A Usage-Based Approach to Child Language Acquisition
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0. Introduction

The modern study of child language acquisition began when developmentalists started to take Linguistics seriously. For many researchers this has meant a top-down approach in which we begin with some more or less formal description of adult language and then investigate the ways in which children's linguistic skills come to conform with that description. Other researchers have taken a more bottom-up approach in which we assume as little as possible about the nature of children's language and then attempt to characterize it in its own terms - based on children's actual use of language at particular developmental periods (in both comprehension and production). Because our characterizations are based on children's language *use*, we may call this a usage-based methodology

In modern Cognitive and Functional Linguistics the term usage-based has, in addition, a number of more substantive meanings. Most important is the proposition that language structure emerges - both historically and ontogenetically - from language use. In the context of first language acquisition, I take this to mean that children begin their linguistic careers with concrete and specific linguistic constructions, and create abstractions only gradually through repeated acts of language comprehension and production in specific usage events. This perspective is also broadly consistent with a Construction Grammar view in which our account of linguistic competence includes not only the most regular aspects of language structure, but also - and perhaps even as a primary starting point - all of the idioms, fixed expressions, and other quirky aspects of human language use (Fillmore et al., 1988; Kay & Fillmore, 1999).

One especially important proposal of some usage-based theorists is that frequency matters. That is to say, certain linguistic expressions and constructions are used so often that they become entrenched for individuals as wholistic units of psycholinguistic processing - regardless of any internal structure they may have in addition (Bybee 1985, 1995; Langacker 1987; 1988). Given this focus on usage events - and on the processes of language learning and structure building that occur in usage events, with the frequency of certain kinds of usage events being extremely important - a crucial item on the research agenda of usage-based models of language is, or should be, the study of how human beings build up the most basic aspects of their linguistic competence during childhood.

In this paper I report on recent research in child language acquisition that

is broadly compatible with a usage-based approach to language. The points I will attempt to make are the following: (i) children's early language is item-based; (ii) children's earliest creative utterances are grounded in these item-based constructions; (iii) this concrete organization lasts longer than previously suspected and even characterizes children's early complex constructions (sentential complements and relative clauses); and (iv) the processes by which children acquire and abstract across item-based constructions all reflect general processes of human cognition.

1. Verb Islands and Other Item-Based Constructions

Many researchers believe that young children operate from the beginning with abstract linguistic categories and schemas because they not only follow adult grammatical conventions fairly well, but they also on occasion produce some creative yet canonical utterances that they could not have heard from adults - which means that they must be generating them via abstract linguistic categories or schemas. The most famous example is *Allgone sticky,* as reported by Braine (1971), and indeed such creativity is convincing evidence that the child has some kind of abstract linguistic knowledge. However, recent evidence suggests that, in this example, the only abstract knowledge this child possesses is what kinds of things can be *allgone* - not, for example, what kinds of things may be the subjects or objects of verbs. The general methodological problem is that we can never tell from a single utterance in isolation what is the child's underlying structural knowledge. To determine underlying structural knowledge we must look at *all* of a child's uses - and most especially non-uses - of a whole set of linguistic items or structures.

Using this more systematic method, Tomasello (1992) found that although most of his daughter's early language during her second year of life was "grammatical", it was also very limited, uneven, and item based. The item based nature of this child's early language was most clearly evident in her use of verbs. Thus, during exactly the same developmental period some semantically similar verbs were used in only one type of sentence frame and that frame was quite simple (e.g., *Cut X*), whereas other verbs were used in more complex frames of several different types (e.g., *Draw X, Draw on X , Draw X for Y, Z draw on Q*). In addition, morphological marking (e.g., for past tense) was also very uneven across verbs. Within a given verb's development, however, there was great continuity, with new uses almost always replicating previous uses with only one small addition or modification (e.g., the marking of tense or the adding of a new participant role). Overall, by far the best predictor of this child's use of a given verb on a given day was *not* her use of other verbs on that same day, but rather her use of that same verb on immediately preceding days; there appeared to be no transfer of structure across verbs. The hypothesis was thus that children have an early period in which each of their verbs forms its own island of organization in an otherwise unorganized language system (the Verb Island hypothesis), thereby serving to define lexically specific syntactic categories such as 'drawer', 'thing drawn', and 'thing drawn with' (as opposed to subject, object, and instrument) (see also Tomasello & Brooks, 1999).

