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The development of definitional skill*

CATHERINE E. SNOW
Harvard Graduate School of Education

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ABSTRACT

Giving good definitions requires controlling both word meaning and definitional form. Definitions from 137 second to fifth graders (i.e. aged seven to eleven) were scored to reflect conformity to the classic Aristotelian form and quality of information provided. Comparisons among children with different backgrounds indicated that school exposure to English was strongly related to per cent formal definitions given and their quality. 63 children were also tested in French, their foreign language. Performance in French was lower than in English; exposure to French at home related to the amount of information the children provided in informal definitions, not to quality of formal definitions. The results suggest that performance on definitions is most strongly affected by opportunities to practise the required form.

INTRODUCTION

Giving definitions for words is a task that has long been exploited as a component of IQ tests, primarily as a way of providing an estimate of vocabulary. From the beginning, though, it has been clear that, in addition to the developmental changes in definitions associated with increased vocabulary, there are qualitative changes with age in the kinds of information children include in their definitions (Binet & Simon, 1916; Terman, 1916; see Markowitz & Franz, 1988, for a review). The nature of the changes with age in definitional forms has been variously characterized (see Markowitz & Franz, 1988), but in general falls into three categories of change: (a) the information offered by young children is more relevant to the object or activity denoted by the word than to the meaning of the word itself; (b) the

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ACQUISITION OF PASSIVES

Crain, S., Thornton, R. & Murasugi, K. (1987). Capturing the evasive passive. Paper presented at the Boston University Language Conference, Boston, MA.

Dewart, M. H. (1979). Role of animate and inanimate nouns in determining sentence voice. *British Journal of Psychology* 70, 135-41.

Harris, M. (1978). Noun animacy and the passive: a developmental approach. *Journal of Experimental Psychology* 39, 495-504.

Hayhurst, H. (1967). Some errors of young children in producing passive sentences. *Journal of Verbal Learning and Verbal Behavior* 6, 534-939.

Horgan, D. M. (1975). Language development: a cross-methodological study. Ph.D. dissertation, University of Michigan.

— (1978). The development of the full passive. *Journal of Child Language* 5, 65-80.

Lempert, H. (1984). Topic as starting point for syntax. *Monographs of the Society for Research in Child Development* 49, No. 209, (5).

— (1989). Animacy constraints on preschool children's acquisition of syntax. *Child Development* 60, 237-45.

MacWhinney, B. (1977). Starting points. *Language* 53, 152-68.

Maratsos, M. P. & Abramovitch, R. (1975). How children understand full, truncated, and anomalous passives. *Journal of Verbal Learning and Verbal Behavior* 14, 145-57.

Maratsos, M. P., Fox, D. E. C., Becker, J. A. & Chalkey, M. A. (1985). Some restrictions on children's passives. *Cognition* 19, 167-91.

Pinker, S., Lebeaux, D. S. & Frost, L. A. (1987). Productivity and constraints in the acquisition of the passive. *Cognition* 26, 196-267.

Rosch, E. (1973). On the internal structure of perceptual and semantic categories. In T. E. Moore (ed.), *Cognitive development and the acquisition of language*. New York: Academic Press.

Turner, E. A. & Rommetveit, R. (1967). Experimental manipulation of the production of the active and passive voice in children. *Journal of Verbal Learning and Verbal Behavior* 7, 246-50.

Wasow, T. (1977). Transformations and the lexicon. In P. W. Culicover, T. Wasow & A. Akmajian (eds), *Formal syntax*. New York: Academic Press.

Weinberg, A. (1987). Commentary on Borer & Wexler. In T. Roeper & E. Williams (eds), *Parameter-setting and language acquisition*. Dordrecht: Reidel.

information offered by older children and adults is more likely to be universal and criterial, whereas the information offered by young children is typically personal and incidental; and (c) the form in which the information is given comes increasingly to conform to the conventions of Aristotelian definitions (Bierwisch & Kiefer, 1969), which for nouns includes a superordinate and a restrictive complement (e.g. an island is a body of land surrounded by water).

