



## Discussion

## A tale of two theories: response to Fisher

Michael Tomasello\*, Kirsten Abbot-Smith

*Max Planck Institute for Evolutionary Anthropology, Inselstrasse 22, D-04103 Leipzig, Germany***1. Introduction**

There are currently two theories about how children acquire a language. The first is generative grammar, according to which all human children innately possess a universal grammar, abstract enough to structure any language of the world. Acquisition then consists of two processes: (1) acquiring all the words, idioms, and quirky constructions of the particular language being learned (by ‘normal’ processes of learning); and (2) linking the particular language being learned to the abstract universal grammar. Because it is innate, universal grammar does not develop ontogenetically but is the same throughout the life-span – this is the so-called continuity assumption (Pinker, 1984). This assumption allows generativists to use adult-like formal grammars to describe children’s language and so to assume that the first time a child utters, for example, “I wanna play”, she has an adult-like understanding of infinitival complement sentences and so can generate ‘similar’ infinitival complement sentences *ad infinitum*.

Tomasello (2000) reviewed a number of observational and experimental studies which show – contrary to the continuity assumption – that children are not very productive with their early language, suggesting that they do not possess the abstract linguistic categories and schemas necessary to effortlessly generate infinite numbers of grammatical sentences. He also pointed out that there are no satisfactory explanations in the current literature of how a child might possibly link an abstract universal grammar, if there were such a thing, to the particularities of the specific language being learned (the linking problem).

The second theory, one version of which was sketched in the final part of Tomasello (2000), simply does away with universal grammar and the theoretical problem of how a child links it to a particular language. The approach advocated is based on theories in Cognitive-Functional (usage-based) Linguistics (e.g. Bybee, 1985, 1995; Croft, 2000, in press; Goldberg, 1995; Langacker, 1987, 1991), and so it is a single process theory. Children acquire the more regular and rule-based constructions of a language in the same way they acquire the more arbitrary and idiosyncratic constructions: they learn them. And, as in the learning of all complex cognitive activities, their initial learning is

---

\* Corresponding author. Fax: +49-341-9952-119.

*E-mail address:* tomas@eva.mpg.de (M. Tomasello).

of concrete things – particular words (e.g. *cat*), complex expressions (e.g. *I-wanna-do-it*), or mixed constructions such as *Where's-the \_\_\_\_* (which are partially concrete and partially abstract) – which is then followed at some point by the construction of abstract categories and schemas out of these concrete pieces of language (MacWhinney, 1999). Tomasello (2000) presented much evidence that they do this only gradually and in piecemeal fashion, with some categories and constructions appearing much before others that are of a similar type from a generative grammar perspective – due quite often to differences in the language that individual children hear (“input”).

The central point made by Fisher (in press) in her commentary on Tomasello (2000) is that our argument – that children develop fully abstract syntactic categories and constructions later than is typically supposed – is overstated, and that as a consequence we have tended to “make different approaches to explanation [i.e. generativist and usage-based] seem more different than they really are” (p. 3). In this response we do two things. We first address Fisher’s empirical challenge, which has much merit and leads to a productive discussion – although we contest a number of specific points, of course. We then address the issue of whether the two theories of language acquisition outlined above are really more similar than we make them out to be. In this case we find Fisher’s arguments difficult to follow because she appears to be advocating a constructivist, usage-based theory very similar to ours; she just thinks that children construct a bit more quickly than we do, and she emphasizes some different raw materials used in the construction process. Nowhere in Fisher’s critique is there a defense of, or even a discussion of, the proposal that children have linguistic abstractions innately – the proposal that was the explicit concern of the original article.

## 2. The empirical situation

Fisher (in press) criticizes the experiments reviewed in Tomasello (2000) for making three faulty assumptions. She then presents some other data as part of her argument that young children have abstract linguistic representations at an earlier age than we suppose. We discuss these each in turn.