Using a combination of periodic sampling and maternal diaries, Lieven et

al. (1997) found some very similar results in a sample of 12 English-speaking children from 2 to 3 years of age. In particular, they found that children used virtually all of their verbs and predicative terms in one and only one sentence frame early in language development - suggesting that their syntax was built around various particular items and expressions. In fact, fully 92% of these children's earliest multi-word utterances emanated from one of their first 25 lexically based patterns - which were different for different children. Following along these same lines, Pine and Lieven (1997) found that when these same children began to use the determiners *a* and *the* in the 2 to 3 year period, they did so with almost completely different sets of nouns (i.e., there was almost no overlap in the sets of nouns used with the two determiners) - suggesting that the children at this age did not have any kind of abstract category of Determiner that included both of these lexical items. This general finding of the item based learning and use of language has now been replicated in a number of different languages of many different types (e.g., see Pizutto & Caselli 1992, 1994, for Italian; Serrat 1997, for Catalan; Behrens 1998, for Dutch; Allen 1996, for Inuktitut; Gathercole, Sebastián, & Soto 1999, for Spanish; Rubina & Pine 1998, for Portugese; Stoll 1998, for Russian; and Berman 1982, 1993, for Hebrew).

Of special note in children's spontaneous speech are so-called overgeneralization errors because they are things the child has presumably not heard from adults. In the context of a focus on syntax, the overgeneralizations of most interest are those involving basic sentence frames, for example, *She falled me down* or *Don't giggle me* in which the child uses intransitive verbs transitively (i.e., a verb normally used with a subject only is used with both a subject and an object). Bowerman (1982, 1988) documented a number of such overgeneralizations in the speech of her two English-speaking children, and Pinker (1989) compiled examples from other sources as well. The main result of interest is that these children produced very few of these types of overgeneralizations before about 3 years of age. This developmental pattern suggests again the hypothesis that the construction of abstract linguistic categories and schemas is a gradual process that takes place over many months, and even years, of ontogeny.

The other main method for studying the nature of children's linguistic knowledge involves teaching them novel linguistic items and seeing what they do with them. The idea is that if the child uses the novel item in creative yet canonical ways, we may infer that she has assimilated it to some kind of abstract category or schema. If she does not use it in any creative ways (despite repeated opportunities), but only in ways she has heard from adults, the inference is that there is no abstract system to take up the new element, and the child is simply imitatively learning a specific linguistic item or structure (assuming that there are no performance limitations, involving limited memory or the like, that prevent the child from demonstrating her syntactic competence in the experiment).

Experiments using novel verbs have demonstrated that by 3 to 4 years of age most children can readily assimilate novel verbs to abstract syntactic categories and schemas that they bring to the experiment, for example, taking a verb they have heard only in a passive sentence frame and using it in an active sentence frame (Maratsos et al. 1987; Pinker et al. 1987). But the same is not true

for younger children. For example, Tomasello and Brooks (1998) exposed 2 to 3 year old children to a novel verb used to refer to a highly transitive and novel action in which an agent was doing something to a patient. In the key condition the novel verb was used in an intransitive sentence frame such as *The sock is tamming* (to refer to a situation in which, for example, a bear was doing something that caused a sock to "tam" – similar to the verb *roll* or *spin*). Then, with novel characters performing the target action, the adult asked children the question: *What is the doggie doing?* (when the dog was causing some new character to tam). Agent questions of this type encourage a transitive reply such as *He's tamming the car* - which would be creative since the child has heard this verb only in an intransitive sentence frame. The outcome was that very few children at either age produced a transitive utterance with the novel verb. As a control, children also heard another novel verb introduced in a transitive sentence frame, and in this case virtually all of them produced a transitive utterance - demonstrating that they can use novel verbs in the transitive construction when they have heard them used in that way.

