

NOTE

The countering of overgeneralization*

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ABSTRACT

Commenting on Goldberg's (1995) 'construction grammar', Tomasello (1998) proposes a model of language acquisition in which children move from highly specific utterance–event pairings to abstract, verb-general structures. Despite their many strengths, models of this kind predict considerably more overgeneralization of the argument structures of verbs than seems to occur. In recognition of this, the paper explains (and supports with data from a previously unpublished study of 44 children aged 2;0 to 4;4) how processes which are side effects of the emergence of the verb form class could counter the overgeneralizing tendencies. It is argued that these processes are consistent not just with the model proposed by Tomasello but also (in large part) with the grammatical theory developed by Goldberg.

INTRODUCTION

One highlight of the 1998 edition of *Journal of Child Language* was a feature entitled *The Return of Constructions* which comprised an analysis from the developmental perspective of Goldberg's (1995) attempt to centralize constructions within grammatical theory. Constructions are defined by Goldberg as form–meaning pairs where some aspect of form and/or meaning is not predictable from the component parts or from other constructions. Morphemes are clear instances of constructions but so according to Goldberg are the argument structures of verbs, i.e. the structures that require

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NP₁ + Verb + NP₂ with ‘raise’ (cf. *The defenders raised the drawbridge*) but NP₁ + Verb with ‘fall’ (cf. *The drawbridge fell*). The treatment of argument structures as constructions is controversial within contemporary linguistics, but it is central to Goldberg’s approach and proves to be the primary concern of her 1995 book.

The analysis of the book in the *Journal of Child Language* was led by Michael Tomasello (i.e. Tomasello, 1998), who outlined Goldberg’s major claims, argued persuasively for their linguistic significance, and made proposals about the implications for the acquisition of English, again focusing upon argument structures. Summarized briefly, Tomasello’s proposals revolve around the assumption that language acquisition in general and argument acquisition in particular are by-products of children’s attempts to preserve entire utterance–event pairings so that these can be reproduced when communication demands it. Because children’s processing resources are limited, utterance fragments will be preserved initially rather than complete strings, but nevertheless the aim is holistic representation and this will be increasingly approximated over time. Yet, whether fragmentary or complete, utterances will be paired with fairly specific phenomena, scenes involving ‘hitter’ and ‘hittee’ as Tomasello puts it rather than ‘agent’ or ‘patient’, because specificity is the nature of unfolding events. Eventually though, children should, according to Tomasello, notice similarities in both represented utterances and encoded events, and integration as a function of similarity should precipitate a move towards ‘more adult-like, abstract, and verb-general constructions’ (Tomasello, 1998, p. 439), constructions which in other words are functionally equivalent to argument structures.

From my own perspective, the attraction of Tomasello’s proposals stems partly from their similarity to a model that I outlined in Howe (1993). This model also presents preservation and reproduction of utterance–event pairings as the driving forces behind language acquisition, and attributes many well-documented features of the learning process to partial representation during the early stages. Nevertheless, despite the similarities, the angle taken by Howe (1993) serves also to highlight elements in Tomasello’s proposals that may require development, and one such element relates to the argument structures of verbs. Since this is the aspect of language acquisition that Tomasello (1998) emphasized and since little has been done on the topic in the intervening years, I wish, via this note, to suggest how development might proceed. My approach will be informed by the Howe (1993) model, together with empirical work that I have conducted subsequently. Since my model is in crucial respects consistent with Tomasello’s *Journal of Child Language* proposals, I believe that my approach is readily incorporated within his underlying framework. Thus, I shall end not simply by endorsing that framework, but also by showing that my approach concurs with the theorizing of Goldberg on which the framework is based.

TOMASELLO AND THE CHALLENGE FROM ARGUMENT STRUCTURES

The question that I focused on in Howe (1993) was whether (and how) children whose language learning is driven by the preservation and reproduction of utterance–event pairings could acquire the formal categories of adult grammar. The importance of the question has been underlined by Schlesinger (1998) for, commenting on Tomasello’s proposals, he notes that ‘one of the main criticisms levelled against [an approach like Tomasello’s] has been that the gap between such semantic relations and the formal ones of adult grammar cannot be bridged’ (Schlesinger, 1998, p. 452). My conclusion was that in general the gap can be bridged, but sometimes at the expense of principles that have become well-entrenched in the background literature. An example of great relevance here relates to syntactic form classes. In Howe (1993), I argue that these classes can be constructed from utterance–event pairings, but their construction implies (amongst other things) overgeneralization in verb argument usage. However, the known facts about argument usage suggest that the tendency towards overgeneralization must be moderated, AS IT EMERGES, by forces towards conservatism. It is this latter point that, I feel, is missing from Tomasello’s proposals, and that I wish to address. To set the scene, this section will summarize the Howe (1993) line on syntactic form classes, spell out the implications for verb argument usage, and discuss the issues raised by the overgeneralizing tendencies.

The Howe (1993) model proceeds on the assumption that learners who are concerned with utterance–event pairings will MAP individual lexical items onto individual event elements, e.g. ‘doll’ onto some individual toy or ‘eat’ onto some individual act of ingestion. Because lexical items are accordingly separate and individual, form classes will not in the first instance play any part. However, the motivation for the utterance–event focus is, as for Tomasello, preservation for future communicative needs, and this should trigger attempts to store in the most parsimonious fashion achievable. The latter should imply FUSION of identical lexical items, e.g. ‘doll’ said of one toy and ‘doll’ said of another, and of identical event elements, e.g. the favourite doll when she is called ‘doll’ and when she is called ‘baby’. Element fusion should produce form classes of a sort, e.g. ‘doll’ and ‘baby’, but these will be element-specific, limited in range, and semantic rather than syntactic. This would continue to be the case except that languages show partial as opposed to full overlap in the lexical items that can be used for specific event elements, e.g. human infants may also be referred to as ‘baby’ but perhaps not as ‘doll’. The key claim made in Howe (1993) is that learners cannot resist the pressures to lexical fusion wherever lexical identity occurs, but they deal with partial identity by EXTRACTING event elements from mappings and APPENDING these to lexical items, producing classes comprised, e.g. of ‘doll: used of dolls’ and ‘baby: used of dolls and babies’.

