TRANSITIVITY IN EARLY CHILD LANGUAGE

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ABSTRACT

This paper examines the hypothesis that children attend to and encode events of cardinal transitivity in their early utterances, and only later extend the grammatical devices thus acquired to describe events of lower transitivity. I show that the parameters of the cardinal transitive event have perceptual and cognitive correlates, and that children are predisposed to attend to such events. A transitivity grid is developed, based on research in infant and child perception and cognition, by which utterances can be rated in terms of relative transitivity. This grid is applied to the most frequently occurring transitive utterances in a diary study of an English-speaking child 20 to 23 months old. The results support the hypothesis that children use cardinal transitive events to bootstrap their way into syntax.

An appendix of all of the utterances used in the analysis is included, along with the context, both linguistic and non-linguistic, in which the utterances occurred.

1. INTRODUCTION[1]

Early grammaticalized speech is a milestone in child language, as it marks the point where children first use morphological and/or syntactic devices to express certain relations. Two basic approaches have been taken to the study of this stage, one in language development (henceforth LD) and the other in learnability.[2]

Research in early LD has generally confined itself to describing the structures which emerge during this stage and the order of their emergence. Children's utterances at this stage have been described in a number of ways, which can be broken down in terms of two features: whether cat-

[1]This paper is based on research conducted for my Ph.D. dissertation. A much earlier version was presented at the Fourth International Congress for the Study of Child Language, Lund, Sweden, July 1987, and a summary appeared in the proceedings. I would like to thank an anonymous reviewer for a careful reading which led to revisions of the paper. The usual provisos apply.

[2]A. Smith (1988) was, I believe, the first to make this distinction, between what he calls 'language development' and 'language acquisition'. I have used the term *learnability* for the latter, as *acquisition* is often used interchangeably with *development* in the LD literature.

egories are semantic or syntactic in nature, and whether these categories are isomorphic with those of the adult grammar or much narrower in scope. But regardless of the type of underlying categories posited, there has been little in the way of an explanation of *how* children might arrive at encoding whatever kind of underlying relation is proposed in a systematic and consistent fashion.

Linguists and learnability theorists have taken the position that children use semantic and/or pragmatic information to assist them in their first syntactic analyses (Borer and Wexler 1987; Chomsky 1981, 1986; Grimshaw 1981; Wexler and Culicover 1980 for example). However, the semantic knowledge required for children to break into syntax is generally assumed rather than defined, and the assumptions are not supported by empirical data in LD. In fact, Wexler and Culicover (1980) claim that actual findings from LD are not necessary for the purposes of theory construction.

In a study which combines empirical data and learnability theory, Pinker (1984) puts forth the Semantic Bootstrapping Hypothesis (SBH), which states that 'the child initially uses semantic notions as evidence for the presence of grammatical entities in the input' (p. 82). He proposes that at the onset of early grammaticalized speech there is a one-to-one correspondence between semantic and syntactic categories in discourse addressed to children by their caregivers, although this correspondence does not always hold in the adult grammar. The suggested associations are:

people and physical objects = Noun;
physical action and change of state = Verb;
agent of action = Subject.

The SBH predicts that children's earliest sentence combinations will respect these syntactic/semantic correlations (p. 57).

Pinker successfully supports this hypothesis based on data from LD. However, his semantic categories lack detail, and are not narrowed down sufficiently. For example, according to the SBH children initially equate the category of verb with 'physical action and change of state' (1984: 39). Yet verbs like *remember, find* and *appear* are considered change of state verbs (van Voorst 1983, Lebeaux 1988) although they are not perceptually salient, and are not verbs which appear in children's early speech. Thus, although these verbs many be considered 'change of state' verbs in the adult grammar, the fact that they are not verbs which young children attend to or use indicates a need for more strictly delimited categories in the SBH. Similarly, 'physical object' is too broad a category, based on what is

known about children's early language. K. Nelson (1973) found that children's first fifty words tended to label objects which they could act upon, a much more constrained category than 'physical object'. This observation has been confirmed by subsequent research. Moreover, the SBH puts a great deal of reliance on the input provided by caregivers, although research has shown that children may receive very different input yet follow very similar routes in language development (Berman 1985, Givon 1985, Schieffelin 1985, Wells 1985).

What is required is a more specific and detailed description of syntactic/semantic correspondences which enable children to bootstrap their way into syntax, and a hypothesis which de-emphasizes caregivers' efforts to respect these correspondences in the speech they address to children. I believe that Slobin (1981, 1985) provides a possible solution.

Slobin has drawn insights from both general linguistics and cross-linguistic research in LD to suggest which specific aspects of meaning allow children to determine grammatical relations. He hypothesizes that at the earliest stages of grammaticalization, only 'prototypical' transitive events will be encoded in 'canonical' form ('the most basic grammatical forms available in a language' (1981: 185)), and that these canonical forms will later be extended to include events which are not of prototypical transitivity.

It is important to emphasize that Slobin hypothesizes that children *encode* (emphasis mine) events which are of prototypical transitivity, because they are somehow more salient. This premise is consistent with the assumption in the LD literature that children talk about what is important to them. However, although he speculates that these transitive events have special status for the child due to their perceptual salience, he does not explain *why* they might be privileged, leaving the question open. I will extend Slobin's hypothesis to suggest that children are predisposed to attend to prototypical transitive events, and that this attention allows them to infer the grammatical relations expressed therein. In the section entitled *Transitivity Scale*, I provide evidence that children's perceptual and cognitive systems are biased towards attending to the parameters which constitute the prototypical transitive event.

By attending to prototypical transitive events, children are able to structure their experience, and the language used by caregivers to describe these events serves as input. Unlike the SBH, this hypothesis does not require that caregivers only talk about certain types of events, or that the input be addressed to the child. Children attend to prototypical transitive events, and whether the caregiver describes them to the child or to another

interlocutor makes no difference: the child is tuned in to these events and will pay attention to the language used to talk about them.

Nelson (1985, 1986) hypothesizes that the event serves as the basis for the child's 'discovery' (1986: 8) of language, but as Mervis (1987) correctly points out, Nelson's claim is too powerful as it implies that any event is input for the child. The prototypical transitive event limits the power of such a proposal, narrowing down the types of events children will attend to.

