J. Child Lang. **33** (2006), 99–124.
doi:10.1017/S0305000905007191 Printed in the United Kingdom

Perspective-shifts in event descriptions in Tamil child language*

BHUVANA NARASIMHAN AND MARIANNE GULLBERG
Max Planck Institute for Psycholinguistics

(*Received* 31 *August* 2004. *Revised* 24 *March* 2005)

ABSTRACT

Children are able to take multiple perspectives in talking about entities and events. But the nature of children's sensitivities to the complex patterns of perspective-taking in adult language is unknown. We examine perspective-taking in four- and six-year-old Tamil-speaking children describing placement events, as reflected in the use of a general placement verb (*veyyii* 'put') versus two fine-grained caused posture expressions specifying orientation, either vertical (*nikka veyyii* 'make stand') or horizontal (*paDka veyyii* 'make lie'). We also explore whether animacy systematically promotes shifts to a fine-grained perspective. The results show that four- and six-year-olds switch perspectives as flexibly and systematically as adults do. Animacy influences shifts to a fine-grained perspective similarly across age groups. However, unexpectedly, six-year-olds also display greater overall sensitivity to orientation, preferring the vertical over the horizontal caused posture expression. Despite early flexibility, the factors governing the patterns of perspective-taking on events are undergoing change even in later childhood, reminiscent of U-shaped semantic reorganizations observed in children's lexical knowledge. The present study points to the intriguing possibility that mechanisms that operate at the level of semantics could also influence subtle patterns of lexical choice and perspective-shifts.

[*] We gratefully acknowledge the cooperation of the teachers and students of the Ramakrishna Mission Tamil Medium School (Chennai, India) in conducting the study reported here. We are also grateful for funding from the Max Planck Institute for Psycholinguistics for data collection. We wish to express our thanks to Melissa Bowerman, Asifa Majid, Asli Özyürek, Leah Roberts, and two anonymous reviewers for comments on aspects of the design and analysis of the study. Any remaining errors are solely ours. Address for correspondence: Bhuvana Narasimhan, Max Planck Institute for Psycholinguistics, PB 310, 6500 AH Nijmegen, The Netherlands. tel: +31-(0)24-3521213; e-mail: bhuvana@mpi.nl

INTRODUCTION

Perspective-taking, marked by choice of linguistic expression, is a pervasive feature of communication among adult speakers. The choice of expression allows speakers 'to present to their addressees a specific conceptualization of an object, property, relation or event' (Clark, 1997: 1). For instance, entities can be labelled with different degrees of specificity, such as in the alternative labeling of a bear with a specific (basic-level) term (viz. *bear*) as opposed to a general, superordinate term (e.g. *animal*). Dynamic events also invite multiple perspectives in terms of speakers' encoding choices (Zacks & Tversky, 2001). Speakers of English can describe the placement of an object in terms of 'the spatial disposition of its major coordinate axis' (Jackendoff, 1987: 203). Based on the orientation of its maximal axis with respect to the vertical, the placement of a bottle can be described in a fine-grained fashion as *he stood the bottle on the table* or *he laid the bottle on the table*. Alternatively, reference to the bottle's orientation can be omitted altogether, and speakers can describe the same event at a coarser grain as in *he put the bottle on the table*. In both cases, speakers must determine the appropriate level of granularity and make the appropriate lexical selection accordingly.

Children acquiring language must learn '... what is available, the range of lexical choices, for conveying the perspectives they choose on particular occasions' (Clark, 1997: 6). Drawing on data from a number of different sources, Clark shows that from 1;0, children make use of multiple perspectives, as seen in their ability to take the physical point of view of other people, and in their pretend play. From the beginning of word-learning, they accept and use different terms to characterize the same referent (e.g. as a *basket* and a *hat*), and before 2;0, spontaneously construct novel terms for subkinds (e.g. *poodle-dog* for a type of dog). From 2;0 on, they can construct innovative compounds on demand, and when asked, can also shift perspective from one level to another (*cat* to *animal*, or the reverse), and from one domain to another. In semi-naturalistic contexts involving the learning of novel words, two-year-olds exhibit the lexical and conceptual abilities to establish hierarchical inclusion relations for entities (Waxman & Senghas, 1992).

In talking about events, children also exhibit early ability to take multiple perspectives. Before 4;0, children use *get* passives and *be* passives to take different perspectives on events which deviate from perspectives taken with active constructions (Budwig, 1990). Children between the ages of 1;8 and 2;8 acquiring German and English use active intransitives to signal the creation of a new play frame. Middle constructions, in contrast, are used to mark resistance from the environment (by English-speaking children) or to describe normative ways in which objects could be related to each other (by German-speaking children) (Budwig, Stein & O'Brien, 2001).

Children thus appear to acquire the linguistic means, i.e. 'what is available' (Clark, 1997:6), to adopt multiple perspectives in talking about events and entities early on. In many of the studies mentioned above, the term 'perspective' is typically interpreted as having to do with the speaker's manipulation of the knowledge state of the addressee according to the communicative goals of the interaction. However, language-specific conventions as to when and how perspective-shifting can take place also plays a role. In order to use particular lexical items to encode event construal at a particular level of granularity in accordance with the conventions of the language they are learning, children must pay attention to the statistical associations of these lexical items with particular situation types in the input language. In talking about 'perspective-shift' for the purposes of this study, we are referring to this latter type of knowledge. Very little is known about when and how versatility in such perspective-taking develops where hierarchically related expressions are available to encode perspectives at differing levels of granularity on the same event. The question is of particular interest as it moves beyond issues of correctness or grammaticality, and instead addresses more subtle issues of preferences and appropriateness in language use. Children's preferences for shifting perspective might develop in tandem with the development of meaning, or they may develop gradually, approaching adultlike norms only in later childhood under the influence of extended exposure to frequently used forms in the input and/or the child's own processes of (re-)organization of forms and functions in her lexicon.

In this study, we examine uses of hierarchically related expressions in descriptions of placement events by adults, four- and six-year-old children, keeping the communicative context constant. Specifically, we investigate speakers' descriptions of one class of caused motion events – OBJECT PLACEMENT EVENTS – in colloquial Tamil, a language which permits multiple encoding options for such events. In particular, we are interested in (a) whether children show adultlike flexibility in their use of semantically general versus specific expressions to take multiple perspectives on object placement events, and (b) whether factors such as the animacy of the 'located object' (the object undergoing change of location in placement events) influence shifts to a fine-grained perspective in similar ways in adults and children.

PERSPECTIVE-SHIFTS ON OBJECT PLACEMENT EVENTS

In different cultures, children and adults talk frequently about the placement of objects, e.g. putting a book in a bag, placing a bowl on a table. Events of object placement involve the caused motion of an object (located object) to an end location (reference object) with manual control exerted over the located object until it reaches its end location. This characterization includes events such as putting an apple on a plate, laying a doll on a table, but excludes events such as moving a box towards a table (but not reaching it), or dropping an orange onto the floor. Across languages, speakers differ in the granularity with which they habitually describe such object placement events. Habitual encoding partially depends on the lexical options afforded by a given language (Slobin, 1996; Newman, 2002). Some languages have lexical items that force fine-grained distinctions between placement events, e.g. on the basis of the orientation of the object (Newman, 2002). For instance, speakers of Swedish describe the placement of a bottle standing upright on a table with a monomorphemic verb of caused posture, *ställa* 'stand'. If the bottle is placed lying down on its side, a different caused posture verb *lägga* 'lay' is required. A superordinate term – the general verb *placera* 'put' – exists, but is very rarely used to take a coarse-grained perspective on object placement events (Viberg, 1998; Hansson & Bruce, 2002).

In other languages, however, there is a relatively greater degree of optionality in speakers' habitual encoding patterns, which allows for different event perspectives to be taken on the same event. Speakers of colloquial Tamil can use a general verb *veyyii* 'put' in talking about a placement event, e.g. standing a bottle on a table. Optionally, they also use complex forms encoding caused position by use of the (light) verb *veyyii* as an auxiliary (which adds the notion of 'cause') following the infinitival form of an intransitive verb that specifies the position of the located object (Asher, 1985: 155).[1] For instance, speakers can use *nikka veyyii* 'stand.inf cause' 'make stand' to specify that the located object ends up being placed in the vertical orientation.[2] If the bottle is lying, speakers can choose between *veyyii* 'put' or *paDka veyyii* 'lie.inf cause' 'make lie'. The Tamil encoding options are summarized in Table 1. The general and the informationally specific forms are thus both available and, potentially, in competition with each other to Tamil speakers describing a particular object placement event.