The inevitability, although gradualness, of syntactic form classes stems from the fact that children do not simply move as Tomasello acknowledges from partial representations of utterances to full ones, they also move (famously, albeit loosely) from ‘telegraphic’ (mainly open class) representations to extended ones. During the period of telegraphic representation, children will be mapping single items onto event elements, e.g. ‘doll’, ‘baby’, ‘eat’ and ‘bite’. Through fusion, extraction and appendage, they should, as sketched above, derive form classes that go beyond individual elements, but these classes should still be restricted to items that overlap in reference, ‘doll’, ‘baby’, ‘girl’ and ‘Wendy’ perhaps but not in normal circumstances ‘doll’, ‘baby’, ‘girl’ and ‘Wendy’ plus ‘atom’, ‘brandy’, ‘manifesto’ and ‘hill’. Thus, the form classes may cease to be element-specific and limited in range, but their semantic basis will continue. By contrast, once children move to extended representations, they will be mapping lexical STRINGS onto event elements, e.g. ‘a doll’, ‘this baby’, ‘some of the girls’ (and, for verbs, ‘eating’, ‘bites’ and ‘has been chewed’). The distribution of determiners, inflections and other closed class items is, of course, syntactic, and therefore the processes of fusion, extraction and appendage should now push towards syntactic classes rather than semantic. As a consequence, syntactic form classes must be the eventual outcome.

Nine years later, I remain convinced that the processes outlined above are (in general terms at least) the ones that children must follow if language acquisition is driven by utterance–event storage and reproduction. Therefore, the prediction of syntactic form classes (and the bridging of Schlesinger’s (1998) semantics-formal gap) should be regarded as encouraging. Nevertheless, as intimated earlier there is also a potential difficulty, and this stems from the fact that a move over time towards syntactic form classes is also a move towards overgeneralization. Although necessary to account for the distribution of determiners, inflections and so on, syntactic form classes are too broad to demarcate precisely the permissible combinations. As is well-known, the noun class includes items that cannot be combined with the plural inflection, and the verb class items that cannot be combined with the past. Thus, overgeneralization should occur once these classes emerge.

At first sight, the pressures towards overgeneralization will hardly seem a problem: it is a celebrated finding that children do overgeneralize the plural and past inflections. Obviously, the rates with which they do this cannot be calculated precisely: as Maratsos (2000) points out, estimates depend on partially imponderable issues of sampling and contextualization. Nevertheless, the rates look from available data to be reasonably high. For instance, Maratsos argues that Brown’s (1973) Adam and Sarah and Kuczaj’s (1977) Abe could have been overgeneralizing the past inflection with as many as 30% to 50% of their past irregular verbs. Likewise, Fletcher (1985), in a one-year longitudinal study of Sophie, observed ‘-en’ and ‘-ed’ being

deployed inappropriately with irregular verbs on 135 of the 987 occasions where the latter were used, an overgeneralization rate of around one in 7. However, while these rates seem substantial, they do not appear to be reflected in other areas of grammar, areas that, on the face of it, should be comparable. One such area may include the argument structures of verbs. The emergence of the verb form class should, in principle, encourage liberal extension of argument structures, just as it encourages liberal extension of past inflections. Moreover, as with past inflections, this should be a force towards overgeneralization, for even verbs that are similar in meaning differ over permissible argument structures. For instance, while 'tell' can take its post-verb arguments in both the NP₁+PP and NP₂+NP₁ orders, 'announce' is limited to the NP₁+PP (cf. *The BBC told the news to the nation/told the nation the news* and *The BBC announced the news to the nation/announced the nation the news*). Likewise, 'splash' is open as regards the NP₁+PP and NP₂+PP orders, while 'pour' is restricted to the NP₁+PP (cf. *John splashed mud on the carpet/splashed the carpet with mud* and *John poured juice into the cup/poured the cup with juice*). However, while the potential for overgeneralization seems clear from such strings, it seems to show limited correspondence to what happens in practice: as far as can be ascertained from available data, spontaneous overgeneralization of argument structures is rare at all stages of the learning process.

Saying that argument overgeneralization is rare is not of course to deny occasional usage, and Bowerman (1988) and Pinker (1989) are good sources for the examples that have been reported in the literature. Nevertheless, when plotted against the contexts where argument overgeneralization might have occurred, the instances in children's speech appear to be few and far between. Baker (1979) was one of the first to make this point, and systematic evidence has subsequently been provided by Gropen, Pinker, Hollander, Goldberg & Wilson (1989). Gropen *et al.* scrutinized the CHILDES files (see MacWhinney, 1991, for details relating to the files) for overgeneralization of the NP₂+NP₁ order in dativization (dativization being the process illustrated above by 'tell' and 'announce'). Gropen *et al.* considered all files relating to Brown's (1973) Adam, Eve and Sarah and to MacWhinney's (1991) Ross and Mark, 86,332 child utterances in total. 432 utterances displayed the NP₂+NP₁ structure in dativization, but only 22 showed evidence of overgeneralization, a rate of one in 20.

