The Acquisition of Body-Posture Verbs in Swedish

Ida Toivonen
Stanford University
February, 1997

1. Introduction

The acquisition of words and constructions that refer to spatial concepts such as path, location, and posture and shape of objects has been the topic of numerous recent child language studies[1] (e.g., Choi and Bowerman 1991, Bowerman, De León, and Choi 1995, Gentner and Imai 1995, Landau, Smith and Jones 1988, Brown 1993). One issue in this research is the relationship between nonlinguistic spatial concepts and language-specific spatial organization. Do children come equipped with universal spatial concepts (e.g. verticality and inclusion) onto which they directly map the forms that their language provides? Or does the semantic organization of the specific language to which a child is exposed influence how that child comes to conceptualize the world? The former view makes it easier to explain why children tend to learn certain spatial meanings relatively early. If a set of conceptual categories is provided from the start, that will limit the number of hypotheses the child might have about the meaning for each specific form. The latter view, however, would seem to provide minimal help for the language learner[2]. These questions are difficult to answer, since we still know little about the cognitive development of children, and how this development relates to their acquisition of language (see, e.g., Quine 1960, Pinker 1984, Carey 1994). We also know little about the strategies children employ when they try to understand how words map onto concepts. Until we gain more insight into these issues (in and of themselves and as they relate to spatial notions), we will not be able to answer the question of how a child is able to acquire the specific system of spatial meaning that a given language employs. The goal of the present study is to bring us one step closer to understanding the techniques a child might employ when learning how a specific language organizes space.

The focus of this paper is Swedish-speaking children's acquisition of six verbs of placement (here called "body-posture verbs"), roughly corresponding to the English 'to sit', 'to stand' and 'to lie' and their transitive counterparts 'to set', 'to stand' and 'to lay'. These verbs are used freely for both animates and inanimates in Swedish (they will be

---

[1]I wish to thank Eve Clark for her invaluable help and advice throughout this project, and for her helpful comments on various drafts of this paper. I also want to thank Paul Kiparsky and John Rickford for interesting discussion of the topics in this paper. Thanks also to Linn, Louise, Dennis, Max, Moa, Verner, Sara, Richard, Fredrik, William, Lukas, Markus, and Olivia for participating in the study. Mamma, thanks for not getting angry even though the spaghetti was missing most of the summer. Finally, I would like to thank Charles for courageously running the café alone while I was collecting data, and also for reading drafts of this paper and discussing it with me many times.

[2] An overview of the literature on this question, as well as a discussion based on new data, are provided in Mandler 1996 and Choi and Bowerman 1991 (C&B's findings for Korean and English will be discussed below).

described in more detail in Section 2 of this paper). Full knowledge of the body-posture verbs includes:

- The word form (that is, the phonological representation)
- Syntactic information (the woed-class category, the syntactic frame)
- Morphological information (inflection)
- Meaning, which includes knowledge of
  - (i) inherent posture of the object named in the affected argument (the figure)
  - (ii) position of the figure and its relation to the ground
  - (iii) whether or not the figure is attached to something else
- Extended meanings (metaphors, fixed expressions, etc.)

The purpose of the experiments designed for this study was to gain insight into the strategies Swedish children use to learn the meanings of the six body-posture verbs, to find out what is difficult or easy for them, and what part of the meaning they pick up on first. The acquisition of the phonology and morphology of these verbs will not be considered here, and the syntax will be important only in relation to the difference between intransitive and transitive verbs.

Section 2 contains a brief introduction to the six body-posture verbs in Swedish. Section 3 discusses previous studies of the acquisition of similar verbs in other languages. Section 4 summarizes how the Swedish body-posture verbs are used by children and adults in transcripts available in the CHILDES achive and other available Swedish child data collections. Section 5 presents the results of some preliminary elicitation and comprehension tasks. Finally, Section 6 discusses the general findings of this study, how they relate to similar studies, and how they bear on the questions raised above.

