

*Early Verbs: a case of pragmatic bootstrapping?**

NEIL PARR

Abstract

The paper presents a top down model of early verb acquisition. Starting from the generally accepted premise that verbs are ‘hard words’ to learn, three conflicting models of verb learning are compared and their shortcomings discussed: Pinker’s Semantic Bootstrapping theory; Ninio’s Path-breaking Verb hypothesis; and Tomasello’s Verb Island Hypothesis. An alternative approach is developed, showing how a child’s developing cognitive abilities enable alignment with the adult target. The conclusion is that children’s early object labelling has an inherent verb element which children’s verbs modify and contrary to the general view verbs are no harder than other words to learn. However, a small productive category of words are used to express content involving the interaction between Primary and Secondary Representations. These complex event types demand that nouns and verbs begin to take on a more typical role.

1 Introduction

How children first acquire verbs has been a long standing problem. Many studies (reviewed and discussed by Braine 1976) have shown that the first words acquired tend to name/label objects and entities in the child’s environment. Although there is some dispute about the statistical ratio of nouns to verbs in the child’s early lexicon (Bloom et al. 1993), most studies agree that nominal terms are recognisably predominant. Indeed word learning studies generally show greater success when the task is object labelling than verb learning (Gentner 2006; Gleitman et al. 2005; Brandone et al 2007). Experiments that require the learning of a label for specific novel actions are particularly inconclusive. This difficulty is generally assumed to be attributable to a greater ease in mapping a word to a concrete object or person. ‘World-word mapping’ is confronted by special difficulties in the realm of verbs.

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Gleitman et al (2005) deem verbs to be 'hard words' principally because they map relations between entities and are assumed to exhibit properties quite different from nouns. Problems for verb learning include:

- Conceptually, action verbs do not stand alone and are not discrete; their expression is integral to an event which can only occur in relation to entities that are interacting in some way. Thus no verb can be uttered or understood devoid of (implicit) participants in an action or change/state relation. It is what the participating entities are capable of doing that is made more explicit by the verb use.

- Action verbs are not labels. A label freezes or nominalises an action with a loss of dynamism: an action is on-going, or is yet to happen or is over and frequently has results. To illustrate: a simple action of someone opening a door, generally involves a person grasping and turning the doorknob, pulling or pushing the door and this action results in an open door. The result can be reported from the person's viewpoint: 'she opened the door', or from the perspective of the result of the several actions: 'the door (was) opened'. Gentner (2006) points out that although children can readily appreciate dynamic events, in order to learn verbs they need to know what aspect of the event to attend to. For example a single scene of a dog running behind a cat is both 'a dog chasing a cat', and 'a cat running away from a dog'. The verb in each case highlights a differing perspective.

- Verbs have a structural role in a sentence, and have properties critical to clause grammar and sentence structure which may function to support the expression of time of the communicated event relative to the utterance; aspect relations within it; perspectives and attitudes of the speaker/hearer as well as the roles of participants in the event.

- Nelson (1995) draws attention to action words that have dual category membership functioning both as nouns and verbs, for instance: 'drink'; 'kick'; 'brush' and that expression of relations between entities and actions are not the sole preserve of verbs, but includes inter alia: prepositional phrases, and comparative adjectival phrases.

Research into infant capabilities has shown that young infants are aware of object permanence and follow an object trajectory even when occluded (Baillargeon 1993); can track events to recognised outcomes knowing the difference between accidental and intentional results, (Baillargeon, R. & Wang, S. 2002; Baldwin et al. 2001) and have expectations of how objects act when acted on in various ways or differentially supported from underneath or from the side. It is currently generally agreed that by 12 months infants perceive and apprehend their physical environment in a comparable way to adults. Also by 12 months typically developing infants are beginning to utter their first words. If children have no difficulty mapping concrete world events to a conceptual representation, why do they encounter such difficulty in mapping words like verbs to these events?

Given these difficulties, children do, however, successfully acquire verbs, which presents the question behind this paper: if verbs are hard words to learn, then how are they acquired?

This paper will argue that the word/world mapping paradigm is inappropriate for verb learning, occasioning the illusion of ‘hard words’. Rather, by considering how a child communicates relations between cognitive representations of events, a distinctive role for early verbs becomes apparent.

The paper has the following structure: Section 2 will provide a brief overview of three influential proposals of early verb learning and indicate their short-comings: Pinker’s Semantic bootstrapping suggestion; Ninio’s Path-breaking Verbs proposal; and lastly, Tomasello’s Verb Island Hypothesis, which will receive more attention and become the launch-pad for exploration of an alternative approach. Section 3 will consider the wider context of Event Representation and provide a working hypothesis which can be applied to infant (English) language data. Section 4 will show that the evidence derived from this analysis demonstrates the development of a verb category primed to take on a recognisable syntactic role.

2 Three approaches to verb learning

2.1 Pinker: Semantic bootstrapping

Pinker’s (1987, 1984/96) Semantic Bootstrapping proposal has been a highly influential and much quoted account of early verb learning. The proposal was designed to address the problem of how a child breaks into the grammatical rule system given limited input from strings of speech sounds. How can words which are arbitrary across languages be assigned to elements within Universal Grammar and therefore trigger the syntactic rules governing their combination? Pinker proposed a system of correspondence rules which initially link the semantic content of a word/contextual situation perceived by the child, to abstract grammatical and syntactic categories. Thus names of persons or things correspond to N(OUN), actions or changes of state to V(ERB), agents to S(SUBJECT) and patients or themes to O(BJECT).

To cite Pinker’s (1996 p.40) example: a child experiencing a scene, accompanied verbally by “The boy threw rocks” will be able, by the linking rules, to assign ‘boy’ to NOUN/SUBJECT; ‘threw’ to VERB and ‘rocks’ to NOUN/OBJECT, which would provide an entrée to the abstract tree structure:

S[[NP[det + N] + [VP[V+NP[N]]]]]
 Subject verb object

Having correlated the input with the abstract structure, the prediction is that this single rule can be readily applied to a significant number of noun/verb constructions. For the present purpose, the most basic prediction is that, given early lexical items, their grammatical categories and a triggered rule, the sentences children utter should exhibit an appropriate syntactic consistency in a short span of time if not instantaneously.

Pinker's proposal has come under sustained challenge. His prediction is simply not supported by empirical evidence and the necessary extensive battery of innate grammatical categories is open to question. There is little evidence of consistent and rapid development of verbs which an acquired rule would provide. Diary evidence (Bowerman 1973; Tomasello 1992) tends to show that some verbs develop well before others and the expected outcome that all verbs show consistently rule governed behaviour is elusive.

2.2 Ninio: Path-breaking verbs

Ninio (1999) dismisses Pinker's Semantic Bootstrapping hypothesis, based on her empirical data which showed that the first verbs are essentially stative, typically 'want'. As such, these verbs do not meet Pinker's criterion of the triggering effect of an initial active verb. Ninio also challenges Tomasello's Verb Island Hypothesis (which will be considered in depth below) which she describes as verbs each developing mini syntax systems, which become integrated, at a time well beyond early word combination.

