THE CHILD AS LINGUISTIC ICON-MAKER

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On Icons
Just as a seal has its imprint, and a body its shadow,
so does every prototype have an icon.
—St Theodore of Studium
(Constantinople, 759-826 AD)

For the honor which is paid to the icon passes on to that which the icon represents, and he who shows reverence to the icon shows reverence to the subject represented in it.
—Decree of the Second Council of Nicaea (787 AD)

According to Byzantine Christian theology, an icon is a direct manifestation of a pre-existing prototype, which the icon-maker renders visible through his craft. It is fitting that we should have revived this ancient term in a new quest to define the relations between language and thought. If, indeed, language adheres to the form of thought as the shadow to the body, then the child-as-language-maker is engaged in rendering mental prototypes tangible in the form of speech. However, just as Eastern Orthodox icons are imperfect reflections of divinity, human languages are imperfect reflections of mind. John Haiman (1980, p. 537), among others, has suggested that in child language ‘‘semantic relations are rendered transparent.’’ This is presumably because ‘‘children strive for transparency of meaning-form correspondences in their acquisition of language’’ (Slobin, 1980, p. 231), often reshaping the material of the parental language to make it more iconic. An examination of the ways in which children structure language can often reveal the underlying prototypes with special clarity (Slobin, 1981, 1982, 1984a). As Joan Bybee (1983, p. 31) has suggested, iconicity principles ‘‘may continue to apply in the active restructuring of morphology that goes on in every generation of language users.’’

In the Berkeley Crosslinguistic Acquisition Project we have been studying the ways in which children ‘‘schematize’’ different sorts of input languages in early development. We find, repeatedly, that some kinds of structures are easily *assimilated* — suggesting that they are close to a set of initial linguistic schemas, while in other cases the child *accommodates* in specifiable ways to kinds of structures that cannot be assimilated early on. In this paper I review some sorts of schematization that seem to be relevant to issues of ‘‘iconicity in language,’’ focusing on ways in which children seem to modify or ignore parts of the parental language in an attempt to make it more transparent.[1]

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[1] Most of the data come from chapters in Slobin (1984b): English (de Villiers & de Villiers), German (Mills), Hebrew (Berman), Hungarian (MacWhinney), Japanese (Clancy), Kaluli (Schieffelin), Polish (Smoczyńska), Romance languages (Clark), Turkish (Aksu Koç & Slobin). Finnish data come from Bowerman (1973) and Toivainen (1980); Serbo-Croatian data from Radulović (1975); and Russian data from Gvozdev (1949). I will leave aside, for purposes of this paper, ‘‘arbitrary’’ aspects of language that children acquire with ease (e.g. phonological conditioning of allomorphy, some types of morphological paradigms based on grammatical gender, rote learning of non-productive combinations, etc.). (See Slobin, 1984a, for discussion of the acquisition of such forms.) The focus here is on the use of semantic/pragmatic criteria for transparency.

To organize the child language data I will first make use of the notion of ''operators,'' looking for instances in which children seem to be sensitive to the *scope* of an operator by imposing limitations on its positioning or on the ways in which its use interacts with particular linguistic categories. Briefly, when children reorganize the input language in the course of acquisition, they tend to place operators adjacent to the most *relevant* item in Joan Bybee's sense (1983, in preparation), and to select alternate forms of an operator only if there are relevant grounds for such a choice.

Children also seem to have preferences in regard to the sorts of semantic categories that can be conflated in individual morphemes. After reviewing acquisition data on the scope of operators, I will discuss instances in which children decompose or reanalyze morphemes of the parental language. Such reanalyses provide some suggestions of the prototypical notions that children rely on in assigning meanings to grammatical morphemes. Finally, I will examine ways in which children try to maintain clear expression of grammatical relations in the face of pragmatic and syntactic variability of sentence forms.

SCOPE OF OPERATORS

1. Negation

In a variety of ways, children indicate in their restructuring of parental languages that the scope of negation should be the proposition, as indicated by the verb or the clause as a whole, rather than any particular nonverbal lexical item within a clause. Evidence comes from ''errors'' in regard to negative placement and the role of negation in conditioning various sorts of reordering and allomorphy.

1.1. Negative placement

Children seem to prefer a separate, rather than a bound morpheme for clausal negation, often moving the negative operator outside of the verb complex or clause.

> § In English, early negative forms are attached to primitive sentences (*No do this*), later moving within the sentence (*I no do this*, and, with auxiliary modal development, *I can't do this*) (Bellugi, 1967; Klima & Bellugi, 1966; Menyuk, 1969; Snyder, 1914). At later stages, children overuse *not* as an uncontracted morpheme with the copula, although contracted forms (*isn't*, *wasn't*, etc.) predominate in parental speech. The contracted forms *can't* and *don't* tend to be preserved, however, suggesting that negation combines naturally with notions of ability and prohibition, while expressed separately for clausal negation. This may be because the proper scope of negation in such instances is 'ability' or 'prohibition'.[2]

> § Smoczyńska (1984) reports similar negative development for one child in Polish, with early sentence-external negation (e.g., *Nie Basia śpi* 'not Basia sleeps' for *Basia nie śpi*), later replaced by sentences which keep negative and verb together, but still with sentence-initial negation (*Nie śpi Basia*). Other children have early sentence-final negation, such as *mamusia kopać bedzie nie* 'mommy dig will not'.

> § In Turkish, verbal predicates are negated by insertion of a negative particle after the verb-stem, before modal, tense, and person suffixes, while nonverbal predicates are negated by separate nonexistential or negative copula morphemes. Some children go through a phase of using one of the nonverbal negators with verbs, resulting in a clause-final separate

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[2] Izchak Schlesinger has suggested a non-iconic explanation, pointing out that it may be easier for children to analyze *isn't* and *wasn't* into morphemes, while treating *can't* and *don't* as unanalyzed amalgams.

negative morpheme in place of verb-internal inflectional negation (e.g. *koy-du-m yok* ‘put-PAST-1SG NEG:EXIS’ in place of *koy-ma-di-m* ‘put-NEG-PAST-1SG’). These children (up to about age 2 1/2) control strings of agglutinated particles, so the problem is not one of agglutination, but rather choice and positioning of a negative morpheme (Aksu Koç & Slobin, 1984).