Slobin looks at LD research from several languages to support his claim. The evidence is plausible for languages in which transitivity is encoded by means of case markings. In Kaluli and Russian, case markings (ergative and accusative respectively) were at first used by the children studied to mark nouns only in utterances describing prototypical transitive events, while nouns in utterances describing events of lowered transitivity were unmarked for case. The evidence for languages in which transitivity is encoded by means of word order (i.e., SVO = Agent/Action/Object in English) is less conclusive, relying mainly on comprehension studies from later stages of LD (comprehension of passive structures for example), where children are well beyond the early stages of grammaticalization. Moreover, although intuition suggests that the examples Slobin cites in support of his hypothesis are of different degrees of transitivity – 'I tore the book' v. 'I read the book' (1981: 189) – a more precise means of determining the degree of transitivity would be desirable.

2. Aims

After describing the methodology used in the study, I will show why children pay particular attention to prototypical transitive events, documented by naturalistic and experimental research in early perception and cognition. I will then develop a scale of transitivity based on this research, giving a precise, child-based means of calculating the degree of transitivity in an utterance. Finally, using data from the early stages of grammaticalization of an English-speaking child, I will test the following hypothesis: that the first events to be attended to and encoded will be of prototypical transitivity, and that events lower in transitivity will only be attended to and encoded once basic relations have been fixed.

3. METHODOLOGY

The Subject

The subject was my son, Ainsley (henceforth A.), a healthy, normally-developing first-born and only child. He spoke his first word at approximately 12 months, and went through a vocabulary spurt just prior to the emergence of his first multi-word utterances. By the time the study began, when he was twenty months old, I had recorded 113 words in his active vocabulary, although he understood many more, and the majority were names of objects. This is consistent with what has been observed with other children at the end of the one word stage (documented by Bates 1979, Benedict 1976, Dromi 1987 and Nelson 1973 for example).

Procedure

This study is based on a diary record, and data were collected daily. It was therefore possible to study in detail all the changes in speech production from day to day, which would be missed in a time sample. As Fletcher (1985: 11) suggests, because important changes in children's language can take place in a matter of days, researchers should begin with frequent samples from a small number of children in order to ascertain the developmental axis.

The diary study was the most common research tool in LD before the advent of audio and video recording equipment. De Laguna (1927) and Leopold (1939) are well-known examples of early studies. This methodology has recently regained favour, particularly among researchers working within an ethnographic (Ochs 1979, Schieffelin 1979) and interactionist (Halliday 1975, Painter 1984) tradition. The diary record has also been employed to study children's developing phonological systems (Menn 1979, N.V. Smith 1973), and early lexical development (Dromi 1987). It is an appropriate research tool whenever the researcher is interested in day-to-day changes in children's language development.

The most common technique for collecting naturalistic data in early language development is a recorded half- or one-hour speech sample collected weekly, bi-weekly or even monthly. The advantage of this method is that there is a permanent record of the data, which can be referred to at any time after the actual event in which the utterances occurred. However, since language growth at the earliest stages is very rapid, it is possible that a linguistic phenomenon would appear in the child's production and disappear in the period between two consecutive speech samples. Moreover,

the researcher can only look at the speech sample at a given point in the child's development and draw inferences based on differences between two samples, with no real insights into intervening developments. The diary record provides an uninterrupted 'moving picture' of the child's development, rather than a frozen 'snapshot' at a given point in time.

A unique aspect of the study described in this paper is that all multi-word utterances were recorded each time they occurred, which is not normally the case. For example, in Bloom's diary record of her daughter Allison, '[n]o attempt was made to record every utterance; rather notes were made and examples of speech events recorded at weekly intervals' (Bloom 1970: 46). Similarly, Braunwald and Brislin (1979) recommend only recording the first occurrence of a particular speech event, unless it is used differently on a subsequent occasion. Leopold (1939) was also selective in what he recorded, and Painter noted 'first occurrences' and 'new forms and usages' only (1984: 40). In Braine's Jonathan corpus '[t]he same combination was not written down twice unless a different gloss was appropriate' (Braine 1976: 32). The Kendall I corpus, reported in Bowerman (1973), does consist of all multi-word utterances produced by the child, but only covers a two-day period.

My methodology is well-suited to testing the hypothesis that children begin by attending to and encoding highly transitive events and subsequently begin to encode events of lower transitivity, since the history of the use of each verb in transitive constructions can be traced from day to day, with no gaps. It is also easy to see how frequently verbs occur in transitive constructions, and when they arise and drop from use. As Braunwald & Brislin say, 'now the selection of the handwritten diary record as a research methodology is made for theoretical reasons rather than by technological default' (1979: 21).

However, the question of the generalizability of this study remains open, and no available data sets that I am aware of could be used to replicate the results. The CHILDES data exchange network, described in MacWhinney (1991), contains corpora from English and other languages, but most are time-samples, recorded weekly, bi-weekly, monthly, and even every three months. Those which involved continuous sampling did not, as far as I could ascertain, record the same utterance every time it occurred.

Larger scale studies (Wells 1986, Bates 1988) looking at individual differences in language growth and individual learning styles have found differences in the rate of acquisition rather than in the order of acquisition and in what is eventually acquired. In an important contribution to validation in the field of LD, Wells (1985), in his study of a large representative

sample of 128 subjects, found a sequence of development which supported and confirmed those proposed on the basis of much smaller samples. And, on the other hand, individual case-studies can flesh out broad-based studies, which of necessity must be much less detailed. Thus, this study provides insights into the day-to-day language development of one child, and we can assume any differences among children would be in rate rather than order of acquisition.

The question of interpretation is also an important one. To this end the Appendix includes the corpus of all utterances used in the analysis, so readers can draw their own conclusions.

The data were collected over a three-month period, from the appearance of A.'s first two-word utterances to the beginning of his morphological development. Every utterance of two or more words which A. produced in my presence was written down on a daily basis, approximately four hours per day. Depending on the situation, utterances were written down on pre-designed sheets, or on slips of paper which were transferred to the sheets. The data collected consisted of:

(i) gross suprasegmental information (i.e., intonation contour, pauses);
(ii) the utterance itself, in very broad phonetic transcription at the beginning and later in English orthography;
(iii) a gloss of the utterance;
(iv) the situation in which the utterance occurred;
(v) the purpose of the utterance;
(vi) my preceding or following utterances, and comments or notes regarding interpretation.