Her review of evidence from 15 children learning Hebrew, along with Tomasello's data, prompts her to suggest a third possibility which is most succinctly expressed from the original

when children start to learn to combine individual verbs in various positional patterns, they also begin to consolidate some more general or abstract knowledge about the verb form class, about different complements verbs take and about the positional patterns involved.

(Ninio 1999: 623)

Ninio justifies this proposal through her data analysis showing that in early word (verb) combinations the initial pattern is a single VO structure. There is then an appreciable time gap before the production of a new verb in a new VO construction. Across all the children in her study, this time gap averages 44 days (span of 17 -104 days) thereafter the number of new verbs appearing in this pattern speeds up. Ninio notes that an SVO pattern occurs consistently after VO development and exhibits the same kind of time lag: the second verb in a SVO pattern appearing an average of 42 days (span 12 -150 days) after the first

occurrence. Further novel verbs appear in the pattern with an increasingly shorter time gap. Significantly also, VO and SVO appear to develop independently with different verbs.

Ninio attributes the gradual speeding up of the learning curves to 'facilitation, generalisation and transfer' from existing verbs that children already know how to combine. She claims that this type of development cannot support a verb island hypothesis. If verbs develop independent syntax without influence from other verbs, then this would not explain the speeding up effect over time. This would seem to be a plausible suggestion if such data were evident.

The major problem that Ninio glosses over is whether the VO structures are actually [V]+[O] or some other designation. Previously, Ninio (1988) had argued that children do not have abstract grammatical categories like verb or noun and that these categories emerge as words are combined - that is: initial word combinations are semantically motivated rather than reflecting syntactic knowledge. Given a growing store of word combinations, she suggests (p116) that children gain a 'growing realisation' or 'insight' into which words require arguments and therefore function as predicates and given a growing stock of predicates a child gains insight into what words function as arguments. For example, a noun 'apple' becomes an argument when entering into a predicate relation with an adjective in the 2 word combination 'big apple'. This combination in turn becomes an argument of a further predicate: 'want [big apple]'. On this account, children's abstract categories change dramatically as new combinations are successfully made. There remains, however, the major problem of what constitutes, motivates or guarantees a 'growing realisation' or 'insight'. Ninio offers no solution to this.

Is it valid to assume that children achieve this growing realisation and insight necessary for two word combinations to be considered VO structures? As will be shown later, (Section 3) there is every reason to conclude that these structures are unlikely to be VO. If such a conclusion is valid, it certainly hampers Ninio's account.

A cornerstone to Ninio's path-breaking hypothesis is that she suggests that the first verbs children acquire are prototypically transitive. She dismisses the work of Hopper and Thompson (1980) which attempts to specify a structure for high and low transitivity, in favour of her own proposal, based on child data, that initial transitivity is either reflected in terms of objects being drawn to/into the self (possession or consumption) or through object creation. This is explained by her observation that the first SVO constructions involve 'want' 'take' 'eat' 'hold' 'get', or 'make' which she terms 'path-breaking verbs'. There are, however, two main aspects of Ninio's account which are problematic. Firstly, what licenses a 'growing realisation' or 'insight' and secondly why are disparate notions of possession and creation so central? As will be shown below (Section 4) there is a clear rationale for

certain verbs to become privileged and this results from the child's representational ability and the aspectual structure of the events being communicated.

It is now timely to consider Tomasello's Verb Island Hypothesis in its own right.

2.3 Tomasello: Verb Island Hypothesis

In 'First Verbs', Tomasello (1992) presents a detailed case study of his daughter's (Travis) gradual acquisition of language and logs her 2+ word utterances from 15-24+ months old. It has the specific advantage of being a diary backed by audio and video evidence, contextual information as well as an indication of the adult interpretation of what Travis is thought to have meant by her utterances. The log also briefly suggests the supposed adult input which may have prompted Travis' learning. One of Tomasello's aims is to provide strong support for an empirical, usage-based approach to the acquisition, development and emergence of syntactic structure from item-based combinations.

Tomasello's analysis organises the extensive data into a number of themes that provide samples of development over the period of the case study. Not surprisingly, the focus of Travis' talk is on relations and actions between and about people and entities in her everyday experience: family members, pets, food, toys and so on. Also recorded are uses of words indicating motion which are not usually analysed as verbs (in the adult sense): up, down, in, out. This tends to emphasise that children may well be operating with categories different from adults (Bowerman 1973), that is, a child's category of verb, if they do in fact have such a category, may include a wide range of relational terms.

Accepting that children may not have an abstract verb category, Tomasello analyses Travis' word combinations – one 'verb-like' word plus a word which, in the main, references an object or entity – into sets of conceptual categories.

Tomasello's classification includes (with a selection of his cited example verbs in italics):

- Presence, absence or recurrence of objects: *whereda ; find-it; more; another*
- Presence, absence or recurrence of actions: *again; do-it; finish*
- Exchange of possession: *thanks; here-go; get-it; hold*
- Location of object: *up; down; on; off; in; out; here; there*
- Movement of object: *stuck; go; come; off; bring; take*
- State of object: *open; close; fix; break; tear; crack.*

A much smaller category indicates

- Actions of objects: *sweep; brush; hammer*

Lastly, a category that Tomasello labels as actions without objects, which he subgroups into:

- Physical activity: *run; jump; swim*
- Perceptual activity: *see; taste; listen*
- Emotional activity: *scared; love; hurt*
- Epistemic activity: *talk; remember.*

Tomasello observes that Travis' extensive knowledge of verbs appear, over time, to develop individually. The most commonly used terms develop more complex uses and participate in increasingly complex constructions. The development is therefore word/item specific and does not at this stage appear to provide a model or rule for other verb development. For instance, Travis' use of *get-it*.

The case study records that parental use of this expression is of 3 kinds: for the telephone 'I'll get it'; telling someone to 'go get it'; or telling Travis 'you can get it' in response to her request for something. The assumption made is that Travis learned *get-it* as a single word expression in relation to objects that are in sight but inaccessible. Her earliest uses show its holophrastic nature: '*Phone, get-it*' and '*Ball, get-it*' around 17mo. By 18mo Travis appears to put this in a 2 word combination structure resembling VO '*Get-it silk*'. '*Get-it puppet*'. By 20mo Travis is indicating the retriever '*Mummy get sauce*' or '*Daddy get-it bottle*'. By 21 mo she utters '*Get raisins to me*', and by 23mo Travis is specifying actor and intention as in '*I'm gonna get more ice-cream*'.

The development seems to be specific to this verb, as the same complexities do not transfer or appear in similar words. Thus at 19+months Travis says '*Balloon, have-it*' and '*have-it cards*' and at 20 months she asks '*Give-it pencil*' and at 23months '*give it to me*'. In another instance Travis uses '*keep-it*' to imply she will not relinquish an object and this remains a single word assertion past 20months.

