

Comparison of Cognitive Dictionaries Across Three Cultures: Korea, Germany, and the United States*

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The cognitive dictionaries of Korean, German, and North American children and adolescents 4 to 18 years of age were inferred from their word associations. Enactive transformations were predominant for 4- to 6-year-olds in all 3 cultures. By 8 years of age, Korean and American children showed a marked shift in response patterns; i.e. iconic among Korean and logical among American children. On the other hand, the German children showed a marked shift toward functional and logical responses from 10 years of age. Findings were discussed in terms of (1) the universality of the enactive mode at the early age levels and its relationship to the theories of Piaget (1980) and Bruner (1966) regarding the action related nature of early language development; and (2) the shift in the early elementary school grades when children begin to develop cognitive dictionaries commensurate with their respective cultures.

Word associations were mainly used in the early part of the 20th century for personality assessment in clinical settings (Cramer, 1968). However, in recent decades, their linguistic components have also been used for the study of thinking and cognition (Entwisle, 1966; Moran, 1981).

Moran (1981) postulated that word associations reflect a cognitive dictionary which can be seen in the tendency for

individuals to respond to stimulus words (SW) with one of several types of response words (RW). According to Moran, individuals appear to have a response set in that the majority of their RWs can be classified as either enactive, iconic, functional, or logical. His notion of a cognitive dictionary is based on the work of McNeill (1963; 1966), and Piaget (1980).

McNeill (1963) inferred a word dictionary

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from his findings that speakers assign properties to words. The words are then contrasted in terms of these properties. This makes it possible for paradigmatic associations to proceed with minimal contrast between words. McNeill postulated that the word dictionary is instrumental in the development of the semantic system in childhood.

Some characteristics of enactive, iconic, functional, and logical modes (Moran's cognitive dictionary can also be found in Piaget's and Bruner's cognitive developmental theories. Piaget's position is that early language and thought is rooted in the child's actions (Inhelder, 1980). Later, the child represents the world in terms of its perceptual structure. It is only as the child approaches the formal operational stage that logical cognitive structures appear in thought and language (Gruber and Voneche, 1977; Piaget and Inhelder, 1964).

Bruner (1966) described three ways in which children represent their experience and organize it for future use. The first means is enactive; that is, the actions the child uses for coping with or understanding his or her world. The second means is iconic, where imagery is all important; and the third means is symbolic, where language is freed of action and imagery. Furthermore, Bruner's colleagues, Olver and Hornsby (1966), found that older school children use classification which is based, in part, on the functional properties of things. These modes of

representation are developmentally related to each other and to language.

Moran's early work on association sets consisted of factor analyses of word associations in adult subjects (Moran, Mefford, & Kimole, 1964; Moran, 1966; reviewed in Tieszen, 1984). He found that the responses of his adult subjects could be classified as functional, iconic, or logical. In the iconic mode, the SW and RW are adjective-noun or noun-adjective combinations, (as in apple-red or red-apple). In functional associations, the SW and RW are denoted by entities or processes which have a functional relationship (as in needle-thread). The logical mode consists of synonyms, superordinates, contrasts, and coordinates. In synonyms, the RW has the same meaning as the SW (as in flower-blossom); in superordinates the RW is an immediate member of the class or category denoted by the SW or vice versa (as in cabbage-vegetable); in contrasts, the RW negates or contrasts with the SW (as in dark-light); in coordinates, the SW and the RW refer to the same class or category (as in blue-yellow).

The enactive mode was included in Moran's later research (1973; 1981) when he began his studies of the associations of younger (3- to 7-year-old) children. The enactive mode consists of noun-verb and verb-noun relationships (as in apple-eat).

Moran also studied age-related and cross-cultural aspects of cognitive dictionaries. He found that adults in Japan

and America gave markedly different responses from each other (Moran, 1973). That is, American adults used primarily logical associations while Japanese adults produced mainly iconic associations. A similar predominance of iconic responses was found by Moran and Huang (1975) among non-English speaking Chinese adults on Taiwan. On the other hand, English-speaking Chinese university students in Taiwan produced a predominance of logical responses.