Transitivity Scale

Slobin bases his concept of a prototypical transitive event on Hopper & Thompson (1980), who define a cardinal transitive clause ('prototypical' in Slobin's terms) as one in which there is '... a human-like A[gent] behaving actively, volitionally and totally upon a definite, referential O[bject]' (p. 274). Using evidence from a variety of languages, Hopper & Thompson establish ten parameters that provide a scale by which sentences can be ranked on a continuum of transitivity.

Table 1 below encapsulates Hopper & Thompson's parameters, which have been modified and in some cases omitted so that they represent the knowledge children can be assumed to possess as they begin the process of grammaticalization. As well, criteria for determining whether a parameter represents high or low transitivity are provided. Representative stud-

ies are also listed, which support the proposal that these parameters have perceptual counterparts, and that children seem to be predisposed to attend to these aspects of events. For example, for the parameter of *Kinesis*, the research cited suggests that since even neonates attend to motion it must be an innate predisposition rather than a learned response (Nelson & Horowitz 1987 for example). Similarly, Bickerton (1981 and subsequent work) hypothesizes that the punctual/non-punctual distinction is part of the 'bio-program', that is, innate. Under *Individuation of Object*, the research again supports Gordon's 1988 suggestion that the notion of individuation is innately available to the child. With regards to *Affectedness of Object*, Kagan 1971 suggests that since infants naturally attend to events in which there is a high rate of change in physical characteristics, this must be inherent in the structure of the central nervous system. The research cited provides empirical support for Slobin's contention that prototypical transitive events are more salient to the child.

Space constraints prevent a full description of the parameters or the research supporting them. See Hopper & Thompson (1980) for the original parameters of transitivity, and Balcom (1991) for fuller justification of their existence in early child development.

Two of Hopper & Thompson's parameters, *Agency* and *Negation*, were dropped, the former because the core notion is covered under *Kinesis* and *Volitionality*, and the latter because negation of transitive events is rare in child language at this stage (de Villiers & de Villiers 1985, Radford 1990)

Table 1: Modified Scale of Transitivity

Parameter	Transitivity		Support
	High	Low	
Participants	Two – Agent and Object (Agent not present in speech signal, but clear from context and definite)	One only, or Agent unclear, ambiguous or indefinite	**Infants perceive Agent & Object** Ashmaed & Perlmutter 1980; Bell 1970; Bruner 1972 **Infants distinguish Agent from other participants** Corrigan & Odyas-Weis 1985; Golinkoff 1981; Grace & Suci 1985; Rescorla 1981; Robertson & Suci 1981 **Children prefer to encode Object in speech** L. Bloom 1970; P. Bloom 1990; Greenfield & Smith 1976; Hyams 1986

Kinesis	perceptible motion physical activity	no perceptible motion; result or state	**Infants attend to motion** Bower 1982; Bower et al 1971; Fox & McDaniel 1982; Gibson & Spelke 1983; Kagan 1971; Nelson & Horowitz 1987; Yonas & Owsley 1987 **Children's words accompany action** Rodgon et al 1977; Sinclair de Zwart 1971; Werner & Kaplan 1963 **Children encode dynamic events** Bloom et al 1975; Stephany 1978
Punctuality and aspect	complete transfer of action, punctual, brief duration, obvious endpoint	ongoing, no clear endpoint, process	**Infants attend to outcome of motion** Clark 1983; Leslie & Keeble 1987 **Children encode endpoint** Aksu-Koc & Slobin 1985; Berman 1985; Cziko 1989; Stephany 1978
Volitionality	Agent instigates action; capable of independent movement	non-instigator	**Others perceived as Agents** Bruner 1972; Ashmead & Perlmutter 1980 **Instigator v. animate Agent** Bowerman 1973; Clark 1979; French 1971; Lempert & Kinsbourne 1981, 1983
Mode	decontextualized[3] based on here and now; describes a real event; variety of functions; variety of Objects or referents; range of contexts	contextualized routine; context-bound; associative; does not refer to a real event; same Object or referent; only one context	**Speech based on real events (the 'here and now')** Greenfield & Smith 1976; Sachs 1983 **Contextualized speech** Anisfeld 1984; Barrett 1987; Bates 1979; Nelson & Lucariello 1985
Individuation of Object	definite, specific reference; separate from surroundings	indefinite; no referent	**Object perceived as bounded entity separate from environment** Baillergeon 1987; Bower 1982; Spelke 1979; Streri & Spelke 1988 **Objects have definite, specific reference** Brown & Bellugi 1964; Clark 1979; Gordon 1988; Sachs 1983
Affectedness of Object	apparent, visible change in position or physical condition	no perceptible change	**Infants attend to change** Lempert & Kinsbourne 1983; Kagan 1971 **Children encode change at 1 word stage** K. Nelson 1973; Greenfield and Smith 1976; Bates & MacWhinney 1982; Bigelow 1987

[3]The terms *decontextualized* and *contextualized* have a specialized meaning in the LD literature. The characteristics of contextualized speech are presented with examples under *Burn* and *Share*.

Analysis

With a modified scale of transitivity it is now possible to test the hypothesis that children initially attend to and encode events of cardinal transitivity, and subsequently use the grammatical devices thus acquired to encode events of lower transitivity.

I looked only at the seven most frequent verbs in the corpus, each of which occurred a minimum of 25 times in VO constructions during the three-month data collection period. Together, the seven exemplar verbs make up 48% of the VO utterances in the corpus (262/542).

In all cases, frequency is determined by the appearance of the verb in VO constructions. The main reason for this is that VO is the most frequent structure in the corpus with the potential for expressing a transitive relation, as can be seen in Table 2.

Table 2: Number of Utterances Expressing Transitivity

Total number of utterances in the corpus	2792
Number of VO utterances	542
Number of SVO utterances	121
Number of SV(O) utterances (Transitive with no overt O)	61

Furthermore, the VO construction was one of the first to emerge, and was productive, while SVO constructions did not even occur twice in the same day until more than half-way through the data collection period. Similarly, SV constructions were predominantly intransitive (134/195 or 69%) and those expressing transitive relations did not, in general, occur until the VO construction with the same verb was well-established.