§ In Japanese, where the negative marker is inserted between the verb-stem and the past-tense marker, similar errors of negative placement are widespread in the past tense. A frequent error is the use of the negative non-past form *nai* as an unanalyzed suffix (e.g. *deki-ta-nai* ‘can-PAST-NEG’ =‘I couldn’t do it’, in place of *deki-na-katta* ‘can-NEG-PAST’). Clancy (1984) cites many errors of this sort in regard to negative past forms of verbs and adjectives, concluding: ‘‘Apparently, children prefer to increase the salience of the negative marker by placing it in word-final position. This makes sense, since the main point of a statement in the negative past is the negation, not the tense.’’

§ French-speaking children may also prefer not to break up the verb complex by inserting a negative element. Clark (1984) reports errors such as **Je lui ai fait rien* ‘I to:him have done nothing’ for *Je lui ai rien fait*.

§ Other types of Japanese errors point to a preference for a free, rather than a bound negative morpheme, as in English and Turkish. The negative form *janai* ‘is not’ follows nouns and nominal adjectives, while *-nai* is suffixed to verb roots. Children sometimes use *janai* to negate verbs as well.

§ Hungarian children also show a preference for separate marking of the negative, where the language allows for portmanteau expressions with the copula and the ‘additive’. MacWhinney (1984) reports: ‘‘The portmanteau negatives *nincs(en), sem, sincs(en),* and *sincsenek* express the same semantic content as the expressive analytic forms *nem van* ‘not is’, **nem is* ‘not also’, **nem is van* ‘not also is’, and **nem is vannak* ‘not also are’. Errors involve use of the analytic forms instead of the portmanteau form or use of both at the same time.’’ These errors also suggest that existence and negation are separate concepts for the child. In Japanese, where the existential has distinct affirmative and negative forms (*aru* ‘there is’ and *nai* ‘there is not’), children sometimes negate the affirmative form (**aru-nai* for *nai* ‘there is none’).

1.2. Effects of negation on other elements

Children not only prefer that an operator like negation have a fixed location, but also that it not affect the form or placement of other elements in a sentence. Again, this suggests that negation is an operator whose scope is the clause as a whole.

§ In Hungarian, focused material is placed in preverbal position, with the consequence that a separable verbal prefix is obligatorily postposed. Negation is treated as a focused element; however children often place the negative morpheme before a prefixed verb, without postposing the prefix (e.g. **nem megeszem* ‘not up+eat+1SG’ for *nem eszem meg* ‘not eat+1SG up’). For children who control postposing for focus, it could be the case that they simply do not conceive of negation as an instance of focus. Or, in any case, children may have a predisposition that negation (or proposition-scope operators in general) should not require movement of other sentence elements. (Similar evidence is presented in regard to conditionals and interrogatives, below.)

§ In French imperatives, object pronouns follow the verb in the affirmative but precede it in the negative. A frequent regularization is to maintain the affirmative order with negation, as in: **Cache-le pas* ‘hide-it not’ for *(Ne) le cache pas* and **Fais-le pas tomber* ‘make-it not fall’ for *(Ne) le fais pas tomber*. Clark (1984) reports such errors for children as old as 9, and suggests that such forms may also appear in adult speech to children.

§ In Polish and Russian, the direct object of a negated verb is placed in the genitive, rather than the accusative case. Children find this a difficult distinction to acquire, and use the accusative for negated direct objects.

§ English requires that indeterminates be changed to indefinites in negated sentences, but Bellugi (1967) found that her subjects used a single indeterminate form for affirmatives and negatives (e.g. *I want some cookie* and **Mama didn’t have some cookie*). Errors of a somewhat related nature are reported for Polish (Smoczyńska, 1984), where the form of the adverb is not adjusted for negation (e.g. *A Jesus to zawsze nie gryzie* ‘But Jesus always not bites’, where *nigdy* ‘never’ should be used instead of *zawsze* ‘always’).

§ A particular type of English error suggests that children try to keep negative marking in close association with the negated proposition. There is a subset of mental verbs with optional *not*-transportation (*think, want, anticipate, expect, believe*). Children treat *think* as an ordinary complement-taking verb, maintaining negation in the embedded sentence (e.g., *I think it’s not fulled up to the top*), although parental speech generally has the negative in the embedding sentence (e.g., *I don’t think the man wants to taste it*).

§ It also appears that, for children, negating a state of affairs, or treating it as irrealis, should not affect the internal description of that state of affairs. For example, in Russian a clause embedded under *ne nado* ‘not necessary’ (=‘one mustn’t’) is obligatorily imperfective, even if it refers to a single event considered as a totality (i.e., the normal use of the perfective). Gvozdev reports errors of using the perfective (e.g., **zakryt’* [PFV] *ne nado* ‘one mustn’t cover’ in place of *zakryvat’* [IPFV]). He notes (1961, p. 425): ‘‘Such use of the perfective aspect is completely justifiable and is more consistent than the way in which this issue is dealt with in the language.’’

2. Interrogation

Question-marking, like negation, poses children with problems of position and ordering of elements. Where the language provides an intonation contour for yes-no questions, comprehension and use of this device emerge very early in development (e.g. English, German, Japanese) — perhaps because it marks the utterance as a whole, rather than a particular lexical item. Where both intonational and morphosyntactic means are both available, intonation is earlier. Clancy (1984) points out that in Japanese, where the most frequently used sentence-final markers in questions also occur in declarative sentences, at least one child relied upon intonation earlier than lexical-grammatical cues to interrogation. Question inversion in English is late to develop. In Finnish (Bowerman, 1973), where the only means of marking yes-no questions is morphological, such questions apparently do not appear in early child speech. Acquisition data from English and Hungarian suggest that interrogation is treated as an operator of propositional scope:

§ In English (Bellugi-Klima, 1968), children acquire inversion for yes-no questions before *wh*-questions — that is, at the same stage in which a child uses inverted forms like *Can he ride in a truck?*, s/he also uses noninverted forms like *What he can ride in?* Note that both forms mark the utterance initially as a question, either by the noncanonical position of the auxiliary or by a question-word.