While adults exhibited such diverse responses across cultures, Moran (1981) found that young (3- to 7-year-old) American, Chinese, and Japanese children all produced predominantly enactive responses. Specifically, he found that while young children exhibited this universality, the predominant response sets of adults in these three cultures were different from the children and also different from each other.

The purpose of the present study was the investigation of cultural similarities and different in age changes of word associations across three cultures. Korea and Germany had not yet been investigated for children's word associations using Moran's taxonomy, and subjects from the USA were included as a comparison group.

It was expected that 1) the youngest (4- to 6-year-old) children in all three cultures would respond in the enactive mode, 2) the German and American adolescents, both having roots in Western culture would be similar to each other in

giving predominantly logical responses, and 3) since Korea, Japan, and China share a number of common elements of East Asian culture, it was expected that the Korean adolescents would be similar to Moran's Chinese and Japanese adults and give predominantly iconic responses.

Method

Subjects The Subjects for this cross-sectional study were 4- to 18-year-old middle-class Korean, German, and American children and adolescents living in their native cultures and sampled at two year age intervals. Korean subjects numbered 242, German subjects 410, and American subjects 159. The number of subjects at each age level in the Korean sample were 29 four-year-olds, 31 six-year-olds, 30 eight-year-olds, 30 ten-year-olds, 31 twelve-year-olds, 30 fourteen-year-olds, 31 sixteen-year-olds, and 30 eighteen-year-olds. The German sample consisted of 14 at age four, 39 at age six, 45 at eight, 45 at ten, 29 at twelve, 93 at fourteen, 122 at sixteen, and 22 at eighteen years of age. In the U.S. sample, there were 19 four-year-olds, and 20 each six-, eight-, ten-, twelve-, fourteen-, sixteen-, and eighteen-year-olds.

The subjects were students in nursery schools, public schools, and colleges of Seoul, Korea; Augsburg, Germany; and Sioux Falls, South Dakota, USA. While the younger children were more difficult to test due to their shorter attention span,

they were included in this study because of Entwisle's observation that by the age of four, or even earlier, children have mastered many concepts of their native language (Entwisle, 1966).

The Word List The 32 stimulus words were randomly selected from Moran's (1973) list and translated into Korean and German (Table 1).

Table 1. The Word List

English	Korean*	German
ship	pae	Schiff
bread	ppang	Brot
beef	soekogi	Rindfleisch
steel	ch'öl	Stahl
butterfly	nabi	Schmetterling
whistle	hwip'aram	Pfeife
oil	kirüm	Öl
doctor	uisa	Arzt
die	chukda	sterben
mask	kamyön	Maske
smile	misp	Lächeln
pain	ap'um	Schmerz
apple	sagwa	Apfel
foot	pal	Fuss
hit	ttaerida	schlagen
yellow	noransaek	gelb
street	köri	Strasse
blossom	kkossongi	Blüte
calf	songaji	Kalb
man	namja	Mann
house	chip	Haus
sour	sida	sauer
tobacco	tambae	Tabak
tug	tang'ida	Zug
bitter	ssuda	bitter
bark	chitta	belln
rip	tchitta	Riss
black	kkamat'a	schwarz
thirsty	mongmarüda	durstig
afraid	turyoa	bange
sweet	talda	süss
needle	panül	Nadel

*Romanized according to the Tables of the McCune-Reischauer System, 1961. Transactions of the Korea branch of the Royal Asiatic Society. 38, 119-128.

Translation problems were resolved through discussion between the three researchers. As a result, one stimulus word, "ham" was changed to "beef" in order to maintain native or well-known vocabulary across

cultures. The remaining translation problems had to do with homonyms. "Calf" and "bark" were translated in their respective bovine and canine meanings. "Foot" was translated in its anatomical meaning. Because the words were administered verbally, "steal" and "dye" became homonyms for "steel" and "die" in English. Some of the youngest children produced their own idiosyncratic homonyms, such as "bit her" for "bitter".

Korean language homonyms included *pal* ("bamboo blinds" as well as "foot"), *pae* ("pear" and "abdomen" in addition to "ship"), *köri* ("distance" as well as "street"), and *ssüda* ("use" and "write" in addition to "bitter"). The only homonym which appeared on the German list was "man" (mankind) for "Mann" (man or husband).