In cases of lexical encoding optionality, various factors will influence the preferences in actual language use. Such factors include 'who the speakers are talking to, what they [are] talking about, and why' (Clark, 1997: 2). Focusing on the role of WHAT speakers are talking about, i.e. the type of entity being described, prior research has shown that the familiarity of the

[1] Although homophonous with the lexical verb *veyyii* 'put', the light verb *veyyii* does not mean 'put', but has the abstract meaning of causation when it appears in combination with many (in)transitive infinitive verb forms, e.g. *ooDa veyyii* 'run.inf cause' 'make run', *saapDa veyyii* 'make eat', *aZa veyyii* 'make cry', etc.

[2] Abbreviations used throughout: inf: infinitive; acc: accusative; sg: singular: pl: plural; fem: feminine; msc: masculine; pst: past; pres: present; prt: participle; adj.prt: adjectival participle. The Roman transliteration conventions used here represent the spoken variety of tamil at a relatively broad level of phonetic detail.

TABLE 1. *Encoding options in Tamil*

Vertical (e.g. bottle standing upright)	Horizontal (e.g. bottle lying on its side)
Caused posture expression (*nikka veyyii* 'make stand') OR General placement verb (*veyyii* 'put')	Caused posture expression (*paDka veyyii* 'make lie') OR General placement verb (*veyyii* 'put')

object influences choice of perspective in labeling entities (Shipley, Kuhn & Madden, 1983). In the case of placement events, a factor that could influence perspective-shifts is the animacy of the located object. The choice of animacy is motivated by the fact that crosslinguistically (caused) posture expressions are typically used for animate located objects, with different languages extending the use of such expressions to inanimate objects to different degrees (Newman, 2002; Ameka & Levinson, in press). In Tamil, the animacy of the located object is not specified as a semantic selectional restriction in caused posture expressions, since these predicates can be felicitously applied both to animate and inanimate located entities (e.g. *kambE/koZhandayE nikka veyyii* 'stick.acc/child.acc stand.inf cause' 'make the stick/child stand').[3] Nevertheless, given the centrality of the use of these expressions in the animate domain, it is likely that the notion of animacy manifests itself as a preference on the part of Tamil speakers to switch to a fine-grained perspective with the use of a caused posture expression when the located object is animate. Although English prepositions such as *in* and *on* and verbs such as *move* do not require that the Figure object (the 'located object' in our terminology) be animate, adult speakers' use of such expressions is nevertheless influenced by the animacy of the located object (Gelman & Koenig, 2001; Feist & Gentner, 2003).

Children acquiring Tamil must thus learn the lexical means representing the different perspectives, but they must also learn when and how to switch appropriately. While children might know the meanings of hierarchically related placement expressions and also take multiple perspectives from early on, they might still show non-adultlike patterns of PREFERENCE in their perspective-taking behaviour. For instance, children might not initially show adultlike flexibility in switching perspectives, but adopt a single perspective more often than adults. They might use the general placement verb *veyyii* 'put' more frequently than adults do in describing object placement events, only gradually expanding their uses of caused posture expressions to switch to a fine-grained perspective as often as adults do. Alternatively, as children

[3] The caused posture expression *okkaara veyyii* 'sit.inf cause' 'make sit' is an exception since it is not extended to inanimate located objects.

are known to be remarkably good at tracking statistical tendencies in language use (Saffran, Aslin & Newport, 1996; Theakston, Lieven, Pine & Rowland, 2004), it is possible that, at the same time that they are acquiring the meanings of expressions such as *veyyii* 'put' and *nikka/paDka veyyii* 'make stand/lie', children are also tuning in to the relative frequencies of these expression types in adult language and therefore show variable use from early on. To decide between the alternatives, the present study compares preferences for the use of the general placement verb versus caused posture expressions in Tamil adult language with children's patterns of use of these expressions.

With regard to the role of animacy as a factor governing perspective-switch, children have been claimed to associate the distinct properties of animates versus inanimates at least by the middle of the second year of age, if not earlier (for a discussion, see Rakison & Poulin-Dubois, 2001). Children also show relatively early understanding of the role of animacy in verb use and argument structure patterns in their language. In a picture description task of inanimate agents acting on animate versus inanimate patients, children acquiring Catalan (ages 4;11–11;11) tended to produce more object-dislocated descriptions with animate patients (Prat-Sala, Shillcock & Sorace, 2000). Five-year-old children pattern with adults in exhibiting animacy effects in the semantic interpretation of verbs such as *move* (Gelman & Koenig, 2001), and four-year-old children acquiring Sesotho have knowledge of animacy hierarchy restrictions on object word order in double object applicative constructions (Demuth, Machobane, Moloi & Odato, 2005). These studies suggest that children, at least by the age of 4;0, should have no conceptual difficulty in linking animacy with the use of caused posture expressions. However, it does not necessarily follow that, in a free-response task, children will PREFER to use a fine-grained caused posture expression to describe placement events with animate located objects to the extent that adults do, especially when a general placement verb can also be used to describe the same event. Since the general placement verb and the caused posture expressions can be used for both animate and inanimate located objects, it is possible that children will initially produce these expressions in free variation for both types of located objects, only gradually homing in on the patterns of preferences in adult language. The present study therefore explores the role of the animacy of the located object in promoting greater use of caused posture expressions overall, as well as on the use of individual caused posture verbs.

In investigating the effects of animacy, it is important to note that the non-canonical orientation of individual objects can also cause a switch to a fine-grained perspective (*cf.* Levinson, 2000; Hellwig, 2003). Since objects vary in their canonical orientation and no independent measures exist for the canonicality of the position of a given object, speakers in the present study are shown placement events in which each located object is placed in both the horizontal and vertical orientation (one of which will be more canonical than the other, depending upon the object). This methodological precaution provides us with a 'control condition' for each object. The pattern of responses in adults is used as a baseline for comparison to gauge the effects of animacy on children's patterns of use of caused posture expressions.

METHOD AND RESULTS

To elicit natural language, we used a Director-Matcher type of game (Clark, Carpenter & Just, 1973; Clark & Wilkes-Gibbs, 1986). In this task, the participant (the director) watched video clips depicting a placement event on a computer screen. She then described what had happened on the video to a confederate (the matcher) who could not see the video and whose task it was to pick the correct still picture of the event from a stack of images. The dependent variable was the description given, and specifically the predicate used to describe the placement event.

Participants

Participants were 23 children acquiring Tamil as their first language, ranging in age from 3;11 to 6;7. Participants were recruited through a Tamil-medium school in Chennai, India. A median split of the children at age 4;9 led to a division into two child age groups: four-year-olds (mean age 4;2, $N=13$) and six-year-olds (mean age 5;7, $N=10$). In addition, 10 adult native speakers of Tamil acted as controls, constituting a third age group.

Materials

A set of stimulus placement scenarios was constructed such that all scenarios consisted of a female actor placing an object (the 'located object') in a specific orientation. Sixteen target events manipulated the object's animacy (animate vs. inanimate) and orientation (vertical vs. horizontal). Four (pseudo)animate objects (a doll, a monkey, a bear, and a dog) and 4 inanimate objects (a can, a book, a flashlight, and a picture frame) were manually placed either in a vertical position (standing) or in a horizontal position (lying) at a location (a table top or a book shelf). An additional 23 events were included as fillers (listed in the Appendix A). Three of the filler events were used as warm-up items, leaving 36 items in the actual elicitation task.