The generality of this finding is demonstrated by a number of similar studies using different modeled constructions and measurement procedures. These studies have used children of many different ages and have tested for a variety of different constructions (see Tomasello 2000, for a review). Most of the findings concern children's ability to produce a simple transitive utterance (subject-verb-object; SVO), given that they have heard a novel verb only in some *other* sentence frame (e.g., intransitive, passive, imperative, etc.). When all of these findings are compiled and quantitatively compared, we see a continuous developmental progression in which children gradually become more productive with novel verbs during their third and fourth years of life and beyond. It is clear that this overall pattern is not consistent with the hypothesis that children possess abstract linguistic knowledge early in development, but rather it is consistent with a more constructivist or usage-based model in which young children begin language acquisition by imitatively learning linguistic items directly from adult language, only later discerning the kinds of patterns that enable them to construct more abstract linguistic categories and schemas.

The validity of these findings is further corroborated by two control studies that deal with alternative hypotheses. First, it is possible that young children are simply reluctant to use newly learned words in novel ways. However, when even younger children (22 months) are taught novel nouns, they use them quite freely in novel sentence frames (Tomasello et al., 1997). Young children are thus not reticent with all newly learned words, and indeed they seem to form something like a category of 'concrete noun' quite early in development. Second, it might be that children's lack of productivity in the novel verb studies does not have to do with their linguistic knowledge, but only with production difficulties. However, in comprehension tests they perform no better. That is, they are first taught a novel verb in a simple sentence frame (*Look! Tamming! This is called tamming!*), and they are asked to act out a transitive construction with that verb: *Show me: The dog's tamming the cat*. Perhaps surprisingly, children younger than 3 years of age do no better in comprehension than they do in production (Akhtar & Tomasello 1997). (The study of Naigles (1990) is sometimes taken to be

discrepant with these findings, but in fact it is not relevant because the two sentences that were compared in that study were *The duck is glorping the bunny* and *The bunny and the duck are glorping* - with one picture depicting the duck doing something to the bunny and the other depicting the two participants engaged in the same parallel action. The problem is that children might very well have been using the word *and* as an indicator of the parallel action picture; Tomasello & Olguin 1993)

2. Usage-Based Syntactic Operations

Given that children are acquiring linguistic constructions of various shapes and sizes and degrees of abstraction throughout early development (i.e., building their linguistic inventories), we may now ask about their ability to put these constructions together creatively in order to adapt to the exigencies of particular usage events. Tomasello, Lieven, Behrens, and Forwergk (2000) addressed this issue in a naturalistic study of one 2-year-old child learning English. The novelty was that this child's language was recorded using extremely dense taping intervals. Specifically, the child was recorded in linguistic interaction with her mother for one hour per day, 5 days per week, for 6 weeks - making the taped data roughly 5 to 10 times denser than most existing databases of child language, and accounting for approximately 8 to 10% of all of the child's utterances during this 6 week period. In order to investigate this child's syntactic creativity, all of her 500+ utterances produced during the last one-hour taping session at the end of the 6 week period were designated as target utterances. Then, for each target utterance, there was a search for 'similar' utterances produced by the child (not the mother) in the previous 6 weeks of taping. Was it an utterance she had said before exactly? Was it an utterance based on some highly frequent schema from before but with a new linguistic item in the slot? Was it an utterance pieced together from previously mastered language in some more creative way? Or did the target utterance have no previous precedents in the child's productive language at all?

The main goal was thus to determine for each utterance recorded on the final day of the study what kinds of syntactic operations were necessary for its production, that is to say, in what ways did the child have to modify things she had previously said (her 'stored linguistic experience') to produce the thing she was now saying. We may call these operations 'usage-based syntactic operations' since they explicitly take into account that the child does not put together each of her utterances from scratch, morpheme by morpheme, but rather, she puts together her utterances from a motley assortment of different kinds of pre-existing psycholinguistic units. And so, following the usage-based models of Bybee (1995), Langacker (2000), and Croft (2000), the question was how this child was able to "cut and paste" together her previously mastered linguistic constructions in order to create a novel utterance in a specific usage event. What was found by this procedure was:

- Of the 455 multi-word utterances produced, 78% were utterances that this child had said before during the previous 6 weeks of sampling - in exactly this same form as whole utterances. Many of these were utterance routines like *Thank-You, There-you-go,* etc., but many were simply frequently used multi-word utterances such as *Where's Daddy?.*