§ In Hungarian, a question particle, *-e*, is attached to the predicate (main verb or predicate complement). MacWhinney (1973, p. 464) reports errors based on the apparent problem that this particle ‘‘relates to the whole proposition, rather than just one noun phrase or verbal element. The child has learned that suffixes are attached to the elements in which they stand in semantic relation. But, in the case of *-e*, the child doesn’t know what element that should be.’’ One child regularly placed the particle on the last element of the sentence, whether or not it was a main verb or predicate complement, while another child regularly placed the particle on the first element. In addition, the particle is restricted to affirmative yes-no questions, but some children treat it as a general polar interrogative marker, placing it on negatives as well; e.g., *nem veri meg-e* ‘not beat PFV-INT’ in place of *merveri-e* ‘PFV+beat-INT’ (=‘Will he beat it’); *ebbe nincs tea-e* ‘in+this isn’t tea-INT’ in place of *ebbe van-e tea* ‘in+this is-INT tea’ (=‘Is there tea in this?’).

3. Conditionality

In languages where the conditional is marked by a special particle, children have problems similar to those of negation and interrogation (though available data are limited). Again, there is a tendency towards separate and verb-external marking of an operator.

§ In Hungarian the conditional is marked in the present tense by a bound particle on the verb, *-ne*, in the order VERB+*ne*+PERSON; and in the past by a postposition, *volna*. MacWhinney (1973, pp. 593-4) reports early errors of marking present conditional by VERB+PERSON *volna*, such as *beszélek volna* ‘speak+1SG COND’ in place of *beszélnék* ‘speak+COND+1SG’. Such errors are reminiscent of Hungarian and Japanese errors in negation, reported above, in which a clause-level operator seems to resist incorporation into the verb, and is preferentially marked as a separate element rather than a bound morpheme.

§ The Hungarian errors also suggest a tendency to keep person-number-tense marking close to the verb. This tendency is clearly shown in Polish, where the parental language requires person-number marking on the conditional particle, *by*, and the conditional connective, *zeby*. Children, however, prefer to maintain person-number marking on the verb, resulting in a postposed or separate conditional marker; e.g. in place of *pisal-by-m* ‘wrote-COND-1SG’ or *Ja by-m pisal* ‘I COND-1SG wrote’, children say *pisal-em-by* ‘wrote-1SG-COND’ or *Ja by pisal-em* ‘I COND wrote-1SG’. (Note that these errors also reflect a reluctance to attach a person suffix to an element that is not a verb. The iconic tendency to keep markers on the most semantically relevant element is discussed in more detail below.)

4. A Theoretical Reprise

The child language facts summarized above resonate with a number of familiar principles in linguistics and psycholinguistics, all of them elaborating in one way or another ‘‘Behagel’s First Law,’’ which can be paraphrased as: *What belongs together mentally is placed close together syntactically*. (‘‘Das oberste Gesetz ist dieses, daβ das geistig eng Zusammengehörige auch eng zusammengestellt wird’’ [Behagel, 1932, p. 4].) Brian MacWhinney (1984) has proposed a consequence of this principle for acquisition — a consequence well supported by the data of this paper:

> Children have no problem placing together items that are related in semantic structure. However, when semantic relations are not clear or when items are related to whole clauses, errors are more frequent.

So far we have been considering the consequences of Behagel’s First Law in regard to operators on clauses. In my earlier work on children’s universal ‘‘Operating Principles’’ for language acquisition (Slobin, 1973), I proposed a general ‘‘non-interruption’’ principle, with a universal developmental consequence for such issues:

> *Operating Principle*: Avoid interruption or rearrangement of linguistic units.

> *Developmental Universal*: There is a tendency to preserve the structure of the sentence as a closed entity, reflected in a development from sentence-external placement

of various linguistic forms to their movement within the sentence.

Closer examination of data such as the findings presented above has resulted in reformulation of a number of more precise Operating Principles (Slobin, 1984a), of which the following is applicable at this point:

> *Operating Principle*: If a functor operates on a whole structure (phrase or clause), try to place it external to that structure. (''OP (POSITION): OPERATORS'')[3]

This principle is a sub-instance of Behagel's First Law, which has been presented in more general form by contributors to this symposium. Givón (1983) has proposed a general *Proximity/Scope Principle*, combining a *Proximity Principle* and a *Scope/Relevance Principle*:

> *Proximity Principle*: The closer together are two concepts semantically or functionally, the more likely they are to be put adjacent to each other lexically, morphotactically or syntactically.

> *Scope/Relevance Principle*: The more *relevant* the operator is to the operand, and the more *specific* and *exclusive* it is to the operand, the closer to the operand it will be placed.

> *Proximity/Scope Principle*: Items that are *semantically closer* to each other or *functionally more relevant* to each other will be coded closer together in the word or in the clause.

Bybee (1983) explores such principles in depth with respect to verbal inflections, showing a crosslinguistic ''diagrammatic'' relation between meanings and their expression:

> Verbal inflections differ with respect to the extent to which they are *relevant* to the verb, that is, the extent to which their meanings *directly affect the lexical content of the verb stem*. The different degrees of relevance of verbal categories that can be inflectional is reflected diagrammatically in three ways: (1) The more relevant a category is to the verb, the more likely it is to occur in a synthetic or bound construction with the verb; (2) The more relevant a morphological category is to the verb, the closer its marker will occur with respect to the verb stem; (3) The more relevant a morphological category is to the verb, the greater will be the morpho-phonological fusion of that category with the stem.

What is of special interest in this paper is the finding that where languages do not adhere to principles such as those stated above, children often appear to apply those principles, making their language temporarily more iconic than that of the speech community. This suggests that iconic principles have a deeply-rooted ontogenetic basis.

Further evidence is provided by children's predispositions to mark semantic notions on particular lexical items *within* clauses, and to strive for relevant ordering of grammatical morphemes. Two more Operating Principles (Slobin, 1984a) relate to morphological choices on the level of the word:

> *Operating Principle*: . . . Try to find distinct meanings for words or word-stems that occur in varying forms . . . (Part of ''OP (UNITS): WORD FORMS'')

> *Operating Principle*: If two or more functors apply to a content word, try to place them so that the more relevant the meaning of a functor is to the meaning of the content word, the closer it is placed to the content word. If you find that a Notion is marked in several places, at first mark it only in the position closest to the relevant content word. (''OP (POSITION): RELEVANCE'')

We have already encountered reflections of the second Operating Principle in Polish, Hungarian, Turkish, and Japanese, where children's placement of markers for negation, interrogation, and conditionality also maintain marking of person, number, and tense adjacent to the verb.