Two female actors acted out the 39 stimulus scenes and the actions were recorded on video. A set of still pictures of the events was also produced where the image represented the object in its end location (see an example

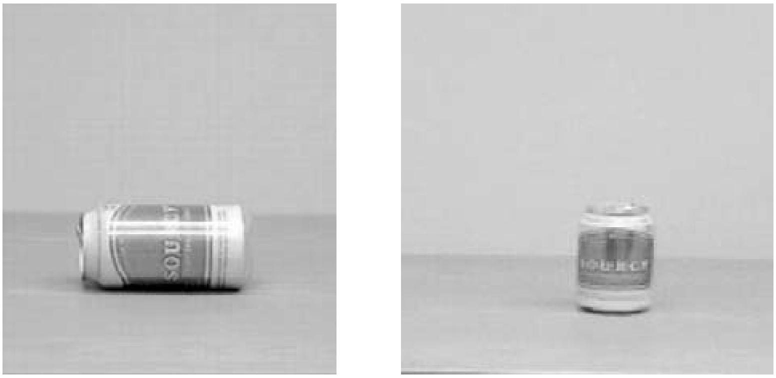

Fig. 1. An example of an inanimate object (a can) placed in the horizontal and the vertical orientation.

in Figure 1). These pictures were to be matched by a confederate with the participants' verbal descriptions of the events in the matching game task. The entire set of stimulus clips was randomized, interleaving the 16 target events with the fillers, and organized into two orders. Within each age group, the presentation of the stimulus order was counter-balanced. Every participant and every event therefore contributed equally to all experimental conditions.

Procedure

Participants were tested individually in a setting schematically depicted in Figure 2. Two experimenters were present during the testing. Instructions were given orally by one of the experimenters. Participants were told that they were going to play a game where they had to help the other person (Experimenter 2) put a set of pictures in the right order. Participants saw one video clip at a time on a laptop screen which was manipulated by Experimenter 1. Experimenter 2, who was seated such that s/he could not see the video screen, asked the question 'What did the woman do'? Participants then had to describe what they had seen to Experimenter 2 (*cf.* Figure 2), who then chose the correct still image from the set of stills that depicted the various placement scenes. If the participant gave a simple locative expression or an intransitive description (e.g. 'the book is on the table'), then Experimenter 1 prompted further elaboration by asking 'What happened' or 'How did the book get there' or 'What did the woman do?'. Adults were allowed to control the presentation of the video clips on the computer themselves, and were asked to describe the scenes to an experimenter to whom the screen was not visible. In other respects, the testing procedure was identical for adults and children.

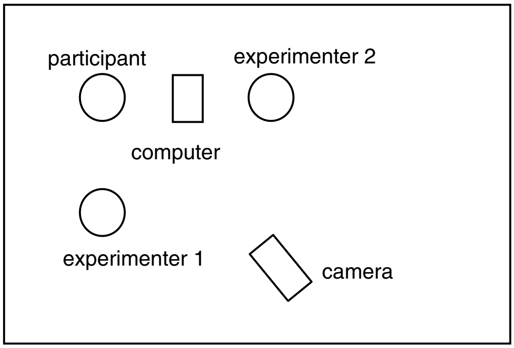

Fig. 2. A schematic representation of the experimental setting for children.

The session started with three warm-up items before the real test items were presented to ensure that the task was clear to the participants. The entire testing session was audio- and video taped to allow for subsequent detailed transcription.

Data treatment

A native speaker of Tamil transcribed the first spontaneous transitive description of each video clip (*cf.* Plumert, Ewert & Spear, 1995 on first mention analysis) from which the predicate (verb plus participial constructions) was selected for further analysis. Utterances where the same verb was repeated but with different tense/agreement properties were considered to be identical (e.g. *veccaa* 'put.3.sg.fem.pst' vs. *vekkraa* 'put.3.sg.fem.pres'). Whenever a speaker produced two utterances describing the same scene with different names for the located object involved (e.g. *marUndU Dabbaa veyyii* 'medicine box put' vs. *pustakattE veyyii* 'book.acc put'), the first one was selected regardless of object label. Finally, in cases of self-corrections and uninterpretable utterances, the first immediately following complete and/or interpretable description was retained and transcribed.

Table 2 lists the most frequent predicate types used to describe the 16 target scenes (the complete list of types and tokens can be found in Appendix B). The most frequent types in all age groups are the general verb *veyyii*, 'put'; the caused posture predicates *nikka veyyii* 'stand.inf cause' and *paDka veyyii* 'lie.inf cause'; and the participial predicate construction *eDtU veyyii* 'take.prt put' ('taking (it), put') in four-year-olds, and *eDtU nikka veyyii* 'take.prt stand.inf cause' ('taking (it), make (it) stand') in six-year-olds. There is a considerable drop in frequency to other predicative expressions such as *pooDU* 'drop', and *eDtUNDU vandU veyyii* 'take.prt hold.prt come.prt put' ('taking (it), bringing (it) put'). It is noteworthy that,

TABLE 2. *Type/token distribution of the most frequent predicative expressions used for the 16 scenes across the age groups*

Four-year-olds		Six-year-olds		Adults	
Types	Tokens	Types	Tokens	Types	Tokens
veyyii 'put'	64	*veyyii* 'put'	58	*veyyii* 'put'	37
eDtU veyyii 'take.prt put'	32	*nikka veyyii* 'stand.inf cause'	32	*paDka veyyii* 'lie.inf cause'	26
nikka veyyii 'stand.inf cause'	32	*paDka veyyii* 'lie.inf cause'	15	*nikka veyyii* 'stand.inf cause'	25
paDka veyyii 'lie.inf cause'	22	*eDtU nikka veyyii* 'take.prt stand.inf cause'	10	*koNDUvandU veyyii* 'hold.prt come.prt put' ('bringing put')	9
pooDU 'drop'	8	*pooDU* 'drop'	6	*eDtUNDU vandU veyyii* 'take.prt hold.prt come.prt put' ('taking (it), bringing (it) put')	5
eDtU nikka veyyii 'take.prt stand.inf cause'	7	*eDtU veyyii* 'take.prt put'	5	*okkaara veyyii* 'sit.inf cause'	5
eDtU paDka veyyii 'take.prt lie.inf cause'	5	*okkaara veyyii* 'sit.inf cause'	5	*eDtU vandU veyyii* 'take.prt come.prt put'	4
eDtUNDU vandU veyyii 'take.prt hold.prt come.prt put' ('taking (it), bringing (it) put')	5	*veccU poo* 'put.prt go'	5	*eDtUNDU veyyii* 'take.prt hold.prt put'	3
okkaara veyyii 'sit.inf cause'	5	*tuukki veyyii* 'lift.prt put'	4	*nirtti veyyii* 'straighten.prt put'	3
		nikka veccU poo 'stand.inf cause.prt go'	3		

although the general predicate *veyyii*, 'put', is the dominant one in all age groups, the morphologically complex caused posture predicates are among the top four most frequent predicates even in the youngest age group.

Two separate analyses were run on the data in order to address our two specific research questions. In the first analysis we examine whether children show adultlike flexibility in their use of semantically general versus specific expressions to shift perspectives on object placement events. The second analysis focuses on whether the animacy of the located object influences shifts to a fine-grained perspective in similar ways in adults and children.

First analysis: overall perspective-shifts

In order to investigate the overall use of semantically general versus specific expressions, the data set for the 16 target scenes was coded into three categories: CAUSPOS (caused posture predicate) vs. PUT vs. OTHER.

All forms of *nikka veyyii* 'make stand' and '*paDka veyyi* 'make lie' (including simple and participial predicate constructions) were categorized as CAUSPOS. For this coding, inaccuracies in the form of the caused posture expression (uses of the intransitive verb in a form other than the infinitive, e.g. *nillU veyyii*, 'stand cause', *ninnU veyyii*, 'stand.prt cause') were ignored. All such forms were coded as instances of CAUSPOS. In contrast, inaccuracies in orientation, manifested as use of an inappropriate CAUSPOS in reference to a particular scene, e.g. use of *nikka veyyii* 'make stand' for an object in a horizontal position, were excluded from the CAUSPOS category. This led to the exclusion of 5 responses (1 for four-year-olds, and 4 for six-year-olds). Since later analyses will focus on the effect of animacy, only responses where it was evident that the meaning of the predicate was clear to the participant were included. Orientation errors were thus excluded to ensure a conservative estimate of usage of CAUSPOS. For similar reasons 23 responses (9 for four-year-olds, 6 for six-year-olds, and 8 for adults) of *okkaara veyyii* 'sit.inf cause' 'make sit' were excluded from the CAUSPOS category. Although both children and adults produced this expression solely in reference to scenes where animate objects were placed in the vertical position, we excluded the 'make sit' responses from the coding on the grounds that it is not clear what is driving the choice of predicate in these cases: verticality, or the fact that the participants did not consider the objects' legs to be sufficiently extended vertically. All forms of *veyyii* (including simple and participial predicate constructions) were coded as PUT. All remaining forms were coded as OTHER. Mean proportions were calculated for each response category.