- Another 18% of the target utterances were things the child had said before but with one minor change, that is, they consisted of an established utterance schema plus other linguistic material 'filled in' or 'added on'. For example, the child had said many scores of times previously *Where's X*, but on the target tape she said *Where's the butter?*, which was new (*butter* having been said on 5 occasions previously in other linguistic contexts). As another example, the child said *I got one here*, which was new. But she had said *I got one* 7 times previously, and she had added *here* onto the end of utterances many scores of times previously.
- Only 4% of this child's target utterances were different from things she had said before in more than one way. These mostly involved the combination of 'filling in' and 'adding on' to an established utterance schema. For example, the child said creatively *I want tissue lounge*, which seemingly derived from the utterance schema *I want OBJECT* (which she had said over 50 times previously), with a slotting in of the word *tissue* (which she had said 9 times previously in other contexts), and adding on of the word *lounge* (which she had said 3 times previously in other contexts).
- There were exactly 3 utterances (less than one-half of one per cent) that could not be accounted for in a relatively straightforward application of this procedure, and 2 of these were heavily scaffolded by the immediate discourse context (i.e., the child took some of her utterance not from her stored linguistic experience but rather from her mother's immediately preceding speech).

It is thus clear that in the vast majority of cases, this child's creative utterances were based directly on things she had said before many times previously. Moreover, in the vast majority of cases, one of the pieces of language on which the child's creative utterance was based was what we called an utterance schema. Utterance schemas were things the child had said before as full utterances with some variation in one (or, infrequently, more than one) slot - such things as *Where's the X?, I wanna X, More X, It's a X, I'm X-ing it, Put X here, Mommy's X-ing it, Let's X it,* and so forth. Importantly, these utterance schemas were things that the child had said before, on average, an estimated 150 times during the previous six weeks, and the other language used in these creative utterances (e.g., to fill the slot) had been said before, on average in one or another context, an estimated 70 times during the previous six weeks (these estimations are aimed at reflecting the child's total experience as projected from our 10% sample). Further evidence for the psychological reality of these utterance schemas derives from the fact that there were virtually no insertions of linguistic material into previously invariant sequential strings within the schemas (e.g., the child never put adverbs or other modifiers into the middle of an established utterance schema) or substitutions of linguistic material into places that did not already have established slots. It is also important that there was almost perfect functional consistency across different uses of these utterance schemas; the child filled the slot with the same kind of linguistic item or phrase (e.g., an object word or a locative phrase) across the six week period of study.

The point is not that children are not creative with language; they are. But initially they are creative only in highly constrained ways. The general picture that emerges is thus as follows. When young children have something they want to say, they sometimes have a set expression readily available and so they simply

retrieve that expression from their stored linguistic experience. When they have no set expression readily available, they retrieve linguistic schemas and items that they have previously mastered (either in their own production or in their comprehension of other speakers) and then "cut and paste" them together as necessary for the communicative situation at hand - what I have called 'usage-based syntactic operations'. Perhaps the first choice in this creative process is an utterance schema which can be used to structure the communicative act as a whole, with other items being filled in or added on to this foundation (Tomasello, 1998a). It is important that in doing their cutting and pasting, children coordinate not just the linguistic forms involved but also the conventional communicative functions of these forms - as otherwise they would be speaking creative nonsense. It is also important that the linguistic structures being cut and pasted in these acts of linguistic communication are a variegated lot, including everything from single words to abstract categories to partially abstract utterance or phrasal schemas.