Tomasello concludes that if the developments of '*get-it*' were rule governed then it should be possible to discern comparable developments for '*have-it*', '*keep-it*', '*find-it*', '*want-it*' etc. Evidence of this, however, is not apparent. Tomasello's Verb Island Hypothesis proposes that grammaticalisation of verbs derives from learning combinatorial possibilities and argument roles for each verb individually. Verb expressions that are used more frequently develop more extensively than less frequently used verbs. Tomasello's principle argument is that this would not be predicted if it were the case that a single rule developed for one verb was applicable to others.

How, then, do verb islands become generalised verb constructions? Tomasello (1992, 2000, 2005, 2006) is vague on this, next development, suggesting that, given a critical mass of verb island constructions, a process of analogy enables the child to construct a generalised system. Tomasello asserts that:

Children begin to form abstract utterance-level constructions by creating analogies among utterances emanating from different item-based constructions.

(Tomasello 2006: 45)

He cites the work of Gentner and Markman (1997), and Gentner and Medina (1998), which, he claims, provides evidence of the young child's ability to make analogies. A closer look at Gentner and colleagues' work raises questions about this assertion, because the empirical evidence for analogous learning by young children is far from conclusive. Their main objective is to explore the psychology of a long discussed philosophical problem: the relation between similarity and analogy. They present 3 types of comparison and give rather quirky illustrative examples, reported here for completeness:

- (i) Literal similarity where objects and relations are shared (e.g. comparing prison and jail);
- (ii) Mere appearance similarity, where objects but not relations are shared (comparing a zebra and prison)¹; and
- (iii) Analogy, where relation but not objects are shared (comparing prison and a job).

The key element of this research, for present purposes, is that in analogy, only relational elements are shared. Experimental work has been conducted with children (from 2years old to 14years old and adult) to explore when and how such relational alignments are made between objects (Gentner and Medina 1998), or events and scenarios (Gentner and Markman 1997; Richland, Morrison and Holyoak 2006). Across all these studies, where young children are participants, the experimental presentation involves concrete items or visual scenes for children to compare and draw analogies. In every case, it is not until children are 4 years old that they perform these experimental tasks successfully, and then only just above chance level. It is not until children are 5-6 years old that they become secure in forming basic analogies, and even then it is with concrete items or visual representations.

Tomasello, however, is suggesting that children around 22 months old might have the ability to draw analogies from inventories of abstract linguistic constructions. This would appear to be unlikely, particularly as it is far from certain that children have even an intuitive notion of verb, or that the item specificity of constructions they use can enable them to form a structural as opposed to a conceptual alignment. Unfortunately for Tomasello, Gentner and Markman (1997)

¹ The comparison is assumed to be between a zebra's stripes and a striped prisoner's uniform.

suggest that it is the acquisition of language itself that supports and prompts the ability to form analogies.

3 Events

All 3 approaches to how children learn verbs and their syntactic properties have been found to present incomplete accounts. This section will begin to build an alternative. Most empirical research maintains that verbs develop in an item-based way as the data gathered by Ninio and Tomasello also show. What is still unclear is how and why this is so.²

As already mentioned, many researchers express doubt that children have [S], [V] or [O] categories, so to imply, as Ninio does, that children's word combinations exhibit [S][V][O] or [V][O] type structures may well be the imposition of a post hoc interpretation which has no validity.

This section will attempt to find a rationale behind children's early word combinations. It will consider the proposition that language acquisition generally and verb learning in particular can best be seen not as a bottom-up synthetic/combinatorial process where general constructions are built from isolated lexical items, but more of a top-down analytic/segmental process. In this way a child increasingly elaborates more explicitly her growing understanding of the physical, social and cognitive contexts she is experiencing. In searching for this rationale, the starting point is to revisit object concepts and object labelling.

An object concept for an infant is thought to be a bounded entity with spatio-temporal cohesion (Spelke 1988). Objects remain conceptually coherent as they move either when changing location or when partially or totally occluded. Much of the research on object cohesion and conceptual representation has focussed on the notion of the discrete bounded entity rather than its spatio-temporal properties. Objects in static displays are uninteresting to infants and merge with the background. When intentionally referenced, what makes an object salient enough to be fore-grounded, apart from appearance, is its affordance, essence or what it is doing or what it can do. These properties are probably just as or even more important than simply visual appearance. Mandler (1992) suggests that an infant's perceptual system can parse and categorise objects and associated movement (events), and analyse the outcome into representational form containing fragments of the original content accessible for manipulation. Nelson (1986, 1996) goes

² To obviate potential confusion, the following notation will be used: [S], [V], and [O] will be used to refer to grammatical categories Subject, Verb and Object respectively; *verb* will be used to refer to a child's lexical item which is verb-like in appearance but does not function as a verb for a child.

further and suggests that events incorporating change of state are the initial contents of mental representations. The supposition is that to a child the world is dynamic and changing, and it is by forming event representations of familiar and regular experiences that children are able to derive stability by making the world appear concrete, i.e. their event representations are for them 'how the world works'. It is such representations that enable a child to track events to recognised outcomes knowing the difference between accidental and intentional results. It is well documented that preverbal infants are able to parse a complete intentional act (Meltzoff 1995, Baldwin et al 2001, Baldwin & Baird 2001), imitate intentional acts and even correct accidental acts. This evidence suggests that the parse that children seem to perform involves the holistic nature of the event involving objects, not an abstract event independent of the participating objects.

3.1 Objects and Events

Studies of children's object labelling abilities, by the required nature of experimental design, attempt to factor out apparent contextual distracters in order to focus on the interaction between a (passively observing) child and an object. A close look at the classic experiment by Xu and Carey (1996) will show the power that the event context can exert. The experiment was designed to demonstrate that a 10 month old infant has only a notion of general object sortal and that it is not until 12 months old that children can recognise object attributes (differences in shape, colour etc). The experiment runs in the following way:

A screen is set up in front of a passively watching infant (10months -12months) who is habituated to a ball emerging and returning from the left of the screen and a toy duck emerging and returning from the right of the screen. The test displays the duck movement twice followed by two examples of the ball movement. At the time when the ball and the duck have both returned behind the screen, it is raised to reveal either a ball and a duck (which would be the expected result as both items had emerged and returned behind the screen) or just the duck (which would be an unexpected result). By a preferential looking measure 12months infants showed the expected result (longer looking time at the single item behind the screen), but 10months infants showed the opposite: looking longer when 2 objects were revealed, indicating that, for them, the two item display was an unexpected result. Xu and Carey explain this in terms of a 10month old having only the notion of object sortal. The ball and the duck are not differentiated. By 12months the assumption is that infants have a greater ability to discern object properties and therefore can differentiate the ball and the duck and so having seen each emerge and return behind the screen, expect that 2 different objects will be present when the screen is lifted. A strong challenge presented by Wilcox & Baillargeon (1998), maintains that the actions of the ball (or duck) emerging and returning behind the

screen are apprehended by the infant as coherent events. The experiment is therefore a display of two discrete events to the infant: ball emerging and returning or duck emerging and returning. This is a significant observation on the experiment. The emergence and return of the object was mainly a methodological necessity of the experimental design in order to show the infant the object beside the screen and enable the infant to maintain the image of the object being behind the screen. The fact of the object as participant in a moving event was not considered. Wilcox & Baillargeon observed that if the 10months infant either entertains each object event as discrete or only has memory capacity for one event, then the result (when the screen is lifted) would be expected to comply with the last seen event, i.e. one object would be behind the screen. A 2 object outcome is surprising because only one object was involved in the last seen emerge/return event. By 12months it is supposed that the infant has the cognitive ability to appreciate the nature of the experiment as a two event display. If the infant can retain each event as sub-events then the infant would expect the result of both emerge/return events to be displayed when the screen is lifted.