In order to investigate whether there was a difference in the overall pattern of verb type usage across the three age groups, a repeated measures

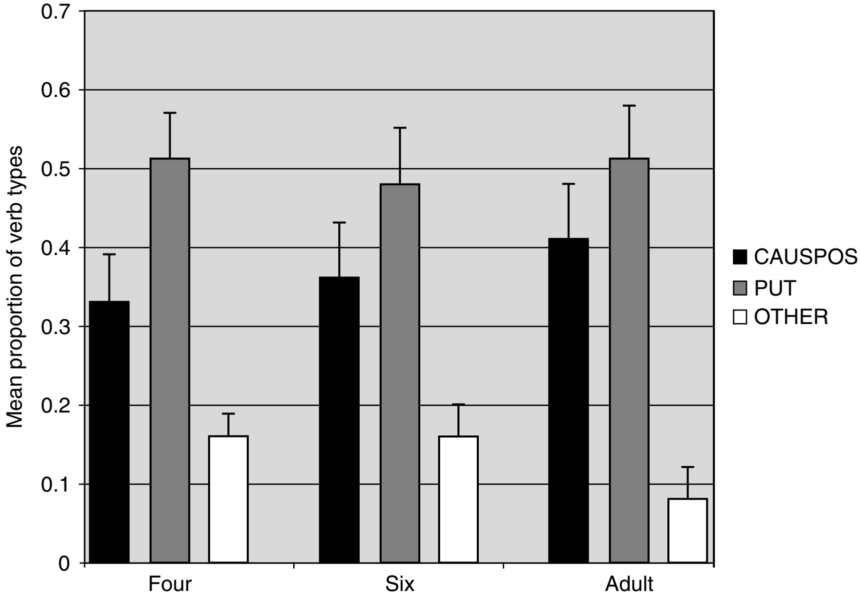

Fig. 3. Mean use of CAUSPOS, PUT, and OTHER for the 16 target scenes across age groups (error bars = standard error).

ANOVA was run with verb type (CAUSPOS, PUT, OTHER) as the within-subject factor, and age (four, six, adults) as the between-subject factor. One set of analyses treated participants as the random factor (*F*1), and a second set treated items as the random factor (*F*2). Effects were treated as significant at an alpha level less than or equal to 0·05.

Results of the first analysis

Figure 3 and Table 3 summarize the mean use of the verb categories across the age groups.

All groups behaved similarly in that the PUT verb was on average most frequent, followed by the CAUSPOS, and finally by the OTHER category. This finding was confirmed in the analysis, which revealed a significant main effect of response type, $F1(1, 32) = 42{\cdot}527$, $p = 0{\cdot}000$, $\eta_p^2 = 0{\cdot}746$; $F2(1, 15) = 39{\cdot}394$, $p = 0{\cdot}000$, $\eta_p^2 = 0{\cdot}642$, and no interaction between response type and age ($F1 > 1$, $p = 0{\cdot}497$, $\eta_p^2 = 0{\cdot}054$; $F2 > 1$, $p = 0{\cdot}457$, $\eta_p^2 = 0{\cdot}039$). Therefore all age groups used both the general verb *veyyii* 'put', associated with a coarse-grained perspective, and the CAUSPOS expressions, *nikka veyyii* 'make stand' and *paDka veyyii* 'make lie', related

TABLE 3. *Mean proportions of the CAUSPOS, PUT, and OTHER expressions across the age groups*

	Age	Mean	Std. Deviation	*N*
CAUSPOS	Four	0·33	0·25	13
	Six	0·36	0·24	10
	Adults	0·41	0·17	10
	Total	0·37	0·22	33
PUT	Four	0·51	0·28	13
	Six	0·48	0·24	10
	adults	0·51	0·13	10
	Total	0·50	0·22	33
OTHER	Four	0·16	0·12	13
	Six	0·16	0·17	10
	adults	0·08	0·06	10
	Total	0·13	0·13	33

TABLE 4. *Association strengths (phi coefficients) between age groups in the application of PUT and CAUSPOS for* 16 *events*

	PUT		CAUSPOS	
Four vs. Six	0·807	$p \leqslant 0{\cdot}000$	0·635	$p = 0{\cdot}004$
Four vs. Adult	0·738	$p \leqslant 0{\cdot}001$	0·572	$p = 0{\cdot}010$
Six vs. Adult	0·555	$p = 0{\cdot}013$	0·332	$p = 0{\cdot}104$

to the fine-grained perspective, to describe the scenes.[4] To further test whether the overall frequencies in the different categories reflect a similar application of PUT and CAUSPOS for the 16 target events between the groups across items, we calculated phi coefficients as a measure of association strength between the age groups. The results are displayed in Table 4. The association strengths are significant between all age groups in the application of PUT, and between four-year-olds and six-year-olds, and four-year-olds and adults in the application of CAUSPOS. The association strength between six-year-olds and adults, however, is not significant for the application of CAUSPOS. This finding suggests that there is a qualitative difference in

[4] As a reviewer pointed out, the exclusion of CAUSPOS responses which we labeled 'inappropriate', as well as CAUSPOS responses which included *okkaara veyyii* 'sit.inf cause' might result in an underestimation of the true frequency of CAUSPOS, leading us to erroneously conclude that the most frequently applied verb category in Tamil is the coarse-grained PUT expression. A repeated measures ANOVA that included these cases yielded the same result. Again, there was a main effect of verb type ($F1(1, 32) = 128{\cdot}059$, $p \leqslant 0{\cdot}000$, $\eta_p^2 = 0{\cdot}898$, $F2(1, 15) = 106{\cdot}888$, $p \leqslant 0{\cdot}000$, $\eta_p^2 = 0{\cdot}829$), and no interaction between verb type and age, $F1 = 1{\cdot}323$, $p = 0{\cdot}272$, $\eta_p^2 = 0{\cdot}081$, $F2 = 1{\cdot}098$, $p = 0{\cdot}362$, $\eta_p^2 = 0{\cdot}047$.

TABLE 5. *Mean use of the CAUSPOS, PUT, and OTHER expressions by first* (01) *and second* (02) *mention across the age groups*

	Age	Mean	Std. Deviation		Mean	Std. Deviation	N
CAUSPOS01	Four	0·24	0·25	CAUSPOS02	0·42	0·30	13
	Six	0·30	0·28		0·43	0·31	10
	adults	0·23	0·16		0·60	0·24	10
	Total	0·25	0·23		0·48	0·29	33
PUT01	Four	0·59	0·30	PUT02	0·43	0·30	13
	Six	0·56	0·32		0·39	0·27	10
	adults	0·70	0·13		0·33	0·19	10
	Total	0·61	0·27		0·39	0·26	33
OTHER01	Four	0·17	0·15	OTHER02	0·14	0·13	13
	Six	0·14	0·20		0·19	0·21	10
	adults	0·08	0·11		0·08	0·09	10
	Total	0·13	0·16		0·14	0·15	33

the category distribution for this age group with respect to CAUSPOS. We return to this difference below under the Second analysis.

To investigate the effects of the contrastive nature of the task, we examined how the use of the two verb types, CAUSPOS and PUT, varied according to order of mention of a particular object. If the contrastive nature of the task influences use of the verb type, we might expect participants' first mentions of an object to favour the use of PUT, along the supposed habitual encoding patterns of Tamil, whereas second mentions, when the same object is encountered for the second time, should favour the use of a CAUSPOS expression. Separate repeated measures ANOVAs for first and second mention (by subject) were run on each verb type (PUT and CAUSPOS), with age as the between-subject factor (see Table 5).

The analysis of PUT revealed a main effect of order of mention, $F1(1,32)=25{\cdot}882$, $p=0{\cdot}000$, $\eta_p^2=0{\cdot}463$, and no interaction between order of mention and age, $F1(1,32)=2{\cdot}283$, $p=0{\cdot}119$, $\eta_p^2=0{\cdot}132$. This finding suggests that all participants were more likely to adopt a coarse-grained perspective encoded by PUT when they saw an object for the first time. This result supports the general classification of Tamil as a language where the default way of encoding a placement event is with the general PUT verb. The analysis of the use of CAUSPOS expressions also revealed a main effect of order of mention, $F1(1,32)=21{\cdot}654$, $p=0{\cdot}000$, $\eta_p^2=0{\cdot}419$, and no interaction between order of mention and age, $F1(1,32)=2{\cdot}240$, $p=0{\cdot}124$, $\eta_p^2=0{\cdot}130$. Tamil speakers at all ages therefore used caused posture verbs significantly more often when they encountered an object for the second time.