### 2.1. *Supposed faulty assumption #1: choice of verbs and elicitation paradigms*

Fisher claims that our experimental studies in which we give children a nonce verb in one construction (e.g. *The ball's gaffing*) and then attempt to get them to produce it in another construction (e.g. *He's gaffing the ball*) rest on a faulty assumption, namely, “that children should predict that any verb could be used transitively” (p. 9). But this is not the case. In all of our studies except the first (six papers, eight studies) we chose verbs very carefully to fall into the appropriate semantic classes, as outlined, for example, in Levin (1993), thus ensuring that they were of a type that adults use both as transitives and in other constructions depending on the study (e.g. active–passive or transitive–intransitive alternation).

If what Fisher means by this criticism is something more general – namely, that the ‘lexically-specific’ behavior of the 2-year-olds in our production tasks may result from the fact that they have yet to learn the alternation classes of English and their particular lexical restrictions – we cannot but agree. This is the whole point; children are learning the syntax

of the language they hear rather than activating an innate universal grammar. Fisher's claim to the effect that all theories, even nativist theories, recognize this learning is belied by the statements of some generativists:

Once a child is able to parse an utterance such as 'Close the door!', he will be able to infer from the fact that the verb 'close' in English precedes its complement 'the door', that all verbs in English precede their complements. (Radford, 1990, p. 61)

There may be some generativist theories that recognize this learning, specifically the third subtype in the original article (pp. 231–232 under 'Lexicalism'). But then what is the point? We agree with Mazuka (1996, p. 317) that:

The strength of the grammatical parameter setting approach is that children can set a grammatical parameter with minimal data... If children must somehow learn to combine words correctly first, and then set the [for example] Head Direction parameter by generalizing from the data, it will nullify the basic motivation for the parameter setting approach to language acquisition. (see also Meisel, 1995)

In addition, we should also stress that this criticism by Fisher does not hold for other novel verb production studies in which the children were not required to alternate between constructions (i.e. the 'weird word order' paradigm; Abbot-Smith, Lieven, & Tomasello, 2001; Akhtar, 1999 – discussed further below).

## 2.2. *Supposed faulty assumption #2: performance effects*

Fisher claims also that we assume that "there are no reasons other than lack of linguistic competence for children to fail to innovate with verbs in language production" (p. 5). This is also not the case. In several places, Tomasello (2000, e.g. pp. 229–230) outlined three alternative hypotheses that might conceivably explain the data (mainly failure to innovate) and then recounted various control conditions that seem to rule out these alternatives. Contrary to what Fisher implies in several places, we do not assume that any of these is a perfect control, but rather that each addresses a specific alternative hypothesis and that together they effectively rule out the most obvious alternative accounts in terms of performance factors.

One very simple alternative hypothesis is that young children are generally too shy to use newly learned words in novel ways syntactically. But this is contradicted by the fact that they use newly learned nouns in novel ways from very early in development (Tomasello, Akhtar, Dodson, & Rekau, 1997). It is true, as Fisher notes, that generalizing nouns and verbs involves different processes so this is certainly not a 'total control', but it does rule out a simple shyness explanation. A second alternative hypothesis is that young children are simply unable to use a newly learned verb in a novel transitive sentence. But this is contradicted by the fact that they use newly learned verbs in novel transitive sentences (e.g. with nouns they have never before heard with that verb) if they have previously heard that verb in another transitive sentence (e.g. Brooks & Tomasello, 1999). This is also not a perfect control, for a variety of reasons, but again it does rule out the specific alternative hypothesis to which it is addressed. Finally, a third alternative hypothesis is that young children have the requisite linguistic knowledge needed for

syntactic productivity, but they also have problems formulating that knowledge for purposes of language production – whereas they should have fewer problems in comprehension. But this is contradicted by the findings of several studies that children have as much trouble comprehending transitive sentences with novel verbs as they do in producing them (Akhtar & Tomasello, 1997). (This is a key issue to which we return below; it rests on the fact that there are different ways to measure children's comprehension.) To repeat: while none of these three controls is perfect, together they effectively rule out the most obvious performance factors that might prevent young children from displaying their full linguistic competence in our experiments.