More recently, I have implemented a check through the CHILDES files for overgeneralizations of ANY post-verb arguments, i.e. not just in dativization but also in locativization as in the 'splash'/'pour' example above and many others. The work was with the six directories relating to English (Bloom, 1970; Brown, 1973; Suppes, 1973; Snow, 1981; Wells, 1981; Sachs, 1983) that could be assumed to span Brown's (1973) Stages I, II, III and IV, thereby allowing a wide developmental spectrum to be explored. 25 files

covering Stage I, 25 covering Stage II, 25 covering Stage III and 25 covering Stage IV were chosen at random. There were 412 instances where a verb was followed by two or more arguments, and 62 verbs were involved although 'put' accounted for 140 instances, 'give' for 41, 'get' for 36 and 'take' for 23. Amongst the 412 strings, there were five possible overgeneralizations in the ordering of arguments and these are listed, although only two seem above question:

- (1) *Take home man* (Peter, File 7): if = 'Take the man home'.
- (2) *Put in chairs breakfast* (Peter, File 11): if = 'I have put my breakfast in the chairs'.
- (3) *Put in bag with that* (Peter, File 11): if = 'I have put that in the bag'.
- (4) *Ride me a horsie* (Peter, File 11): seems clearcut 'Ride a horsie to me'.
- (5) *Put in dere your marble* (Adam, File 28): seems clearcut 'Put your marble in there'.

It might be argued that by looking at all verbs followed by two or more arguments, I was stacking the cards against overgeneralization: some verbs, e.g. 'tell' and 'splash', are unrestricted as regards post-verb argument order and therefore do not provide contexts where overgeneralization could occur. However, even if the analysis is limited to verbs that are restricted, 283 utterances remained in the dataset. Thus, even treating all of (1) to (5) as overgeneralizations, we are left with a rate of one to 57, and hence with further evidence that, with the argument structures of verbs, overgeneralization seldom occurs.

The rarity of argument overgeneralization is potentially problematic for accounts of language learning that presume syntactic form classes from the earliest stages, and is acknowledged as such by, e.g. Baker (1979) and Pinker (1989). Nevertheless, the point that I am stressing here is that it is equally challenging for approaches like Tomasello's in the 1998 *Journal of Child Language* which presuppose that initial distinctions are specific and semantic but set up storage processes that guarantee moves towards generality. Such approaches have no difficulties with early learning: the presumed specificity at this stage precludes overgeneralization (see also Tomasello, 1992, 2000). However, because these approaches also (I am arguing) predict syntactic form classes, albeit now as emergent, they too must anticipate eventual overgeneralization and be exercised by its rarity. The trouble is that, in contrast to proponents of *a priori* syntactic categories like Baker and Pinker, Tomasello does not acknowledge the challenge posed by rarity: his focus is the predicted absence of overgeneralization in the initial stages and then its occurrence. I believe that this focus has led Tomasello into a certain amount of difficulty, and it is, in fact, the main reason why, as suggested earlier, his proposals are in need of development. In the next section, I shall start by identifying what, in my view, is the precise nature of the difficulty. Then, I

shall outline how Tomasello's proposals might be developed to account for both the occurrence and the rarity of argument overgeneralization.

COUNTERS TO OVERGENERALIZATION IN ARGUMENT STRUCTURE

As noted by way of introduction, the solution to the overgeneralization problem must lie with countering mechanisms that operate as forces towards conservatism in argument usage. From the point of view of Tomasello (1998), not to mention Howe (1993), the most satisfactory version of such a mechanism would be something that emerges in tandem with syntactic form classes and thereby moderates their consequences. However, the child language literature has little to say about countering mechanisms of this or any other form: the emphasis has been on corrective processes that eliminate errors once they occur (so-called 'negative evidence'), rather than mechanisms that pre-empt most errors in the first place. Corrective processes are also emphasized by Tomasello (1998), and this is a theme that he develops in subsequent papers (Brooks & Tomasello, 1999; Brooks, Tomasello, Dodson & Lewis, 1999). Three processes are proposed, and even though they are post-overgeneralization and corrective, they might appear, on the face of it, to be transformable into the countering mechanisms that are needed. Unfortunately however, transformation does not prove feasible in practice. Two of the corrective processes are subject to precisely the difficulty under scrutiny: they are consistent with the initial absence and later occurrence of argument overgeneralizations (and they can probably eliminate the latter), but they cannot deal with the evidence that, even at their height, argument overgeneralizations seldom occur.

The first of the problematic processes is 'entrenchment', a mechanism that depends on verbs that have been solidly learned with certain constructions not being extended to alternative constructions without independent evidence that extension is acceptable. For example, if 'pour' is repeatedly experienced with the NP₁ + PP structure as outlined earlier, it will not be extended to the NP₂ + PP without independent evidence, evidence which will not of course be forthcoming. The second process, 'pre-emption', is closely related, depending on the use of verbs in constructions other than those that would be expected being taken as evidence that the verbs are prohibited from the expected constructions. For instance, if 'pour' is experienced with the NP₁ + PP structure where the discursive context would signal NP₂ + PP, it is inferred that NP₂ + PP is prohibited. Brooks & Tomasello (1999) and Brooks *et al.* (1999) demonstrate that both processes can operate with language learning children, although not until six or seven years with pre-emption. However, operational or not, it would be hard, without extra and potentially unacceptable constraints, to define entrenchment or pre-emption in a fashion that was specific to the argument structures of verbs. Entrenchment and pre-emption would also have to apply, e.g. with

verb inflections. As a result, they could not be the counters that explain why argument overgeneralization seems rare compared with overgeneralization elsewhere.

The third of Tomasello's corrective processes is derived from the work of Pinker (1989), work that focuses exclusively upon argument structures and that also (as noted above) acknowledges the rarity of overgeneralization. Like many earlier theorists (e.g. Green, 1974; Wierzbicka, 1986), Pinker believes that there are subtle differences in meaning between the various argument structures, e.g. within dativization the NP₁ + PP form is thought to mean 'causes Y to go to Z', while the NP₂ + NP₁ form is thought to mean 'causes Z to have Y'. These differences operate as 'broad range rules' on verb selection: verbs will appear with both forms to the extent that they can convey both meanings. The key point is that, for Pinker, broad range rules operate throughout the language learning period, implying that children should never overgeneralize beyond them. However, there are verbs which comply with some structure's broad range rules but which are unacceptable when used in the structure, e.g. 'supply' can convey 'cause Z to have Y' yet *John supplied Mary sheets* sounds odd. These are the verbs that Pinker believes will be overgeneralized, with overgeneralization continuing until 'narrow range rules' are acquired to act as constraints. Thus, overgeneralization will occur during language learning because of the absence of narrow range rules but it will be limited because of the presence of broad range rules.