3. Some More Complex Constructions

The usage-based approach is also quite revealing in the case of some of children's more complex constructions a bit later in their development. For example, Diessel and Tomasello (in press) looked at 7 children's earliest utterances with sentential complements and found that virtually all of them were composed of a simple sentence schema that the child had already mastered combined with one of a delimited set of matrix verbs (see also Bloom 1992). These matrix verbs were of two types. First were epistemic verbs such as *think* and *know*. In almost all cases children used *I think* to indicate their own uncertainty about something, and they basically never used the verb *think* in anything but this first-person, present tense form; that is, there were virtually no examples of *He thinks ..., She thinks ...,* etc., virtually no examples of *I don't think ..., I can't think ...,* etc., and virtually no examples of *I thought..., I didn't think ...,* etc. And there were almost no uses with a complementizer (virtually no examples of *I think that ...*). It thus appears that for many young children *I think* is a relatively fixed phrase meaning something like *Maybe*. The child then pieces together this fixed phrase with a full sentence as a sort of evidential marker, but not as a "sentence embedding" as it is typically portrayed in more formal analyses. The second kind of matrix verbs are attention-getting verbs like *Look* and *See* in conjunction with full finite clauses. In this case, children use these 'matrix' verbs almost exclusively in imperative form (again almost no negations, no non-present tenses, no complementizers), suggesting again an item-based approach not involving syntactic embedding. Thus, when examined closely, children's earliest complex sentences look much less like adult sentential complements (which are used most often in written discourse) and much more like various kinds of 'pastiches' of various kinds of established item-based constructions.

A related study is that of Diessel and Tomasello (submitted) on relative clauses. Using a similar methodology, they found that the earliest relative clauses that English-speaking children learn occur in presentational constructions that are propositionally simple. They consist of a copular clause and a relative that usually includes an intransitive verb. Two types of this construction must be distinguished: (1) The regular presentational relative construction (PRC) in which

the relative clause is syntactically separated from the rest of the sentence, and (2) the amalgam construction in which the relative is conflated with the copular clause. Since the amalgam construction is usually the first relative construction that children learn and since the occurrence of this construction becomes very infrequent once the regular PRC has emerged, it can be seen as a precursor to the latter. Both presentational relative constructions express a single proposition, but since the amalgam construction does not include two separate full clauses, it is syntactically denser than the regular PRC. As the children of our study grow older, they begin to use more complex relative constructions in which a relative clause, including an intransitive *or* transitive verb, is attached to a noun in a full-fledged main clause. Such relative constructions contain two propositions expressed in main and subordinate clause. The whole development can therefore be seen as a process of clause expansion: Starting from the presentational amalgam construction, which expresses a single proposition in a structure that is not truly biclausal, children gradually learn the use of complex relative constructions in which two propositions are expressed in two separate full clauses.

The main point is that a usage-based account focused on specific item-based schemas that children learn and use can also account for complex sentences of a type that have traditionally been thought to require extremely abstract and complex syntactic structures. Again, the point is not that children cannot learn and use complex linguistic constructions, only that they do this on the basis of particular pieces of language that they hear and use repeatedly - with abstractions coming only slowly and gradually as children acquire more and more linguistic experience with the many expressions and constructions of their native language.

4. Some Thoughts on Process

If children are acquiring mainly item-based constructions early in development - and children acquiring different languages acquire different item-based constructions - an important part of the process must be some form of imitative learning. Imitation has been almost banished from the study of child language because it is most often defined as the child repeating verbatim what an adult has just said without understanding its meaning, and indeed this process very likely does not play a central role in language acquisition. But there are forms of social learning called cultural learning in which the learner understands the purpose or function of the behavior she is reproducing (Tomasello, Kruger, & Ratner 1993). Thus, Meltzoff (1995) found that 18-month-old infants attempted to reproduce the intentional action they saw an adult attempting to perform, even when that action was not carried through to completion, and Carpenter, Akhtar, and Tomasello (1998) found that 16-month-old infants attempted to reproduce an adult's intentional, goal-directed actions, but not her accidental actions. In the case of language, if they are to use a piece of language in an adult-like way, children must understand and reproduce both its surface linguistic form and its underlying communicative function - in the sense of using it in connection with the same communicative intention (Tomasello 1998b; 1999).