The most striking finding is that the relative preference for each verb type is the same in all age groups. There is thus no evidence of development in this domain. Instead, the results clearly indicate that Tamil-speaking children regularly apply multiple perspectives to placement scenes and switch from a coarse-grained to a fine-grained perspective as early as 4;0, and that they do so to the same extent as, and in similar ways to, adults.

Second analysis: the role of animacy in perspective-shifts

The second analysis was undertaken to specifically examine the role of the animacy of the located object for the patterns of perspective-shifts. Recall that, although the located objects in the target events varied in their canonical orientation (horizontal or vertical), speakers had equal opportunities to use a caused posture verb (either *nikka veyyii* 'make stand' or *paDka veyyii* 'make lie') for events with animate and inanimate objects, since each located object in our study was placed in both horizontal and vertical orientations. Although patterns of preference for one or the other caused postural might vary with animate versus inanimate located objects, the overall use of caused posturals is expected to be higher in descriptions of placement events with animate located objects, as suggested by the typological literature.

For the second analysis, the 16 target scenes were grouped by animacy and orientation into 4 groups of 4 scenes each: inanimate-horizontal (INHOR); animate-horizontal (ANHOR); inanimate-vertical (INVERT); and animate-vertical (ANVERT). For each group, the number of CAUSPOS responses was calculated. Each CAUSPOS response yielded a score of 1. Given this scoring system, the number of CAUSPOS per participant for each group of scenes could thus range from 0 to 4. Notice that this scoring system led to an items count of 12. An ANOVA, with animacy (animate, inanimate) and orientation (vertical, horizontal) as within-subject factors, and age (four, six, adults) as the between-subject factor was run on the mean scores.

Results of the second analysis

Figure 4 and Table 6 provide an overview of the mean use of CAUSPOS across the four coding categories INHOR, ANHOR, INVERT, and ANVERT in all age groups.

The analysis found a significant main effect of both animacy, $F1(1, 32) = 26{\cdot}382$, $p = 0{\cdot}000$, $\eta_p^2 = 0{\cdot}468$; $F2(1, 11) = 13{\cdot}280$, $p = 0{\cdot}005$, $\eta_p^2 = 0{\cdot}596$, and orientation, $F1(1, 32) = 4{\cdot}373$, $p = 0{\cdot}045$, $\eta_p^2 = 0{\cdot}127$; $F2(1, 11) = 10{\cdot}811$, $p = 0{\cdot}009$, $\eta_p^2 = 0{\cdot}546$, as well as a significant interaction between the two by subject, $F1(1, 32) = 9{\cdot}184$, $p = 0{\cdot}005$, $\eta_p^2 = 0{\cdot}234$; but not by item, $F2(1, 11) = 2{\cdot}176$, $p = 0{\cdot}174$, $\eta_p^2 = 0{\cdot}195$. This suggests that both the animacy and the orientation of the located object affected the use of

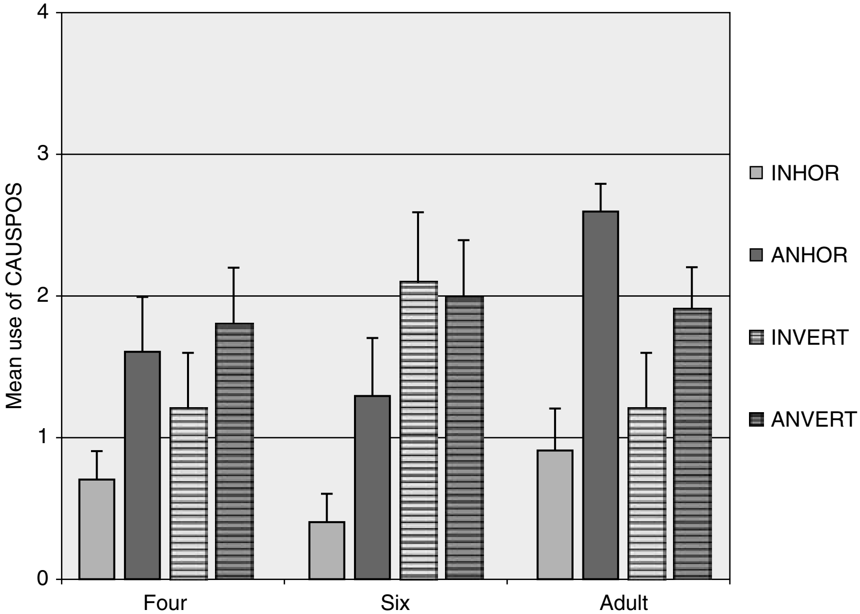

Fig. 4. Mean use of CAUSPOS for inanimate-horizontal (INHOR), animate-horizontal (ANHOR), inanimate-vertical (INVERT), and animate-vertical (ANVERT) in all age groups (error bars = standard error).

CAUSPOS. The factor age did not interact with animacy, $F1(1, 32) = 2{\cdot}177$, $p = 0{\cdot}131$, $\eta_p^2 = 0{\cdot}127$; $F2(1, 11) = 1{\cdot}185$, $p = 0{\cdot}349$, $\eta_p^2 = 0{\cdot}208$. To examine the animacy by orientation interaction, paired samples t tests for animacy by orientation were performed, collapsing over age groups (assuming adjusted alpha level 0·025 for multiple comparisons). The results showed that significantly more CAUSPOS were used for animate, horizontally located objects than for inanimate horizontally located objects, $t1(32) = 5{\cdot}757$, $p = 0{\cdot}000$; $t2(11) = 5{\cdot}141$, $p = 0{\cdot}000$. This pattern was also found in the vertically located objects, with the animate versus inanimate comparison approaching significance in the subject analysis, $t1(32) = 1{\cdot}933$, $p = 0{\cdot}062$, but not in the items analysis $t2(11) = 0{\cdot}936$, $p = 0{\cdot}369$.

There was also a significant interaction between age and orientation, $F1(1, 32) = 3{\cdot}337$, $p = 0{\cdot}049$, $\eta_p^2 = 0{\cdot}182$; $F2(1, 11) = 8{\cdot}912$, $p = 0{\cdot}007$, $\eta_p^2 = 0{\cdot}664$, indicating a difference in the use of CAUSPOS across age groups depending on the orientation of the located object. Subsequent paired samples t tests, comparing the use of CAUSPOS for horizontally versus vertically located objects collapsing over animacy, showed that, unlike adults and four-year-olds, six-year-olds used caused posture expressions

TABLE 6. *Mean use of CAUSPOS across the four coding categories INHOR, ANHOR, INVERT, and ANVERT in all age groups*

	Age	Mean	Std. Deviation	*N*
inhor	Four	0·69	0·75	13
	Six	0·40	0·70	10
	adults	0·90	0·99	10
	Total	0·67	0·82	33
anhor	Four	1·61	1·45	13
	Six	1·30	1·25	10
	adults	2·60	0·70	10
	Total	1·82	1·29	33
invert	Four	1·23	1·54	13
	Six	2·10	1·52	10
	adults	1·20	1·32	10
	Total	1·48	1·48	33
anvert	Four	1·77	1·54	13
	Six	2·00	1·33	10
	adults	1·90	0·99	10
	Total	1·88	1·29	33

significantly more often in the vertical than in the horizontal, $t1(9) = -2{\cdot}753$, $p = 0{\cdot}022$; $t2(7) = -3{\cdot}642$, $p = 0{\cdot}008$.

The results confirm that animacy does affect shifts to a fine-grained perspective such that animate located objects are more likely to prompt the use of a caused posture expression than are inanimate objects in all age groups. Specifically, animacy tends to prompt the use of *paDka veyyii* 'make lie', and this to the same extent in all age groups. However, although speakers in all age groups are influenced in similar ways by animacy, six-year-olds differ from the four-year-olds and adults in also using CAUSPOS expressions significantly more often for objects oriented vertically. Overall, the six-year-olds were more likely to use *nikka veyyii* 'make stand' for vertically located objects than *paDka veyyii* 'make lie' for horizontally located objects. This result suggests that, in this age group, the vertical orientation of the located object appears to influence the shift to a fine-grained perspective even for inanimate objects.