Entities are intimately linked to (potential) events and events cannot occur without them. It is suggested here that the child view initially is that an object is defined by its action in an event, and that the object and the action (activity, or state) have integrity. By extension, the case being made here is that children's *verbs* are not the same as those normally denoted [V]. For linguists this [V] category is generally thought of as a category of expressions for a separate conceptual event (or property of an event) which is then combined with [N]-labelled expressions (denoting participants in an event). Instead, the suggestion here is that infants' object-category expressions tend to play the role of an event label, while many infants' *verbs* are more like modifiers of these descriptors. It will be argued that the reason for this is that an object (or entity) has an integral event potential.

If objects are intimately part of, or in fact, are the only manifest elements of events, then it is possible that the infant's object label includes not only the physical characteristics of an object but also its contextually expected event 'potential'. These expectations arise from the child's first-hand experience of the object. The conclusion is that, from the experience of observing, handling and otherwise interacting with the physical object, an object-concept will include the capabilities of that object. So, balls roll // food is eaten // doors open or close, and spoons spoon and hammers hammer. The communicative effectiveness of one word utterances demonstrates this. Children's one word utterances are not just static descriptions of objects but pragmatically interpretable of implied relevant action. For example a single utterance 'apple' can be interpreted as 'this is an apple', simply identifying the fruit, but equally the utterance can be interpreted as 'I'm eating this apple'; 'give me an apple'; 'I like apples' or even 'an apple has just fallen off that tree', depending on the context of utterance. For a young child

without a category [V], the word forms which adults identify as verbs may in fact be the means to make more explicit the event potential of an entity, as realised in a specific instance, and therefore be more informative. The two word utterance ‘eat apple’ meaning ‘I am eating an apple’, makes more explicit what aspect of the object-event ‘apple’ is relevant at the time, and has a function comparable with adjectival combinations, ‘green apple’, ‘sweet apple’. If this analysis is correct, then combinations which explicate the expected object-event are essentially attributional. Combinations are, therefore, descriptive of an object and its event potential, learned through experience of the object over time. Rather than word combinations being Verb Islands, the notion of an Event Island is preferable, which is explored in the next section.

3.2 Event islands

Adopting the thinking that word combinations may be attributional of an object, where objects are the means by which children think about on-going events, many of a child’s *verbs* appear closer to adjectives in the early months of multi word speech, particularly as communication is about an object more often than not. As will be seen, examples of this become very apparent in Travis’ corpus data, as many of the previously assumed [V]+[O] type combinations focus on the object role in the communication event. Indeed, all early *verb* and non-*verb*-like word combinations appear to do so in the extensive data reviewed by Braine (1976). All of the two-word combinations cited there involve a nominal term referencing a concrete object and another term explicating some attribute, property, function or event potential of that object. Examples include:

Baby sleeps; fall candy; crying baby; daddy teeth; Melissa walk; blue plate; wipe cloth....

As has been suggested, the additional information is integral to the object-event and, although the additional words may be given an adult notation (adjective, adverb, or verb), they all pattern in the same way: non-nominal + nominal – the sequential order being variable. What seems likely is that these types of word combinations are essentially attributional, that is, the combinations refer to objects and their ‘event’ or ‘action’ properties. If this is so, then *verb* combinations might pattern closely with adjectival combinations. Some clear supporting evidence can be found within experiments with colour adjectives, again generally noted to be ‘hard words’ to learn.

A child’s interpretation of a novel adjective is tied to the properties of the specific nominal element it modifies (Waxman and Lidz 2006), and children’s initial tendency is to extend adjectives very narrowly, as with verbs. So, ‘white’ when applied to a cat, is extended to other cats and not generally to milk, snow etc. In fact, colour terms are notoriously difficult to detach from specific items to form a

generalised category. Sandhofer and Smith (1999), in a set of experiments to test the mapping of colour words and colour properties of objects, found that 2 year olds could answer successfully comprehension questions like “Show me the red one” which relies on word-property mapping and they could use colour words (as a known lexical category) in answering “What colour is this?” whether their answer was correct or random. Children had greater difficulty in abstracting colour in a property to property matching test, in effect answering the question “What matches this?” In this case, children were more likely to match similar objects (a series of different cups for instance) by colour, than dissimilar objects (cups and blocks). One conclusion to the study was that children have difficulty abstracting the colour property from the objects which have the property, and it was only after a period of time of actively labelling object sorts that property to property mapping was possible. If, as is being suggested in this paper, the action or event potential of an object is considered an integral property of that object, then the difficulty of gaining the property to property mapping ability as predicted by the Sandhofer and Smith experiment will take time. This would support an Event Island Hypothesis where *verbs* require time before they are applied on a general basis. That is, they are integral attributes of specific objects. Many of Travis’ *verbs* support this, when she appears to be describing an event perceptually shared by herself and her listener.

In contradiction, it seems to stretch the point to propose that utterances like ‘*get-it balloon*’ or ‘*get-it silk*’ are descriptive of objects (balloon/silk) that can be *got* (property). It is necessary to address why there are a number of *verbs* which do not fit the object /event potential proposal put forward so far. The difference appears to be between utterances descriptive of shared, public contexts and those which are communicative of private representations.

3.3 Event interaction

As discussed in Section 2.2, Ninio speculated that children have ‘a growing awareness’ or gain ‘an insight’ into how words pattern as predicates and arguments. It is necessary to give some substance to ‘growing awareness’ and ‘insight’ in this context, and introduce the notion of Representation types.

Perner (1993) makes a distinction between Primary and Secondary Representational models. During the first year of life a child maintains a single updating model of ‘reality’. During the second year, typically around 15months, a child is able to maintain at least two models which, Perner proposes, frees the child from being tied to the current reality and enables her to contemplate the past or entertain hypothetical or desired situations, including pretence. To make this distinction, Perner terms the current updating model of reality as Primary

Representation and other constructed models (the remembered, the hypothetical or desired outcome) as models of Secondary Representation.