Pinker's claims have been widely accepted, and there is little doubt that patterns of adult usage can be more or less predicted using the rules that he specifies. This is not to say that the predictive value is perfect and Goldberg (1995) is one of many researchers to identify exceptions, but nevertheless it is reasonably good. However, it is developmental significance rather than prediction of usage that is at issue here, and the evidence to support Pinker's rules as constraints on children is far from compelling. For one thing, as Ingham (1992) pointed out, the developmental data presented in Pinker (1989) relate exclusively to broad range rules: narrow range rules were overlooked. This situation has continued until recently, and it is only with the work of Brooks & Tomasello (1999) that we have an attempt to remedy matters. Bowerman (1988) is also critical of the narrow range concept, although the term 'narrow range rules' was not used in the work of Pinker's that Bowerman had access to, and therefore does not appear in her text. Amongst other problems, Bowerman wonders why children would go to the trouble of formulating narrow range rules, when broad range rules are sufficient for the processing of all speech that they are likely to hear.

Perhaps though, the problems with narrow range rules should not be regarded as unduly troublesome, when as noted above, broad range rules are supposed to play the major role in delimiting overgeneralization. In which

case, an arguably more serious problem is the fact that the strongest (i.e. controlled experimental) evidence for broad range rules relates with few exceptions (Gropen, Pinker, Hollander & Goldberg, 1991, could be argued to be one) to children of five years and older. This is very late to be studying features that are supposed to be present from the outset and much later than the start of any move towards syntactic form classes and therefore the need, under discussion here, to counter overgeneralization. For reasons presented in Howe (1993) and unqualified by subsequent research, the emergence of syntactic form classes is harder to pinpoint than some authors presume. Nevertheless, there is nothing in the evidence relating to onset to challenge the key assumptions of my model (and by inference Tomasello's proposals) that emergence is both gradual and triggered by representation of determiners, inflections and other closed class items. Since the latter typically begins during the third year of life, the implication is that countering processes must be operational by then.

In view of the above, I think that we have to acknowledge uncertainties about Pinker's claims, and hence also about Tomasello's apparent endorsement. However, is that endorsement crucial? Even though dissociation from Pinker would leave Tomasello with few options from amongst his three corrective processes, there are theoretical advantages in exploring whether dissociation is possible. This is because incompatibilities exist between Tomasello's basic approach and that of Pinker, and these incompatibilities would create serious problems should Pinker's approach be sustained. The whole thrust of Tomasello's proposals is that abstract, verb-general constructions emerge over time, being preceded by structures that are concrete and verb-specific. Quite apart from the fact that Pinker makes limited use of the construction concept, his claims depend on verb-generality from the outset. For example, the notion of broad range rules depends on *a priori* verb classes of a general, albeit semantic, variety, e.g. classes which associate verbs that can mean 'cause Y to go to Z' and verbs that can mean 'cause Z to have Y'. Since this difference is fundamental, it may be in Tomasello's interest to accept that even the third of his three processes is questionable, and to look elsewhere for countering mechanisms. This raises the question of whether promising alternatives are likely to be found.

In my view, there is certainly one alternative possibility that is worth taking seriously, and this stems from the fact that children are faced not only with learning the order of arguments associated with particular verbs but also with learning their number. The significance of the latter is explained in detail in Howe (1993). However to appreciate the point in general terms, imagine that en route to the verb form class a child who was deploying the mapping, fusion, extraction and appendage processes outlined earlier encountered two intransitive sentences, *The sun shone* and *The door opened*, and two transitive sentences, *The dog chased the cat* and *The boy lost his shoe*.

The child should realize that dealing with these sentences via a grammar that relied exclusively on verb-general structures would prove unacceptable. After all, if the structures specified NP₁ + V + NP₂ they would allow the nonsensical *The sun shone the cat*, if they specified NP₁ + V they would allow the incomplete *The boy lost*, and if they specified NP₁ + V + (NP₂) they would allow everything, nonsense and incomplete. The only way out of the dilemma, assuming that the pressure to a generalized verb form class is irresistible, would be to ABSTRACT arguments from the verb-general structures and MARK individual verbs for the arguments they are associated with. The latter, which would amount to the representation of arguments as lexical features, would involve children in analysing the arguments they experience on a VERB-BY-VERB basis. It would therefore be inconsistent with overgeneralization, and once it emerged it should serve to eliminate the overgeneralizing tendencies that form classes create. Importantly though, it is not merely a counter to those tendencies but also a consequence of them: what I have just argued is that as children move towards form classes with their overgeneralizing consequences, so they must experience difficulties with generalized representation of argument structures and so they must also move (with reference to their linguistic experiences) to a lexical solution. The implication will be clear: if the mechanism that blocks argument overgeneralization is part-and-parcel of the pressures that create it, then it is no wonder that overgeneralization occurs rather rarely.

Although the mechanism that I am proposing stands in contrast to Tomasello's corrective processes, it does have precedents in the background literature. For instance, it can be related to claims made by Randall (1990). Randall also sees intrinsic structural change as the solution to the overgeneralization problem, and uses variability in argument number to motivate lexical representation of argument structures. This said, my mechanism differs from Randall's in that it presumes the gradual emergence of a generalized verb form class, whereas Randall works from the government-binding perspective that presupposes this from the outset. Likewise, the individuation that is inherent in my mechanism has parallels with the verb-by-verb learning proposed by Baker (1979), but nevertheless there are differences. Baker treats verb-by-verb learning as a constant, while I am suggesting that the pressures that produce the concept of a verb lead OVER TIME to lexical features that include argument structures. This gradualness is important since it means that overgeneralization can occur during language acquisition, even though the shift to verb-by-verb representation guarantees that it will be limited. As a result, my approach does not merely address the rarity of argument overgeneralization (and its eventual elimination), it also anticipates the occasional occurrence.