GENERAL DISCUSSION

The present study shows that children acquiring Tamil take multiple perspectives on (placement) events in language use. Like adults, children describe both animate and inanimate objects from a coarse-grained perspective (using the verb *veyyii* 'put') as well as from a fine-grained view (with the use of specific caused posture expressions). Moreover, children show similar sensitivity to the influence of animacy on shifts to a fine-grained perspective, such that animate located objects pull for a caused posture expression more often than inanimate located objects, just as in adult speech. The effect of animacy on patterns of use of each of the fine-grained caused posture expressions is also similar in children and adults: *paDka veyyii* 'make lie' is used more for animate located objects than inanimate ones, whereas *nikka veyyii* 'make stand' is used with similar frequency for both animate and inanimate located objects. However, a closer analysis of the patterns of use of the two caused posture expressions across age groups reveals differences in the overall distribution of the two caused posture expressions. Six-year-olds have a global preference for *nikka veyyii* 'make stand', using it more often than *paDka veyyii* 'make lie', whereas adults and four-year-olds use both types of caused posture expressions with similar frequency.

Our results show that, in learning the meanings of hierarchically related relational expressions, children acquiring Tamil are also tuning in to statistical tendencies in the use of placement expressions by age 4;0, if not earlier. We find no evidence that children prefer to restrict themselves to a single categorization level, either to the subcategories of orientation-specifying terms, or to the superordinate level which groups together vertical and horizontal placement events in a single class of 'putting' events. While prior research points to children's ability to take multiple perspectives on objects and events in specific situations (Waxman & Senghas, 1992; Clark, 1997), our findings demonstrate that children are adultlike in their patterns of preferences across similar contexts of use. Children are employing the linguistic devices available in the language to switch perspectives with the same flexibility as adults, even when they are not specifically prompted to do so. These findings are entirely in line with a growing body of research pointing to the importance of frequency and statistical reckoning for acquisition (e.g. Saffran, 2002; Theakston *et al.*, 2004). Our results show these mechanisms to be operative not only for the acquisition of meaning and morphosyntax, but also for the use of semantically related expressions in switching perspectives on events.

The second major finding is that children do not initially shift perspective in a random fashion, only later homing in on the systematicity underlying perspective-shifts in adults. By age 4;0, children exhibit adultlike sensitivity to the influence of animacy in switching to a fine-grained perspective. Previous studies have documented animacy effects in (older) children's and adults' understanding of spatial expressions encoding spontaneous motion (Gelman & Koenig, 2001) and in adults' interpretation of static relations (Feist & Gentner, 2003). However, these studies have focused on the semantics of a single lexical predicate (*move*) or expressions which encode contrasting spatial relations (e.g. *in* and *on*). Our study extends the finding of animacy effects to the case where hierarchically related semantic expressions are simultaneously available as encoding options, enabling children and adult to vary perspectives at different levels of granularity.

A third finding is that, despite evidence of early refinement, fine-tuning of perspective-taking behaviour occurs even in later childhood. While children's knowledge of the meaning of placement expressions is overwhelmingly accurate, the development of patterns of use is not one of gradual progression towards adultlike norms. Rather, it is characterized by early sophistication in some respects, and '(superficial) regression' (Campbell, 1996: 61) in other, more subtle respects. The preference for the use of *nikka veyyii* 'make stand' in six-year-olds is surprising given the patterns in the four-year-olds. If children converge towards patterns of preferences in adult language over time, we would expect deviations from adult norms in the four-year-old children, with the six-year-olds showing more adultlike patterns than the younger children. While the literature on U-shaped curves in language development also has several examples of deviations from adult norms, they are typically discussed in contexts such as morphological overgeneralizations (e.g. the use of *goed* for *went*), or semantic overextensions (e.g. use of an adjective in causative contexts, e.g. *who deaded my kitty cat?*) (Bowerman, 1982). Our findings, in contrast, are not related to non-adultlike meanings, since both the four-year-old and six-year-old children overwhelmingly use the two caused posture verbs with the correct orientation. Rather, developmental changes in perspective-shifts manifest themselves as an increased preference for using a caused posture expression in the vertical orientation in six-year-olds versus four-year-olds and adults.

There are several possible reasons for the deviation from adultlike norms in children. One possibility is that differences in the distribution of the two caused posture expressions in children versus adults are linked to differences in interpreting the communicative goals of the situation (Clark & Grossman, 1998). However, as our analysis of association strengths between groups, and verb use in first versus second mention shows, all age groups show similar quantitative and qualitative preferences. While communicative factors can clearly influence patterns of perspective-taking, the particular pattern of results in our study of placement event descriptions suggests that other factors must be involved.

Another possibility is that changes in input frequency play a role in children's acquisition of the patterns of use of placement expressions. Theakston *et al.* (2004) suggest that it is input frequency rather than semantics (more specifically, semantic generality) which influences children's early acquisition and use of verbs, whereas semantic factors might play a role later in development, e.g. in generalizations about argument structure. While the study reported here employs adult usage directed to another adult as a baseline, it remains an important empirical question whether perspective-shifting in Tamil-speaking adults' input to children changes over time, such that this might account for the discrepancy between the patterns of four- and six-year-old children and their encoding preferences.

A third possible explanation is related to the nature of semantic change over development. Children between the ages of 5;0 and 8;0 show an increased preference for separately marking elements of meaning which were previously conflated in a single form (Karmiloff-Smith, 1979). Following this reasoning, six-year-olds might be expected to explicitly label the cause and result components of meanings conflated in the mono-morphemic general verb *veyyii* 'put' by using *both* types of caused posture expressions more often than the younger children. What we find instead is a preference only for *nikka veyyii* 'make stand' relative to the four-year-olds and adults. The preference for marking separate meaning components therefore does not appear to operate across the board in an all or nothing fashion, but seems to favour the vertical dimension over the horizontal.

The preference for the vertical dimension can be linked to observations in the literature regarding the cognitive salience of this dimension for children (but for important crosslinguistic qualifications, see Choi & Bowerman, 1991; Brown, 2001; de León, 2001). Interestingly, a preference for the vertical dimension has been implicated in the semantic errors children make in their use of spatial words in later stages of their development (Lumsden & Poteat, 1968). If an increasingly consistent preference for the vertical dimension guides older children's interpretations of the meaning of size terms, it is plausible that such a preference should also play a role in older children's tendency to switch to a fine-grained perspective to describe vertically placed located objects. Younger children might attend to the patterns of use of placement expressions with particular located objects in particular orientations, e.g. the relative frequencies with which the general and caused posture expressions are used in the input for vertically versus horizontally oriented cans, etc. As they get older, children increasingly attend to the dimension labelled by an expression across different objects, and 'overuse' *nikka veyyii* 'make stand' for the more salient dimension, the vertical (*cf.* Maratsos, 1973; Smith, 1984).[5] In comparing objects, children attend to higher order similarities among attributes on separate dimensions. Such comparisons lead to semantic change in later childhood (Bowerman, 1982; Smith, 1984). The present study points to the intriguing possibility

[5] One of our reviewers suggests that if six-year-olds are operating with a more abstract vertical object category, we would expect less variation in the vertical condition between items than in the horizontal condition. We find more variation between items in the vertical condition for the six-year-olds (as measured by the standard deviation). However since we also find greater variation between items in the vertical versus horizontal condition for adults (who presumably have abstract representations for both the 'make stand' and the 'make lie' categories), we cannot plausibly link differences in variation between the horizontal and vertical conditions to differences in the abstractness of representation.

that mechanisms that operate at the level of semantics could also influence subtle patterns of lexical choice and perspective-shifts. Further developmental research can help determine the extent to which such mechanisms are influenced by the input language. For instance, children acquiring Swedish, which has only monomorphemic caused posture expressions (e.g. *ställa* 'stand', *lägga* 'lay'), might take longer to tease apart the cause and result components of vertical placement events than children acquiring Tamil, where the two components are labelled by distinct morphemes. The broader question of the origin of these encoding patterns also needs to be addressed. It has been suggested in the typological literature that the use and morphosyntactic behaviour of intransitive posture expressions (e.g. 'sit', 'stand', 'lie') are influenced by factors such as agency and sensorimotor control (Newman, 2002). Further crosslinguistic investigation is required to explore whether similar factors play a role in the causative counterparts of these expressions, and more fundamentally, whether they can account for the origin of these patterns crosslinguistically and developmentally.