### *2.3. Supposed faulty assumption #3: the problem of verb meaning*

Finally, Fisher also worries that children may not be interpreting the novel verbs we teach them as potentially causative and so as usable in a transitive construction. But several of the studies have a control condition in which other children learn the same verbs in transitive utterances for the exact same events, and in these conditions they treat them as causative and produce novel transitive utterances with them. So there is nothing about the verbs or our nonlinguistic situations by themselves that mislead the children. However, it is possible, as Fisher argues, that in some cases when children hear the novel verb during the initial exposure phase – for example, in an intransitive utterance – they construe the enacted action as non-causative and subsequently fail to construe it as causative when encouraged to do so. The problem is that Fisher's main critique here revolves around only the transitive–intransitive alternation, since she focuses on the different number of arguments in these two constructions. In studies using the passive (e.g. Brooks & Tomasello, 1999), both the construction in which children originally hear the novel verb (full passive) and the one in which they are supposed to produce it (active transitive) have two expressed arguments. Moreover, in the Akhtar (1999) study, all the utterances in which children heard the novel verbs had two expressed arguments and were used transitively by the adult, and the children still failed quite often to correct the ungrammatical orderings to SVO.

### *2.4. Where to look for abstract knowledge*

Fisher also focuses on some data that may suggest that 2-year-olds have more abstract linguistic representations than they show in our nonce verb productivity studies. Most importantly she points out that 2-year-old children in the Akhtar (1999) study were better at using sentences with nonce verbs if they had heard these verbs used in SVO order than if they had heard them used in the ungrammatical orders SOV or VSO. Although these children were 2;8 and so their emerging knowledge of English transitive word order is not so surprising, Abbot-Smith et al. (2001) recently tested younger children and found a similar effect. Although children at 2;4 were much more likely to follow the adult in using ungrammatical word orders than to correct to grammatical word order (unlike the 3-year-olds, for whom the trend was in the opposite direction), they nevertheless did produce canonical orders more readily than noncanonical orders. One suggestion is thus that young 2-year-olds have only a weak transitive schema – one that enables certain kinds of linguistic operations but not others – whereas older children have a stronger and more robust schema based on a wider range of stored linguistic experience.

A similar conclusion might be drawn from the other area of research on which Fisher focuses, namely, comprehension experiments. There are two types of studies: those using act-out tasks (children hear a sentence and act out its meaning using toys) and those using preferential looking tasks (children hear a sentence and look preferentially toward one of two video events). Studies using novel verbs in the classic act-out task fall perfectly into line with the production studies (as noted above). For example, Akhtar and Tomasello (1997) performed two novel verb, act-out tasks using two slightly different methodologies and found that, in line with the production data, children below 3 years of age were very poor at acting out appropriately transitive sentences with novel verbs (i.e. they were poor at choosing the pre-verbal NP as actor and the post-verbal NP as undergoer).

The findings of preferential looking studies are mixed. The relevant preferential looking studies are those using novel or very low frequency verbs, so we know that children have had no previous experience with them. In almost all of these studies the comparison is between transitives and intransitives. First, Naigles (1990) found that when they hear utterances with noun-verb-noun orderings (transitives), children from 2;1 prefer to look at one participant doing something to another (causative meaning) rather than two participants carrying out synchronous independent activities. She also found that children had the reverse preference when they heard an intransitive utterance. Further preferential looking research has generally corroborated this finding with transitive utterances for children ranging in age from 2;2 to 2;6 (Bavin & Growcott, 1999; Bavin & Kidd, 2000; Hirsh-Pasek & Golinkoff, 1996, Experiments 5 and 6). In contrast, however, further findings for the intransitive construction have been inconsistent with Naigles' result. Three other novel verb, preferential-looking studies have found that children aged 2;2 (Bavin & Growcott, 1999), 2;4 (Hirsh-Pasek & Golinkoff, 1996, Experiment 5), and 2;6 (Bavin & Kidd, 2000) have no preferred interpretation for intransitive utterances. These findings suggest – in line with the item-based, usage-based theory we are espousing – that these two constructions are acquired on their own timetables independently.