Suddendorf and Whiten (2001) in applying Perner's proposal, show that children's developing abilities with behavioural tests, in contrast to great apes and other animals, depend on being able to entertain the potential outcome from comparing a Primary Representation and Secondary Representation and they attribute this comparison to what they term 'the collating mind'. They are not forthcoming about what a 'collating mind' might be. What is attributed to it implies more than a simple juxtaposition of models. Zelazo (2004) and Zelazo et al. (2007) propose a developmental model of levels of consciousness which appears to address this. During the second year of life children become able to recursively compare two representational models. It is the outcome of the comparison which becomes available to consciousness. This process seems to cover the function of Suddendorf and Whiten's notion of the 'collating mind'; i.e. the collation and comparison of Representations, enabling a Primary Representation of actuality to be compared with a memory and/or a hypothetical and/or a desired outcome. For Zelazo, it is important at this age that children are not conscious of making a comparison but have a conscious awareness of the result of the comparison, which is therefore available for expression.

Evidence for this can be found in children's one word utterances. Greenfield and Smith (1976), (driven at the time by Fillmore's case grammar), provide useful examples from their investigation. They studied a detailed diary corpus of two children, each over 20 months old, to identify whether one-word utterances reflected different functional relations/cases. The current account provides a different explanation. Consider the following examples of different uses of the single utterance: 'mummy':

1. requesting something from her mother
2. giving something to her mother
3. identifying a coat as her mother's in the absence of the mother
4. indicating who gave the child an object in the absence of the mother
5. vocative to attract attention.

These uses reflect more than simple labelling, and can be explained in terms of the resulting outcome from a comparison of a Primary Representation of the given physical context with the following, respective Secondary Representations:

- 1a. Representation of the 'thing' requested
- 2a. Representation of the mother receiving an object
- 3a. Representation of a memory of the mother/coat pairing
- 4a. Representation of a past giving event

5a. Representation of the outcome of gaining the mother's attention

These examples, however, are of single word utterances. An analysis of Tomasello's data from this viewpoint will reveal how Secondary Representations affect word combinations and *verbs* in particular.

4 Evidence from Tomasello's diary data: Travis

From the foregoing discussion, it should be acceptable to conclude that, at her age, Travis has the cognitive ability to compare implicitly a constructed, Secondary Representation with Primary Representation (her up-dating model of reality) and have a conscious, expressible, awareness of the outcome of the comparison.

4.1 Aims of the analysis

It is predicted that a re-analysis of the data from the perspective of Travis' proposed developing cognitive abilities will:

- Reveal how verbs can be discriminated by which representational type they are used for and how this linguistic development extends the range of Travis' communicative intentions; and
- Provide the missing link between discrete Event Island construction and the advent of a recognisable verb category.

4.2 The method

To reduce the strong influence of Tomasello's own analysis, only the information appearing in the appendix to Tomasello (1992) has been used. This is organised by the single sample *verb* with examples of Travis' utterances listed with respect to her age at the time of recording. Each recorded utterance is accompanied by a brief contextual description – typically less than half a line long. The selection for this analysis has been limited to word combinations, rather than single word uses. 161 *verbs* are recorded in the data, 66 of which are used in <5 utterances.

As Tomasello maintained that Travis did not have a specific (adult) category verb, he includes significant entries for prepositions: on/off; in/out; up/down; over/under; and the like which are identified to exemplify Travis' expression of motion or location. Travis does, however, frequently accompany these elements with *verbs*. As the point of this analysis is not to align the use of *verbs* specifically with motion events, utterances under this classification have been re-allocated to the appropriate *verb* set, otherwise the prepositional phrases are either considered

en masse or removed from the analysis. Apart from these provisos, all the data entries have been considered.

Given the discussion in section 3, the analysis has a deceptively simple approach. This is to separate the selected utterances into what could be considered Primary Representation types and Secondary Representation types and note any differences in the linguistics.

Utterances relating to Primary Representation are defined as descriptive of the perceived environment (Travis' current model of reality). They are referential in terms of events within this environment, and frequently in joint attention with her carer.

Utterances relating to Secondary Representation are defined as those which concern events of which Travis is aware but which are not referentially present in her perceived environment. The distinction can be clarified by considering the difference between Travis saying 'apple' because she has an apple in front of her as opposed to her saying 'apple' referring to an object which is not present in her perceived environment, but of which she has a mental model. The Secondary Representational models relevant for this analysis are:

4.2.1 Intentional outcome. A constructed model closely associated with 'reality' but not apparent in the perceived environment, depicting a desired state which can be compared positively with the Primary Representational model if the outcome is successful. For instance:

To request a perceived but distal object be made proximal to the child requires the child to have a representation of the intended outcome – object proximal – with which the representation of the result of the requested action event can be compared, i.e. the expected outcome (Secondary Representation) compares positively with the actual outcome (Primary Representation). The vast majority of Travis' utterances deemed to be related to Secondary Representation are of this type, and might be described as reference to an intended event in the immediate future.

4.2.2 Memory/cause – A constructed model of a previous experience i.e. a construction of a former primary representation, or a constructed model of a previous event that represents how the current situation has come about, that is a non-random sequence of events. For instance:

Members of this group are the simple description of a past event, or a more complex declaration of how a current event has come about.

4.2.3 Possibility. A constructed model, which shares much with Primary Representation and respects many of the beliefs of Primary Representation but is decoupled from it and can exist in parallel. For instance:

Travis describes how she is making dinner while playing in her sand tray.

4.2.4 Implausible alternative. A constructed model sharing much with Primary Representation but which can consciously violate an aspect of belief in Primary Representation. It is decoupled from Primary Representation and invites comparison with it. For instance:

Travis makes a joke about chewing on rocks, accompanied with paralinguistic signals that this is in fact a joke

4.3 Categorising the utterances as Representation types

The data has been reviewed to identify linguistic expressions which signal one of the Secondary Representational functions listed above. (Henceforth these will be termed SR. In keeping with this ad hoc terminology, utterances reflecting Primary Representations will be termed PR). The detail of the analysis appears in the appendices in tabular form. (In both the tables in the appendices, a page reference of the paperback version of Tomasello (1992) is given alongside the sample *verb*, for convenience.)

4.3.1 Appendix 1 - 'SR verbs'. 27 different Verbs were found exclusively to signal SR in their various word combinations. The Table in Appendix 1 lists these, indicates the number of utterances and age when they are used in combination. The Table also provides an indication of which SR function(s) the utterances evoke. The majority (15) exclusively represent intentional outcomes; and 9 exclusively represent explicit memory/ causation. The remaining have overlapping uses. Each communicative function is now considered in turn.

4.3.1.1 Intentional outcome. ‘Where(da) X’ appears to be an initial stereotypical SR construction for Travis. In adult terms ‘where’s the X’ most usually implies a query about the location of an object, but for Travis the focus is upon the object. The interpretive comments in the corpus indicate each time that it is the object that Travis wants, not information about the location. On the current account, Travis has a SR of an object which is not present in PR. The ‘whereda X’ construction is highly productive, and as shown in Appendix1, is frequently used at an early age. There is no recorded evidence of use from 19 mo until 23mo when she uses this construction to accompany her own searching for items, which may indicate that she has refined the meaning she assigns to the construction to focus more appropriately on location.