In sum, this study shows that while children show remarkable early flexibility and systematicity in adopting multiple perspectives on spatial events, in later childhood, they are still working out the relative importance of different factors involved in influencing perspective-shifts. Semantic factors, such as animacy and verticality, investigated here, do play a role and are attended to by children, but other factors such as (changes in) patterns in the input, and the participants' goals in the communicative situation, are equally likely to be important. Further research is required to identify the full range of factors that play a role in perspective-taking on events, and their relative importance in influencing children's preferences for shifting perspective over the course of development.

REFERENCES

Ameka, F. & Levinson, S. C. (in press). Towards a typology of locative predication. *Linguistics*.

Asher, R. E. (1985). *Tamil*. London: Routledge.

Bowerman, M. (1982). Starting to talk worse: clues to language acquisition from children's late speech errors. In S. Strauss & R. Stavy (eds), *U-shaped behavioral growth*. New York: Academic Press.

Brown, P. (2001). Learning to talk about motion UP and DOWN in Tzeltal: is there a language-specific bias for verb learning? In M. Bowerman & S. C. Levinson (eds), *Language acquisition and conceptual development*. Cambridge: CUP.

Budwig, N. (1990). The linguistic marking of non-prototypical agency: an exploration into children's use of passives. *Linguistics* **28**(6), 1221–52.

Budwig, N., Stein, S. & O'Brien, C. (2001). Non-agent subjects in early child language: a crosslinguistic comparison. In K. Nelson, A. Aksu-Koç & C. Johnson (eds), *Children's language* (vol. 11 Interactional contributions to language development, pp. 49–67). Mahwah, NJ: Erlbaum.

Campbell, R. N. (1996). Semantic development of adjectives. In W. J. M. Levelt (ed.), *Advanced psycholinguistics*. Nijmegen: Max Planck Institute for Psycholinguistics.

Choi, S. & Bowerman, M. (1991). Learning to express motion events in English and Korean: the influence of language-specific lexicalization patterns. *Cognition* **41**(1–3), 83–121.
Clark, E. V. (1997). Conceptual perspective and lexical choice in acquisition. *Cognition* **64**(1), 1–37.
Clark, E. V. & Grossman, J. B. (1998). Pragmatic directions and children's word learning. *Journal of Child Language* **25**(1), 1–18.
Clark, H. H., Carpenter, P. A. & Just, M. A. (1973). On the meeting of semantics and perception. In W. G. Chase (ed.), *Visual information processing*. New York: Academic Press.
Clark, H. H. & Wilkes-Gibbs, D. (1986). Referring as a collaborative process. *Cognition* **22**(1), 1–39.
de León, L. (2001). Finding the richest path: language and cognition in the acquisition of verticality in Tzotzil (Mayan). In M. Bowerman & S. C. Levinson (eds), *Language acquisition and conceptual development*. Cambridge: CUP.
Demuth, K., Machobane, M., Moloi, F. & Odato, C. (2005). Learning animacy hierarchy effects in Sesotho double object applicatives. *Language* **82**(2), 421–47.
Feist, M. I. & Gentner, D. (2003). Factors involved in the use of 'in' and 'on'. In R. Alterman & D. Kirsh (eds), *Proceedings of the Twenty-fifth Annual Conference of the Cognitive Science Society*. Boston: Cognitive Science Society.
Gelman, S. A. & Koenig, M. A. (2001). The role of animacy in children's understanding of 'move'. *Journal of Child Language* **28**(3), 683–701.
Hansson, K. & Bruce, B. (2002). Verbs of placement in Swedish children with SLI. *International Journal of Communication Disorders* **37**(4), 401–14.
Hellwig, B. (2003). *The grammatical coding of postural semantics in Goemai* (*a West Chadic language of Nigeria*). Unpublished PhD dissertation, University of Nijmegen, Nijmegen.
Jackendoff, R. (1987). *Consciousness and the computational mind*. Cambridge, MA: MIT Press.
Karmiloff-Smith, A. (1979). *A functional approach to child language*. Cambridge: CUP.
Levinson, S. C. (2000). H. P. Grice on location on Rossel Island. In S. S. Chang, L. Liaw & R. Ruppenhofer (eds), *Proceedings of the Berkeley Linguistics Society*. Berkeley: Berkeley Linguistics Society.
Lumsden, E. A. & Poteat, B. W. S. (1968). The salience of the vertical dimension in the concept of "bigger" in five- and six-year-olds. *Journal of Verbal Learning and Verbal Behavior* **7**(2), 404–8.
Maratsos, M. (1973). Decrease in the understanding of the word 'big' in pre-school children. *Child Development* **44**(4), 747–52.
Newman, J. (2002). A crosslinguistic overview of the posture verbs 'sit', 'stand', and 'lie'. In J. Newman (ed.), *The linguistics of sitting, standing, and lying*. Amsterdam: Benjamins.
Plumert, J. M., Ewert, K. & Spear, S. J. (1995). The early development of children's communication about nested spatial relations. *Child Development* **66**(4), 959–69.
Prat-Sala, M., Shillcock, R. & Sorace, A. (2000). Animacy effects on the production of object dislocated descriptions by Catalan-speaking children. *Journal of Child Language* **27**(1), 97–117.
Rakison, D. H. & Poulin-Dubois, D. (2001). Developmental origins of the animate–inanimate distinction. *Psychological Bulletin* **127**(2), 209–28.
Saffran, J. R. (2002). Constraints on statistical language learning. *Journal of Memory and Language* **47**(1), 172–96.
Saffran, J. R., Aslin, R. N. & Newport, E. L. (1996). Statistical learning by 8-month old infants. *Science* **274**, 1926–8.
Shipley, E. F., Kuhn, I. & Madden, I. C. (1983). Mothers' use of superordinate category terms. *Journal of Child Language* **10**(3), 571–88.
Slobin, D. I. (1996). From "thought and language" to "thinking for speaking". In J. J. Gumperz & S. C. Levinson (eds), *Rethinking linguistic relativity*. Cambridge: CUP.
Smith, L. B. (1984). Young children's understanding of attributes and dimensions: a comparison of conceptual and linguistic measures. *Child Development* **55**(2), 363–80.
Theakston, A. L., Lieven, E. V. M., Pine, J. M. & Rowland, C. F. (2004). Semantic generality, input frequency and the acquisition of syntax. *Journal of Child Language* **31**(1), 69–99.

Viberg, Å. (1998). Contrasts in polysemy and differentiation: 'running' and 'putting' in English and Swedish. In S. Johansson & S. Oksefjell (eds), *Corpora and crosslinguistic research: theory, method, and case studies*. Amsterdam: Rodopi.
Waxman, S. R. & Senghas, A. (1992). Relations among word meanings in early lexical development. *Developmental Psychology* **28**(5), 862–73.
Zacks, E. M. & Tversky, B. (2001). Event structure in perception and conception. *Psychological Bulletin* **127**(1), 3–21.

APPENDIX A

MATERIALS (Target items in bold)

ORDER 1	*ORDER 2*
Warmup item 1	*Warmup item 1*
Warmup item 2	*Warmup item 2*
Warmup item 3	*Warmup item 3*
Agent_put_bear_lying	Agent_drop_monkey_lying
Agent_put_flashlight_lying	Agent_drop_matchsticks_table
Agent_put_book_lying	Agent_put_tomato_bag
Agent_put_doll_standing	**Agent_put_dog_lying**
Agent_put_paper_envelope	Agent_put_ring_pole
Agent_squeeze_wet_cloth	Agent_put_arm_frame
Agent_put_book_standing	**Agent_put_monkey_standing**
Agent_put_can_lying	Agent_put_pillowcase_pillow
Agent_put_flashlight_standing	**Agent_put_picframe_lying**
Agent_put_monkey_lying	Agent_put_rice_table
Agent_put_can_standing	**Agent_put_dog_standing**
Agent_spin_disc	Agent_flick_coin
Agent_put_picframe_standing	Agent_put_piece_puzzle
Agent_put_bear_standing	Agent_put_cookiebatter_tray_spoon
Agent_drop_can_accidentally	Agent_drop_doll_lying
Agent_put_doll_lying	Agent_put_napkin_floor
Agent_drop_pencils_table	Agent_drop_can_lying
Agent_put_mouse_vase	Agent_put_mouse_vase
Agent_drop_book_lying	Agent_drop_book_lying
Agent_drop_can_lying	Agent_drop_pencils_table
Agent_put_napkin_floor	**Agent_put_doll_lying**
Agent_drop_doll_lying	Agent_drop_can_accidentally
Agent_put_cookiebatter_tray_spoon	**Agent_put_bear_standing**
Agent_flick_coin	Agent_spin_disc
Agent_put_piece_puzzle	**Agent_put_picframe_standing**
Agent_put_dog_standing	**Agent_put_can_standing**
Agent_put_rice_table	**Agent_put_monkey_lying**
Agent_put_picframe_lying	**Agent_put_flashlight_standing**
Agent_put_pillowcase_pillow	**Agent_put_can_lying**
Agent_put_arm_frame	Agent_squeeze_wet_cloth
Agent_put_monkey_standing	**Agent_put_book_standing**
Agent_put_ring_pole	Agent_put_paper_envelope
Agent_put_dog_lying	**Agent_put_doll_standing**
Agent_put_tomato_bag	**Agent_put_book_lying**
Agent_drop_matchsticks_table	**Agent_put_flashlight_lying**
Agent_drop_monkey_lying	**Agent_put_bear_lying**