Despite ample documentation of the course of development of definitions, little agreement has been reached on the sources of development, nor on the reasons why young children's definitions are so deficient. Why, for example, do 4- and 5-year-olds not use superordinate terms in their definitions? One hypothesis is that they have not yet acquired the taxonomic knowledge that would enable them to do so. However, Anglin (1970) and Watson (1985) have both demonstrated that children respond correctly to questions like 'is a cat an animal?' at ages when their definitions omit terms like 'animal'. Benelli, Arcuri & Marchesini (1988) showed that children who solve logical class inclusion problems give no better definitions than those who cannot, while work by Gelman & Baillargeon (1983), Markman and Hutchinson (1984), Carey (1985), Waxman & Gelman (1986) and others has now confirmed that quite young children have access to taxonomic organizations for their category systems. We are thus left with the question why the taxonomic knowledge children possess is not incorporated into their definitions.

A second explanation that has been offered for the omission of superordinates is the demands they make on metalinguistic accomplishments, for example the knowledge that one can use two words (a superordinate as well as a basic object level term) for one referent. Benelli (1988) found a correlation between 7-year-olds' willingness to use two words for one referent and their tendency to use superordinates in a definitions task, indicating that the cognitive achievements associated with abandoning nominal realism may help explain the acquisition of more adult-like definitional forms. Other metalinguistic skills, such as analysis of knowledge and self-monitoring for form, have also been implicated in success in giving definitions (Snow *et al.* 1990).

An alternative explanation for the developmental changes in definitions is that the conventional definitional form is simply a fairly infrequent one which young children have little opportunity to learn. Only as a result of schooling or other similar experiences do children come to recognize that a question like 'What is a cat?' requires an answer in the form of a definition, rather than, for example, a description or a narrative. Some support for the view that inadequate knowledge about the GENRE of definitions is a source of children's poor definitions comes from work by Watson & Olson (1987). 'They asked children 'What is an X?' and followed up with 'What is an X?', stressing the copula in the way that schoolteachers seeking definitions in class discussions have been observed to do. The follow-up question that stressed

the copula evidently served for 5- to 10-year-old children as a cue that the definitional genre was being requested; many more superordinates were supplied in this case, whereas the follow-up 'Tell me more about X' did not elicit any increase in superordinates. These results suggest that giving adult-like definitions is a task with at least two components: knowing something about the genre of definitions, including when it is being requested, and having adequate information about the meaning of the specific word for which a definition is required. The importance of knowledge of the definitional genre is underlined by results reported by Markowitz & Franz (1988) that subjects who give sophisticated, adult-like definitions of nouns may revert to childish forms and to giving much more incidental, personal information when asked to define adjectives or verbs. The specific rules for giving a formal definition of an adjective or verb are somewhat different from those for nouns; thus, mastery of the noun form does not ensure competency in giving formal definitions for all word classes.

While understanding the dual nature of the task of giving definitions (and, indeed, of many language tasks, especially those imposed in formal learning settings) helps clarify why young children perform so differently from older children and adults on this task, it does not clarify the developmental course from five to adulthood. The most striking thing about the cross-sectional data offered in every study of definitions that has been reviewed is the gradualness of the change across ages. The gradual movement from childlike to adult-like definitional forms is, furthermore, not a statistical artefact engendered by an increasing proportion in the sample of children who operate like adults. At every age before adulthood most subjects give some noun definitions in the conventional form and others of a less sophisticated type, indicating that even after knowledge of the genre is achieved there are some problems in applying the knowledge consistently. One way to conceptualize the pattern of findings from different age groups is to think of giving good definitions as a skill which rests on the achievement of various knowledge components but also requires a considerable amount of practice before it can be consistently displayed.

The study presented here was undertaken to provide evidence relevant to the conception that giving definitions is a specific skill, i.e. a performance which requires practice to achieve fluency and consistency, that rests upon but also goes beyond knowledge of the genre and its characteristics or of the words used and their meanings. Children in second to fifth grades were tested using frequently occurring words which are expected to be within the vocabularies of even much younger children. The performance of native English-speaking children was compared with that of non-native speakers of English who had received schooling in an English-language curriculum school; if, as Miller & Gildea (1985), Watson (1985), Snow, Cancino, Gonzalez & Shriberg (1989) and others have proposed, definitions are a form

students can enter French instruction after emerging from ESL at any point in the junior school.