Finally though (and despite the contrast with Tomasello's corrective processes), the countering mechanism that I am proposing is, I believe,

entirely consistent with the broad tenor of Tomasello (1998). After all, insofar as the mechanism is associated with the emergence of syntactic form classes, it is part of a chain that links ultimately to the preservation and reproduction of utterance–event pairings. Indeed, the proposed mechanism is also consistent with what I presented earlier as Tomasello’s primary focus, the predicted absence of overgeneralization in the initial stages of language learning and its subsequent occurrence. This is because, like Tomasello, my emphasis upon utterance–event processing leads me to anticipate: (1) specific utterance–event pairings in the initial stages that preclude overgeneralization; (2) integrative pressures that, from the third year onwards but with growing momentum over time (for me, as syntactic form classes are consolidated), constitute forces towards overgeneralization. What I am adding now are: (3) countering mechanisms (for me, verb-by-verb learning) that emerge in tandem with and as consequences of the integrative pressures, and that guarantee not only that overgeneralization will eventually disappear (as do Tomasello’s corrective processes) but also that it will always be limited. The question is whether there is evidence to support my approach, and the next section will describe an empirical study that can be regarded as the first step towards an affirmative answer.

DATIVIZATION IN CHILDREN AGED TWO TO FOUR : AN EMPIRICAL STUDY

The previous section discussed four possible approaches to the countering of argument overgeneralization. Of the approaches, two, Tomasello’s (1998) ‘entrenchment’ and ‘pre-emption’, were rejected as failing to deal with the apparent rarity. The third approach, derived from Pinker’s (1989) broad and narrow range rules, was seen as empirically uncertain and theoretically inconsistent with Tomasello’s general perspective. However, it was never actually ruled out. The fourth approach was mine, as developed from Howe (1993). Thus, based on the previous section, it could be argued that comparison of Pinker’s approach and mine is the crucial issue for further research, and this was the rationale for the study to be outlined here. The study was concerned with the contrasting predictions that Pinker’s approach and mine would make about generalization during dativization from the NP₁ + PP structure to the NP₂ + NP₁, given four types of verb: (1) Common verbs that concur with both the broad range and narrow range rules that Pinker specified for NP₂ + NP₁ (Common + BR + NR); (2) Common verbs that concur with the broad range rules for NP₂ + NP₁ but not the narrow range (Common + BR – NR); (3) Common verbs that concur with neither the broad range nor the narrow range rules for NP₂ + NP₁ (Common – BR – NR); (4) Obscure verbs that concur with both the broad range and narrow range rules for NP₂ + NP₁ (Obscure + BR + NR).

Given children in the age range 2;0 to about 4;0, Pinker would presume

constant access to the broad range rules but growing access to the narrow. Therefore after experience with each of the above types of verb in the NP₁+PP structure, such children should be ready at all ages to generalize the Common+BR+NR verbs and the Obscure+BR+NR to the NP₂+NP₁ structure, unwilling at all ages to generalize the Common-BR-NR verbs, and more willing at the younger ages than the older to generalize the Common+BR-NR verbs. My approach implies that from their third year onwards, children will engage in integrative procedures that produce increasing pressures to generalize and at the same time increasing pressures to use linguistic experiences to represent arguments lexically. The net effect of these pressures should be a steady increase with age in generalization of Common+BR+NR verbs to the NP₂+NP₁ structure, since the language of adults should provide evidence that generalization is appropriate. The effect should be an increase and then decrease with Common+BR-NR and Common-BR-NR verbs, since evidence that generalization is appropriate will not be observed and therefore the pressures to generalization will eventually be resisted. Obscure+BR+NR verbs could behave like Common+BR-NR and Common-BR-NR verbs. However, before making a firm prediction here, it should be remembered that on my approach lexical items need to go through fusion processes to be embedded in the system. Recognizing this, the possibility has to be entertained that Obscure+BR+NR verbs will not be generalized at any stage. In any event though, the implications of my approach for Obscure+BR+NR verbs differ from Pinker's.

The study tested the above predictions with 'give' as the Common+BR+NR verb, 'pull' as the Common+BR-NR, 'drop' as the Common-BR-NR, and 'bunt' as the Obscure+BR+NR. 'Bunt' is obscure in British contexts because it refers to an action in baseball. The verbs were chosen purely because when measured against Pinker's specification of the broad and narrow range rules for dativization, their BR and NR status is clear. Thus, they would not only allow the predictions from Pinker's approach to be tested in a fashion that he would regard as fair; given that Pinker's rules are good predictors of adult usage (as mentioned earlier), they would also guarantee the varying 'evidence of appropriateness' within linguistic experiences that testing my approach depends on. It was recognized that Pinker's intuitions about the acceptability of the verbs with NP₂+NP₁ are not universal: Levin (1993) for instance concurs with Pinker over 'give', 'drop' and 'bunt', but believes that 'pull' can take NP₂+NP₁. Such cross-speaker variation will be taken up later, but here it is irrelevant. Given the aims of the study, the crucial thing is that the verbs contrast over BR and NR status with respect to Pinker's specification and, as predicted by that contrast, vary in usage (as opposed to theoretical acceptability) with NP₂+NP₁. There is no reason to doubt that these conditions were fulfilled.

Method

Participants. The study involved 44 children from predominantly middle class backgrounds who were attending private nurseries in Stirlingshire, Scotland. Nine boys and nine girls were aged 2;0 to 2;11 (Mean = 2;6) and will be referred to as ‘two-year olds’, eight boys and ten girls were aged 3;1 to 3;11 (Mean = 3;6) and will be referred to as ‘three-year olds’, and four boys and four girls were aged 4;0 to 4;4 (Mean = 4;2) and will be referred to as ‘four-year olds’. The relatively small number of four-year olds and their skew to the lower end of the four to five age range reflects the fact that at the time of the study, children aged 4;6 and older would have left the nurseries for primary schools.