2. Swedish Body-Posture Verbs

The verbs I am concerned with in this study are *sitta, stå, ligga,* and *sätta, ställa, lägga.* The intransitives *sitta, stå, ligga* correspond to the English verbs 'to sit', 'to stand', 'to lie', and the transitives *sätta, ställa, lägga* all correspond to the English verb 'to put'. I will call these body-posture verbs, because an important part of the semantics of these verbs is the posture of the objects talked about in the intransitives (*sitta, stå, ligga*) and the objects affected by the action in the transitives (*sätta, ställa, lägga*). These verbs may also refer to entities which cannot be said to have a proto-typical "body", such as blocks and other objects, but I will still call them body-posture verbs, under the assumption that their potential to be used with objects like blocks is an extension of their original meaning[3]. When these verbs refer to humans or animals, the Swedish uses are virtually identical to the English ones. I will therefore not try to define those uses here. However, when these verbs are applied to inanimate objects, we find that the conventions differ somewhat in English and Swedish, although there are big overlaps.

This study is only concerned with the body-posture verbs as they relate to physical entities in the world. In both English and Swedish these verbs are included in many fixed expressions and idioms, and it is with respect to these kinds of expressions that we find the largest differences in convention between the two languages. However, since these uses have been excluded from the present study, I will make no attempt to sort out their semantics in relation to the core meanings of the body-posture verbs[4].

2.1. Intransitives

This section concerns the intransitive body-posture verbs *sitta, stå* and *ligga.* I will concentrate here on how these verbs are used for inanimates, since the animate uses exactly parallel the English meanings of 'to sit', 'to stand' and 'to lie'.

Sitta

The verb *sitta* is used in contexts where an object is attached to something, enclosed in something, or stuck to something. Three common uses of *sitta* are shown in (1-3).

(1) Nyckeln sitter i dörren.
key-the sit in door-the
'The key is in the door.'

[3]This assumption may be wrong, of course, but that is irrelevant to the general issues of this paper.
[4]For more detailed discussions of these verbs used in both literal and figurative speech, see Viberg (1985) and references cited therein for Swedish, Van Oosten (1985) for Dutch, and Hansen (1974) for Danish.

(2) Glasögonen sitter på näsan.
glasses-the sit on nose-the
'The glasses are on his nose.'

(3) Tuggummit sitter fast under bordet.
Chewing gum-the sit stuck under table-the
'The chewing gum is stuck to the bottom of the table.'

The verb *sitta* is always the best verb to use with *fast*, when the meaning is 'stuck'[5]. It sounds very odd to replace the verb *sitta* with, e.g., *vara* 'to be' in (3). However, *sitta* is not dependent on *fast* to convey the meaning of attachment. Sentence (3) without *fast* (*Tuggummit sitter under bordet*) is perfectly acceptable, and it is understood that the relation between the chewing gum and the table involves attachment.

It does not sound natural in Swedish to use the verb *sitta* in a sentence like the English 'the lamp is sitting on the table', since this has nothing to do with enclosure or attachment.

Another common use of *sitta* refers to clothing. This is illustrated in (4-5).

(4) Hatten sitter på huvudet på snögubben.
hat-the sit on head-the on snow man-the
'The hat is on the snowman's head'

(5) Byxorna sitter bra på dig.
trousers-the sit well on you
'The trousers fit you well' or: 'The trousers look good on you'.

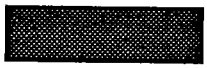
It should be noted that it is just as common to use other words and expressions when referring to clothing items. Other possiblities include the general *vara* 'to be', or *ha på sig* 'to wear' (lit. 'to have (sth) on oneself').

Stå

The verb *stå* corresponds fairly closely to the English 'to stand' as used for both inanimates and animates. The generalizations in (a-b) define the core meaning of *stå*.

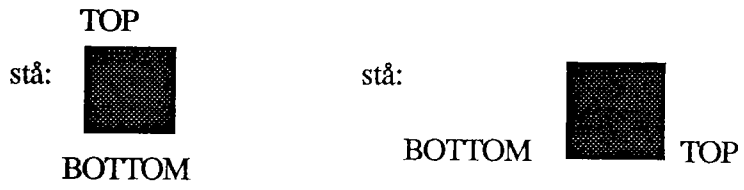
(a) The verb *stå* is used when an object is placed so that its greatest extension is vertical:

stå: 

*stå: 

[5]The adverb *fast* can also be used in other contexts, for example with the verb *ta* 'to take' in the expression *ta fast* meaning 'to catch'.