From the larger population of approximately 240 second to fifth graders at UNIS, children were chosen that met the following criteria: sufficient skills in English to be tested using a fairly extensive test battery; no indication from teacher interview or academic record of any serious behavioural or learning problem; parental permission to participate in the study. The distribution of the children tested over grade and gender is given in Table 1. Of these subjects, 78 came from homes in which English was the only or the most commonly used language. An additional 14 children from homes where English was not a primary language had nonetheless received all their schooling in mainstream English-language classrooms.

Seventy-three of the children had advanced sufficiently in French as a foreign language that they could be administered the test battery in French as well. Of these, data from the 64 who were native speakers of English were analysed for the purposes of this report.

Test procedure. The definitions task, administered as part of a longer test battery, used the procedure from the Wechsler Intelligence Scale for Children (WISC; Wechsler, 1958), which involves asking children 'What is —?' or 'What does — mean?' for each of a series of words. Children were also asked to use each word in a sentence, to confirm that they knew what it meant. Definitions for words of which children did not know the meaning were discarded, but this rarely happened since the words used were the first (easiest) ten nouns on the WISC: *hat, umbrella, donkey, knife, thief, bicycle, alphabet, clock, diamond, and nail*. Translation equivalents were used in French, with a few substitutions for ambiguous or nonequivalent cases.

Coding procedure. The coding procedure was designed to reflect the degree to which children approached the norm of adult-like, Aristotelian definitions, with a superordinate, a restrictive complement, and the inclusion of criterial information about the word's meaning. In outline, coding proceeded as follows (more detailed instructions are available from the author): the transcribed definition was first sorted into one of two broad classes. It was called a 'formal definition' if it included anywhere in the stretch of talk a copular construction and some superordinate predicated of the definiendum. Definitions with vague superordinates (*something, a thing*) and quasi-superordinates (*a kind of*) were scored as formal. Each child received a score indicating what percent of words defined received a formal definition (%FD).

Formal definitions were then scored on a variety of categories:

- (1) Syntax: the degree to which the definition given approached the ideal definitional syntax 'x is a y [restrictive complement]' was scored on a four

which are largely learned and practised at school, we would not expect any difference between native and non-native speakers who have had equivalent school experience in English. However, non-native speakers who have experienced fewer years of English schooling than their age-mates might be expected to show some deficits in performance on the definitions task in English. In addition, the performance of the native English speakers in English was compared with their performance in French, which they were learning as a foreign language; if knowledge is a primary determinant of performance on this task, then the children should perform as well in French as in English, since their knowledge of the definitional genre and of the word meanings were equivalent in both languages. If, on the other hand, practice is relevant to developing definitional skill, even those children with relatively good proficiency in French should perform better in English, the language in which they have engaged in school discourse and in which they have, therefore, had much more opportunity to hear and to practise giving definitions.

METHOD

Subjects. Subjects were 137 children attending second to fifth grades (i.e. aged seven to eleven years) at the United Nations International School (UNIS), an independent school located in Manhattan that serves the United Nations community and the international community of New York City as well as a sizeable population of English-speaking American children. UNIS is an English-language school, with a strong program in English as a second language (ESL) to serve the 45-55% of incoming students whose native language is not English. Some of these students have, before arrival at UNIS, had experience in other schools where English was the medium of instruction or a subject of instruction, but many arrive with no previous exposure to English. All children at UNIS who are not receiving any ESL instruction study French in daily foreign language classes. French classes are offered at the introductory, intermediate, and advanced level at every grade, so

TABLE 1. *Distribution of subjects across grades and language experience groups*

Grade	Tested in English		Tested in French			
	N	Boys	Girls	N	Boys	Girls
2	30	19	11	4	3	1
3	34	17	17	6	2	4
4	31	12	19	23	7	16
5	42	20	22	31	14	17

point scale reflecting the syntactic complexity of the complement. No complement was scored as 1; a broken off or garbled relative clause was scored as 2; semi-relatives (e.g. 'an umbrella is something for like when it rains') and reduced relatives (e.g. 'a knife is something for cutting') were scored 3; and a full relative clause (e.g. 'a knife is something which you use to cut with') was scored as 4.