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3 Those Operating Principles that have some relevance for issues of iconicity in acquisition are listed in the Appendix to this paper.

Further evidence for these principles is provided by the development of operators on verbs and nouns.

5. Operators on Verbs

In all of the languages for which we have acquisition data, children do not have great difficulty in acquiring affixes on verbs marking tense/aspect and person/number. They *do* have trouble, though, with various kinds of stem changes, almost always preferring a single form of the verb-stem for all types of affixation. Although this may simply reflect a general tendency towards regularization, the fact that the phenomenon is not uniform across all distinctions suggests that semantic relevance may also play some role. In the following sections I briefly summarize available child data for some of the morphological categories marked on verbs, looking for evidence that can be related to Bybee's observations of the likelihood of occurrence of inflectional or fusional expression of notions on the verb.

§ *Person*. Children readily acquire person/number affixes on verbs, but where verb-stems change for person, as in Romance, Germanic, and Slavic languages, children tend to use one form for all persons (e.g., Spanish **tieno* for *tengo* 'have+1SG', retaining *tien-*, stem of 2-3SG; German **habt* for *hat* 'have+3SG', retaining *hab-*, stem of 3SG, 1-3PL, and INF; Russian **vidu* for *vižu* 'see+1SG', retaining *vid-*, stem of other persons and INF). Following Bybee, distinctions of person are not relevant enough to verb meaning to condition the phonological form of the stem.

§ *Tense*. Where verb-stems change for tense, as in Romance, Germanic, and Slavic languages, children tend to use one form for all tenses (e.g., French **prendu* for *pris* 'took', from the stem *prend-*; German **gedenkt* for *gedacht* 'thought', from the stem *denk-*; Polish **pierzyl* for *pral* 'washed', from PRES *pierze* rather than INF *prać*). Note that the child *does* mark tense by affixation on verbs or by the use of auxiliaries; but tense may not be relevant enough to the verb to condition systematic change of the verb-stem as well.

§ *Aspect*. Only where verb-stems change for *aspect* — in the Slavic languages (Russian, Polish, Czech, Serbo-Croatian) — do children readily acquire alternate verb forms. For example, Smoczyńska (1980) notes Polish child errors which reflect an attempt to establish pairs of perfective and imperfective verb forms; e.g. *pomylić sie* [PFV] / **pomylać sie* [IPFV] in place of *pomylić sie* / *mylić sie* 'to make a mistake'. Gvozdev (1961, p. 426) reviews a wide range of aspectual neologisms in Russian child speech, and concludes: ''These childish neologisms present numerous examples pointing to the fact that imperfective and perfective verbs are joined in pairs: where a verb of one aspect is present, a verb of the other aspect emerges as well.'' These observations are in full accord with Bybee's crosslinguistic finding that: ''*Aspect* conditions changes in the verb stem more frequently than any other inflectional category'' (1983, p. 23). It must be that Slavic-speaking children are sensitive to the same criteria of relevance that Bybee proposes crosslinguistically — namely, ''that aspect is the category that is most directly and exclusively relevant to the verb'' (1983, p. 6). Accordingly, if there is one category that children accept as conditioning verb-stem alternation, it should be aspect. (Aspect also seems to be the category of verbal inflection that is learned most easily by children — both in terms of early development and relatively error-free acquisition. This is true not only for Slavic languages, but for all types of aspectual marking crosslinguistically.)

§ *Gender*. Across a variety of languages, children learn early on to select pronouns and verb inflections on the basis of person and number. As Bybee notes, agreement categories are most relevant to the *participants* in a situation, and it is not surprising that children should acquire different pronominal forms without great difficulty. In addition, person and number apparently have enough relevance to the verb to condition the choice of agreement markers (though not stem changes, as noted above). Natural gender, however, presents interesting problems. (I do not include grammatical gender, since it has no iconic basis.)[4] Where natural gender of nominal participant plays a widespread role in agreement paradigms, as in Hebrew (modifier-noun, subject-verb), it is, nevertheless, acquired later than number-marking on nouns and person/number-marking on verbs. Levy (in press) reports gender confusion after appropriate person-marking of verbs in singular and plural. In Russian and Polish, where verbs are marked for subject gender in the past, person/number marking is acquired considerably in advance of gender. In Bybee's analysis, gender is of little relevance to verb meaning, and in her stratified random language sample, it rarely occurs as an inflectional category marked on the verb (16% for gender, compared with 55% for number and 57% for person). One might be inclined to argue that gender is not a good candidate for iconicity, since its widespread extension from sex to grammatical gender obscures the obvious semantic basis for agreement in the case of nouns with natural gender. However, it appears that acquisition is most difficult for first- and second-person agreement, where the only basis is sex. In both Hebrew and Slavic languages, subject-verb gender agreement is mastered earlier in the third person. Here we may seek discourse-based explanations, in that the sex of first and second person is continually deictically present, whereas third-person gender must often be established and maintained purely linguistically. On the one hand, this makes gender-marking of speaker and listener irrelevant; and on the other hand, where gender is marked on all three persons, it is constantly shifting between 'you' and 'I' in a male-female dyad, while third-person gender reference remains stable. (In this regard, is it interesting to note the large collection of languages that have gender pronouns only in the third person.)