(b) The verb *stå* is used when an object with an inherent top is placed so that the top is facing up:



Although English 'to stand' and Swedish *stå* appear to be similar, I believe that these verbs have a different status in the two languages. It is my impression that *stå* is more commonly used in Swedish for objects than 'to stand' is in English. Consider the sentence in (6).

(6) Det står en vas på bordet.
there[6] stands a vase on table-the
'There's a vase on the table.'

In Swedish, the most natural verb to use in a sentence like (4) is *stå*. The verb *vara* 'to be' sounds odd, although it is marginally acceptable. This contrasts with English, where 'to be' is the primary verb in this context, although 'to stand' can appear, as in 'there's a vase standing on the table'.

Ligga

Similar to *stå*, but unlike *sitta*, the basic meaning of the body posture verb *ligga* corresponds fairly well to its English counterpart 'to lie'. The generalizations in (c-d) below hold for *ligga*, as well as for English 'to lie'.

(c) The verb *ligga* is used for an object placed so that its greatest extension is horizontal:

[6]This is expletive 'there', not locative 'there'.

(d) The verb *ligga* is used for an object with an inherent top, when the top is not facing up:

ligga:

*ligga:

Just as for *stå*, Swedish *ligga* comes across as a more basic verb of placement than English 'to lie'. Example (7) illustrates this.

(7) Det ligger en bok på bordet.
there lie a book on table-the
'There's a book on the table.'

In English, it is completely idiomatic to say 'There is a book on the table', but in Swedish, this sentence is best expressed as in (5) with *ligga:* it sounds odd to substitute *vara* 'to be' for *ligga* .

The verb *ligga* is used for geographical places, such as cities and countries: 'France *ligga* in Europe', 'Paris *ligga* in France'. It can also be used for buildings: 'there *ligga* an old castle in that valley', 'the post office *ligga* on Green Street'. When you talk about tall buildings, it is also sometimes possible to use *stå*, especially if the buildings are visible to the people who are talking about them.

2.2. Transitives

This section offers a brief presentation of the transitive body-posture verbs *sätta, ställa* and *lägga.*

Sätta

The verb *sätta* is the transitive counterpart of *sitta* when used for humans and animals. This is shown in examples (8-9).

(8) Barnet sitter i baksätet.
child-the sit in back seat-the
'The child is sitting in the back seat.'

(9) Mamman sätter barnet i baksätet.
mother-the seat[7] child-the in back seat-the
'The mother puts (seats) the child in the back seat'

[7] 'Seat' is a verb here, not a noun.

Examples (8-9) show that when used for humans, *sitta* is the intransitive counterpart of *sätta*. However, this is not true when these verbs refer to inanimates. Recall that *sitta* is used for inanimate objects only when referring to some kind of attachment or enclosure. The transitive *sätta* is appropriate in these same contexts, but *sätta* is also used in many other contexts where *sitta* would be impossible. In fact, in my dialect of Swedish, *sätta* is the generic verb, very similar to English 'to put'. In my dialect it is never ungrammatical to replace the more specific verbs *lägga* and *ställa* with the verb *sätta*[8]. However, in contexts where *lägga* or *ställa* clearly fit perfectly, it sounds unidiomatic to replace them with *sätta*. This is demonstrated in (9-12).

(9) Jag ställer vasen på bordet.
I stand vase-the on table-the
'I put the vase on the table.'

(10) ? Jag sätter vasen på bordet.

(11) Jag lägger mattan på golvet.
I lay rug-the on floor-the
'I put the mat on the floor.'

(12) ? Jag sätter mattan på golvet.

Note that (10) and (12) are not ungrammatical, although they are dispreferred compared to (9) and (11).

Ställa

The transitive *ställa* is much more restricted than *sätta*. The verb *ställa* can be used in all and only the contexts where it is appropriate to use the verb *stå* for intransitives. This is shown in (13-14).

(13) Koppen står på bordet.
cup-the stands on table-the
'The cup is (standing) on the table.'

(14) Jag ställer koppen på bordet.
I stand cup-the on table-the
'I put the cup on the table.'

Ställa can never be used in contexts where *sitta* or *ligga* (rather than *stå*) are appropriate intransitives, as in (15-16).