(2) Superordinate: the quality of the superordinate was rated on a four point scale, with *thing* and *a kind of* scored as 1, *something* or *someone* scored as 2, a somewhat restrictive but less-than perfect superordinate (e.g. *tool* for umbrella) as 3, and the correct adult-like superordinate (e.g. *animal, vehicle, utensil*) was scored as 4.

(3) Complement: the complement was rated on a 4-point scale, on which 0 reflected the absence of any complement. If a complement was present, the semantic content of the complement was rated, with an incorrect or misleading complement scored 1, a correct but insufficiently limiting complement scored 2, and a properly restrictive complement scored 3.

(4) Definitional features: the number of correct definitional features mentioned was counted. Definitional features were decided on in advance for each word, based on elicited adult and dictionary definitions of the words. Three to six definitional features were identified for each word. A summed score based on the above four categories was calculated per word; this score, which had a maximum value of 15-18 depending on the word, is referred to as the formal definitional quality (FDQ).

If non-definitional but correct information about the meaning of a word was provided in addition to a formal definition (e.g. example of its use, descriptions, comparisons) instances were scored under the category formal definitional supplement (FDS). Both FDQ and FDS scores were averaged over the number of words which received formal definitions to calculate the child's scores.

If a definition did not qualify as formal, it was then scored to reflect how much information was provided about the definiendum. Points were given for correct information about definitional features, descriptive features, functions, examples, etc. These points were summed per word to provide a score of informal definitional quality (IDQ). The IDQ word scores were averaged over the number of words which received informal definitions to calculate the child's score. Thus, the IDQ score was independent of the FDQ and FDS scores, since it was based on a different set of words.

Two coders rated all the English definitions from the children, and served as trainers for the single French definitions coder. All coders had to reach perfect agreement on five definitions protocols before coding independently.

RESULTS

Developmental differences. Since the coding scheme for definition sophistication used here reflects many of the same distinctions used by other researchers (Feifel & Lorge, 1950; Litowitz, 1977; Watson, 1985; Markowitz & Franz, 1988), it was to be expected that the generally reported patterns of growth in definitional sophistication would be replicated. To see if they were, a three-way MANOVA was carried out on the four definitions scores, with grade (2, 3, 4 or 5), sex, and home exposure to English (high or low) as factors. Sex effects did not reach significance in this or any of the analyses reported below, and therefore will be ignored henceforth. Univariate analyses were performed subsequent to the MANOVAs to identify the source of significant effects.

A highly significant multivariate effect of grade was obtained (Wilks' lambda = 0.72, $F = 3.72$, d.f. = 12/338, $p < 0.001$), and univariate analyses indicated significant effects of grade on FDQ, FDS, and %FD, but not on IDQ (see Table 2). As Table 2 shows, considerable development occurred

TABLE 2. Means and significant univariate grade effects for English definitions scores

	Grade					F^a	p
	2	3	4	5			
%FD	49%	64%	76%	76%	76%	12.49	0.0001
FDQ	6.63	7.47	8.22	8.44	8.44	6.50	0.0004
FDS	0.71	1.08	1.18	1.06	1.06	3.05	0.03
IDQ	2.14	2.57	2.23	2.14	2.14	0.63	n.s.

^a d.f. = 3/131.

between second and fifth grades in both the percent formal definitions given in English and in the degree of sophistication of those formal definitions, as reflected both in the FDQ and the FDS scores. The lack of developmental differences in the IDQ scores indicates that second graders perform as well as older children on this measure.

While the pattern seen here is clearly one of developing sophistication, it is important to note that there is a levelling off at fourth grade (pairwise comparisons confirmed the presence of significant differences between all groups except the fourth and the fifth grade groups on all measures). This flattening occurred well before adult-like levels of performance were reached, a finding that conflicts with the conclusion of Benelli, Arcuri & Marchesini (1988) that 10-year-olds' definitions were as good as adults'. However, Benelli *et al.* based their conclusion on judges' ratings of definitions rather

than on an analytic scoring procedure. Furthermore, very few of the fourth or fifth graders in our sample achieved maximum scores on %FD, supporting the claim that knowledge of the formal definitional genre must be supplemented by practice with it in order to achieve consistent and reliable use. Presumably the junior high and high school years see considerable additional growth in definitional skills.