With regard to the transitive construction in particular, these four studies consistently show that in the preferential looking paradigm young 2-year-old children know enough about the construction to know that it goes with asymmetrical activities (one participant acting on another) rather than symmetrical activities (two participants engaging in the same activity simultaneously). What these studies do **not** show is that young children can connect the pre-verbal position with the actor (or subject) and the post-verbal position with the undergoer (or object) in a transitive utterance – which would be required for a full-blown representation of the transitive construction, and which is indeed required of children in both the act-out comprehension task and novel verb production tasks. The only preferential looking study which attempted to examine this knowledge is by Fisher (2000). However, the sentences she gave children (1;9 and 2;2) had prepositional phrases that provided additional information (e.g. *The duck is gorping the bunny up and down*). Thus, the child merely had to interpret *bunny up and down* in order to 'prefer' the picture in which the bunny was indeed moving up and down (rather than the duck), without paying attention to the syntactic marking of verb arguments at all. Therefore, whether young 2-year-olds can use canonical English word order to identify actors and undergoers is at this point still an open question.

And so we see little in these findings that would support the views expressed by Fisher and her colleagues in other places:

These [1;5-year-olds are] sensitive to the idea that the doer of the action is the subject of the transitive sentence; and that in English the serially first noun is that subject. (Fisher, Hall, Rakowitz, & Gleitman, 1994, p. 359)

Statements such as these not only overinterpret the findings for transitives in the preferential looking paradigm, but they do not take into account (1) the production findings, (2) the act-out comprehension findings, and (3) the negative findings for intransitives in the preferential looking paradigm. In addition, to impute knowledge of grammatical subject to children one would have to show, using something like passives, that they understand the utterance-initial NP as something more than ‘actor’ in general.

In our view, a much more reasonable interpretation of the overall pattern of findings is as follows. If we consider the Fisher (2000) findings to be methodologically problematic, we can say that from about age 2;0 children have a weak verb-general representation of the transitive construction that includes information about its basically causative meaning, but not information about how the two different participants (actor, undergoer) are syntactically marked. If we do follow the Fisher (2000) interpretation, then we still must explain why knowledge about participant roles and their marking does not show up in act-out comprehension and nonce verb production studies until later. One possibility would be to hypothesize that linguistic and other cognitive representations grow in strength during ontogeny, and performance in preferential looking tasks requires only weak representations whereas performance in tasks requiring more active behavioral decision making requires stronger representations. This hypothesis is in the general spirit of a number of proposals suggesting that, if cognitive representations retain information about the variety of individual instances, they may be felicitously described as being either weaker or stronger based mainly on their type and token frequency (e.g. Munakata, McClelland, Johnson, & Siegler, 1997). It is also consonant with the view that ‘linguistic knowledge’ and ‘linguistic processing’ are really just different aspects of the same thing. Thus, the processing factors that Fisher describes – frequency and probabilistic distribution of lexical items in the input, memory, categorization, and so forth – not only play a crucial role in how children build up their linguistic representations but also form an integral part of those representations in the end state (see the papers in Barlow & Kemmer, 2000; Elman, Bates, Johnson, & Karmiloff-Smith, 1996).

### **3. The theoretical situation**

To return to the large-scale theoretical issue, Fisher claims that we have exaggerated the difference between generative theories and usage-based theories of language acquisition. More specifically, her claim is that young children have abstract linguistic knowledge at an earlier age than we give them credit for, and so the actual situation is that children’s early language is a rich mixture of item-specific and abstract knowledge. But even if this is true, the major question that differentiates the theories is how are these abstractions created? What is the process? For generativists, the abstractions are given at the start of development, and the child “only” has to link them up to the language she is learning (in some as-yet-unexplained way). For usage-base theorists, the abstractions must be constructed by individuals based on their linguistic experience. What could be more different?