---

[8]According to Viberg (1985), this is true for the different varieties of Swedish spoken in Finland (my version comes from the Finnish island Åland). In the Swedish spoken in Sweden, *sätta* is more restricted (Viberg 1985, p13).

(15) Nyckeln sitter i dörren.
key-the sit in door-the
'The key is in the door.'

(16) *Jag ställer nyckeln i dörren.'
I stand key in door-the

The context in (15) does not fulfill the requirements of (a-b) in section 2.2, so *stå* is inappropriate. And *ställa* cannot be used in (16) because the transitive equivalent of (15) requires *sätta.*

Lägga

The transitive verb *lägga* is used in the same contexts as the intransitive *ligga* (see section 2.3). This is demonstrated in (17-18).

(17) Pappret ligger på bordet.
paper-the lies on table-the
'The paper is on the table'

(18) Jag lägger pappret på bordet.
I lay paper-the on table-the
'I put the paper on the table.'

The verb *lägga* can never be substituted for *ställa* or *sätta* in situations where the verbs *stå* or *sitta* would be appropriate in the corresponding intransitive contexts (19-21):

(19) Koppen står på bordet
cup-the stand on table-the
'The cup is on the table.'

(20) Jag ställer koppen på bordet.
I stand cup-the on table-the
'I put the cup on the table.'

(21) *Jag lägger koppen på bordet.
I lay cup-the on table-the

The sentence (21) may be used only if the cup is laid down on its side. But if we assume that (21) corresponds to the same context as (19), it is ungrammatical.

2.3. Comments

This section has presented the basic or core uses of the intransitives *sitta, stå, ligga* and their transitive counterparts *sätta, ställa, lägga.* My discussion focussed on normal,

prototypical situations -- it is possible imagine situations where the example sentences given here as correct may not be appropriate, and the sentences I have marked as ungrammatical may be grammatical. For example, the normal verbs to use when talking about a key and a door are *sitta* and *sätta*. However, we could imagine a situation where a door is lying on the ground, and a key is balancing on top of it. Now, *stå* and *ställa* would be appropriate. The purpose of this section is not to give a full account of all possible uses of the Swedish verbs of body-posture; instead, it is an attempt to present the basic meanings of these verbs.

The verbs in this study can often be translated with more specific English verbs than 'to be' and 'to put'. *Sitta, stå, ligga* can often be naturally translated with 'to sit', 'to stand' and 'to lie', and *sätta, ställa* and *lägga* can often be translated with the transitive 'to set', 'to stand' and 'to lay'. The reason why I have often used the more generic verbs in the English translations is that I feel that they more accurately reflect the meaning of the original Swedish sentences. When you say *koppen står på bordet* (cf. example (19)), you are typically making a comment about the fact that the place where the cup is situated is the table. You are not really concentrating on the posture of the cup. The verbs of body-posture in Swedish have more "bleached" meanings than English 'to sit', 'to stand' and 'to lie', which draw attention to the actual posture of the object.

These verbs are extremely common in Swedish, and it therefore seems likely that they should be learned at a relatively young age. There are a couple of clues that should provide help for the children when they acquire these verbs. First, the meanings of the transitive body-posture verbs are basically parallel to the meanings of the intransitives. Second, the pronunciation of the words give clues to which intransitive corresponds to which transitive.

3. Cross-linguistic Studies

This section briefly presents some studies concerning child acquisition of spatial words in languages other than Swedish.

3.1. Choi and Bowerman 1991

Choi and Bowerman (1991) compare English and Korean children's acquisition of the lexicalization of motion events. Their study is based on an analysis of spontaneous child utterances, and they find that children make few errors in their production of verbs of motion. They also note that with respect to the verbs of motion, children show sensitivity to language-specific patterns from as early as 17-20 months. Choi and Bowerman question the existence and relevance of the types of nonlinguistic semantic primitives that were discussed in Section 1 above. Their conclusion is that although it is possible that semantic primitives such as verticality, inclusion and attachment[9] are innate, and that this innate knowledge may offer some help when children learn the spatial organization of their language, there is still a massive amount of language-specific learning involved (pp.116-118). They present two main arguments against explaining the acquisition of the language of space by means of semantic primitives. First, notions like "head" and "clothing item" may play a role in early spatial words, and these notions are not "plausible-sounding semantic primitives" (p.115). Second, Choi and Bowerman found that English learners were able to isolate pure path markers several months before Korean children were able to do the same thing. This directly reflects the specifics of English and Korean: Korean expresses path with verb roots, e.g. *tule* 'enter' and *ollita* 'cause to ascend', whereas English typically expresses path with the help of a syntactically independent particle (for a fuller discussion of Korean and English verbs of motion, see Choi and Bowerman 1991 and Bowerman et al. 1995). If the ability to separate out the path is built in, this is difficult to explain, Choi and Bowerman argue (pp.116-17). However, if you assume that children rely heavily on the clues that the input gives them, the results follow directly from the difference in spatial organization in English and Korean.