Native/non-native differences. While the multivariate effect of home use of English was only marginally significant (Wilks' lambda = 0.93, $F = 2.26$, $d.f. = 4, 128$, $p < 0.07$), there were significant univariate effects for FDQ and %FD (see Table 3). The children with a high level of exposure to English in

TABLE 3. Means and significant univariate effects of home exposure to English on English definitions scores

	Exposure to English in the home		F^a	p
	High (N = 78)	Low (N = 59)		
%FD	71%	63%	6.58	0.01
FDQ	8.04	7.40	4.88	0.03
FDS	0.99	1.05	0.28	n.s.
IDQ	2.10	2.49	2.19	n.s.

^a $d.f. = 1/131$.

the home produced more formal definitions and somewhat more sophisticated formal definitions than their classmates who spoke another language than English primarily or exclusively in the home. These results do not tell us, however, whether the somewhat poorer performance of the group that experienced low exposure to English was attributable to their use of another language at home or to their decreased experience with academic English, since the non-native group includes children who had spent some time in non-English medium schools.

In order to assess the impact of schooling in English we performed another MANOVA, replacing the home use of English factor with a different classification based on educational history in English: we compared children who were still attending ESL classes, children who had previously attended ESL at UNIS, and those who had never attended ESL. Although this grouping overlapped with the one based on home language use, there were some differences because children from non-English speaking homes who had previously attended English medium schools were not placed in ESL, whereas native speakers of dialects of English considered nonstandard did receive ESL. Thus, more than 10% of the high-home exposure group had experienced ESL classes, and more than 40% of the low-home exposure

group had always been in English classrooms. The English educational history factor had a significant multivariate effect (Wilks' lambda = 0.80, $F = 2.37$, $d.f. = 12/334$, $p < 0.006$) with significant univariate findings for FDQ and %FD replicating the pattern found based on the home-exposure

TABLE 4. Means and significant univariate effects of school exposure to English on English definitions scores

	English educational history			F^a	p
	English only (N = 92)	Former ESL (N = 29)	Continued ESL (N = 16)		
%FD	70%	65%	58%	3.92	0.02
FDQ	8.09	7.72	5.95	12.02	0.0001
FDS	1.00	1.02	1.13	0.15	n.s.
IDQ	2.21	2.30	2.57	0.28	n.s.

^a $d.f. = 2/130$.

classification (see Table 4). Comparing the levels of performance shown by the group with the lowest level of exposure to school English (5.96 on FDQ, 57% on %FD) to those with the lowest level of exposure to English at home (7.40 on FDQ, 63% on %FD) suggests that school exposure to English may be more crucial than home exposure in promoting performance on the definitions task. In order to test this explicitly, a regression analysis was carried out, to see whether scores on %FD and FDQ in particular were better explained by home or by school exposure to English, and to see whether the variation explained by either of those variables subsumed the variation explained by the other. First, single models were tested, with grade, home exposure to English, and school exposure to English as predictors. Subsequently, home and school exposure to English were entered together, first without and then with grade. The results (see Table 5) indicate very

TABLE 5. Percent variance explained by regression analyses on English definitions scores^a

	FDQ	FDS	IDQ	%FD
Grade alone	11.6 ^b	3.2 ^a	0.1	16.9 ^b
Home English alone	2.6	0.2	1.3	3.1 ^a
School English alone	11.8 ^b	0.4	0.4	2.8 ^a
Grade + home English	14.7 ^b	3.3	1.5	20.7 ^b
Grade + school English	24.7 ^b	3.5	0.5	20.4 ^b
All three together	24.7 ^b	3.5	1.5	21.8 ^b

^a The model is significant at $p < 0.05$.

^b The model is significant at $p < 0.0001$.