Procedure

Testing was carried out by a specially trained staff. The 8- to 18-year-olds were tested in groups. They were instructed, following presentation of each SW, to "write the first word that comes to mind". Two practice words ("cat" and "shoe") were presented. After this, the stimulus words (SW) were presented at 5 second intervals, and the subjects recorded their own responses on numbered answer sheets.

4- to 6-year-olds were tested individually. They were instructed to "say the first word that comes to mind" after presentation of the SW, and they were

given the same two practice words as the older subjects. After this, the SWs were presented at 5 second intervals, and their responses were recorded by the investigator.

The responses were assigned to the categories developed by Moran (enactive, iconic, functional, and logical) as defined above. Only responses which could clearly be classified as belonging to one of these categories were analyzed in this study. The

remainder were discarded. Discarding ambiguous word-pairs in this way ensures the reliability of scoring (Moran, 1979).

Results

The frequency of response in each of the cognitive dictionary related categories was calculated by age for each country. The data, presented in means and percentage, are shown in Table 2.

Table 2
Mean Frequency of Response Classes by Age in Three Cultures

Age*	Number	Enactive	Iconic	Functional	Logical
Korea (ROK)					
4	29	6.3 (37.7)	2.9 (17.4)	3.3 (19.8)	4.2 (25.1)
6	31	6.6 (34.2)	5.5 (28.5)	2.5 (13.0)	4.7 (24.1)
8	30	4.0 (26.7)	6.2 (41.3)	1.4 (9.3)	3.4 (22.7)
10	30	3.2 (17.8)	4.9 (27.2)	2.9 (16.1)	7.0 (38.9)
12	31	4.1 (17.6)	10.3(44.2)	4.8 (20.6)	4.1 (17.6)
14	30	2.3 (11.8)	8.0 (41.0)	5.7 (29.2)	3.5 (17.9)
16	31	1.9 (9.5)	6.6 (32.8)	7.1 (35.3)	4.5 (22.4)
18	30	1.5 (8.1)	5.3 (28.5)	6.3 (33.9)	5.5 (29.6)
Germany (BRD)					
4	14	11.0(54.2)	3.6 (17.7)	3.3 (16.3)	2.4 (11.8)
6	39	8.4 (38.2)	3.6 (16.4)	6.2 (28.2)	3.8 (17.3)
8	45	6.2 (25.8)	7.3 (30.4)	6.3 (26.3)	4.2 (17.5)
10	46	3.3 (13.3)	3.8 (15.3)	7.4 (29.8)	10.3 (41.5)
12	29	4.7 (21.0)	3.4 (15.2)	7.6 (33.9)	6.7 (29.9)
14	93	3.8 (17.4)	3.3 (15.2)	7.4 (34.1)	7.4 (24.1)
16	122	3.7 (17.4)	3.5 (16.4)	7.2 (33.8)	6.9 (32.4)
18	22	5.2 (26.0)	3.4 (17.0)	5.1 (25.5)	6.3 (31.5)
United States (USA)					
4	19	9.9 (56.9)	3.4 (19.5)	1.5 (8.6)	2.5 (14.9)
6	20	8.2 (38.1)	4.2 (19.5)	2.6 (12.1)	6.5 (30.2)
8	20	3.7 (15.3)	4.1 (16.9)	3.6 (14.9)	12.9 (53.3)
10	20	1.6 (7.3)	2.4 (11.0)	4.9 (22.4)	13.0 (59.4)
12	20	2.1 (8.5)	2.2 (8.9)	4.7 (19.0)	15.7 (63.6)
14	20	1.3 (5.6)	2.9 (12.5)	4.1 (17.7)	14.9 (64.2)
16	20	2.5 (10.9)	3.4 (14.8)	4.3 (18.7)	12.8 (55.7)
18	20	2.0 (8.7)	3.2 (13.9)	4.9 (21.2)	13.0 (56.3)

Chi square analyses were conducted for age by category by cultural group. The analyses were all significant at the $p < .01$ level.