My rationale for looking at only the seven most frequent verbs in VO constructions is that a large number of examples allowed me to arrive at a transitivity rating based on the child's use rather than on an adult-imposed meaning. Moreover, according to Anisfeld (1984), the high frequency use of a given structure shows that it has been recently acquired and is being practised to perfect its use. Typically these verbs were frequent for a short period of time and then decreased in use. And, with fewer tokens, it would be difficult to determine whether the utterance had been broken down into its component parts or if it was an unanalyzed chunk (Peters 1983).

4. RESULTS

The time under study was divided into four separate periods, according to when the exemplar verbs first became productive, as shown in Table 3.

Table 3: Exemplar Verbs for each Period

Period 1	December 20 - January 27	*Turn (on/off)*
Period 2	January 28 - February 15	*Shut; Open*
Period 3	February 16 - February 29	*Eat; Share; Burn*
Period 4	March 1 - March 20	*Find*

Scoring

A transitivity rating was calculated for each exemplar verb, based on the modified parameters of transitivity described above. For each parameter, the number of utterances high in transitivity was divided by the total number of utterances with that verb during the period. For example, for *turn* in Period 1, there were 8 utterances out of 11 in which there was a definite agent, giving a rating for the *Participants* parameter of 0.7. There are a total of seven parameters so that the highest possible rating, indicating cardinal transitivity, is 7.0.

Turn (on/off)

Period 1 can be viewed as pre-grammatical, since almost all utterances had variable word order. With *turn*, 8/11 utterances were ungrammatical in the adult grammar (OV). However, in almost all cases there was a volitional agent performing a discrete action with a clear end result on a variety of well-defined objects. This suggests that although A. was attending to events of cardinal transitivity, he had not yet found the syntactic means of encoding this relationship. The transitivity rating for *turn* is shown in Table 4.

In the subsequent periods, there were 64 utterances with this verb, of which 4 were contextualized routines similar to the one described below under *Participants*, and 4 were practice sequences where A. was not referring to an object in the conversational context, and where the utterances had no communicative function. This would have a minimal effect on the transitivity rating.

Table 4: Transitivity Rating for *Turn* in Period 1

PARAMETER					TRANSITIVITY RATING
1. **Participants**					0.7
Agent =	Ainsley	5	Object =	light 6	
	Mother	3		TV 2	
	ambiguous	2		other 3	
	indefinite	1			
The ambiguous cases were A. or M(other). The indefinite agent was 'people', based on a routine where I would look out the window and say 'It's getting dark. People are turning on the lights in their houses'. (See 21.12.15.)					
2. **Kinesis**					1.0
All are 'manipulative activity scenes' (Slobin 1985), involving a plug, knob, or switch.					
3. **Punctuality and Aspect**					0.9
All but one event (29.12.03, with the vaporizer) involve direct action and an instantaneous result.					
4. **Volitionality**					0.9
In the routine, it is not clear if A. perceived *people* as an instigator.					
5. **Mode**					0.9
All but one are decontextualized. One is a routine.					
6. **Individuation of Object**					0.9
In the routine, the object *light* had no referent.					
7. **Affectedness of Object**					0.9
There is an obvious visual or auditory change as a result of all but one action, namely the vaporizer.					
TOTAL					6.2 / 7.0

Shut

The emergence of this verb at the beginning of Period 2 marks the transition to grammaticalized speech for A. Almost all transitive and other utterances had adult word order, and ungrammatical utterances accounted for a very small proportion of the corpus. This is consistent with what has been found with other children in the LD literature. For example, Radford 1990: 70 affirms that the head/complement parameter is set early. There were 20 VO utterances with this verb in Period 2, all of which were decontextualized: 16 were descriptions accompanying or immediately following an action and 4 were requests, accompanied by pointing. The transitivity rating is shown in Table 5.

Table 5: Transitivity Rating for *Shut* in Period 2

PARAMETER	TRANSITIVITY RATING
1. **Participants** Agent = Ainsley 15, Mother 4, ambiguous 1 — Object = door 17, drawer 3 The ambiguous Agent could be either M or GM (Grandmother), but might also be indefinite ('one', 'you'). (See 30.01.01)	0.9
2. **Kinesis** In 19/20 cases there is activity involving movement.	0.9
3. **Punctuality and Aspect** All are punctual events, and the object comes to rest in a closed position.	0.9
4. **Volitionality** Even in the ambiguous case the Agent is an instigator.	1.0
5. **Mode** All are decontextualized.	1.0
6. **Individuation of Object** The Objects have a variety of referents in the speech setting.	1.0
7. **Affectedness of Object** In all but 30.01.01, objects are moved and change position.	0.9
TOTAL	6.6 / 7.0

Open

There 8 VO utterances with this verb during Period 2. This verb is in fact the transformation of *shut* (Gibson and Spelke 1983), and its transitivity rating similar, as can be seen in Table 6.

In the subsequent periods, in 7/26 cases the Agent was ambiguous, and 3/26 utterances were contextualized routines similar to 09.02.12 discussed above, although the majority of SV and SVO utterances with *open* were routines. The types of objects expanded to include many non-door objects (vaseline jar, window, purse, present, bottle, sewing machine). The transitive events which are still 'manipulative activity scenes' (Slobin 1985), but the movement and result are less obvious.

Table 6: Transitivity Rating for *Open* in Period 2

PARAMETER						TRANSITIVITY RATING
1. **Participants**						0.9
Agent =	Ainsley	5	Object =	door	6	
	Mother	2		drawer	1	
	ambiguous	1		shampoo	1	
The ambiguous case may be an intention, with A. as agent, or a routine (See *Mode*).						
2. **Kinesis**						1.0
All are dynamic actions involving movement						
3. **Punctuality and Aspect**						0.7
In 6/8 cases there is a punctual event with a clear endpoint. With *open shampoo* the endpoint is not obvious. One case (see 10.02.12) involves using a key, which was neither punctual (requiring several tries) nor telic.						
4. **Volitionality**						0.9
The agent would not be volitional in the routine.						
5. **Mode**						0.9
One (09.02.12) I have interpreted as a routine, as this type of utterance increases in the next period.						
6. **Individuation of Object**						1.0
Although *door* occurs as the object 7/8 times, the word has a wide variety of referents						
7. **Affectedness of Object**						0.9
The Object changes position, except in the case mentioned in (3), where A. was putting a key in a lock, not moving a door.						
TOTAL						6.3 / 7

Eat

There were 15 VO utterances with this verb during Period 3. For A., *eat* may have meant nothing more than 'put into the mouth, optionally with an instrument'.[4] It did not necessarily involve chewing and swallowing, as the following entries suggest:

18.02.67	eat water	Trying to eat pineapple juice with a spoon
03.03.09	eat cigarette	I smoking a cigarette A: 'cigarette' M: 'cigarette' A: 'eat cigarette'

[4]I would like to thank Alana Johns, who first suggested this possibility to me.