Cultural learning of this type works on multiple hierarchical levels simultaneously, and indeed it must work in this way if the child is to become creative with conventional, culturally based skills. As a nonlinguistic example, a

child may see an adult use a stapler and understand that his goal is to staple together two pieces of paper. In some cases, the child may understand also that the goal/function of placing the papers inside the stapler's jaws is to align them with the stapling mechanism inside the stapler, and that the goal/function of pressing down on the stapler is to eject the staple through the two papers - with both of these sub-actions being in the service of the overall goal/function of attaching the two sheets of paper. To the extent that the child does not understand the sub-functions, she will be lost when she encounters some new stapler, for example, one whose stapling mechanism works differently (e.g., does not require pressing down). Only to the extent that the child understands the relevant sub-functions, will she be able to adapt to this new situation creatively (e.g., adjusting her behavior to effect the same outcome with the new stapling mechanism). The comparable linguistic example is that the child hears an adult say "I stapled your papers" and comprehends not only the utterance and its overall communicative intention, but also, for example, the word *stapled* and its communicative sub-function in the utterance (the contribution it is making to the utterance as a whole), along with the phrase *your papers* and its communicative sub-function in the utterance - with *your* serving a sub-function within that phrase. Again, only if the child performs some 'functionally based distributional analysis' of this type will she be able in the future to use these linguistic elements creatively in novel utterances.

Reconceptualized in this way to include intention reading, my claim is that cultural (imitative) learning is more important in language development, especially in the early stages, than has traditionally been recognized. This is clear in the data reviewed above, which revealed that before their third birthdays children use individual verbs and syntactic constructions in just the way they have heard and understood them being used - with only very limited abilities to go beyond what they have heard. Interestingly, there are two phenomena of child language acquisition that are often taken to be evidence against imitative learning, but which are actually evidence for it - if we look at exactly what children do and do not hear. First, many young children say things like "Her open it", an accusative subject which they supposedly have not heard from adults. But children hear things like "Let her open it" or "Help her open it" all the time, and so it is possible that when they say these things they are simply reproducing the end part of the utterances they have heard. Very telling is the fact that children almost never make the complementary error "Mary hit I" or "Jim kissed she" - the reason being that they never hear anything like this anywhere. A similar account can be given for some of the findings going under the general rubric of optional infinitives (Rice 1998). Children hear a very large number of nonfinite verbs right after nominative nouns, especially in questions such as "Should he open it?" and "Does she eat grapes?" The child might then later say, in partially imitative fashion: "He open it" and "She eat grapes".

It is also important that children seem to have special difficulties in going beyond what they have heard when they have heard it multiple times, that is, it is entrenched. Thus, Brooks, Tomasello, Lewis, and Dodson (1999) modeled the use of a number of fixed-transitivity English verbs for children from 3;5 to 8;0 years - verbs such as *disappear* that are exclusively intransitive and verbs such as *hit* that

are exclusively transitive. There were four pairs of verbs, one member of each pair typically learned early by children and used often by adults (and so presumably more entrenched) and one member of each pair typically learned later by children and used less frequently by adults (less entrenched). The four pairs were: *come-arrive, take-remove, hit-strike, disappear-vanish* (the first member of each pair being more entrenched). The finding was that, in the face of adult questions attempting to induce them to overgeneralize, children of all ages were less likely to overgeneralize the strongly entrenched verbs than the weakly entrenched verbs; that is, they were more likely to produce *I arrived it* than *I comed it*. This finding suggests not only that children say what they hear, but that the more they hear it the more it seems to them that this is the only way it can be said.

The imitative learning and entrenchment of particular linguistic forms cannot be the whole story of language acquisition, however, since children do at some point go beyond what they hear from adults and create novel yet canonical utterances. As noted above, they do this first by creating 'slots' in otherwise item-based schemas. It is not known precisely how they create these slots, but one possibility is that they observe in adult speech variation in that utterance position and so induce the slot on the basis of 'type frequency'. In general, in usage-based models the token frequency of an expression in the language learner's experience tends to entrench an expression - enabling the user to access and fluently use the expression as a whole (Langacker 1988; Krug 1998; Bybee & Schiebman 1999) - whereas the type frequency of an expression (i.e., the number of different forms in which the language learner experiences the expression or some element of the expression) determines the creative possibilities, or productivity, of the construction (Bybee 1985, 1995). Together, these two types of frequency - along with the corresponding child learning processes - may explain the ways in which young children acquire the use of specific linguistic expressions in specific communicative contexts and then generalize these expressions to new contexts based on various kinds of type variations they hear - including everything from type variation in a single slot to type variation in all of the constituents of a construction. The extent of type variation needed for different kinds of productivity is not known at this time, and indeed after a certain point in development it may be that type variation in the slots of constructions becomes less important as these slots comes to be more precisely defined functionally.