As predicted, enactive responses (Figure 1) were predominant among the 4- to 6-year-olds in all three cultures. The Korean 4-year-olds gave nearly 40 per cent of

their responses in the enactive mode while the American and German 4-year-olds gave over 50 per cent enactive responses. The enactive responses in each country decreased rapidly from age 8, especially among the American and Korean children.

Age trends in iconic responses between countries showed that the U.S. and German

subjects gave a rather low frequency of iconic responses throughout the age range whereas the Korean subjects gave about 40 per cent or more iconic responses starting at 8 years of age. This diminished to about 30 per cent at 16 and 18 years of age (Figure 2).

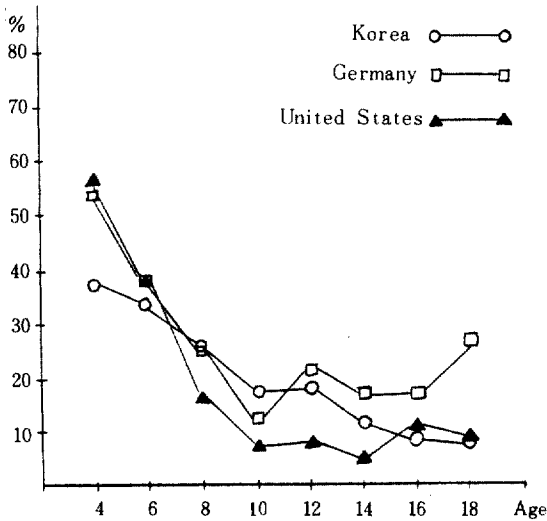


Figure 1. Enactive

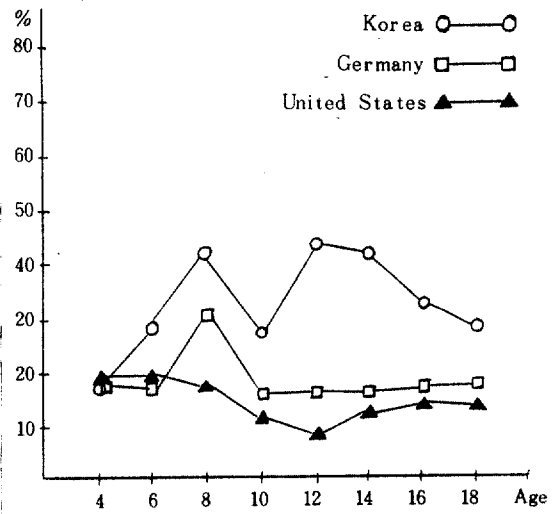


Figure 2. Iconic

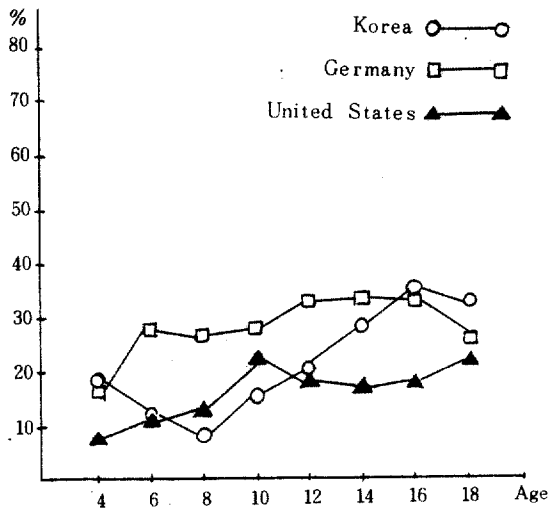


Figure 3. Functional

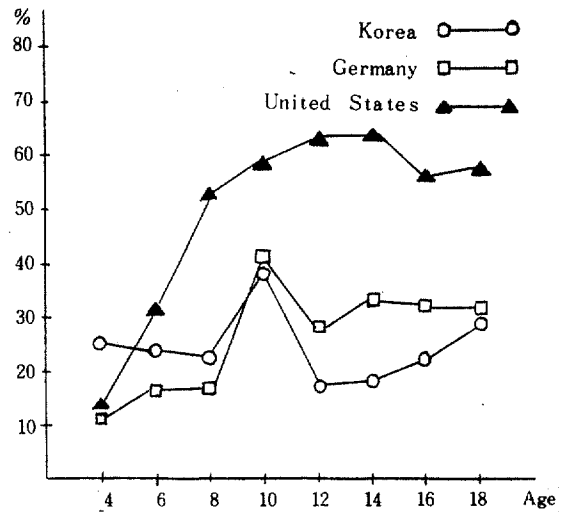


Figure 4. Logical

(Caption for Figures 1-4.)