Table 7 shows the transitivity rating for this verb. The practice utterances discussed below increased in the subsequent period, where 8/19 utterances were of this type, but apart from *Mode* the transitivity rating for *eat* would not change.

Table 7: Transitivity Rating for *Eat* in Period 3

PARAMETER						TRANSITIVITY RATING
1. **Participants**						0.7
Agent =	Ainsley	9	Object =	tree	2	
	Mother	1		Smartie	3	
	chick	1		various	10	
	ambiguous	1				
	unclear	3				
The ambiguous Agent was either A. or M. The unclear Agents occurred in routines, where the presence of a food item triggered *eat toast/garlic/celery*, and there was no interpretable Agent.						
2. **Kinesis**						1.0
There is physical action with transferral.						
3. **Punctuality and Aspect**						0.5
For A., *eat* describes punctual event rather than a process, but the endpoint is not visible, giving half points for this parameter.						
4. **Volitionality**						0.8
In 3/15 cases there is no clear agent. (See Participants.)						
5. **Mode**						0.8
3/15 are routines, and are not decontextualized.						
6. **Individuation of Object**						0.9
One object for which there is no referent in the speech setting.						
7. **Affectedness of Object**						0.0
Most were part of a mass which did not change when a portion was removed, e.g. Smarties, grapes, chili, scrambled eggs.						
TOTAL						4.7 / 7.0

Burn

So far, even in the pre-grammaticalized period before A. had acquired basic VO word order, almost all of his VO utterances were decontextualized. The utterances occurred in different contexts, with a variety of objects, and expressed diverse communicative functions. However, *burn* and *share*, two of the exemplar verbs for Period 3, broke this pattern, and *Mode* interacted with other parameters of transitivity to give very low ratings for these verbs.

Before looking at how *burn* scores in parameters of transitivity, I will give a typical example of how it was used:

16.02.25	burn self x 2	Points to stove. A: 'sit down stove' M: 'Oh no, you mustn't sit down on the stove.' A: 'stove hot' M: 'What did you say darling?' (I didn't understand at first, subsequently reconstructed after the following utterance.) A: 'hot stove' 'burn self'/'very very hot'

This situation has most of the components that provided a context for *burn self*: a hot item, the word 'hot', and some mention of danger. There were 19 VO utterances with this verb during the period, and all had at least one of these elements present. A. had only burned himself once before this period, and there was no visible mark, which suggests he had only a vague notion of what the verb meant. Thus, it was often difficult to arrive at on a rating for this verb, as can be seen in Table 8 below.

Table 8: Transitivity Rating for *Burn* in Period 3

PARAMETER	TRANSITIVITY RATING
1. **Participants** In all cases the object is *self*. Because it is reflexive, there is only one participant.	0.0
2. **Kinesis** There is no movement – the verb describes the result of movement.	0.0
3. **Punctuality and Aspect** Assuming A. knew what the verb meant, it is punctual, as the result would be immediate, but there would be no visible endpoint, giving half points.	0.5
4. **Volitionality** I assume the action would be accidental and A. would not be the instigator. If A. perceived the hot objects as causing the event, they were not capable of independent movement (stove, cup, teapot).	0.0
5. **Mode** None of the utterances is decontextualized.	0.0
6. **Individuation of Object** *Self* is the only object which occurs with *burn* in this period. Reflexive pronouns are non-distinct from the subject (H & T 1980) and lack independent reference (Chomsky 1982: 83).	0.0
7. **Affectedness of Object** None of the utterances referred to an actual event where A. was visibly burned, and there was therefore no visible change.	0.0
TOTAL	0.5 / 7.0

In Period 4, *burn self* became decontextualized and other objects occurred with the verb. In these cases, A. instigated a situation resulting in

the object's being burnt (he turned on a stove element), and the object was individuated and affected (the bottom of the tea kettle blackened). This would raise the transitivity rating for the parameters of *Participants*, *Volitionality*, *Individuation*, and *Affectedness*.

Share

Like *burn*, VO utterances with *share* were contextualized routines, an almost ritualistic accompaniment to his play. *Mode* again interacted with other parameters of transitivity to give a low rating for this verb.

Utterances with this verb were typically triggered by a situation in which A. was playing with, or even looking at, a toy. The utterances were often preceded or followed by *Mika turn* 'It's Mika's turn', another phrase A. often used when playing, even if Mika wasn't present. (Mika would be the Goal of the change of possession.) In Period 3, the bulk of the utterances with *share* (16/17) were similar to the one below:

27.02.41	share toolbox Mika	A. points vaguely in direction of his toolbox. A: 'turn, Mika turn toolbox'/ 'share toolbox Mika'/'share Mika'

Given the routine nature of the utterances, it might be argued that the Agent was indefinite; i.e., 'one' or 'you' should share. However, there is one early utterance with *share* where the Agent was overtly expressed:

16.02.40	AB[5].share.Mika	A. was playing with his toys, saying 'Mika'. A: 'AB.share.Mika'; 'share Mika'; 'share,share,share,Mika'

The adult meaning of *share* is abstract, and does not entail either movement or physical activity. For A. it was closer in meaning to 'give', and this was the interpretation used when calculating the transitivity rating, as can be seen in Table 9. *Give* only occurred twice in the corpus, in Period 4, while *share* was productive, occurring 17 times in Period 3 and 10 times in Period 4.

In Period 4, DOs predominated, and they were not all toys, unlike the previous period. *Mika* only appeared as the overt IO in one out of three utterances, and there was only 1/10 cases in which she was not present as the Goal of the transfer of possession. Another difference is that there were a number of (understood) agents in the utterances during Period 4; A., Mother, Mika, bunnies in a picture book and the cat, while A. was the

[5]During this period A. began referring to himself as *Ainsley Balcom* (AB), particularly in Subject position in his transitive utterances.

Agent in 16/17 cases in Period 3. The use of *share* also started to become decontextualized in Period 4, and utterances functioned as requests (06.03.21, 07.03.07) as well as routines.