APPENDIX B

COMPLETE TYPE/TOKEN (#) DISTRIBUTION (ALPHABETICAL) OF THE PREDICATES USED FOR THE 16 SCENES IN ALL THE AGE GROUPS

Four-year-olds		Six-year-olds		Adults	
Types	#	Types	#	Types	#
eDtU kaaTTU 'take.prt show'	1	*aDUkki veyyii* 'stack.prt put'	1	*eDtU koNDUvandU poo veyyii* 'take.prt hold.prt come.prt go put'	1
eDtU maDakki veyyii 'take.prt fold.prt. put'	1	*eDtU nikka veyyii* 'take.prt stand.inf cause'	10	*eDtU koNDUvandU veyyii* 'take.prt hold.prt come.prt put'	1
eDtU nikka veyyii 'take.prt. stand.inf cause'	7	*eDtU paDka veyyii* 'take.prt lie.inf cause'	1	*eDtU kuppura paDka veyyii* 'take.prt face. down lie.inf cause'	1
eDtU okkaara veyyii 'take.prt sit.inf cause'	2	*eDtU veyyii* 'take.prt put'	5	*eDtU nikka veyyii* 'take.prt stand.inf cause'	2
eDtU okkaara viDU 'take.prt sit.inf leave'	1	*kavUttU pooDU* 'overturn.prt drop'	1	*eDtU vandU nikka veyyii* 'take.prt come.prt stand.inf cause'	1
eDtU paDka veyyii 'take.prt lie.inf cause'	5	*muuDi veyyii* 'close.prt put'	1	*eDtU vandU veyyii* 'take.prt come.prt put'	4
eDtU pooDU 'take.prt drop'	3	*muuDU* 'close'	1	*eDtU veyyii* 'take.prt put'	2
eDtU tuukki pooDU 'take.prt lift.prt drop'	2	*nikka veccU poo* 'stand.inf cause.prt go'	3	*eDtUNDU nikka veyyii* 'take.prt hold.prt stand.inf cause'	1
eDtU veyyii 'take.prt put'	32	*nikka veyyii* 'stand.inf cause'	32	*eDtUNDU okkaara veyyii* 'take.prt hold.prt sit.inf cause'	1
eDtUNDUvandU veyyii 'take.prt hold.prt come.prt put'	5	*okkaara veyyii* 'sit.inf cause'	5	*eDtUNDU paDka veyyii* 'take.prt hold.prt lie.inf cause'	1
kaamii 'show'	1	*paDka veccU poo* 'lie.inf cause.prt go'	1	*eDtUNDU pooi veyyii* 'take.prt hold.prt go.prt put'	1
muTTi poo 'kneel'	1	*paDka veyyii* 'lie.inf cause'	15	*eDtUNDU veyyii* 'take.prt hold.prt put'	3
muuDi veyyii 'close.prt put'	1	*pooDU* 'drop'	6	*eDtUNDUvandU kavUttU veyyii* 'take.prt hold.prt come.prt overturn.prt put'	1

APPENDIX B (CONT.)

Four-year-olds		Six-year-olds		Adults	
Types	#	Types	#	Types	#
neera veccUNDU paDka veyyii 'straight keep.prt hold.prt lie.inf cause'	1	*pooTTU amUkkU* 'drop.prt press'	1	*eDtUNDUvandU okkaara veyyii* 'take.prt hold.prt come.prt sit.inf cause'	1
niiTTU veyyii 'straighten.prt put'	1	*saacci viDU* 'lean.prt leave'	1	*eDtUNDUvandU paDka veyyii* 'take.prt hold.prt come.prt lie.inf cause'	1
nikka veyyii 'stand.inf cause'	32	*tirppi paDka veyyii* 'turn.prt lie.inf cause'	1	*eDtUNDUvandU veccU poo* 'take.prt hold.prt come.prt put.prt go'	1
okkaara veyyii 'sit.inf cause'	5	*tirppi veyyii* 'turn.prt put'	2	*eDtUNDUvandU veyyii* 'take.prt hold.prt come.prt put'	5
paDka veyyii 'lie.inf cause'	22	*tuukki paDka veyyii* 'lift.prt lie.inf cause'	1	*kavUttU veyyii* 'overturn.prt put'	1
pooDU 'drop'	8	*tuukki pooDU* 'lift.prt drop'	2	*koNDUpooi veyyii* 'hold.prt go.prt put'	1
pooTTU amUkkU 'drop.prt press'	1	*tuukki veyyii* 'lift.prt put'	4	*koNDUvandU mallaaka paDka veyyii* 'hold.prt come.prt face.up lie.inf cause'	1
talakiila paDka veyyii 'head.down lie.inf cause'	1	*tuunga veyyii* 'sleep.inf cause'	1	*koNDUvandU neera veyyii* 'hold.prt come.prt straight put'	2
tirppi veyyii 'turn.prt put'	2	*tuungi pooDU* 'sleep.prt drop'	1	*koNDUvandU nikka veyyii* 'hold.prt come.prt stand.inf cause'	1
tuukki pooDU 'lift.prt drop'	1	*veccU okkaara pooDU* 'put.prt sit.inf drop'	1	*koNDUvandU okkaara veyyii* 'hold.prt come.prt sit.inf cause'	1
tuunga veyyii 'sleep.inf cause'	1	*veccU poo* 'put.prt go'	5	*koNDUvandU paDka veyyii* 'hold.prt come.prt lie.inf cause'	1
tuungi veyyii 'sleep.prt cause'	2	*veyyii* 'put'	58	*koNDUvandU veyyii* 'hold.prt come.prt put'	9
vaangi nikka veyyii 'receive.prt stand.inf cause'	1			*kuppura paDka veyyii* 'face.down lie.inf cause'	1

APPENDIX B (CONT.)

Four-year-olds		Six-year-olds		Adults	
Types	#	Types	#	Types	#
veccU kaaTTU 'put.prt show'	1			*mallaaka paDka veyyii* 'face.up lie.inf cause'	2
veccU paDka veyyii 'put.prt lie.inf cause'	1			*neera koNDUvandU veyyii* 'straight hold.prt come.prt put'	1
veccUNDU amUkkU 'keep.prt hold.prt press'	1			*neera nikka veyyii* 'straight stand.inf cause'	1
veccUNDU okkaara veyyii 'keep.prt hold.prt sit.inf cause'	1			*neera veyyii* 'straight put'	1
veyyii 'put'	64			*nikka veyyii* 'stand.inf cause'	25
				nimtti veyyii 'straighten.prt put'	1
				nirtti veyyii 'upright.place.prt put'	3
				okkaara veyyii 'sit.inf cause'	5
				paDka veyyii 'lie.inf cause'	26
				paDkraa veyyii 'sit.adj.prt.pres. put'	1
				pooDU 'drop'	1
				pooTTU kavU 'drop.prt overturn'	1
				saacci veyyii 'lean.prt put'	2
				talakiila kavUttU veyyii 'head.down overturn.prt put'	2
				tirppi konDUvandU pooDU 'turn.prt hold.prt come.prt drop'	1
				tirppi veyyii 'turn.prt put'	1
				veccU aDUkkU 'put.prt stack'	1
				veccU amUkkU 'put.prt press'	1
				veccU paDka veyyii 'put.prt lie.inf cause'	1
				veyyii 'put'	37
	208		160		160