§ *Valence*. Valence is a category that is clearly relevant to the verb, but it also singles out an entire clause as a configuration with a given number of participants. Bybee finds widespread valence-changing morphology on the verb in her crosslinguistic sample, including causative, transitivizing, and intransitivizing morphology. She relates valence most particularly to the verb, as opposed to other sentence elements: ''Valence-changing categories such as transitive, intransitive and causative are relevant to the situation described in the verb stem, in the sense that any changes in the number and role of the participants can have a profound effect on the situation described by the verb stem'' (1983, p. 5). However, child language data point to early attention to the entire configuration of noun(s) and verb as the domain of valence, rather than the verb itself. Across a wide range of languages, children seem to prefer to let the sentence frame carry valence, with a single verb form as opposed to lexicalized or inflectionally-marked transitives or causatives. In English there is a basis for such a solution, since the language provides valence-neutral verbs like *open* (*The door opened / I opened the door*); and English-speaking children readily say things like *I'm gonna fall this on her* in place of lexicalized *drop* (Bowerman, 1974, 1982; Lord, 1979). What is more striking, however, is the use of such forms by children in languages where there is no potential model in the input, such as Hungarian and Hebrew. (For example, Hebrew has regular means of forming causative verbs, but Berman (1984) reports child forms such as *ima *oxelet oti* 'mother eats me' in place of *ma'axila* 'feeds', formed from the same root, *?-x-l*.) Use of a valence-neutral verb in sentence-frames with varying number of participants is reported for child speech in English, French, Polish, Portuguese, Hebrew, Hungarian, and Turkish.

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[4] Dwight Bolinger has pointed out to me that it may be a bit too strong to deny iconic bases altogether for grammatical gender. He has found (personal communication): ''In Spanish, gender has vague associations with size. In an experiment I did with native speakers I drew two figures identical in shape but differing in size, and gave a nonsense word with two forms, masculine and feminine, which was to be matched to the figures. The feminine was consistently matched to the larger figure. Part of this I think relates to the massifying of Latin neuter plurals into feminine singulars — the same thing that has happened to English *data* without benefit of gender.''

When children *do* begin to acquire inflectional marking of valence, the first distinction seems to be in terms of a general sense of *transitivity*, blurring language-specific distinctions:

Hebrew provides systematic verb-pattern alternations for causative, passive, reflexive, and reciprocal. Berman (1984) reports simplification of this system along the lines of a primordial valence split, noting that children do ‘‘not make haphazard, implausible kinds of errors cutting across the transitivity axis . . . Rather, these errors reveal that children divide events up into two major types — transitive, active, causative versus intransitive, passive or middle-voice, reflexive or reciprocal — and they assign verb-patterns accordingly.’’

In Turkish, a causative morpheme makes intransitives transitive (e.g. *öl* ‘die’ / *öl-dür* ‘kill’), and makes transitives instigative (e.e. *kir* ‘break’ / *kir-dir* ‘have someone break’). Some children apparently interpret this morpheme as a marker of transitivity in general, ignoring its instigative use on transitives. For example, in response to the question *Kim kes-ti onu?* ‘Who cut-PAST it+ACC?’, a 2-year-old answered *Ben kes-tir-di-m* ‘I cut-CAUS-PAST-1SG’, intending to say ‘I cut (it)’, while literally meaning ‘I had (someone) cut (it)’.

§ *Voice*. As Bybee notes, voice is relevant both to the verb and its arguments, and accordingly may be morphologically coded on nounphrases, verbs, or both. In a sense the distinction in Hebrew child speech noted by Berman partakes of both voice and valence, since the ‘‘nontransitive’’ pole is heavily passive and middle-voice. Very young children show a basic distinction between two *perspectives* on events — an active, manipulative, transitive perspective, in which agent and patient are both involved; and a nonagentive, result perspective, with primary attention on the patient. In the languages available for developmental study, the result perspective gravitates to verbs, being involved in acquisition of participles, and passive and middle-voice forms. In languages which provide middle-voice verb forms, such as Hebrew, verbs that are highly result-focused often emerge first in that form (e.g. *nišbar kadur* ‘break+PASSIVE ball’ (=‘the ball got broken’) at a younger age than *hu šavar kadur* ‘he broke+TRANS ball’, both from the root *š-v-r*). The first passives in English are agentless *got*+PARTICIPLE constructions (e.g. *It got broken*). Herring (1981) suggests that children may seek special ways of marking resultant states on verbs, citing 3-year-old examples *I can let it spilled* and *I broken that thing*. Antinucci and Miller (1976) found that Italian children recruited number/gender marking on participles for marking of patients. In the standard language, a neutral past participle is used in transitive sentences, regardless of the number or gender of either subject or object (e.g. *levato* ‘removed’ or *preso* ‘took’ in the examples below). But Italian 2-year-olds make the participle agree with the *object*, saying things like *Chi gli ha levate le gambe?* ‘Who took off the legs?’, with plural agreement between *levate* ‘took:off+PL’ and *le gambe* ‘the+PL leg+PL’, instead of *Chi gli ha levato le gambe?*; or *Ho presa la campana* ‘I took+FEM.SG the+FEM.SG bell+FEM.SG’, said by a boy, instead of *Ho preso la campana*.

6. Operators on Nouns

6.1. Casemarking

Children readily accept case affixes on nouns and pronouns in the languages we have examined, and, somewhat later, alternate forms of pronouns to express various cases. Casemarking is acquired later on articles, adjectives, and numerals, indicating that the head of the nounphrase is the most relevant locus for case. The functions of cases are at first rather limited, suggesting a set of primordial case notions. Evidence is clearest for the following two general foci of casemarking: (1) agent/patient of physical manipulation (high transitivity) and (2) recipient/possessor/location.

§ *Agent/Patient*. In languages with accusative casemarking, the accusative emerges early to mark the patient of direct physical manipulation in a highly transitive event (Hopper & Thompson, 1980), while it tends to be absent for the objects of less manipulative verbs, including cognitive verbs and verbs of saying. That is, the accusative appears on the objects of such verbs as ‘break’, ‘take’, and ‘throw’, but not on the objects of verbs such as ‘see’, ‘read’, and ‘call (to)’ (Slobin, 1981). To the extent that we have data on ergative languages (Kaluli: Schieffelin, 1979, 1984; Quiche: Pye, 1979), the ergative marker appears to have a similar restriction to the subjects of verbs in highly transitive events only.

Children tend not to accept subdivisions of the general direct object category without clearly relevant semantic grounds. We have already noted that Slavic-speaking children do not shift the direct object of negated verbs from accusative to genitive. Polish, Russian, and Serbo-Croatian children also do not adhere to the distinction between animate and inanimate direct objects in the masculine singular, using a single accusative form for both. Although animacy may be a relevant category for subject nouns, it does not seem to be relevant to objects (or locations, see below). If children first orient to highly kinetic, manipulative actions, the effects on animate and inanimate objects may be similar. In addition, animacy is purely a classificatory notion, applying to representations of animate beings as well as to living creatures themselves. Since many of the child’s toys are dolls and stuffed animals, a grammatical animacy category would have to include living and nonliving things (e.g. people, pets, dolls, stuffed animals) while excluding other objects of manipulation (e.g. balls, toy cars, etc.).