Table 9: Transitivity Rating for *Share* in Period 3

PARAMETER						TRANSITIVITY RATING
1. **Participants**						0.9
Agent =	Ainsley	16	Object =	Mika	12	
	Mika	1		toys	7	
				indef.	1	
The indefinite (indirect) object was *body* 'people'. In 3 instances there were 2 participants expressed overtly, the Theme and the Goal, giving 20 objects in 17 utterances.						
2. **Kinesis** Assuming *share* means 'give', there is motion.						1.0
3. **Punctuality and Aspect** If the verb means 'give' it is a punctual action with a clear endpoint. However, since the Goal of the change of possession (*Mika*) is not present in 10/17 cases, there can be no endpoint.						0.4
4. **Volitionality** All understood agents are capable of independent action (although they may not want to share!).						1.0
5. **Mode** All utterances are routines, a ritualized accompaniment to A.'s play.						0.0
6. **Individuation of Object** Both DOs and IOs are considered. In 7/17 cases there is a definite referent in the context, 5 toys + 2 *Mika*.						0.4
7. **Affectedness of Object** Since the Goal of the change of possession was not present in 10/17 cases, the object could not change location.						0.4
TOTAL						4.1 / 7.0

Find/Found

There were 25 utterances with this verb during Period 4. It appeared late, occurring only 4 times in VO constructions before this period. As can be seen in Table 10, it is the verb which scores lowest in transitivity among the decontextualized verbs.

Table 10: Transitivity Rating for *Find* in Period 4

PARAMETER					TRANSITIVITY RATING
1. **Participants**					1.0
Agent =	Ainsley Mother ambiguous.	17 7 1	Object =	wide variety	
2. **Kinesis** In 20/25 cases the utterances describe a result, so there is no movement. In 5/25 cases the verb means 'look for', which does involve physical action.					0.2
3. **Punctuality and Aspect** With the sense 'look for' the action is ongoing and the endpoint uncertain. When the verb describes a result, there is no action, punctual or otherwise, and the endpoint is coded in isolation.					0.0
4. **Volitionality** In 5/25 cases where the meaning was 'look for', the Agent instigated the activity. When *found* described a result, 15/25 are probably accidental, but in 5 cases A. did intend to locate the objects he found, based on the context of his utterance.					0.4
5. **Mode** 2/25 are practice of a form rather than a description or a request. (See 12.03.44, 12.03.46.)					0.9
6. **Individuation of Object** In all cases A. was referring to a specific object, whether it was absent or not.					1.0
7. **Affectedness of Object** No visible change in the objects.					0.0
TOTAL					3.5 / 7.0

5. DISCUSSION AND CONCLUSIONS

Table 11 summarizes the transitivity ratings for the seven exemplar verbs. The reader will recall that exemplar verbs were selected as being representative of the period in which they first occurred productively.

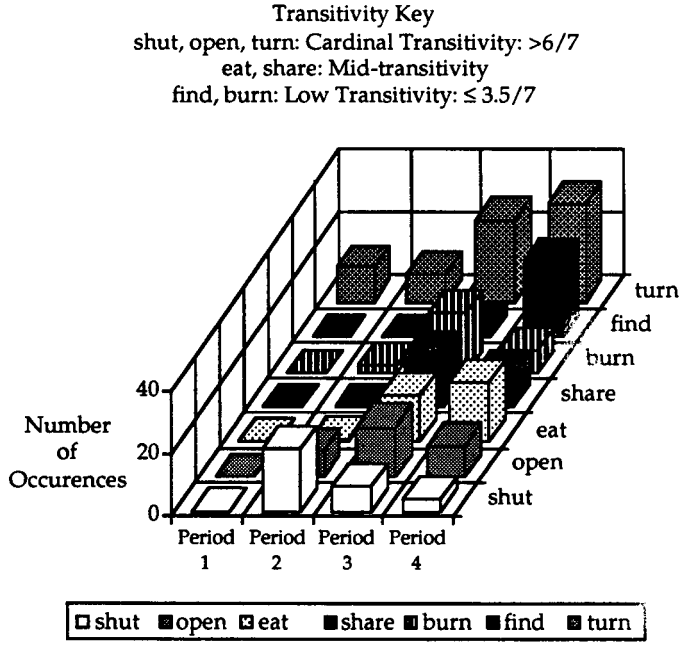
Looking at the data in from a somewhat different angle, Figure 1 summarizes the comparative frequency of the exemplar verbs over the data collection period.

VO utterances expressing cardinal transitivity were the first to occur and were very productive, while mid and low transitivity verbs occurred either not at all or rarely until later on in the study. In general, the verbs were frequent for a short period of time in VO constructions and then decreased or dropped out of use.

Table 11: Summary of Transitivity Ratings

Period	Verb	Part.	Kinesis	P & A	Vol.	Mode	Indiv.	Affect	TOTAL
1	turn	0.7	1.0	0.9	0.9	0.9	0.9	0.9	6.2
2	shut	0.9	0.9	0.9	1.0	1.0	1.0	0.9	6.6
	open	0.9	1.0	0.7	0.9	0.9	1.0	0.9	6.3
3	eat	0.7	1.0	0.5	0.8	0.8	0.9	0.0	4.7
	burn	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.5
	share	0.9	1.0	0.4	1.0	0.0	0.4	0.4	4.1
4	find	1.0	0.2	0.0	0.4	0.9	1.0	0.0	3.5

Figure 1: Comparative Frequency of Exemplar Verbs over Time



The results of this study provide additional evidence in favour of Slobin's hypothesis. A. initially attended to and encoded events which were of cardinal transitivity and subsequently applied the word order thus acquired to events of lowered transitivity. Thus Slobin's work has further support, based on data from the earliest grammaticalized speech of a child learning a language in which transitivity is encoded by means of word order rather than by the use of overt case markers.

The modified parameters of transitivity, reflecting the knowledge children can be assumed to possess at the ontogenesis of syntax and supported by research in infant and child perception and cognition, are precise and have been broken down into distinct components which allow testable hypotheses for empirical research. Moreover, the fact that the parameters of transitivity have perceptual and cognitive correlates, which some researchers believe to be hard-wired, suggests that children are predisposed to attend to certain types of events, and in this way they initially organize their experience. Slobin's conjecture that prototypical transitive events are more salient to children now has empirical support.

