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## **The acquisition of English particle placement: A case study in developing productivity**

Expanding upon work by Diessel & Tomasello (2005, hereafter D&T) and Gries (to appear),<sup>1</sup> this study explores particle positioning in child language as a gradual cognitive-pragmatic development based on statistical distribution of input. The phenomenon of particle position alternation is peculiar insofar as it defines a category of combinations which show syntactic variation without concomitant semantic variation.

Place alternation in verb-particle constructions

- a. Tip over<sub>[PARTICLE]</sub> the cup. (continuous)
- b. Tip the cup over<sub>[PARTICLE]</sub>. (discontinuous)

Such a category is distinct from verbs followed by prepositional phrases, which lack alternation, as well as phrasal stress on the preposition (see Dehé 2002 for a review).

Lack of place alternation in verbs followed by prepositional phrases

- a. Climb over<sub>[PREPOSITION]</sub> the wall.
- b. ?Climb the wall over<sub>[PREPOSITION]</sub>.

Overall, D&T find that early child language has no default particle order (as claimed by Hyams et al. 1993; Bennis et al. 1995 and more recently by Snyder 2007), and that some of the contextual and processing factors determining particle placement distribution (Gries 2003) are already present in children's earliest multi-word utterances. This study goes further, attempting to establish the course of development for adult-like particle ordering. For these purposes, it focuses, not on the earliest stages of syntax, but on the developmental period immediately following that studied by D&T (1;6 – 2;3), that is, the period between 2;3 and 4;10, as represented by Adam from the Brown Corpus (1973).

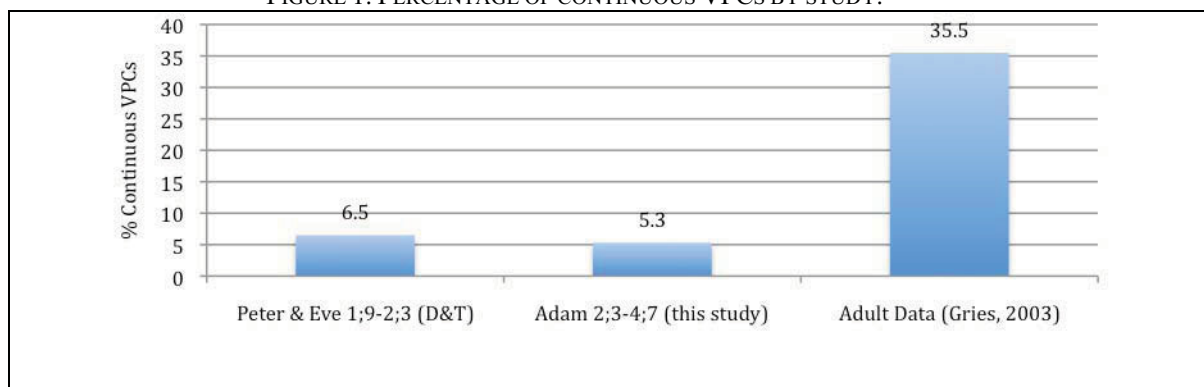
In contrast with Gries' study (to appear), which analyses multiple semantic, syntactic and phonological factors across the entirety of the developmental corpus data for three children, my goal is to observe the corpus-internal development of particle distribution within the 31 months of the available data. A view is provided into how a single child gradually develops a principled use of particle order, as a function of contextual factors such as object type and meaning. More suggestively, based on a sampling of data from Adam's mother, arguments are provided so as to consider child particle ordering a fundamentally lexically-based process (an idea also examined in Gries, to appear), which gradually transitions into a principled, probabilistic system.

The initial contrast of D&T's data (based on Eve (Brown 1973) and Peter (Bloom et al. 1974-5)) with my own, is unilluminating as regards particle position, since it shows a decrease in the continuous order when viewed from the perspective of adult distributions (data from Gries 2003).