The centrality of physical manipulation of objects is also evidenced by the early acquisition of distinct casemarking for whole versus partitive objects in such languages as Russian and Finnish. (The following errors by Gvozdev’s son at age 23 months show productive use of both accusative and genitive-partitive, at a period in which a single accusative was used for animate/inanimate and affirmed/negated objects. Although the case suffix is a gender error, it is semantically appropriate. (The gender error gives good evidence that these forms could not have been imitations.) ACCUSATIVE — *daj *itsku* ‘give egg+ACC.SG.FEM’, using the feminine accusative on a neuter count noun, *jaičko*; PARTITIVE — *daj *solja* ‘give salt+GEN.SG.MASC’, using the masculine genitive-partitive on a feminine mass noun, *sol’* ‘salt’.) One can speculate that it is relevant to the child’s notions of transitivity whether one grasps or acts upon a whole object or part of a mass, but not relevant whether the object is classified as animate or inanimate.

§ *Recipient/Possessor/Location*. In locative casemarking children tend to initially collapse locative state and locative goal, marking only general figure-ground relations, thus neutralizing the static-dynamic distinction between a figure at rest and the end-point of a trajectory to a goal. In addition, they show some tendency to neutralize the distinction between goal as place or person.

In languages which provide distinct case inflections for locative state and locative goal, a typical child error consists in confusion of the two forms — generally with the stative form used for both functions. Such errors are found in German in regard to accusative (directional) and dative (static) and accusative casemarking on articles; in Slavic languages in regard to nominal suffixes of the accusative and other cases (typically prepositional); and in Turkish in regard to the dative-directional and locative suffixes on nouns and deictics. These patterns suggest that the figure-ground relationship itself is most naturally marked on nouns, while verbs are relied upon to indicate the manner in which the relationship is temporally manifested (enduring vs. coming into being). However, nouns *are* distinctly marked as *source* (although later in development), suggesting a binary distinction between location/goal (presently visible or forward-looking) vs. point-of-departure (backward-looking). Note that languages, like English, often neutralize the static-dynamic locative distinction (e.g., *I poured the milk IN the glass* and *The milk is IN the glass*, allowing the distinction between an active verb and the copula to differentiate uses of the locative preposition as goal or location, while using distinct prepositions to encode departures from a state (*I poured the milk OUT OF the glass*.)

Animacy of location or goal is often ignored by children as a feature distinguishing location from possession, or goal as place or person. Broadly conceived, possession is a locative state in which the ground is a person and the figure-ground relation is of an enduring or socially-sanctioned nature. We find that children often do not attend to these peculiar social and conventional definitions of the ground, marking only the figure-ground relation. One type of evidence comes from extension of a locative functor to mark possession as well, where the language provides distinct means of expression. For example, Mills (1984) reports German errors such as *die Grossmama ZU den Affe* 'the grandma TO the monkey' (='the monkey's grandma'), in which a locative preposition is extended to possession. Other languages provide a single marker for both location and possession. If both meanings emerge at the same point in development, one can infer that the two meanings have semantic affinities from the child's point of view. For example, Clark (1984) reports the simultaneous emergence in a French 1 1/2-year-old of the preposition *à* for both functions: *Nini à bouche* 'in Nini's mouth' and *chaise à Pierre* 'Pierre's chair'.

Additional evidence for the generality of ground as a basic notion comes from conflations of location and possessor/recipient as a goal of directed movement or object transfer. Many languages do not distinguish locations as goals from recipients as goals (e.g. English *go TO papa*, *give it TO papa*, Turkish *baba-YA git*, *baba-YA ver*). Hungarian grammaticizes this distinction, using the allative for goals of movement and the dative for recipients of object transfer. MacWhinney (1973, 1984) reports child errors of using the dative for both meanings: *papa-nek* 'papa-DAT', used correctly for recipient ('give to papa') and incorrectly for goal ('go to papa') in place of *papa-hoz* 'papa-ALLAT'.[5]

§ *Definiteness*. Children learn fairly easily to mark definiteness (or what Bickerton, 1981, has more correctly characterized as a *specific-nonspecific* distinction). Such marking is always acquired in relation to nouns, in the form of articles and determiners (as in Germanic and Romance languages and Hebrew), or specialized particles (such as the Turkish accusative, which is limited to definite direct objects). However, in Hungarian the verb must agree with the definiteness of the object, and MacWhinney reports that ''this rule probably causes children more difficulty than any other single rule in Hungarian grammar.'' It would appear that the verb is not a highly relevant location for this semantic distinction.

§ *Number*. Where number is marked redundantly, children often limit its marking to the noun. In French, for example, Clark reports errors of plural subjects with singular verbs. In Serbo-Croatian, Radulović (1975) reports early marking of case, gender, and

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[5] Melissa Bowerman (personal communication) has pointed out that semantic errors in the use of grammatical forms must be considered in relation to linguistic aspects of the forms themselves. For example, location-possession confusions do not occur in early English child speech, where a clear word-order difference is available (e.g. *mommy ball* 'mommy's ball' versus *ball table* 'the ball is on the table'). It appears that certain conflations are likely in those situations in which the language either (1) does not present highly differentiated forms (e.g. the alternation between two suffixes in Hungarian is probably less salient to the child than the two word-order patterns of English), or (2) one of the forms is more accessible to the learner on formal grounds (e.g. the German prepositional construction is probably easier to acquire than the genitival constructions required for possessive marking). In such situations, one form will embrace several meanings if those meanings are close to one another in semantic space. It is interesting that the distinction between animate and inanimate goals causes problems later in English development, in regard to lexical meanings of verbs. Bowerman (1981) has noted confusions between *put* and *give* such as *You put the pink one to me* and *Give some ice in here*. She offers a variety of evidence for the proposition ''that children's recurrent substitution errors may arise from deep-seated cognitive predispositions towards perceiving certain kinds of similarities among events or relationships, regardless of whether these similarities are formally recognized in the language being learned'' (p. 17).

number only on the noun, and not on accompanying adjectives or numerals. (Casemarking of numerals poses great difficulties to children learning Slavic languages. The function of counting or enumeration is clearly distinct from the marking of grammatical relations.) Conversely, in languages like Turkish, where number is not marked redundantly, children do not make errors of extending the plural morpheme to verbs or adjectives if there is already a plural noun present. Thus ‘‘negative evidence’’ also suggests that the noun is the most relevant locus for number inflection.