The diary study was chosen for theoretical reasons, as it allowed me to trace the emergence and decline of verbs in transitive constructions on a daily basis. However, it is not clear whether individual differences in learning style or in the language being learned might result in different findings. More research needs to be done in this area, both with children learning English and other languages.

It is important to emphasize that although cardinal transitive events may serve a bootstrapping function, facilitating the process of grammaticalization, there is still a need for a separate level of syntactic representation, and the mapping between the levels is not straightforward. Although the concepts and relations expressed may be universal, the linguistic means of expressing them may be radically different. For example, transitivity may be encoded by word order (SVO in English), case markings (ergative in Inuktitut and Kaluli, accusative in Russian and Turkish for example), or a combination of the two (Finnish, Serbo-Croatian). Children must decide which mode for expressing transitive relations is basic in their language (word order or overt case markings) and then establish either which word order is basic (i.e., SVO, SOV, VSO) or which morphological affixes encode the relations, and on which argument of the verb. The fact that children are able to do this quickly and at a very young age suggests strong constraints on the possibilities they entertain.

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APPENDIX

Listed below are all occurrences of the exemplar verbs in VO constructions, which provided the basis for calculating the transitivity ratings for these verbs. Not all information from the diary record is included, because of space constraints.

Key

AB	=	Ainsley Balcom (During Period 2-3, he took to calling himself AB in subject, and less frequently, in object position.)
GM	=	Grandmother
D	=	Debra
M	=	Mother
UR	=	Uncle Richard
< >	=	Information not in notes.
( )	=	Information in notes, but in a different place. For example, on the forms there was a special column for 'Function', which here has been put in parentheses.
[ ]	=	(broad) phonetic transcription
*	=	non-standard word order
x y	=	word or utterance repeated y times
/	=	vertical construction in diary record
,	=	brief pause
.	=	longer pause
0.0.0	=	day.month.utterance number

Turn (on/off)

21.12.15	*light,turn x3	<A> <p>oints to window. A: 'dark'/'light,turn x 3' M: 'Yes, when it gets dark people turn on the lights in their houses.' (Routine)
22.12.02	turn x3, light	Wanted me to turn on Xmas tree lights. I turned them on. M: 'There, doesn't the tree look nice?' (Request)
22.12.14	turn x3, light	In highchair, <A> pulled back curtain and said 'dark'/'turn light.' M: 'Yeah, it's getting dark. Can you see the lights in the window?' A: 'light x 2' (Routine)
23.12.01	*radio,turn x2	<A> <t>urned on the radio. (Description)
23.12.02	*light x3,turn x2	(lamp on bedside table) <A> <t>urned light on. (Description)
29.12.02	*light x4,turn x6	Looking at a lamp which he isn't supposed to touch. Accompanied by gesture, turning hand in circular motion. (Request) A: 'light, turn' M: 'No honey, you know you mustn't play with that light.'
29.12.03	*vaporizer,turn x2	Looking at vaporizer. Points. A: 'vaporizer, turn x 2' M: 'No, Mummy puts water in the vaporizer and plugs it in when A. goes to bed.' (Request)
29.12.05	*record x 3, turn	In UR's bedroom. A: 'record x 3, turn' M: 'UR, could you play a record for A.?' (UR puts on a record.) (Request)
01.01.04	*lightx4,turnx4	In kitchen, he wants to turn on light. (Request)
19.01.01	*TV.turn	Points to TV. (Request) A: 'TV.turn'/'on/turn/on/TV'
21.01.02	turn x 3,light	Coming up from basement. A: 'turn x3,light'
	M:	'Okay, you can turn the light off for Mummy.' (Request)

Shut

28.01.04	shut door	Playing with his <toy> garage, opening and shutting door. (Description)
28.01.05	shut door	Opening and shutting dryer door in laundry room. (Description)
28.01.08	shut door	Opening and shutting door of GM's room. (Description)
29.01.01	shut door	Closing revolving door in GM's <kitchen> cupboard. (Description)
29.01.03	shut drawer	Put candles in drawer and closed it. (Description)
30.01.01	shut drawer	In kitchen at GM's. GM ties up <cupboard> doors and puts yardstick in drawers when A visits. Had not done so yet. A: 'stick'/'shut drawer' (Request/Comment)
30.01.02	shut door	Playing with rotating shelf, closing it. (Description)
03.02.04	shut door x 2	Closing <cupboard> door. A: 'door open.Ainsley'/ 'shut door' x 2/'door open' (Description)
07.02.04	shut door	In front seat of car, wanted me to close door. (Request)
09.02.13	shut door	Of car, points. (Request)
10.02.17	shut door x 4	Of car, points. (Request)
10.02.23	shut door	Of <toy> mailbox. (Description)
12.02.07	shut drawer	Closing drawer so he could see something. (Description with Request tone <rising intonation>.)
12.02.21	shut door	Opening and closing <kitchen cupboard> doors. (Description)
12.02.22	shut door	See 12.02.21. Playing peekaboo while opening and shutting cupboard door. (Description)
14.02.17	shut door	Playing with toolbox, which has a moveable side. <Lifting it up and down.> (Description) A: 'shut'/'shut door'

14.02.30	shut door	Closed cupboard door <in kitchen>. (Description)
15.02.11	shut door	<I shut door> of car. (Description)
Open		
03.02.05	*door open	Opening cupboard door. A: 'door open Ainsley'/ 'shut door' x2 (Closing door.) 'door open'(Opening door.)
07.02.05	*door open	He in car, with door closed, I outside. (Request)
09.02.12	open door	Of dryer at day care. (Intention)
10.02.12	open door	I had put key in lock <of house door>: he wanted to. (Request)
10.02.18	open door	Trying to open door to Debra's room. (Intention)
10.02.22	open door	Of <toy> mail-box. Followed by: A: 'shut door' (Description)
13.02.21	open drawer	Opened drawer. (Description)
15.02.30	open shampoo	In bath. Has shampoo bottle. A: 'open shampoo'/'bubble' (Description)
Eat		
18.02.67	eat wawa	<A> trying to eat pineapple juice with a spoon. *Wawa* 'water'. (Description)
18.02.72	eat hamburger	Points to me eating a hamburger. (Description)
19.02.70	eat toast	A. found jar of jam in cupboard. A: 'eat toast'/'jam on' (Routine)
22.02.21	eat tree	Eating grapes. Puts stem in mouth. (Description)
23.02.54	eat tree	Eating grapes - holding stems. A: 'tree' x2/'eat tree' (Intention/Threat)
25.02.14	eat egg	On GM's lap, she eating scrambled eggs. (Request)
26.02.99	eat apple	<Looking at a book, *Chicken Little*.> Last page of book shows a chick eating an apple. (Description)
26.02.108	eat grape	Eating grapes. (Description)
27.02.27	eat [ən]	A: 'eat [ən]' M: 'Eat what honey?'