Where does Fisher stand on this issue? Despite the introduction, which prepares the reader for a defense of generativist approaches, it would seem that she is more on the constructivist side of the issue: “Do young children have adult syntactic competence? Not from the start.” (p. 21). What children have from the start, according to Fisher, are some “simple structure-matching biases” (p. 25) between conceptual and linguistic representations – involving, for example, number of arguments – that enable them to get started. But there is no evidence that these biases are specific to language; they could just as easily result from characteristics of human cognition in general – including especially such things as the ability to categorize, to register statistical probabilities of any sequenced stimuli (e.g. Saffran, Johnson, Aslin, & Newport, 1999), or to discern analogies among situations in all kinds of linguistic and nonlinguistic domains (Gentner & Markman, 1997). Indeed, this more flexible approach is by far the more plausible possibility given the vast amount of syntactic variability that exists among the thousands of different languages of the world, including some that organize their syntax ergatively in one tense and accusatively in another, or that mark the single argument of intransitive verbs differently for unergatives and unaccusatives (Slobin, 1997).

And of course we agree with Fisher that children at some point must “scale up” to the more complex and abstract constructions of adult language. But rather than simply implying how difficult this would be without help from an innate universal grammar (or alluding to supposed evidence for a “critical period” for language acquisition – which may represent nothing more than differences between children and adults in general cognitive skills), we have been investigating ways that young children might scale up using the same usage-based linguistic knowledge and operations that they have used at earlier stages of development with simpler constructions (e.g. see Diessel & Tomasello, 2000, on relative clauses; Diessel & Tomasello, 2001, on sentential complements; Israel, 2000, on passives). Indeed, Childers and Tomasello (in press) have recently begun to investigate experimentally precisely what types and numbers of training utterances enable children to create linguistic abstractions of various kinds. These kinds of process-oriented studies stand in stark contrast to generative studies which simply look to confirm the view that children know it all from the start.

### Acknowledgements

Thanks to Elena Lieven and Nameera Akhtar for comments on an earlier draft.

### References

- Abbot-Smith, K., Lieven, E., & Tomasello, M. (2001). What pre-school children do and do not do with ungrammatical word orders. *Cognitive Development*, 16, 1–14.
- Akhtar, N. (1999). Acquiring basic word order: evidence for data-driven learning of syntactic structure. *Journal of Child Language*, 26, 339–356.
- Akhtar, N., & Tomasello, M. (1997). Young children’s productivity with word order and verb morphology. *Developmental Psychology*, 33, 952–965.
- Barlow, M., & Kemmer, S. (2000). *Usage-based models of language*. Cambridge: Cambridge University Press.
- Bavin, E., & Growcott, C. (1999). Infants of 24–30 months understand verb frames. In M. Perkins & S. Howard (Eds.), *New directions in language development and disorders*. New York: Kluwer Academic/Plenum.