TABLE 7. Means and significant univariate effects of home exposure to French on definitions scores

	Exposure to French in the home		F ^a	p
	High	Low		
%FD	57%	55%	0.09	n.s.
FDQ	8.05	6.91	0.17	n.s.
FDS	0.41	0.18	4.20	0.05
IDQ	3.18	1.98	10.16	0.002

^a d.f. = 1,56.

available had high home exposure to French; thus, these results derive from a very unbalanced design, but nonetheless match the theoretical prediction that home exposure to French would influence general French proficiency but not performance on scholastic, decontextualized language tasks in French. This conclusion was confirmed by a regression analysis, which showed that 10% of the variation on French FDS and 16% on IDQ were explained by home exposure to French, but that home exposure to French was not a significant predictor, either alone or in combination with grade or school exposure to English, of French FDQ or %FD (see Table 8).

TABLE 8. Percent variance explained by regression analyses on French definitions scores^a

	FDQ	FDS	IDQ	%FD
Grade alone	1.2	2.4	0.1	0.1
Home French alone	1.2	10.7	16.3	0.2
School English alone	0.0	0.1	3.8	2.4
Grade + home French	4.1	10.8	17.9	0.2
Grade + school English	1.4	2.4	3.8	3.0
All three together	4.2	13.2	17.9	4.6

^a Only those models in which at least 10% of the variance was explained were significant at $p < 0.05$.

Relation of French to English scores. For the 64 children tested both in French and English, correlations were calculated between their scores in the two languages, in order to see whether higher levels of skill with formal definitions in English transferred to the foreign language. Simple correlations between languages were fairly low, though significant for %FD ($r = 0.27$, $p < 0.05$) and FDS ($r = 0.20$, $p < 0.05$). Although significant for IDQ as well ($r = -0.27$, $p < 0.05$), the correlation here was negative. For FDQ, the most sensitive indicator of formal definitional skill, the correlation was not

clearly that school exposure to English explains more variance than home exposure. Results for IDQ showed that none of these variables were significant predictors, but for FDQ and %FD the three-predictor model explained more than 20% of the variance; in neither case did home exposure to English make a significant contribution, as can be seen in Table 5 from the fact that the three factor model is essentially equivalent in explanatory power to the model that includes only grade and school exposure to English. These findings again support the interpretation that experience hearing and producing formal definitions in the language of testing contributes to children's development of skill in giving them in that language.

English/French differences. We predicted that children whose only exposure to French came in foreign language classes would provide as many formal definitions in French, but definitions of worse quality than in English, because of their lack of practice in tasks of this sort in French. To test this prediction, we carried out analyses on scores in French from 64 children who could perform this task both in English and in French. Significantly more formal definitions were produced in English than in French by children at every grade, and by children with high levels of home exposure to French as well as those with no home exposure to French (univariate $F = 16.55$, d.f. = 1/57, $p < 0.0001$; see Table 6). There was no significant language effect

TABLE 6. Means for English vs. French definitions scores for subjects tested in both languages at each grade

	Grade									
	2		3		4		5		5	
	E	F	E	F	E	F	E	F	E	F
%FD	64%	49%	66%	61%	78%	56%	76%	54%	76%	54%
FDQ	5.73	5.58	7.59	7.06	8.62	4.91	8.66	7.75	8.66	7.75
FDS	0.38	0.37	1.10	0.44	1.34	0.14	1.05	0.21	1.05	0.21
IDQ	1.87	1.77	3.67	2.75	2.26	1.67	2.01	2.04	2.01	2.04

on FDQ or IDQ, but higher FDS scores were obtained in English (univariate $F = 24.25$, d.f. = 1/49, $p < 0.0001$; see Table 6). A MANOVA on the French scores alone revealed no significant effect of grade, sex, or home exposure to English. There was a significant multivariate effect of home exposure to French (Wilks' lambda = 0.83, $F = 2.56$, d.f. = 4/53, $p < 0.05$), which univariate analyses indicated reached significance only for FDS and IDQ, the measures of how much information is conveyed, not for FDQ or %FD, the measures reflecting skill with formal definitions *per se* (see Table 7). It should be noted that 14 of the 64 children from whom data were

significant ($r = -0.03$). These generally low correlations suggest that the unavailability of opportunity for use of or practice with definitions in the French foreign language classroom made any skill achieved in English definitions relatively irrelevant to French performance. Thus, although one might expect skill at a task like this to transfer across languages, such transfer may occur only if the skill is demanded and given an appropriate context for development in the second language setting.