3.2. Bowerman et al. 1995

Bowerman et al. (1995) compare the acquisition of spatial language in English, Korean, Dutch and Tzotzil. Both spontaneous and elicited production data were examined,

---

[9]The following list is cited from the literature in Bowerman and Choi 1991, p. 115: "verticality, region, inclusion, support, contact, attachment, Figure, Ground, Path or direction, and object dimensionality (point, line, plane, or volume)".

but only the results of the spontaneous production data are relevant to the issues at hand. One similarity among the languages examined was that children start using spatial words very early in contexts which refer to putting on and taking off clothing. Another similarity was that words for "separating" and "joining" were learned early in all four languages. A difference found between English on the one hand and Korean and Tzotzil on the other hand, is that while English children used path words in both intransitive and transitive contexts very early (p.103; see also Bowerman and Choi 1991), Korean and Tzotzil children started using transitive path verbs long before they started using intransitive ones. Bowerman et al. hypothesize that this might be a result of a preference for semantically richer path markers (p.105). Another finding that the authors attribute to this preference for words with richer semantics is that Tzotzil children prefer transitive Path verbs over Path particles (p. 105 and p. 107).

3.3. Bowerman and Choi 1994

Bowerman and Choi 1994[10] present results from a production study in which they elicit descriptions of a standardized set of spatial actions from Korean, Dutch and English children (aged 2;0 - 3;5). They focus exclusively on caused motion involving spatial manipulations of objects; mostly the actions of joining and separating objects. The actions that the subjects were asked to describe involved situations such as taking off and putting on clothing and putting a toy boat into a baby bathtub and taking it out. The main result was that the children classified the actions in a way similar to the adult speakers of the language. However, the children's classification patterns were simpler than the adults'. Bowerman 1996 concludes that "[...] the influence of the input language is quite strong: statistical analysis shows that in all three languages, the youngest age group of children classified the spatial actions more similarly to *adult* speakers of their own language than to *same-age children* learning *other* languages" (p.415).

An important finding in Bowerman and Choi's study involves the acquisition of words used for talking about taking clothes off. In Dutch, the particle *uit* corresponds to English 'out' and *af* to 'off'. However, *uit* is used for taking off clothing. So, in Dutch you say 'take out your shoes/hat!', although you actually take your feet out of the shoe or the head out of the hat. Bowerman and Choi found that children overextended the atypical use of *uit* for clothing to actions for which adults use *af* 'off' (Bowerman 1996, pp.415-416). The important thing to note here is that children grouped together the removing of clothing and the situations where adults use *af*, and that they overextended the clothing *uit*

[10]The study is described and discussed in some detail in Bowerman 1996.

to *af* situations, and not vice versa. This suggests words that are used in clothing stituations are important in children's early vocabulary.

3.4. Mandler 1996

Mandler (1996) discusses and summarizes research on preverbal spatial representation in infants. All of the studies discussed in Mandler 1996 point in the same direction: Infants have established sophisticated spatial concepts long before the onset of language. Infants can differentiate caused motion from self-motion by four months of age (Mandler 1996, p.371, Leslie 1984). By seven months of age, infants have formed concepts of animal and vehicle. Mandler refers to Mandler and McDonogh 1993, where it was shown that infants could distinguish between little models of birds and airplanes, but not between dogs and fish, or dogs and rabbits. Another study, Berenthal 1993, has shown that three-month-olds differentiate biological from non-biological motion, insofar as the parameters of people's motion are concerned. It has also been shown that babies know certain things about objects and support; by six months, babies know that containers must have bottoms if they are to hold things, and already by three months, children expect an object to fall if it loses contact with a surface (Mandler 1996, p. 371). These facts lead Mandler to conclude:

> "...babies have a mechanism that enables them to abstract spatial regularities and to use these abstractions to form the beginnings of a conceptual system. The contents of this new conceptual system are sets of simplified spatial invariants. It is these invariants that form the earliest represented meanings. I claim that these spatial abstractions are sufficient in themselves to represent the initial meanings of such concepts as animate thing, inanimate thing, cause, agent, support, and container" (p.372).