- Bavin, E., & Kidd, E. (2000). Learning new verbs: beyond the input. In C. Davis, T. J. van Gelder & R. Wales (Eds.), *Cognitive Science in Australia 2000: Proceedings of the 5th Australasian Cognitive Science Conference, Adelaide*. Location?: Publisher?.
- Brooks, P., & Tomasello, M. (1999). Young children learn to produce passives with nonce verbs. *Developmental Psychology, 35*, 29–44.
- Bybee, J. (1985). *Morphology: A study of the relation between meaning and form*. Amsterdam: John Benjamins.
- Bybee, J. (1995). Regular morphology and the lexicon. *Language and Cognitive Processes, 10*, 425–455.
- Childers, J., & Tomasello, M. (in press). The role of pronouns in young children's acquisition of the English transitive construction. *Developmental Psychology*.
- Croft, William (2000). *Explaining Language Change: An Evolutionary Approach*. London: Longmans.
- Croft, W. (in press). Radical construction grammar. Oxford: Oxford University Press.
- Diessel, H., & Tomasello, M. (2000). The development of relative constructions in early child speech. *Cognitive Linguistics, 11*, 131–152.
- Diessel, H., & Tomasello, M. (2001). The acquisition of finite complement clauses in English: a usage based approach to the development of grammatical constructions. *Cognitive Linguistics, 12*, 97–141.
- Elman, J., Bates, E., Johnson, M., & Karmiloff-Smith, A. (1996). *Rethinking innateness: a connectionist perspective on development*. Cambridge, MA: MIT Press.
- Fisher, C. (2000) *Who's blinking whom?: word order in early verb learning*. Poster presented at the 11th International Conference on Infant Studies, Brighton, UK.
- Fisher, C. (in press). The role of abstract knowledge in language acquisition: a reply to Tomasello (2000). *Cognition*.
- Fisher, C., Hall, S., Rakowitz, L., & Gleitman, L. (1994). When it is better to receive than to give: syntactic and conceptual constraints on vocabulary growth. *Lingua, 92*, 333–375.
- Gentner, D., & Markman, A. (1997). Structure mapping in analogy and similarity. *American Psychologist, 52*, 45–56.
- Goldberg, A. (1995). *Constructions: a construction grammar approach to argument structure*. Chicago, IL: University of Chicago Press.
- Hirsh-Pasek, K., & Golinkoff, R. M. (1996). *The origins of grammar: evidence from early language comprehension*. Cambridge, MA: MIT Press.
- Israel, M. (2000). From states to events: the acquisition of English passive participles. With Christopher Johnson & Patricia Brooks. *Cognitive Linguistics, 11-1/2*, 103–129.
- Langacker, R. (1987). *Foundations of cognitive grammar*. Vol. 1. Stanford, CA: Stanford University Press.
- Langacker, R. (1991). *Foundations of cognitive grammar*. Vol. 2. Stanford, CA: Stanford University Press.
- Levin, B. (1993). *English verb classes and alternations*. Chicago, IL: University of Chicago Press.
- MacWhinney, B. (1999). The emergence of language from embodiment. In B. MacWhinney (Ed.), *Emergentist perspectives on language acquisition*. Mahwah, NJ: Erlbaum.
- Mazuka, R. (1996). Can a grammatical parameter be set before the first word? Prosodic contributions to early setting of a grammatical parameter. In J. L. Morgan & K. Demuth (Eds.), *Signal to syntax: bootstrapping from speech to grammar in early acquisition* (pp. 313–330). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Meisel, J. (1995). Parameters in acquisition. In P. Fletcher & B. MacWhinney (Eds.), *Handbook of child language*. Cambridge, MA: Blackwell.
- Munakata, Y., McClelland, J. L., Johnson, M. H., & Siegler, R. S. (1997). Rethinking infant knowledge: toward an adaptive process account of successes and failures in object permanence tasks. *Psychological Review, 104*, 686–713.
- Naigles, L. (1990). Children use syntax to learn verb meanings. *Journal of Child Language, 17*, 357–374.
- Pinker, S. (1984). *Language learnability and language development*. Harvard University Press: Cambridge, MA.
- Radford, A. (1990). *Syntactic theory and the acquisition of English syntax*. Cambridge, MA: Blackwell.
- Saffran, J. R., Johnson, E. K., Aslin, R. N., & Newport, E. L. (1999). Statistical learning of tone sequences by human infants and adults. *Cognition, 70*, 27–52.
- Slobin, D. (1997). On the origin of grammaticalizable notions – beyond the individual mind. In D. I. Slobin (Ed.), *The crosslinguistic study of language acquisition*. 5. Hillsdale, NJ: Erlbaum.
- Tomasello, M. (2000). Do young children have adult syntactic competence? *Cognition, 74*, 209–253.
- Tomasello, M., Akhtar, N., Dodson, K., & Rekau, L. (1997). Differential productivity in young children's use of nouns and verbs. *Journal of Child Language, 24*, 373–387.