Another possibility - not mutually exclusive but rather complementary to the above - is that abstract constructions are created by a relational mapping across different verb island constructions (Gentner & Markman 1997). For example, in English the several verb island constructions that children have with the verbs *give, tell, show, send*, and so forth, all share a 'transfer' meaning and they all appear in a structure: NP+V+NP+NP (identified by the appropriate morphology on NPs and VPs). The specific hypothesis is thus that children make constructional analogies based on similarities of both form and function: two utterances or constructions are analogous if a "good" structure mapping is found both on the level of linguistic form and on the level of communicative function. Precisely how this might be done is not known at this time, but there are some proposals that a key element in the process might be some kind of "critical mass"

of exemplars, to give children sufficient raw material from which to construct their abstractions (Marchman & Bates 1994).

In either case, the main point is that young children begin by imitatively learning specific pieces of language in order to express their communicative intentions, for example, in holophrases and other fixed expressions. As they attempt to comprehend and reproduce the utterances produced by mature speakers - along with the internal constituents of those utterances - they come to discern certain patterns of language use (including patterns of token and type frequency), and these patterns lead them to construct a number of different kinds of (at first very local) linguistic categories and schemas. As with all kinds of categories and schemas in cognitive development, the conceptual "glue" that holds them together is function; children categorize together things that do the same thing (Mandler 1997). In this case, children understand as instances of the same kind of linguistic units those that serve 'the same' or 'similar' communicative functions in utterances.

5. Conclusion

If grammatical structures do not come directly from the human genome, as the above- reported data suggest they do not, and if children do not invent them *de novo*, as they clearly can not, then it is legitimate to ask: Where do grammatical structures come from? The answer is that, in the first instance, they come from processes of grammaticalization in language history. That is to say, at some point in human evolution, *Homo sapiens* evolved the ability to communicate with one another symbolically (Deacon 1998). When human beings communicate symbolically with one another in extended discourse interactions, the stringing together of symbols begins to become grammaticalized, for example, content words such as nouns and verbs become function words such as prepositions and auxiliaries, and loosely concatenated symbols acquire syntactic relationships involving constituency and dependency. These transformations of linguistic structure occur as a result of social-interactive processes in which (i) speakers try to abbreviate linguistic expression as much as they can, and (ii) listeners try to make sure that speakers do not go so far in this direction that the message becomes incomprehensible. Grammaticalization processes are well-attested in the written records of numerous languages in their relatively recent pasts, and it is a reasonable assumption that the same processes were at work in the origin and early evolution of language, turning loosely organized sequences of single symbols into grammaticized linguistic constructions (Traugott & Heine 1991; Givón 1995; Slobin, 1997)

But grammaticalization by itself is not enough because it does not account for the abstractness of linguistic structures. Abstractness, as Chomsky recognized in even his earliest writings, must be contributed by the minds of individual children as they acquire the use of particular pieces of particular languages. It is possible - albeit very difficult - to imagine that children make this contribution by simply linking an innate universal grammar with the particular structures of the particular language they are learning. However, it is also possible - and more in accord with recent data - to imagine that children make this contribution in more extended developmental processes in which they apply their general cognitive, social-cognitive, and vocal-auditory processing skills to the historical products of

grammaticalization (Tomasello 1995, 1998c, 1999). Overall, then, we may hypothesize that human language originated ultimately from a species-unique biological adaptation for symbolic communication, but the actual grammatical structures of modern languages were humanly created through processes of grammaticalization during particular cultural histories, and through processes of cultural learning, schema formation, and structure combining during particular human ontogenies.

The study of language acquisition has always tagged along behind models from Linguistics - because to study how children acquire something we should first know what that something is. The new usage-based models of Cognitive and Functional Linguistics offer some exciting new perspectives for developmentalists because they are concerned with the actual psychological processes by means of which individuals comprehend and produce utterances. But cognitive and functional linguists have something to learn from developmental psycholinguists as well. If we are interested in people's "stored linguistic experience", and how they use that experience in acts of linguistic communication, it would seem relevant to investigate systematically the processes by which linguistic experience is built up and used in human ontogeny.

6. References

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