The second item - the ‘get(-it) X’ construction - has the same function as her early use of ‘whereda’. Again this is highly productive as any entity (animate including humans or inanimate) can fill the X slot. Note too, that the construction is not, initially, order critical in that ‘X get-it’ is more usual until 18mo. By 19mo the construction seems to have a fixed order ‘get-it X’ seemingly in line with English syntax.

It is suggested that the first 17 words in Appendix1 all express the same ‘intentional outcome’ function. What might be the difference between them for Travis? In adult terms there is significant difference between ‘get’, ‘give’, ‘hold’, ‘have’ or ‘move’. It is suggested that these subtle differences have not yet been acquired. Although all these items have a similar underlying meaning for Travis, as new words are learned, a greater refinement, or precision is available for expression. There is a suggestion of this in the data. ‘Where(da)X’ appears to become replaced by ‘get(-it) X’ which in turn gives way to ‘hold(-it) X’. The number of examples recorded for each word suggests she makes good use of the new word when it is acquired. At 18mo, when all three constructions are recorded in use, ‘where(da) X’ seems to accompany active searching; ‘hold(-it) X’ seems to refer to quite small items, whereas ‘get-it X’ remains general. Travis’ single use of ‘want-it’ at 19mo is given the interpretation in the corpus as ‘don’t want it’, and as such contrasts with the other uses. By 22+mo ‘want’ appears to have generally taken over a significant amount of Travis’ intentional outcome utterances. The data is insufficiently robust to discern in detail how Travis differentiates the other items in this section.

4.3.1.2 Explicit memory, causes and results. To express an explicit memory, adults typically use a past tense form of a verb. The few examples discernable from the corpus also seem to use past tense forms, but there appears to be little to suggest that Travis has any notion of a past tense for this purpose. Although ‘got’; ‘ate’ seem good candidates as past tense forms, each example is used to relate events which happened in the immediate past with perceived results in the present.

‘Weezer ate the roach’ (Weezer is the family pet) may be a report of a past event or equally a cause for the roach disappearing. Similarly when Travis says ‘Got-it balloon’ she has the balloon in her possession and is not (apparently) reporting a memory. More robust examples are ‘remember monsters up in the sky’ which is a reference to a tv programme seen the day before. In this case Travis is not using a past tense, although ‘remember’ would appear to be a clear marker for a memory. The explicit ‘left my coat in Schaufele’s house’ and ‘Santa Claus gave lollipop for me’ are good but isolated examples of a reported past event but Travis was much older when she made these utterances (23mo).

Most of the examples which have some reference to the past are ones where Travis is giving information about a past event that has a result in the present. The most productive construction of this type is ‘X made Y’. In each case her reference is not to manufacture, but covers any action which has resulted in the presence of the referred object. ‘Maria made that book’ is about a book that Maria had given her. ‘Danny made this’ is about a shirt that looks like one Danny has. A particularly endearing example is ‘mail-box made this’ referring to a doll that arrived by mail. Similarly, Travis uses ‘buy’ to report how certain items come to be in the house: ‘buy this plum’, ‘buy Weezer cat’ (cat food), and ‘buy this sponge’ all of which are given the interpretation of “mama bought at store 20 minutes earlier”. By the same token, the examples already given: ‘Weezer ate the roach’ and ‘got-it balloon’ are most probably recounting the cause of the presence (or absence) of an object in the present.

What is particularly interesting is that these constructions begin to show a SVO type structure and would appear to align with suggestions that transitive constructions frequently express causation. Discussion of this relation must, however, wait for another time. What is important to retain here is that Travis is expressing a constructed SR tracking a present object back to its ‘origins’ within the limits of her experience. Thus, despite her referring to an object in the present, her use of a construction containing a past tense form is completely appropriate. There is still, however, considerable doubt that her reference is to a discrete past event in itself. She is, after all, talking about an entity in PR. It would appear that Travis is acquiring a set of constructions to express causation and the verbal element is limited to: ‘gave’; ‘got’; ‘made’; ‘told’ expressing a clear relationship between PR and SR. This will be discussed further in section 4.4.

The next section considers Travis’ verbs which display an intentional distinction between SR and PR without overt marking.

4.3.2 Appendix 2 description - PR / SR verbs. Of the remaining verbs, 26 were found to be used mainly for PR but also with some SR functions. These appear listed in Appendix 2 again, with numbers of utterances according to age and recorded in a SR/PR ratio. As the same words are used for both PR and SR,

interpretation is derived pragmatically, and so the analysis is based on the additional comments given by Tomasello, who indicates the difference between Travis' utterances which accompany her actions and those where she wants such actions to occur. In general the word combinations listed in Appendix 2 differ from those in Appendix 1 in that they involve a verb + object combination where the Verb element makes more explicit an attribute or the event potential of the object. 'Draw' is probably an exception in that it seems to lexicalise a complete activity including implements and outcomes. Her word combinations with 'draw', in fact, make explicit a location for the drawing. So, 'draw couch' indicates that she is drawing on the couch, not a picture of the couch. There is only one example where Travis indicates what is to be drawn when she asks her father 'draw mans'. As the outcome of a drawing is a representation of a mental representation this may present additional difficulties for verbalisation. At any rate Travis avoids this in her utterances.

4.3.2.1 Intentional outcome. Travis' use of the word combinations in Appendix 2 generally express PR, as in 'baby crying' when a baby is crying or 'see Danny' when she can see Danny. There are, however, circumstances when these utterances can be interpreted as SR. Such instances include 'mommy crying' when she wants to see a picture of her mommy crying, or 'see Stu' when she is requesting to be lifted up to be able to see Stu. The interpretation is pragmatically derived at the time from the context of use. Tomasello records such interpretations in the comments made in the corpus, usually with a brief statement of 'wants to'. The majority of the comments differentiate between an event actually happening and Travis' wanting it to happen.

4.3.2.2 Explicit memory, cause and result. Unlike the previous section, there are several examples of Travis expressing an explicit memory of an event that had happened well before the time of utterance. 'Cry about you' is used to tell her parents what happened in school. 'Pee-pee grass' recounts what she had done at some time. 'Danny fall-down', 'Pete hurt a car' (Pete was hurt by a car), and 'run in the street' all relate past events. In no case is a past tense form used, and the interpretation that this is a past event has to be derived (without much difficulty) pragmatically. This is a clear demonstration that Travis is able to recall and comment on past (dramatic) events constructed from memory, a condition that seemed to be in doubt in the previous section.

As in the previous section, causes are recorded here as an expression of a past event which explains a current situation. 'Danny hit tennis' recounts that she is crying because she was hit in the mouth by Danny with a tennis racket. 'Fix-it car' recounts that the car is working now after Pete had fixed it. 'Bring ball', 'hurt leg', 'spill-it couch' each relate causal actions for a current state. Each utterance is also

used unchanged to describe an event while it is happening (PR). As such, the different interpretations need to be pragmatically derived.