DISCUSSION

The results we have presented are consistent with the claim that giving formal definitions should be conceptualized as a skill that rests upon but goes beyond knowledge of word meaning and knowledge of the definitional genre. While an experimental study would be required to provide incontrovertible proof that definitional skill in school-aged children is heavily influenced by the opportunity to practise giving definitions, several specific findings from this study support this view:

- (a) Many children who demonstrated with some of their definitions that they understand the kind of verbal form being requested nonetheless failed to provide that form consistently.
 - (b) Exposure to English in school affects English definitions scores more strongly than exposure to English in the home.
 - (c) Exposure to French in the home does not affect the frequency or quality of formal definitions in French, though it does affect the amount of information given in both formal and informal definitions.
 - (d) The percentage of formal definitions in French, a weaker language learned exclusively through foreign language instruction for most of the children, was lower than in English, the curricular language in which definitions were frequently encountered and produced.
 - (e) Even the children who spoke French at home gave fewer formal definitions in French than in English.
 - (f) Correlations between definitions scores in English and French were low, indicating that a major component of definitional skill is fluency with the linguistic code, which may require some amount of practice at definitions in every successively learned language.
- Furthermore, the lack of age differences in the quality of informal definitions suggests that the site of continued development during the elementary school years is not in amount of information children can provide, but in the way they organize that information into the formal structure required. These organizational skills evidently benefit from opportunities to hear relevant models and to practise producing definitions.

These findings do not fully clarify how practice in hearing and producing definitions contributes to children's definitional skill. One contribution may

be in speeding lexical access to relatively infrequent items. Clearly, achieving fully adult-like definitions even for simple words like *knife* or *bicycle* requires knowledge of sophisticated superordinate terms (*utensil* and *vehicle*), which cannot be expected of most second graders. However, the superordinates *person* and *animal* (for *thief* and *donkey* respectively) are well within a second grader's vocabulary; the problem is to retrieve these words rapidly and to integrate them into the information structure being conveyed. Second graders are occasionally able to do this, but several more years of experience in classrooms where definitions are requested, read, given, and discussed is evidently necessary before children can access their information structures and automate their psycholinguistic processes sufficiently to retrieve superordinates reliably.

Alternately, the practice effects may operate to automate the complex psycholinguistic planning required for the syntax of definitions. Or they may speed up the task analysis component of giving definitions – identifying the genre being requested, and recalling the characteristics of formal definitions as a template for one's response.

The children who served as subjects in this study were performing well in a challenging English-medium private school. Thus, even the lowest scoring groups (those still in ESL, for example) were academically competent – as indicated by their scores on the California Achievement Test, on which even the group still in ESL scored at or above grade level in reading, language, and math, and the other groups scored in the 70th to 85th percentiles on these subtests. It would, therefore, be wrong to interpret these results as indicating that bilingual children or children from non-English speaking homes have an academic disadvantage. In fact, in another analysis of these same data (Snow, Cancino, De Temple & Schley, 1990) we could find no relation between the degree of bilingualism of the subjects and the quality of their definitions. It is, however, important to note that a skill like giving formal definitions evidently takes several years to acquire. Children acquiring this skill in second language are not starting from scratch if they understand the demands of the genre in their first language, but they may still need more time to achieve fluency with this relatively infrequently occurring genre than with other language tasks which they have more opportunity to practise. In predicting the progress of children in other-language classrooms it is important to assess the variety and nature of second-language tasks they face, the native-language skills they bring with them, and the opportunities they have to learn and to practise the second-language skills they are expected to display.