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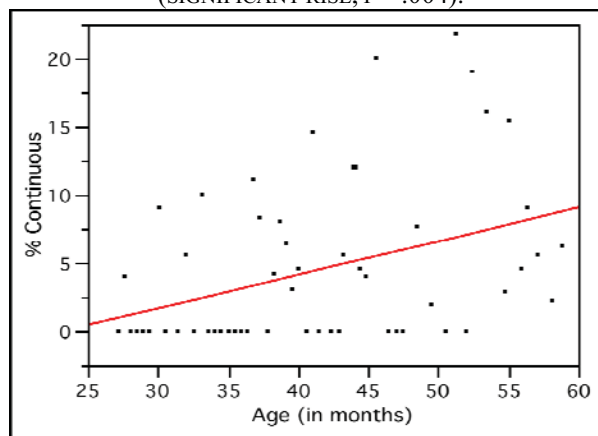
<sup>1</sup> The author would like to thank an anonymous reviewer for pointing out the imminent publication of Gries (to appear), which substantially changes the landscape of English particle-verb acquisition studies.

FIGURE 1: PERCENTAGE OF CONTINUOUS VPCs BY STUDY.



A closer look at the internal development of Adam's data alone, provides a very different picture.

FIGURE 2. BIVARIATE FIT FOR PERCENTAGE OF CONTINUOUS VPCs AGAINST ADAM'S AGE (SIGNIFICANT RISE,  $p = .004$ ).



Internally, the corpus data for Adam shows a gradual growth in the continuous order, which predicts that, if sustained, adult-like ordering may not be acquired until after the age of twelve. Furthermore, in line with D&T, we may say that there is no one moment in the data that attests to the setting of a parameter licensing the adult distributions.

As in the case of D&T's and Gries' (2003, to appear), our study finds a statistical correlation (here a simple, monofactorial chi-square distribution) between VPC order and its meaning as well as its object-type. In other words, we find a significant relation ( $\chi^2 = 52.224$ ;  $p < .0001$ ) between the ordering of the particle and the object NP's being a pronoun (*I wrap it around*, 4;1) or a noun (*gobble up the food*, 3;8). Such a relation also holds for particle order and the meaning of the VPC ( $\chi^2 = 14.829$ ;  $p < .0001$ ), which may be spatial (i.e. directional, *pick dirt up*, 2;4) or non-spatial (i.e. idiomatic, *made it all up*, 2;5, or telic aktionsart, *eat you up*, 2;7). Again, here I add to D&T and Gries' (forthcoming) analyses by focusing on the internal development of these factors within the corpus. In separate linear bivariate fit analyses, the proportion of nominal objects is shown to decrease over time, as does the percentage of spatial VPCs.

FIGURE 3. BIVARIATE FIT FOR PERCENTAGE OF NOMINAL NPs AGAINST ADAM'S AGE (SIGNIFICANT DROP,  $P=.008$ ).

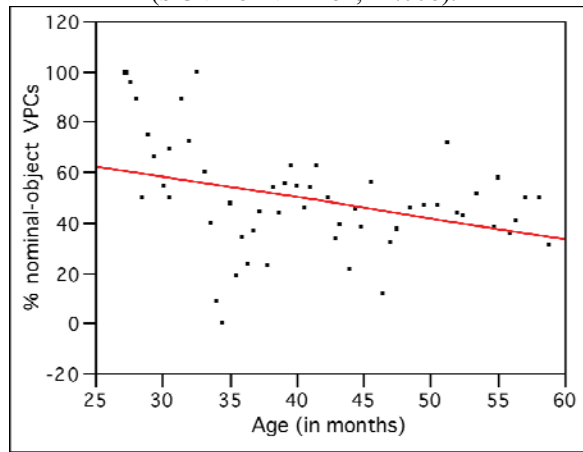
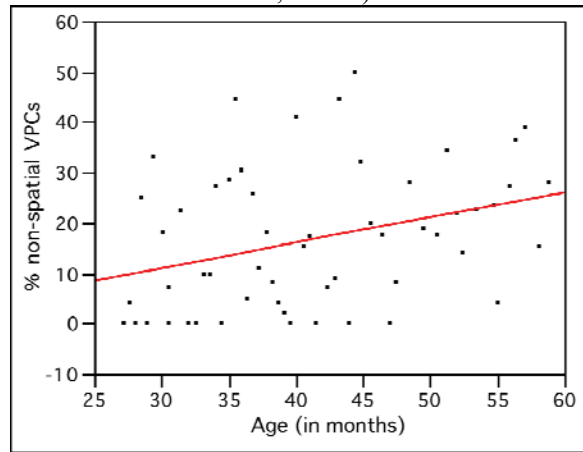