Figures 1-4. Percentage of Cognitive

Dictionary Responses by Age in Each of the Three Cultural Groups.

Differences in age trends between countries were also found in functional and in logical responses (Figures 3 and 4). The age trends in responses of The German and American subjects were less similar than expected. That is, the U.S. subjects gave over 50 per cent logical responses not only in adolescence but as early as 8 years of age. The outstanding aspect of the German sample was about 30 per cent responses in both logical and functional categories from 10 years of age continuing into adolescence. In the Korean sample, functional and logical responses increased somewhat at 16 and 18 years of age.

In sum, Korean, German, and American children all gave predominantly enactive responses up to age 6. After that, the responses of the three cultures showed varying patterns. German subjects gave a predominance of functional and logical responses from the age of 10. The American subjects gave predominantly logical responses from 8 years of age, and the Korean subjects exhibited a predominance of iconic responses starting at 8 years of age.

Discussion

The findings of the present study that 4- to 6-year-olds in Korea, Germany and the United States used the enactive mode in their word associations are similar to Moran's results with Japanese, Taiwanese, and American subjects (Moran, 1981).

This supports the notion of the universality of the enactive mode at the early age levels and affirms Moran and Huang's assertion that an "action-upon-referent" principle independent of any particular language determines the cognitive dictionary structure of young children (Moran & Huang, 1974).

The expected similarities between the German and the U.S. adolescents were not found. That is, while the U.S. adolescents gave predominantly logical responses, the German adolescents gave about the same percentage of logical and functional responses. Furthermore, these trends appeared at different age levels. In the German sample, it was from 10 years of age that the functional and logical responses were predominant, and in the American sample, it was from 8 years of age that logical responses were dominant.

The predominant response of Korean 8- to 14-year-olds was iconic. The iconic mode then diminished somewhat at later age levels. Data from 8- to 14-year-olds are missing from Moran's studies of Taiwanese and Japanese cognitive dictionaries (Moran, 1973; Moran, 1981; Moran & Huang, 1975). However, the strong iconic responses of Japanese adults and non-university educated Taiwanese adults parallels the iconic responses of Korean 8- to 14-year-olds.

The changes in cognitive dictionary found in the present study might have come about through formal educational experience. On the other hand, the shift

occurred very early in the school years for the American and Korean children and later for the German children. This might implicate other cultural factor(s) as responsible for the differing cognitive dictionaries. Nakamura (1964), for instance, contends that the people of the East are intuitive, and by contrast, those of the West are propositional or logical. One might speculate whether an intuitive frame of reference may be expressed as an iconic cognitive dictionary. In any case, the genesis of cultural differences in cognitive dictionaries and the relationship of these differences to such practical matters as intercultural communication remains to be explored.

With regard to research method, intra- and inter-cultural work on the construction of word lists may be fruitful. The present study used a word list based on Moran's (1973) research which, in turn, was based on his earlier work on the construction of set-compatible word lists (Moran, 1966). A word list based on set-compatible lists constructed directly from Korean and/or German sources might be productive. Semantic differential analyses also hold promise for the construction of word lists for intercultural study (Osgood, 1964).

In conclusion, the pattern of cognitive dictionaries inferred from the word associations displayed in the present study agrees with the theories of Piaget (1958) and of Bruner (1966) in their emphasis on the action related nature of early language development. Furthermore, cultural

differences in children's cognitive dictionaries begin to emerge in the early to middle elementary school years.