REFERENCES

- Anglin, J. (1970). *The growth of word meaning*. Cambridge, MA: M.I.T. Press.
- Benelli, B. (1988). If it is a dog can be an animal: the role of metalinguistic knowledge in the acquisition of linguistic superordination. *Journal of Psycholinguistic Research* 17, 227-43.
- Benelli, B., Arcuri, L. & Marchesini, G. (1988). Cognitive and linguistic factors in the development of word definitions. *Journal of Child Language* 15, 619-36.
- Bierwisch, M. & Kiefer, F. (1970). Remarks on definitions in natural language. In F. Kiefer (ed.), *Studies in syntax and semantics*. Dordrecht: Reidel.
- Binet, A. & Simon, T. (1916). *The development of intelligence in children*. Vineland, NJ: Publications of the Training School.
- Carey, S. (1985). *Conceptual change in childhood*. Cambridge, MA: M.I.T. Press.
- Feifel, H. & Lorge, I. (1950). Qualitative differences in the vocabulary responses of children. *Journal of Educational Psychology* 41, 1-18.
- Gelman, R. & Baillargeon, R. (1983). A review of some Piagetian concepts. In J. H. Flavell & E. M. Markman (eds), *Handbook of child psychology*. Vol. 3. *Cognitive development*. New York: Wiley.
- Litowitz, B. (1977). Learning to make definitions. *Journal of Child Language* 4, 289-304.
- Markman, E. M. & Hutchinson, J. E. (1984). Children's sensitivity to constraints on word meaning: taxonomic vs. thematic relations. *Cognitive Psychology* 16, 1-27.
- Markowitz, J. & Franz, S. (1988). The development of defining style. *International Journal of Lexicography* 1, 253-67.
- Miller, G. & Gildea, P. (1985). How to misread a dictionary. AILA Bulletin, Pisa.
- Snow, C., Cancino, H., De Temple, J. & Schley, S. (1990). Giving definitions: a linguistic or metalinguistic skill? In E. Bialystok (ed.), *Language processing and language awareness by bilingual children*. New York: C.U.P.
- Snow, C., Cancino, H., Gonzalez, P. & Shriberg, E. (1989). Giving formal definitions: an oral language correlate of school literacy. In D. Bloome (ed.), *Literacy in classrooms*. Norwood, NJ: Ablex.
- Terman, L. (1916). *The measurement of intelligence*. Boston: Houghton-Mifflin.
- Watson, R. (1985). Towards a theory of definition. *Journal of Child Language* 12, 181-97.
- Watson, R. & Olson, D. (1987). From meaning to definition: a literate bias on the structure of word meaning. In R. Horowitz & J. Samuels (eds), *Comprehending oral and written language*. Orlando: Academic Press.
- Waxman, S. & Gelman, R. (1986). Preschoolers' use of superordinate relations in classification and language. *Cognitive Development* 1, 139-56.
- Wechsler, D. (1958). *The measurement and appraisal of adult intelligence*. Fourth edition. New York: Wilkins & Wilkins.

NOTES AND DISCUSSION

Input evidence regarding the semantic bootstrapping hypothesis*

JEAN A. RONDAL AND ANNE CESSION

Université de Liège

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ABSTRACT

The input language addressed to 18 language-learning children (MLU 1.00-3.00) was analysed so as to assess the quality of the semantic-syntactic correspondence posited by the semantic bootstrapping hypothesis. The correspondence appears to be quite satisfactory with little variation from the lower to the higher MLUs. All the persons and things referred to in the corpora were labelled by the mothers using nouns. All the actions referred to were labelled using verbs. Most of the attributive information was conveyed by adjectives. Spatial information was expressed through the use of spatial prepositions. As to the functional categories, all agents of actions and causes of events were encoded as subjects of sentences. All patients, themes, sources, goals, locations, and instruments were encoded as objects of sentences (either direct or oblique). This good semantic-syntactic correspondence may make the child's construction of grammatical categories easier.

INTRODUCTION

According to current theorizing, grammatical categories and functions such as noun, verb, subject, object, sentence, etc. are necessary for clause production and comprehension. Whether or not the child is innately endowed with the intuition that such categories exist in natural languages (Chomsky, 1965; Maratsos & Chalkley, 1980; MacNamara, 1982; Pinker, 1984), he or she must have ways of identifying the grammatical categories

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