Procedure. Each child was taken through an interview schedule that revolved around four verbs plus their post-verb arguments. There were four such schedules, with the major variation being in the verbs used, i.e. (1) give – stick – drop – etch; (2) stamp – pull – draw – bunt; (3) give – draw – pull – etch; (4) stamp – drop – stick – bunt. Only two verbs in each schedule were of interest, e.g. ‘give’ and ‘drop’ in (1), and insofar as each child went through one schedule only, each child generated data relating to two of the verbs. The other verbs in the schedules were included as distractors, and were deployed in sequences parallel to the ones described below but relating to locativization rather than dativization. It was the perceived need to include distractors that led to four schedules each containing four verbs, for a single eight-verb schedule was found (during piloting) to be excessive for the youngest children. Presentation of the schedules was counter-balanced with respect to the children’s age and sex, so that data generated for each verb could reasonably be combined across schedules for purposes of analysis.

Within the schedules, each verb was associated with ten sequences, each set of ten involving a single puppet character from the television programme ‘Sooty’, i.e. Sooty, Sweep, Soo or Scampi. The first five sequences were devoted to training in the use of the verb with its arguments in the NP_I + PP order. The approach to training was similar to Gropen *et al.*’s (1989) and relied on ‘syntactic priming’ (Bock, 1986), i.e. when one of two possible structures is modelled, the modelled structure is more likely to be used subsequently than the alternative. In detail, the training sequences proceeded as follows:

- In Sequences 1 and 2, the researcher made the relevant Sooty character perform the action described by the verb to transfer small objects (e.g. a biscuit, book, apple or brush) to animal puppets (e.g. a panda, monkey, rabbit or mouse). The researcher then used NP_I + PP to describe the action, e.g. *Sooty is giving a biscuit to Monkey*, *Scampi is dropping the ball*

TABLE 1. *Use of verbs*

	Verb omitted	Verb changed	Verb correct
TRAINING			
Two-year olds			
give	4.78	0.00	0.22
pull	3.12	0.00	1.88
drop	4.37	0.00	0.63
bunt	3.62	0.00	1.38
Three-year olds			
give	2.56	0.00	2.44
pull	1.86	0.14	3.00
drop	2.42	0.17	2.41
bunt	3.00	0.00	2.00
Four-year olds			
give	2.50	0.00	2.50
pull	2.00	0.20	2.80
drop	2.33	0.00	2.67
bunt	2.75	0.25	2.00
TESTING			
Two-year olds			
give	4.11	0.11	0.78
pull	3.89	0.00	1.11
drop	3.38	0.00	1.62
bunt	4.00	0.00	1.00
Three-year olds			
give	1.56	0.00	3.44
pull	0.57	1.14	3.29
drop	1.83	0.50	2.67
bunt	2.10	0.50	2.40
Four-year olds			
give	1.25	0.00	3.75
pull	1.60	0.60	2.80
drop	1.33	0.00	3.67
bunt	1.50	0.50	3.00

to *Panda*, and invited the child to repeat what she had said, prompting if necessary via the subject plus verb, e.g. *Sooty is giving ...?*, *Scampi is dropping ...?* She repeated the descriptions and prompts until the child attempted to complete the sentence.

- Sequences 3 and 4 followed the same format as Sequences 1 and 2, but with new objects and recipients and therefore descriptions. The only substantive difference was that the child was given the opportunity to provide the description, in answer to e.g. *What is Sooty doing here?*, before the researcher modelled and prompted.
- Sequence 5 also started with *What is X doing here?* but omitted the modelling. There was simply a pause after the question and then the *X is (verb)ing ...?* prompt.

The second five sequences in each set were designed to test the children's willingness to extend the verbs they had been trained upon to the NP₂ + NP₁ order without direct linguistic evidence that this was appropriate. The testing sequences involved further actions equivalent to the training ones where small objects were transferred to animal puppets, and the children were invited to describe what happened. This time though there was no training and the actions were contextualized, again following Gropen *et al.* (1989), to make the NP₂ + NP₁ order pragmatically preferable. In particular, both the actor and the recipient were now kept constant, meaning that the only features which varied from sequence to sequence were the transferred objects. As noted by, e.g. Allerton (1978) and Erteschik-Shir (1979), there is a tendency to place phrases referring to new arguments after those referring to given ones, meaning that the NP₂ + NP₁ order should be preferred over the NP₁ + PP when the transferred objects are new. The point was reinforced in the study by the use of questioning along the lines of *We've still got Panda, but what is Sooty doing with him this time? [Pause] Sooty is giving ...?* The issue was whether the children were prepared to switch to the NP₂ + NP₁ order, in the presence of these contextual cues but without NP₂ + NP₁ being explicitly used. To this end, the researcher never modelled the argument structure: the five testing sequences were restricted to modelled actions, ... *what is X doing with him this time?* questions, and *X is (verb)ing ...?* prompts. It is worth noting that the researcher had limited knowledge of the child language field, and was kept in ignorance of the competing predictions throughout.

Coding and reliability

Every session was audiotaped in its entirety, and the tapes were subsequently coded for: (1) the use of the verb in each sequence, i.e. verb omitted, verb changed, verb correct; (2) the use of post-verb arguments in each sequence, i.e. both omitted, one omitted, both included in the trained order, both included in the reversed order. The data from 11 children (i.e. 25%) were independently coded by two judges, with 98% agreement reached over verb coding and 95% over argument.

Results

Table 1 shows the mean number of training and testing sessions for each verb within which the two-, three- and four-year olds omitted the verb, changed the verb or included the correct verb. Using the data in Table 1, six two-way ANOVAs were carried out to explore the effects of verb and age on verb omission, verb change and correct verb during first training and then testing. Statistically significant differences were followed up using Scheffé tests.