References

- Bruner, J. (1966). On cognitive growth. In J. S. Bruner, R. Olver, and P. Greenfield, et al, (Eds.), *Studies in cognitive growth*. New York: Wiley.
- Cramer, P. (1968). *Word association*. NY: Academic Press.
- Entwisle, D. R. (1966). *Word associations of young children*. Baltimore: Johns Hopkins.
- Gruber, H. E., and Voneche, J. J. (Eds., 1977). *The essential Piaget*. New York: Basic Books.
- Inhelder, B. (1980) Language and knowledge in a constructivist framework. In M. Piattelli-Palmarini (Ed.), *Language and learning: The debate between Jean Piaget and Noam Chomsky*. Cambridge, Mass.: Harvard University Press.
- McNeill, D. (1963). The origin of association within the same grammatical class. *Journal of Verbal Learning and Verbal Behavior*, 2, 250-262.
- McNeill, D. (1966). Development psycholinguistics. In F. Smith, and G. A. Miller (Eds.), *The genesis of language: A psycholinguistic approach*. Cambridge: M. I. T. Press.
- Moran, L. J. (1966). Generality of word-

- as-association response sets.
Psychological Monographs, 80 (4, Whole No. 612)
- Moran, L. J. (1973). Comparative growth of Japanese and North American cognitive dictionaries. *Child Development*, 44, 862-865.
- Moran, L. J. (1979). Person Communication, 34, 154
- Moran, L. J. (1981). Evidence for the universal structure of the child's cognitive dictionary. *Journal of General Psychology*, 105, 149-154.
- Moran, L. J., and Huang, I. (1974). Note on the cognitive dictionary structure of Chinese children. *Psychological Reports*, 34, 154.
- Moran, L. J., and Huang, I. (1975). Note on the cognitive dictionary structure of adult Chinese and on a Piagetian semantic universal. *Psychological Reports*, 36, 180.
- Moran, L. J., Mefford, R. B., and Kimble, J. P. (1964). Idiodynamic sets in word association. *Psychological Monographs*, 78 (2, Whole No. 579), 1-22.
- Nakamura, H. (1964). *Ways of thinking of eastern peoples*. Honolulu: The University of Hawaii Press.
- Olver, R. R., and Hornsby, J. R. (1966). On equivalence. In J. S. Bruner, R. R. Olver, and P. M. Greenfield, et al. (Eds.) *Studies in cognitive growth*. New York: Wiley.
- Osgood, C. E. (1964). Semantic differential technique in the comparative study of cultures. *American Anthropologist*, 66 171-200. Reprinted in L. Jakobovits, and M. S. Mirron (Eds.) *Readings in the psychology of language*. Englewood Cliffs, N. J.: Prentice-Hall
- Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.
- Piaget, J. (1980). The psychogenesis of knowledge and its epistemological significance. In M. Piatelli-Palmarini (Ed.), *Language and learning: The debate between Jean Piaget and Noam Chomsky*. Cambridge, Mass.: Harvard University Press.
- Piaget, J., and Inhelder, B. (1964). *The early growth of logic in the child*. London: Routledge and Kegan Paul.
- Tables of the McCune-Reischauer System (1961). *Transactions of the Korea Branch of the Royal Asiatic Society*, 38, 119-128.
- Tieszen, H. R. (1984). Cognitive dictionaries inferred from word associations. *Korean Child Studies Journal*, 5, 47-52.

한국, 독일 및 미국 아동의 인지어휘유형 비교

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4세부터 18세까지의 한국, 독일 및 미국 아동 총 811명을 대상으로 인지어휘유형(cognitive dictionary)이 비교되었다. 인지어휘유형은 32개의 단어로 단어연상법을 통해 추정되었다. 연상된 단어들은 Moran(1981)에 의한 인지어휘유형 분류에 따라 분석되었다.

그 결과 모든 문화에서 4세에서 6세 사이에서는 동작적 유형이 가장 뚜렷하였으며 8세경에서부터는 한국과 미국 아동간에 반응 유형에 차이가 나타나기 시작하였다. 즉 한국 아동의 경우 심상적 유형, 미국 아동의 경우 논리적 유형이 나타났다. 반면에 독일 아동들은 10세경에 기능적 유형과 논리적 유형으로의 전환을 보였다.

이들 결과들은 Piaget와 Bruner 이론에 따른 동작적 양식이 초기 연령에서는 보편적으로 나타나나 나이가 들어가면서 점차 각 문화의 성인들의 인지어휘유형과 일치하는 발달 경향을 보이는 것으로 해석되었다.