4.3.2.3. *Possibility*. The only examples which exemplify this use appear to be: ‘Cook dinner’, ‘fix dinner’ which are both utterances made from within pretence, and ‘chew on rocks’ which is uttered as a joke.

4.4 Aspect and telicity

Having now identified a distinctive class of *verb* based on representational type – SR, it is clear that the utterances involving this type all express telic situations (bounded and complete actions). Why should this be so? The answer to this may well be found in the processing requirements involved. The current account so far proposes that the underlying cognitive process is one of implicit comparison between a constructed representation (SR) and the representation of actuality (PR). It seems reasonable to speculate that discrete, bounded elements are more easily constructed and compared than unbounded, overlapping events for a child under two years old. Although empirical evidence to this effect is not to hand, there is no contradictory evidence in Travis’ data. Indeed, as will be demonstrated, her utterances reveal that the events she communicates do have a predictable Aspectual structure. Aspect expresses time within an event. In general, it signifies whether an event has a clear beginning or end point, whether the event has duration and is on-going or is instantaneous. Aspect contrasts with Tense which, on the other hand, expresses time of the event relative to a defined reference point – usually the time of speaking. To refine the current account further, the additional influence of Aspect is required.

Vendler’s (1957) influential solution to the long held problem of the interplay between tense and aspect was to identify 4 distinct situation types, each with contrasting ‘internal’ event aspect: States; Activities; Achievements; Accomplishments.

Since Vendler’s paper, there has been a wide range of research into aspect types and a number of analyses that draw ever more fine grained distinctions. For the present purposes, however, it is generally accepted that Vendler’s 4 situation types can be characterised by 3 equipollent features: +/- dynamic; +/- durative; and +/- telic, for instance (drawing examples from the Travis data):

States: - dynamic; - telic; + durative

e.g. ‘hot coffee’, ‘me hungry’

Activities: + dynamic; - telic; + durative

e.g. ‘baby crying’, ‘Maria singing’

Achievements: + dynamic; + telic; - durative

e.g. 'Maria made this', 'get-it balloon'

Accomplishments: + dynamic; + telic; + durative

e.g. 'hold the spoon', 'have this wallet'

Travis' SR type utterances focus on the latter two situation types, when she expresses causes, change of state, results or intended outcomes. Her PR utterances are in general atelic or attributional with an object focus and express states or activities of that object.

A key feature of Aspect for Travis at this stage of development is the influence of telicity. All of Travis' *verbs* in Appendix 1 are + telic, and this invites the conclusion that there is a functional and defining link between telicity and SR *verbs*. But, there remains the problem that some *verbs* in Appendix 2, notably 'see' and 'open', are sometimes +telic/SR and at other times they are -telic/PR, the difference being pragmatically derived.

It is a well documented problem in adult usage that certain verbs appear to change their inherent aspect under certain contextual conditions. An example is the case of 'run'. The verbal aspect of "He is running" is [-telic]. The standard test for this is to imagine stopping the running process before it comes to a natural conclusion. In this case it is still true to say of the runner 'he has run'. In contrast, the aspect of "He is running to the shop" is [+telic], because there is a specific end point in reaching the shop. The same test, i.e. stopping the running before the shop is reached, fails because it cannot be said of the runner that 'he has run to the shop'. In this case 'run' has a [+telic] aspect prompted by the context. In Travis' data there are similar problematic *verbs* which appear in Appendix 2 for which a SR type utterance is pragmatically derived. Under this condition the *verb* is +telic, otherwise a PR-type utterance is -telic.

Olsen (1997) has a very neat solution for this aspectual problem (her focus is on adult usage, but is also appropriate for Travis). Olsen proposes that aspectual features are not equipollent (+ or -) but privative, appearing only as a + marking for a verb as part of its semantics under all conditions. In other cases where a verb is unmarked, the aspectual feature (+ or -) is derived pragmatically. On this account she predicts 8 possible situation types (2 of which she finds unattested by the wide range of languages to which she applies her account). The two situation types additional to Vendler's 4 are Semelfactive (a single dynamic action: sneeze or cough) and Stage level state (a state of limited duration: 'I am sick' - as in currently sick but knowing this state will not last). The 8 situation types appear as follows: (∅ denotes that marking is pragmatically derived):

Situation types	Durative	Dynamic	Telic
Stative	+	∅	∅
Semelfactive	∅	+	∅
Activity	+	+	∅
Stage level state	+	∅	+
Achievement	∅	+	+
Accomplishment	+	+	+
unattested	∅	∅	+
unattested	∅	∅	∅

Travis' *verbs* can now be accounted for:

Appendix 1 *verbs* can be defined as a class of SR verbs marked for telicity:

Situation types	Durative	Dynamic	Telic
(Stage level state) 'me hungry'	+	∅	+
Achievement 'Maria made this'	∅	+	+
Accomplishment 'get-it balloon'	+	+	+

Appendix 2 *verbs* do not form a coherent class as yet, they are not marked for telicity and their value is pragmatically derived, given a developing SR usage:

Situation types	Durative	Dynamic	Telic
Stative	+	∅	∅
Semelfactive	∅	+	∅
Activity	+	+	∅

It is proposed that telic marking is the key that opens the door to the development to a category [V] for Travis. The set of privileged Appendix 1 verbs are all marked for telicity and all used for SR-type utterances. The specific words Travis uses as her first verbs may be unique to her. How applicable these words are to other children requires further research. However, many of Travis' verbs mirror Ninio's path-breaking verbs, but not all. Ninio (as discussed in Section 2.2) characterised such verbs in terms of expressing 'drawing into the self' (*want, get, give, bring,*

find, eat, drink) or ‘creation’ (*make, do, build, draw*), both of which seemed loose definitions without a generally applicable rationale. On the current account the first verbs such as those in Appendix 1 are clearly defined by being + telic and SR-type, and appear to have canonical properties of transitivity.

As stated at the beginning of this section, SR event types are necessarily telic to provide the young learner with discrete implicitly comparable representations. The outcome of the comparison is therefore an overall event constituted of 2 sub-events – one PR and the other SR. It is a significant observation that an object must play different roles in each sub-event. For instance:

Get-it balloon implies an SR event where the balloon is represented and a PR event where the balloon is absent; similarly

Danny made this implies an SR event where ‘Danny’ is in some sort of relation to ‘this’ and a PR event where ‘this’ is present but ‘Danny’ is not.

The attributional features of the object (balloon/this) are not significant or at least not sustained across both sub-events. In these instances an object’s event potential is conceptually less important than its referential properties. It would appear that in SR type constructions, both verbs and nominals take on a more conventional role. If this is so, then evidence of a developmental shift can be found in Appendix 2 *verb* constructions. Here, objects can exhibit both event and referential roles distinguished pragmatically. For instance:

See Danny a PR event type, with an attributional *verb* representing ‘Danny is visible’, and

See Stu (interpreted as a request to be lifted up to be able to see Stu) suggesting an SR event where Stu is visible, and a PR event where Stu is not.