FIGURE 4. BIVARIATE FIT FOR THE PERCENTAGE OF NON-SPATIAL NPs AGAINST ADAM'S AGE (SIGNIFICANT RISE,  $P=.013$ ).



This is precisely what we would expect if we consider that adult-like VPC distribution is the result of the acquisition of principles and processing strategies (such as those outlined by Gries 2003), and the gradual growth in their frequency of use by children. Two of the factors that appear to contribute to adult distributions are the decrease in nominal objects – which correlates to the shrinking percentage of discontinuous VPCs – and the growth of non-spatial forms – which correlates to the growth of the continuous VPC.

I argue that my analysis is in line with the ‘Cognitive Commitment’ proposed by Lakoff (1991) insofar as the use of pronominal forms, as well as non-spatial semantics imply a greater development of abstraction, which ultimately shows the mapping of more complex cognition to particular linguistic structures, which in turn grow in frequency. The development of productive particle ordering in phrasal verbs is another case of grammatical developments mirroring the growth of cognitive structure, both linguistic and non-linguistic (cf. Bowerman 2007; Behrens 2001).

Finally, the study examines whether particular particle-verb combinations are more or less likely to surface in the continuous or discontinuous order, finding that, of the 213 VPC types in the corpus, 19 appeared (in a chi-square test) as significantly different in terms of their overall ordering ( $p < .05$ ). I argue that these items are strongly

associated to a particular ordering, which is not a default, but an item-based generalization. Further evidence for this comes from the close match found between the child-data and the particle ordering used by Adam's mother, in the same corpus.

TABLE 1. COMPARISON OF IRREGULARLY AND REGULARLY DISTRIBUTED ITEMS IN THE ADAM CORPUS.

Sample Irregularly Distributed Items					Sample Regularly Distributed Items				
VPC item	Adam		Mother		VPC item	Adam		Mother	
	Cont	Disc	Cont	Disc		Cont	Disc	Cont	Disc
Run over	11 (0.58)	0 (10.48)	4	1	Turn on	1 (0.99)	18 (18.01)	0	8
Find out	3 (0.16)	0 (2.84)	2	0	Take off	3 (5.65)	105 (102.35)	0	47
Chop down	3 (0.16)	0 (2.84)	0	0	Take out	2 (3.77)	70 (68.23)	0	49
Cut out	7 (0.94)	11 (17.05)	1	0	Turn off	1 (0.63)	11 (11.37)	0	4
Put in	0 (5.02)	96 (90.97)	2	102	Bring down	0 (0.05)	1 (0.95)	0	1

\*figures in parenthesis correspond to expected ( $H_0$ ) values for the item in its particular order

Although the number of attested data for each VPC type is limited, I suggest that Adam's data represents an intermediate stage between item-dependent and principle-based particle placement. That is, based on the predominant distribution of each combination in the ambience language, particle placement may be determined for some (or all) VPCs in children's early language, only to gradually be replaced by the contextual-pragmatic factors used by adults.

The data and analyses of VPC ordering provide new evidence for a usage-based perspective on language acquisition (Tomasello 2003; Diessel 2004). Particle alternation in child language appears to behave neither randomly nor on the basis of a single set of pre-established, monolithic principles, but is rather the result of interaction between the child's observation of adult frequency, and the gradual systematization and abstraction of pragmatic, cognitive, and formal principles governing particle placement.

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