The results showed that response patterns were independent of whether the verb was 'give', 'pull', 'drop' or 'bunt', for there were no significant

main effects of verb and no significant interactions between verb and age. However, age did make a difference. During both training and testing, there was a statistically significant age effect for omission of verbs (F for training = 15.65, $df = 2, 76$, $p < 0.001$; F for testing = 20.28, $df = 2, 76$, $p < 0.001$). As can be seen from Table 1, this was because the two-year olds were more likely than the other children to omit verbs. During training and testing, there was also a statistically significant age effect for use of correct verbs (F for training = 7.70, $df = 2, 76$, $p < 0.001$; F for testing = 11.63, $df = 2, 76$, $p < 0.001$), resulting from the two-year olds being less likely than the other children to articulate correct verbs. Although these trends are of interest, they should not be overplayed: since the prompts expressed the verbs, the rules of ellipsis legitimate verb omission should the speaker wish this. A far more important result in Table 1 is the rarity of changed verbs, for this indicates that the children were generating arguments for the intended verbs and not for something else. During training, the frequency of changed verbs was not only rare but also unrelated to age ($F = 1.07$, $df = 2, 76$, ns). Moreover, although the age effect during testing was significant ($F = 4.38$, $df = 2, 76$, $p < 0.05$), the only significant pairwise comparison was between the two- and three-year olds.

As for the arguments, the data in Table 2 show that by and large the training sessions did achieve their aim: at all age levels and for all verbs, the bulk of the responses during training included both arguments in the trained (NP1 + PP) order.

This said, two-way (verb \times age) ANOVA's did reveal statistically significant differences. In particular, the two-year olds were significantly more likely than the other children to omit one argument ($F = 7.68$, $df = 2, 76$, $p < 0.001$) and showed a non-significant trend towards being more likely to omit both arguments ($F = 2.64$, $df = 2, 76$, $p = 0.08$). Conversely, the three- and four-year olds were more likely to include two arguments in the trained order ($F = 7.22$, $df = 2, 76$, $p < 0.001$). Including both arguments in the reversed order was very rare during training, and was unrelated to age. It was on the other hand related to verb ($F = 2.87$, $df = 3, 76$, $p < 0.05$), but although as Table 2 shows this was because of more reversals with 'give', no *post hoc* comparisons via the Scheffé test yielded statistically significant results. The reversal measure was the only one during training to be affected by verb.

In some respects, the results for argument usage during testing mirrored those for usage during training, with two-way ANOVA's showing the two-year olds to be more likely than the other children to omit one ($F = 7.23$, $df = 2, 76$, $p < 0.001$) or both arguments ($F = 4.31$, $df = 2, 76$, $p < 0.05$), and less likely than the other children to include both arguments in the trained sequence ($F = 11.38$, $df = 2, 76$, $p < 0.001$). The key differences from training occurred with the use of both arguments in the reversed (NP2 + NP1) order. For one thing, reversals were reasonably frequent across the test

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TABLE 2. *Use of arguments*

	Both omitted	One omitted	Both included (Trained order)	Both included (Reversed order)
TRAINING				
Two year olds				
give	1.22	1.11	2.67	0.00
pull	0.11	2.11	2.78	0.00
drop	0.50	0.88	3.63	0.00
bunt	0.63	1.25	3.13	0.00
Three-year olds				
give	0.11	0.56	4.00	0.33
pull	0.00	0.14	4.86	0.00
drop	0.25	0.67	4.00	0.08
bunt	0.30	0.50	4.20	0.00
Four-year olds				
give	0.00	0.00	4.25	0.75
pull	0.00	0.00	5.00	0.00
drop	0.00	0.00	5.00	0.00
bunt	0.00	0.00	5.00	0.00
TESTING				
Two-year olds				
give	0.67	3.22	0.56	0.56
pull	1.33	2.78	0.89	0.00
drop	1.13	3.75	0.13	0.00
bunt	0.75	3.25	1.00	0.00
Three-year olds				
give	0.00	2.11	1.22	1.67
pull	0.00	0.86	3.71	0.43
drop	0.33	2.83	1.67	0.17
bunt	0.60	1.20	3.20	0.00
Four-year olds				
give	0.00	1.50	0.00	3.50
pull	0.20	1.80	2.80	0.20
drop	0.00	1.33	3.67	0.00
bunt	0.00	0.75	4.25	0.00

sequences, showing that the contextual support did operate as planned. More importantly though, there were significant age ($F = 3.23$, $df = 2, 76$, $p < 0.05$) and verb ($F = 14.00$, $df = 3, 76$, $p < 0.001$) effects over the use of the reversed order and a significant age x verb interaction ($F = 2.58$, $df = 6, 76$, $p < 0.05$). Inspection of Table 2 suggests that the interaction resulted from: (1) a steady increase with age in use of the reversed order with 'give', the Common + BR + NR verb; (2) an increase followed by a decrease in use with 'pull' and 'drop', the Common + BR - NR and Common - BR - NR verbs; (3) zero frequencies of use at all ages with 'bunt', the Obscure + BR + NR verb. This said, the only differences to reach conventional levels of statistical significance on Scheffé tests were with 'give', where the two-year olds differed significantly from the three-year olds and the three-year olds differed significantly

from the four-year olds. Despite this, the picture concurs closely with what my approach would predict, while being in almost complete contrast to what Pinker (1989) would have anticipated.

DISCUSSION AND A RETURN TO CONSTRUCTIONS

Although the results of the study are encouraging, I do not wish to pretend that they provide conclusive support for my approach. The results concur with the predictions that would be made about children who have begun the move to syntactic form classes, but there is no certainty that the children in the study had all reached this point (and as intimated earlier, it would be exceedingly difficult to test this empirically). In addition, no attempt was made to work with children who were so young that on a 'gradualist' model like mine, and of course Tomasello's (1998), failure to start the move could be taken for granted. On the other hand, very young children are expected to be conservative, and therefore some encouragement can be drawn from the low levels of argument reversal by the two-year olds (regardless of verbs) that is shown in Table 2. A further potential difficulty is that the results clearly require replication. It would be useful to investigate dativization with additional verbs since only one exemplar of the four types was used in the study, and to investigate argument structures additional to dativization. The research reported by Brooks & Tomasello (1999) and Brooks *et al.* (1999) that has been mentioned already makes a start towards the latter in that it was concerned with transitivity. Interestingly, the children whose experimental experiences were most comparable to my study's (Brooks & Tomasello's 'no pre-emption' group) produced equivalent results. Thus, even though further research is undoubtedly required, there are signs already that the present results and the approach they support may have something to offer. This is perhaps sufficient to warrant discussion of the possible consequences.