Establishing further evidence of the attendant properties of transitivity and the developmental move to generally more recognisable (in adult terms) verbs and nominals are key areas for further research.

5 Conclusion

Three existing models of early verb acquisition have been presented and their shortcomings discussed. This paper has begun to construct an alternative approach based on an assumption that children may have a starting point which differs initially from adult competence. By considering the enabling factors of a child’s developing cognitive abilities, and re-analysing Tomasello’s original data, three main conclusions are drawn:

1. It is preferable to consider early word combinations as Event Islands, in that, most of a child’s earliest use of nouns are not as category [N] but more like adult verbs. They are descriptors of event types categorised according to the event

potential of objects as they appear in Primary Representation. Most of a child's earliest uses of verb-forms are not category [V] but more like adjectives. On this account verbs are not harder than any other words for a child to learn.

2. Children's development of an adult-like verb category begins with a small but more productive group of words that are used to express content involving Secondary Representations. These are all telic and have canonical properties of transitivity. The speculation is that the syntactic category [V] forms round these words. This is supported by noting the conceptual shift which adjusts the child's earlier categorisation of events in language, from the event potential of objects in Primary Representation to that of a wider range of properties that have objects as participants in Secondary Representation.

3. Of particular note is the observation that the verbs expressing the relation between Secondary and Primary Representational content denote complex event types involving sequences of sub-events (past events as causes of current outcomes or intended outcomes not apparent in the present). In these contexts, objects are no longer suitable to be the conceptual focus of the event as they must persist through the sequence of sub-events. Thus, both the child's verbs and nouns take on their more typical roles in these constructions.

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Appendix 1 SR-type verbs

Lexical item	pg	Main	16mo	17mo	18mo	19mo	20mo	21mo	22+mo	Intl	Mem	caus	
where(da)	286	SR	Whereda dog; where cracker; where the keys	23	11	5			6	X			
get-it	304	SR	Cup getit; Maria get-it; get-it silk	3	24	9	8	4		X			
no- absence	287	SR	No boy; bottle no; no monkey.	3	2	1				X			
come	328	SR	Come back; bottle coming too; Maria come in				4	6	1	11	X		
find	287	SR	Find-it bird; find Danny; more find Lulu		2	5	3			2	X		X
get + particle	331	SR	Me get out; get down me; get down this book				1	8	1	3	X		
give	310	SR	Give-it pencil; Joe give that for you				3	1	1		X		X
have	309	SR	Balloon have-it; Linda have-it more cream				13	1	7	7	X		
hold	307	SR	Hold da pencil; hold this blocks; hold the grapejuice		3	12	30	6			X		
leave alone	302	SR	Leave my tummy alone; leave me alone					3	6		X		
let-go	302	SR	Let-go my hand							1	X		
move	327	SR	Move brush; first move this			1	11	2			X		
need	357	SR	Need more jello; need this up-here					2			X		
share	310	SR	Share this pen; share me				1	3			X		
take (off)	330	SR	Daddy take a da bottle; take that belt off me				2	9	6	9	X		
use	311	SR	Use it too; use Maria's necklace				1	1			X		
want	357	SR	Wanna bite? Want more mommy; I want my bottle				1			15	X		
ate	345	SR	Ate mine potato chip on floor; weezer ate the roach					5				X	X
buy	311	SR	Buy this plum; daddy buy this				4	1	2				X
gave	310	SR	Laura gave that for me						1	6		X	X
got	306	SR	Ring got-it; Maria got really mad			3	1	3	1	4		X	X
left	311	SR	Left my coat in Schaufele's house							1		X	
made	297	SR	Dana made this; Mailbox made this			3	14	5	1	2			X
make	296	SR	Make dinner; make a house				7	2			X		X
mean-to	356	SR	= didn't mean to							1		X	
remember	358	SR	Remember monsters up in sky				1			3		X	
told	358	SR	Maria told me draw, daddy told me star leg				3	3		2			X

Appendix 2 PR/SR type verbs

(the proportions marked in the grid gives the pragmatically derived SR utterances out of a total of utterances for the age level)

Lexical item	pg	Mai	SR	Example utterance	17mo	18mo	19mo	20mo	21mo	22+mo	Intl	Mem	cause	poss
clean	339	PR	Prag	Clean this rocks; clean door			2/3	8		1	X			
crying	351	PR	Prag	Baby crying; crying mommy; cry about you	2	1	1/1			1/1	X	X		
draw	340	PR	Prag	Draw this door; draw too; draw some hands for the man	2	1/5	1/10	2/5	1/2	1/5	X			
fix	337	PR	Prag	Fix-it car; have mommy fix it; fix dinner		1	2/5	1	1		X		X	X
go	328	PR	Prag	Maria go; go seven eleven buy more coca-cola	1	1		1	1/2	3/8	X			
hit	343	PR	Prag	Hit ball; because Maria hit me; Danny hit tennis		3	1/5	1/2		4	X	X	X	
listen	355	PR	Prag	Listen to my record					1/1		X			
more	290	PR	Prag	More bottle; more cracker; more cycle-man	6	1/27	3/42	7/8	1/1	2/2	X			
off/ turn off	296	PR	Prag	Light off; off tv; turn light off		1/3				1/3	X			
on/ turn on	295	PR	Prag	Light on; hose on			1/8	2/5	1/4	1	X			
open	333	PR	Prag	Open-it doors; open crayons; doors open	1	1/14	2/20	4/5		1	X			
pee-pee	352	PR	Prag	Pee-pee potty; pee-pee pants; pee-pee grass	2	1	2/6	1			X	X		
read	341	PR	Prag	Read this; read pictures; reading book		1/5	1/5			2/3	X			
roll	343	PR	Prag	Roll-it baby	1/1						X			
see	352	PR	Prag	See Danny; see the sheep; see Stu		6	11/22	2/3	5	5	X			
stand	350	PR	Prag	Standing to the heater; stand on the book						1/3	X			
talk	358	PR	Prag	Talking Catherine; Danny's talking a Chris			1/1			1/3	X			
turn over	322	PR	Prag	Turn it over;			1/1				X			
wipe	348	PR	Prag	Wipe this shirt off; wipe it off a swing				2	1	1/5	X			
bring	329	PR	Prag	Bring chair; bring ball			2/3	2/4	2	1/2			X	
chew	346	PR	Prag	Chew it; chew on rocks						1/2				X
cook	341	PR	Prag	Cook dinner; cooking dinner; rolls cooking			1/1	2	1					X
fall-down	335	PR	Prag	Fall-down man; Danny fall-down; fall down berries;	3	3	1/12	2	1			X	X	
hurt	355	PR	Prag	Hurt fingers; daddy hurt; Pete hurt a car; hurt by car		1	1/7	1/6	3	3/6		X	X	
run	351	PR	Prag	Run in the street; run real fast steps				1/2				X		
spill	336	PR	Prag	Spill-it leg; spill-it couch; spilled Weezer milk			7		1/2	4/4			X	