ALLOCATION OF RESOURCES

Language-learners have some degree of choice in the degree and nature of semantic conflation that they will build into their language, and the uses to which they will put various types of morphosyntactic operations. Again, children’s restructuring of the allocation of linguistic resources is often based on iconic principles.

7. Deconflations

One cannot talk of ‘‘one-to-one mapping’’ between form and function without knowing what constitutes ‘‘one unit’’ of form and what constitutes ‘‘one unit’’ of function or meaning. Children accept many conflations of meaning in grammatical morphology, for a variety of reasons beyond ‘‘naturalness’’ of the conflation (e.g., lack of alternative means of creating less conflated expressions, rote memorization). However, there are instances in which children succeed in creating more analytic or transparent expressions when faced with some conflations. Such reanalyses are based on Operating Principles which guide the child in avoiding plurifunctionality and creating analytic alternatives.

§ *Unifunctionality*. There are some examples, chiefly from the work of Annette Karmiloff-Smith (1979) on French child language, that children make use of the following Operating Principle:

If you discover that a linguistic form expresses two closely related but distinguishable Notions, use available means in your language to distinctly mark the two Notions. (‘‘OP (MAPPING): UNIFUNCTIONALITY’’)

Karmiloff-Smith’s examples suggest that it is important that (1) the semantic categories involved be ‘‘related but distinguishable’’ and (2) that some sort of available alternative means of expression be available in the language. For example, when children realize that *même* can express both ‘same kind’ and ‘same one’, they reserve *la même X* for the meaning ‘same one’, and create new expressions for ‘same kind’, such as *la même de X* and *une de même de X*. They devise new forms of the plurifunctional indefinite article to distinguish the nonspecific reference function of the article (e.g. *J’ai une vache* ‘I have a cow’) from its numeral function (e.g. *J’ai une de vache* ‘I have one cow’). Clark (1984) even reports one idiosyncratic case of a child who invented a distinction between partitive and possessive constructions, using contracted *de* + ART for partitive and uncontracted *de* + ART for possession: PARTITIVE — *J’ai du pain* ‘I have some bread’ and *Y’a *da neige* ‘There is some snow’ versus POSSESSIVE — *le chapeau *de le monsieur* ‘the man’s hat’ and *le soulier de la dame* ‘the woman’s shoes’. We would need many more crosslinguistic examples such as these in order to specify the domains where children prefer unifunctional expressions.

§ *Analyticity*. Many childish reanalyses suggest that children make use of the following Operating Principle:

If you discover that a complex Notion can be expressed by a single, unitary form (synthetic expression) or by a combination of several separate forms (analytic expression), prefer the analytic expression. (‘‘OP (MAPPING): ANALYTIC FORM’’)

One example of this principle is given by the widespread tendency, noted above, to use a valence-neutral verb in sentence frames with varying number of participants in place of lexicalized or inflectional causatives. Another example comes from the common tendency in Romance languages (e.g. French, Spanish, Romanian) to use analytic PREPOSITION + PRONOUN constructions (e.g. *de moi*) rather than forms which conflate the fact of possession along with person of possessor and gender and number of possessed (e.g. *mon/ma/mes*). Clark notes (1984): ‘‘The prepositional constructions for possession appear to be more analytic than the possessive adjectives like *mon* in that they mark explicitly the relation between object-possessed and possession.’’

Of special interest in light of Talmy’s (in press) crosslinguistic study of verbs of motion is the tendency in Spanish, Italian, and Hebrew for children to reanalyze verbs which conflate motion and direction into separate expression of these two notions, while, at the same time, conflating motion and manner. For example, whereas in English we say *run down*, the normal Spanish equivalent is *bajar corriendo* ‘descend runningly’. Spanish-speaking children, however, often produce expressions similar to the English analysis, such as **correr abajo* ‘run down’ (considered unacceptable in the dialect of Spain being acquired by the child in question). Perhaps there is some iconic basis for a relative semantic proximity of notions of movement and manner, allowing for conflations such as *run, walk, crawl, swim, fly*, with direction of movement as a sort of general operator on such verbs (e.g., *up, down, along, through*). Note that manner of movement cannot be separated from the fact of movement, while directionality is an independent dimension.

Japanese children’s errors of using *nai*, the non-past form of negation, across tenses may, in addition to other factors, reflect their sense that a single morpheme should not conflate two notions as distinct as negation and tense. Use of *nai* with verbs inflected for the past tense, thus, can represent an analytic option of marking tense and negation separately.

8. Clear Marking of Grammatical Relations

8.1. Pragmatic Variability, Casemarking, and Pronouns

Children easily acquire flexible use of word order for pragmatic functions. Early postposing of highly presupposed sentence elements is reported for Romance languages, German, Hungarian, Turkish, and Japanese. However, children seem to make a clear distinction between *pragmatic* functions and the clear marking of *grammatical relations*, maintaining marking of case roles in all sentence orders.

§ In Kaluli (Schieffelin, 1979, 1984) the ergative marker only appears on subjects in the focused OSV order, and not in the neutral SOV; however, children mark the subject as ergative in both orders, while correctly using the preverbal position for focus.

§ In Hebrew, children often use the direct object particle, *et*, on postverbal patients in passive and dative constructions, even though such nouns should function grammatically as subjects. Berman suggests that ‘‘they may overgeneralize the rule of definite direct object marking by extending it to subject (non-object) nouns which follow the verb,’’ as in: *nafal lo et ha mitriya* ‘fell+MASC to:him OBJ the umbrella+FEM’ in place of *nafla lo ha mitriya* ‘fell+FEM to:him the umbrella+FEM’ (=‘his umbrella fell/he dropped his umbrella’), and *ba sefer lo mesupar et ze* ‘in+the book not tell+PASSIVE OBJ that’ (=‘in the book, that’s not mentioned’).