My views about the consequences for Tomasello (1998) should already be clear: in my opinion, it is highly consistent with Tomasello's proposals to suggest that patterns of overgeneralization stem from treating syntactic form classes and lexical representation of arguments as emergent and interlocking phenomena. Thus, the support for this suggestion provided by the study should be welcome. However, what about Goldberg (1995)? To consider the implications here, we need to be clear what Goldberg's key insights are, and like Tomasello, I believe that they lie with her claims about verb meaning, construction meaning and the interaction between these. On verb meaning, Goldberg amasses a multitude of linguistic and experimental findings to challenge the view, popular among linguists, that the semantic interpretation of verbs changes as a function of their associated argument structures. What this view amounts to is the belief that the meaning of 'give' in the NP₁ + PP context differs from its meaning in the NP₂ + NP₁, a view that Goldberg roundly and, to my mind, persuasively dismisses. For Goldberg, verbs have

unitary meanings, and if the reading of ‘give+NP₁+PP’ differs from the reading of ‘give+NP₂+NP₁’, it is because the CONSTRUCTIONS have contrasting semantics and not the verbs. Goldberg would probably accept Pinker’s ‘cause to go to’ and ‘cause to have’ distinction for the constructions in question, but she also recognizes the fluidity of within-construction semantics. She points out that like concepts in general, constructions have prototypical exemplars (cf. Rosch & Mervis, 1975), a role that ‘give+NP₂+NP₁’ plays within dativization. Thus, like concepts in general, constructions can be extended to events that show feature overlap with the prototype although not necessarily with each other, producing ‘a family of closely related senses’ (Goldberg, 1995, p. 31). Goldberg spells out the senses associated with a range of argument structures including dativization.

Putting the above together, we have a situation where in adult representation the meanings of verbs can be autonomous from the meanings of their arguments, and argument structure is polysemous. This creates potential tension when using verbs within constructions for purposes of communication, and analysing this tension is one of Goldberg’s key aims. The crucial point about her analysis is that one-to-one correspondence between verb and construction semantics is not required, and this according to Goldberg is what allows creativity in language usage. It permits Pinker’s (1989) ‘Haig speak’, i.e. *Let me caveat that* and *That statement needs to be nuanced*. Moreover, it also accounts for cross-speaker variation over which argument structures are acceptable and which ill-formed, variation which is widely recognized (Allerton, 1978; Czepluch, 1982) and which has been alluded to already.

At first sight, evidence for creativity and/or variability might seem troubling for the approach I have taken, when the approach emphasizes lexical conservatism as the outcome of learning. Nevertheless, the conservatism is only with respect to grammatical representations. It says nothing about strategic decisions about whether representations should be followed during social interaction, and as it happens my approach predicts precisely the tension between verb and construction meaning that Goldberg relies on. I suggested earlier that arguments become features upon verbs AS LEXICAL ITEMS, implying that as far as argument structures are concerned forms are paramount rather than functions. As a result, verb meaning must depend on factors that are independent of argument structure. Likewise, I expressed support for Tomasello’s claim that language acquisition falls out from children’s attempts to preserve utterance–event pairings as integrated wholes. In Howe (1993), I go into considerable detail about the consequences of such attempts for the course of grammatical development, but suffice it to say here that the structures underpinning constructions must derive from the structures underpinning events, and as a result must be semantically interpretable. Constructions can therefore interact with verbs as Goldberg

proposes to determine meaning, and given normal prototype processes can undoubtedly be polysemous.

Because my approach predicts tension between verb and construction meaning, it also allows for unconventional usage when conditions support this. In which case, we may have to recognize two forms of overgeneralization, both rare and countered by lexical conservatism but nonetheless real: one, the focus of this note, which results from inadequately specified grammars and the other which results from tensions within grammars once they are relatively advanced. Indeed, if this possibility can be entertained, we may be able to find a role for Pinker's (1989) broad and narrow range rules, despite their incompatibility with the results of my study. In particular, rather than relating directly to verbs and their arguments, perhaps these 'rules' are features extracted from the prototypical constructions into which verbs and arguments can be slotted and from which usage can be strategically (and, on occasion, unconventionally) extended. In support of this, two points that have been made already can be re-iterated, that Pinker's rules are reasonably successful at predicting adult usage and that developmental support comes mainly from older children.

It seems likely then that the full picture as regards verb argument usage will call upon the work of Goldberg, Pinker and Tomasello, even though the countering of argument overgeneralization is an issue that, I suggest, none of these researchers deal with adequately. Recognizing this, my primary aim in this short note has not been to criticize, but rather to make a proposal that may help to fill the gap. Hopefully, the proposal will seem worthy of further research in its own right, but whether this is the case or not the problem that the proposal addresses certainly requires study. Considerable effort has been expended over the past thirty years in studying the occurrence of overgeneralization in the speech of young children, but there has been far less research into the absence of overgeneralization where it might otherwise be expected. Probably the most general message to be drawn from the above is therefore not the implications for Goldberg, Pinker and Tomasello, important though these may be. Rather it is the fact that seemingly conventional behaviour on the part of young children can be as developmentally significant as the well-documented idiosyncracies, and moreover that such behaviour does not always reflect passive assimilation of the adult model but can on occasion result from the dynamic interplay of opposing tendencies. It is to be hoped that such consideration will be acknowledged in future research.

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