status, language background, and life experiences, and this may limit the interpretability of results. Finally, researchers may not always agree on the nature of the data collected and/or the method of analysis used. In the present investigation, the data were analyzed as interval data, although Likert scale data are sometimes considered to be ordinal. It is unlikely that different results would have been obtained if a nonparametric test was used because there is typically no need for nonparametric statistics with interval data (M. Arlin, personal communication, December 1999).

Future analyses of the data from this study are expected to provide additional information about how symbols for referents in different word classes (i.e., nouns, verbs, modifiers) are perceived from a cross-cultural perspective as well. It may be that some types of vocabulary concepts are more readily reflected by graphic symbols across cultural groups. Future research is also needed to determine the extent to which symbol perceptions are age and/or ability specific. As researchers continue to examine user perceptions of graphic symbols, additional variables that merit further examination are also likely to emerge. In the interim, the results of this investigation suggest that participants' cultural/linguistic experiences may be significant elements to consider when selecting graphic symbols and when teaching consumers to represent meaning through them.

ACKNOWLEDGMENTS

This research was supported in part from the U.S. Department of Education by Grant No. H029B40232 to the author. Opinions expressed herein are those of the author alone and should not be interpreted to have agency endorsement. The author gratefully acknowledges the assistance of Edith Li, Lilly Cheng, Greta Tan, Terry Saenz, and Toya Wyatt, especially during the translations of the lexical items. Their helpful comments and assistance were appreciated. Bruce Helmbold is acknowledged for his participation during the long hours of data entry and analysis. Rich Wiseman, John Renaird, Carlene Nelson, and Marshall Arlin were especially helpful during the statistical analysis;

and Pat Miranda's editorial assistance and support during the review process were exceptional. Finally, all of the California State University-Fullerton graduate students on the AAC Across Cultures Grant who participated in the data collection are acknowledged for their participation, especially Debra Zipf, Mike Erhard, and Anissa Jones.

Address reprint requests to: Mary Blake Huer, Department of Speech Communication, California State University-Fullerton, P.O. Box 6868, Fullerton, CA 92834-6868, USA.

REFERENCES

- Bedrosian, J. L. (1995). Limitations in the use of nondisabled participants in AAC research. *Augmentative and Alternative Communication, 11*, 6–10.
- Beukelman, D., & Miranda, P. (1998). *Augmentative and alternative communication: Management of severe communication disorders in children and adults* (2nd ed.). Baltimore: Paul H. Brookes.
- Bloomberg, K., Karlan, G. R., & Lloyd, L. (1990). The comparative translucency of initial lexical items represented by five graphic symbol systems. *Journal of Speech and Hearing Research, 33*, 717–725.
- Brown, R. (1977, May–June). *Why are signed languages easier to learn than spoken languages?* Keynote address at the National Association of the Deaf Symposium on Sign Language Research and Teaching, Chicago, IL.
- Carmeli, S., & Shen, Y. (1998). Semantic transparency and translucency in compound Blissymbols. *Augmentative and Alternative Communication, 14*, 171–183.
- Fuller, D. R., & Lloyd, L. L. (1987). A study of physical and semantic characteristics of a graphic symbol system as predictors of perceived complexity. *Augmentative and Alternative Communication, 3*, 26–35.
- Fuller, D., & Lloyd, L. (1991). Toward a common usage of iconicity terminology. *Augmentative and Alternative Communication, 7*, 215–220.
- Fuller, D., Lloyd, L., & Schlosser, R. (1992). Further development of an augmentative and alternative communication symbol taxonomy. *Augmentative and Alternative Communication, 8*, 67–74.
- Fuller, D., Lloyd, L., & Stratton, M. (1997). Aided AAC symbols. In L. Lloyd, D. Fuller, and H. Arvidson (Eds.), *Augmentative and alternative communication: Handbook of principles and practice* (pp. 48–79). Needham Heights, MA: Allyn & Bacon.
- Hetzroni, O. E., & Harris, O. L. (1996). Cultural aspects in the development of AAC users. *Augmentative and Alternative Communication, 12*, 52–58.
- Higginbotham, D. J. (1995a). Use of nondisabled participants in AAC research: Confessions of a research infidel. *Augmentative and Alternative Communication, 11*, 2–5.
- Higginbotham, D. J. (1995b). Subject selection in AAC research: Decision points. *Augmentative and Alternative Communication, 11*, 11–13.
- Huer, M. B. (1994, November). *Diversity now: Multicultural issues in AAC*. Miniseminar presented at the National Annual Meeting for the American Speech-Language-Hearing Association, New Orleans, LA.
- Huer, M. B. (1997). Culturally inclusive assessments for children using augmentative and alternative communication (AAC). *Journal of Children's Communication Development, 19* (1), 23–34.
- Johnson, R. (1994). *The Picture Communication Symbols combination book*. Solana Beach, CA: Mayer-Johnson.
- Mauchly, J. W. (1940). Significance test for sphericity of a normal *n*-variate distribution. *Annals of Mathematical Statistics, 11*, 204–209.
- McNaughton, S. (1993). Graphic representational systems and literacy learning. *Topics in Language Disorders, 13*, 58–75.
- McNaughton, S. (1998). *Reading acquisition of adults with severe congenital speech and physical impairments: Theoretical infrastructure, empirical investigation, and educational application*. Unpublished doctoral dissertation, University of Toronto, Toronto, Ontario, Canada.
- McNaughton, S., & Lindsay, P. H. (1995). Approaching literacy with AAC graphics. *Augmentative and Alternative Communication, 11*, 212–228.
- Mizuko, M. (1987). Transparency and ease of learning of symbols represented by Blissymbolics, PCS, and Picsyms. *Augmentative and Alternative Communication, 3*, 129–136.
- Nakamura, K., Newell, A., Alm, N., & Waller, A. (1998). How do members of different language communities compose sentences with a picture-based communication system? A cross-cultural study of picture-based sentences constructed by English and Japanese speakers. *Augmentative and Alternative Communication, 14*, 71–79.
- Soto, G., Huer, M. B., & Taylor, O. (1997). Multicultural issues. In L. L. Lloyd, D. H. Fuller, & H. H. Arvidson (Eds.), *Augmentative and alternative communication: Handbook of principles and practice* (pp. 406–413). Needham Heights, MA: Allyn & Bacon.
- SPSS, Inc. (1999). *SPSS for Windows* (Release 10.0). Chicago, IL: Author.
- Wood, C., Storr, J., & Reich, P. (1992). *The complete Blissymbol reference guide*. Toronto, ON: Blissymbolics Communication International.

APPENDIX

41-Word Corpus from Bloomberg et al. (1990) Used in This Study

1. come	11. read	21. hot	31. car
2. drink	12. sleep	22. little	32. cookie
3. eat	13. want	23. more	33. door
4. fall	14. wash	24. no	34. food
5. give	15. big	25. sad	35. girl
6. go	16. cold	26. sick	36. me
7. help	17. dirty	27. ball	37. milk
8. make	18. frightened	28. bed	38. music
9. open	19. funny	29. book	39. TV
10. play	20. happy	30. candy	40. toilet
			41. wheelchair