	A:	'pineapple'/'Mama have [ən]' Gave me the piece of pineapple. (Offer)
27.02.73	eat garlic A:	I dropped <some> garlic on the floor. 'that garlic'/'eat garlic' (Routine)
28.02.56	eat chili	Eating chili for dinner. (Description)
28.02.57	eat celery	Still eating supper. A held up a piece of celery. (Routine) M: 'That's celery.' A: 'eat celery' (Both new vocab. items tonight <-> 1st exposure.) <A. didn't like celery.>
29.02.15	eat smartie	Had Smarties in his hand. (Intention)
29.02.18	*green eat	Put green Smartie in <his> mouth. (Description)
29.02.27	eat smartie	Eating Smarties. A: 'AB turn' (Put S<martie> in his mouth.) A: 'eat smartie' (Description)

Burn

16.02.25	burn self x 2	Points to stove. A: 'sit down stove' M: 'Oh no, you mustn't sit down on the stove.' A: 'stove hot' M: 'What did you say darling?' (I didn't understand <at first, subsequently reconstructed>.) A: 'hot stove' (Very clearly enunciated) A: 'burn self'/'very very hot' (Routine)
16.02.28	burn self	Several minutes later. In high chair, blowing out match. A: 'burn self' (Routine)
18.02.6[illegible]	burn self	I taking a cup of coffee out of th[illegible]ach. A: 'hot, hot/burn self' (Routine)
18.02.71	burn self	Put <his> finger in hot tea. M: 'Ainsley, that's hot.' A: 'burn self' (Routine)
20.02.34	burn self	I told him to get away from the stove. A: 'hot/burn self' (Routine)
21.02.30	burn self	Points to teapot.

		A: 'teapot'(points)/'hot.burn self' (Routine)
21.03.30bis	burn self	<Approximately> 5 minutes later. In living room, points to teapot <in kitchen>. A: 'teapot.burn self' (Routine)
21.02.40	burn self	Serving supper. D: 'Wait, it's too hot.' A: 'too hot'/'hot. burn self' (Points to stove.) (Routine)
22.02.09	burn self	<A> knocked a cig<arette> out of ash tray. M: 'Be careful.' A: 'burn self' (Routine)
23.02.19	burn self	<A> playing with <toy> cat. Wanted to put him on lamp. A: 'on light' M: 'No, pussycat will get burned if I put him on the light.' A: 'burn self' (Routine)
23.02.36	burn self	I reciting 'Pease Porridge Hot'. M: 'Some like it hot.' A: 'burn self' (Routine)
23.02.64	burn self	<I> told him not to touch TV. A: 'burn self' (Routine)
24.02.05	burn self	We discussing GM's birthday cake for Sunday. M: 'And we'll put candles on the cake.' A: 'hot.burn self' (Routine)
26.02.02	burn self	Points to coffee maker. A: 'hot.burn self' (Routine) Points to can opener. A: 'cut self'
26.02.06	burn self	Talking about candles on GM's birthday cake. <See 24.02.05.> (Routine)
26.02.75	burn self	Told him not to put plastic on lamp as it would burn and start a fire. A: 'start fire' x3/'hot fire'/ 'burn self' (Routine)
28.02.19	burn self	I pouring tea. A: 'tea'/'make tea' x 4/'burn self'/'hot tea' (Routine)
28.02.88	burn self	Gesturing towards cigarette. (Routine)

	A:	'found sewing machine' (Description)
05.03.06	found mixer	Flipping through book in 05.03.02. A: 'mixer'x 2/'found mixer' (Description)
06.03.23	find mixer	Looking at book which has a pic<ture> of a mixer. Flipping thru pages. (Intention)
07.03.17	find very very dark	Looking for pict<ure> in book. <Elephants> <i>n cave, have to turn on flashlight. <When describing this picture, I say 'It's very, very dark.'> A: 'very dark'/'very very dark'/ 'find very very dark' (Intention)
08.03.11	found soap	Shows me bar of soap in D's room. A: 'soap' x 2/'found soap' (Description)
12.03.04	found screw	Ran into kitchen with screw from toy tool-box. (Description)
12.03.14	found tape	Walking towards tape recorder. (Request <i.e., 'Get me a tape'>.)
12.03.15	found tape	<I> <b>rought him a tape. (Description)
12.03.36	found yellow record	Had asked for yellow record. I went to find it. Gave it to him. <He was> very happy. Laughing - excited. (Description) M: 'Look what I found Ainsley.' A: 'found yellow record' x10
12.03.44	found record. find	Showing me record <in 12.03.36.> A: 'found record. find' (Description) M: That's right. M found the yellow record.' A: 'found yellow record' (Imitation)
12.03.46	found yellow record	Sev<eral> min<utes> later. (Still playing with his record.) (Practice)
12.03.47	found scissors	Ca[illegible] running out with nail scissors. (Description)
12.03.70	found merry-go-round	Walks into room with <toy> merry-go-round. (Description)
14.03.13	find blender part	Had found lid to blende[illegible]me out to show it to me. A: 'find'/'find blender part' (Description)
15.03.04	found marker x5	[illegible]me running into kitchen with tin of markers. (Description)

15.03.11	found Mama car	We are walking on the street towards our car. He could see it. (Description)
15.03.14	found Mama tape	Came out of back room with some cassettes. (Description)
15.03.16	found birdy	Came out of back room with a toy bird. (Description) A: 'birdy'/'found birdy'
18.03.41	find narm	Playing with <a jigsaw> puzzle. Arm piece missing. <*narm* 'arm'> (Request) <At this time, A began to add [n] to words he had previously pronounced with initial vowels (*nowl* 'owl', *negg* 'egg'. I assume this was a result of his analyzing the phrase as 'a' + Noun, as determiners began to appear at this time.>
20.03.55	find blender	Has catalogue. I've shown him pictures of blenders in it before. (Request)