Although children are willing to reorder elements pragmatically, they are apparently reluctant to delete material syntactically. That is, they tend not to make full use of pragmatic options for ellipsis, apparently preferring some overt marking of each sentence participant.

> § In languages that clearly mark the verb for person, the use of a pronoun with a verb is specialized for functions such as introducing or re-introducing a topic, contrastive focus, and so forth. Suggestive data from Polish and Turkish indicate that children in the older preschool period *over-use* pronouns in relation to adult pragmatic norms, perhaps relying on the pronoun to clearly and distinctly mark a semantic role. Clancy notes that Japanese is a language which extensively uses ellipsis to omit presupposed information, but that children are slow to make use of such patterns, producing ‘‘too much information from an adult point of view.’’

8.2. Embedded Clauses

Children show a clear tendency to try to mark all nominal arguments in embedded clauses, even though the language allows for or requires deletion. Again, overt marking of all sentence participants seems to take precedence over backgrounding for pragmatic purposes (as discussed, for example, by Givón, 1983).

> § In Polish, noncoreferential complement clauses are embedded with the complementizer *zeby* and a finite verb, while coreferential clauses are embedded without *zeby* and with the infinitive. Children make errors of extending the former pattern, marking the embedded clause explicitly in the first person (e.g. **Ja chce, zeby mialem kotka* ‘I want that I+have cat’.

> § In Hebrew, children of late preschool age consistently tend to copy the subject pronoun in relative clauses, though this is not the norm (e.g. *ha yeled še hu nafal ba mayim* ‘the boy that *he* fell in the water’; *ha iša ve hi ra’ata et ha naxas* ‘the woman that *she* saw OBJ the snake’.

> § Children also try to maintain normal casemarking on sentences when they function as embedded clauses. In some Turkish relative clause and complement constructions, for example, the subject of the embedded clause appears in the genitive case, as ‘‘symbolic possessor’’ of the action attributed to it. A frequent error is to retain the nominative form of such nouns in embedded clauses, reflecting their underlying subject role.

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All of these examples are but a brief overview of the ways in which child language data may reveal basic areas of iconicity in grammar. It would seem that the child is not a bad icon-maker at all!

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Appendix

OPERATING PRINCIPLES FOR LANGUAGE ACQUISITION

> [The following 12 Operating Principles are part of a collection of 40 proposed principles that guide the child in discovering and building linguistic structures. The system of Operating Principles (OPs) is discussed in detail in Slobin (1984a). Only OPs that have some relevance to issues of iconicity are listed here.]

OP (MAPPING): FUNCTORS. If a speech segment remains uninterpreted after the establishment of content words and routines, try to map it onto an accessible grammaticizable Notion that is relevant to the meaning of adjacent referential units in the situation in which the speech segments occur. If you succeed, store such a nonreferential relational unit (‘‘functor’’) with its meaning and its placement in relation to associated linguistic units and their meanings.

OP (PRODUCTION): MAXIMAL SUBSTANCE. While you are mastering the linguistic expression of a Notion, mark that Notion with as much acoustic substance as possible, with maximal phonological separation of the form in question from adjacent speech units.

OP (UNITS): WORD FORMS. If you discover more than one form of a word or word-stem in storage, or if monitoring reveals a mismatch between your word form and that in the input, try to find a phonological or semantic basis for distinguishing the forms.

Phonologically attempt to change your word form in the given environment, following a hierarchy of possible adjustments of word forms. At first try to maintain the consonant frame and syllable structure (number of syllables, stress placement).

Try to find distinct meanings for words or word-stems that occur in varying forms, checking for relevant Notions.

If you cannot find a principled basis for differentiating the forms of a word or word-stem, pick one form as basic and use it in all environments.

OP (UNITS): MORPHOLOGICAL PARADIGMS. If you find more than one functor expressing a given Notion relative to a particular word class, and choice of functor cannot be determined by phonological conditioning, try to find semantic grounds for subdividing the Notion expressed by the functors, and map each new Notion onto one of the functors.

If you cannot find phonological or semantic grounds for choice of functor, check the citation forms of the associated words or stems and try to differentiate them on systematic phonological grounds. If you succeed, set up a paradigm in which choice of functor is conditioned by the phonological shape of the citation form.

If you do not succeed, and if your procedural capacities allow you to check the immediate environments of citation forms, try to differentiate the functors on the basis of elements that systematically co-occur with the citation forms, and set up a paradigm in which choice of functor is conditioned by factors that regularly co-occur with the citation form.

If you fail, use only the most salient and applicable functor to express the given Notion in the given position.

OP (MAPPING): OVEREXTENSION. If you have discovered the linguistic means to mark a Notion in relation to a word class or configuration, try to mark the Notion on every member of the word class or every instance of the configuration, and try to use the same linguistic means to mark the Notion.

OP (MAPPING): UNIFUNCTIONALITY. If you discover that a linguistic form expresses two closely related but distinguishable Notions, use available means in your language to distinctly mark the two Notions.

OP (MAPPING): ANALYTIC FORM. If you discover that a complex Notion can be expressed by a single, unitary form (synthetic expression) or by a combination of several separate forms (analytic expression), prefer the analytic expression.

OP (MAPPING): VARIABLE WORD ORDER. If you find that a clause type occurs in more than one word order, attempt to find a distinct meaning or pragmatic function for each order.

OP (MAPPING): CANONICAL CLAUSE FORM. If a clause has to be reduced, rearranged, or otherwise deformed when not functioning as a canonical main clause (active, declarative, affirmative clause with full noun arguments and finite verb), attempt to use or approximate the full or canonical form of the clause.

OP (POSITION): MORPHEME PLACEMENT. Mark a Notion in the same place in the various constructions in which it can occur. If you discover that a particular class of words or functors occurs in different positions in different constructions, try to find a principled basis to differentiate the constructions. If you fail to define distinct construction types, use the same position across constructions.

OP (POSITION): RELEVANCE. If two or more functors apply to a content word, try to place them so that the more relevant the meaning of a functor is to the meaning of the content word, the closer it is placed to the content word. If you find that a Notion is marked in several places, at first mark it only in the position closest to the relevant content word.

OP (POSITION): OPERATORS. If a functor operates on a whole structure (phrase or clause), try to place it external to that structure.