Thus, children do have preverbal knowledge of certain spatial distinctions, to which they can map the spatial words of the input language.

3.5. Summary

Assuming that the acquisition process of the Swedish spatial verbs under examination in this study is comparable to the spatial verbs examined in the studies cited above, we might expect certain patterns in the results of the Swedish experiments. First of all, we might expect the children to show sensitivity to the language-specific "division of space" very early. It would thus be surprising if a child made spatial distinctions that do not exist in the target language, although they might exist in other languages. It would also be surprising if a spatial distinction in the target language proved to be problematic for the child. For example, children should learn the distinction between spontaneous and caused

motion relatively early. Another thing that the studies cited above lead us to believe is that semantically rich spatial terms are learned before or at the same time as semantically "lean" spatial verbs. This means that if an intransitive and a transitive describe the same general action or state, the transitive should emerge before the intransitive (as in Korean and Tzotzil) or they could emerge at the same time (as in English). The studies discussed above also suggest that spatial verbs that involve clothing are learned early. Finally, the fact that words for separating and joining are learned early lead us to expect that spatial verbs that relate to attachment are learned with relative ease. The category of attachment and the category of clothing might be related, since putting on a piece of clothing is, in some sense, attaching it to the body. In languages where the same word is used for putting on clothing and attaching something (e.g, Swedish, but not Korean), learning the word for clothing might help you learn the word for attaching other objects, or vice versa. There is reason to believe that words for clothing are learned easily, because that is something that caretakers are likely to use often on a daily basis. Once children learn the word for "attaching" a clothing item, they might extend the use to other kinds of attachment. On the other hand, if situations that involve attachment prove to be salient for infants, then this could be a reason why attachment words are learned early. This could then help children learn the words used for clothing, since clothing situations can be seen as a subset of attachment situations. However, Korean children learn attachment verbs and clothing verbs early, although Korean does not use the same verb for these situations This suggests that verbs that refer to each of those situations are easy for children to master independently of each other.

4. The body-posture verbs in Swedish child language data collections

Before the experiments were carried out, I investigated the use of body-posture verbs in the Swedish material available in the CHILDES database and in published data from Swedish children. I did not find any discussion that directly concerns the six body-posture verbs in the Swedish first language acquisition literature, but these verbs occur frequently in the available corpora. The CHILDES data were collected from two children, Markus (Plunkett and Strömqvist 1992, Strömqvist et al. 1993) and Harry (Strömqvist et al. 1993). The Markus data consists of transcriptions of 25 recording sessions, all of which were analyzed. Markus is aged 1;3.19 at the first recording and 2;7.24 at the last. The other CHILDES child, Harry, is later than Markus in his speech development and it is often difficult to make out from the transcriptions what he is saying. I therefore analyzed only the last three recording sessions, where Harry was aged 2;3.4, 2;4.2, and 2;4.23. The other data come from the two Swedish child language studies of Lindhagen (1976) and Lange and Larson (1973). The Lindhagen data come from a girl Åsa (2;0.24 - 2;4.0) and a boy Patrik (1;8.5 - 1;10.5), and the Lange and Larsson data come from a girl Embla (1;8.0-2;1.0).

4.1. Frequency

It is unclear what the frequency of words in child production can tell us about children's knowledge of these words. A problem with taking frequency into consideration is that a given word might be part of a very common fixed expression, and the children might use this word only rarely, if ever, outside this expression. This, however, does not seem to be a problem with respect to the six body-posture verbs. As far as it is possible to tell from the transcriptions available, children use these verbs in various "natural" contexts, rather than exclusively in fixed expressions. There are, of course, other problems with frequency counts. A child might repeat a word fifteen times in a row (in order to get the adult's attention, for example), and that might change the statistics drastically, especially in a small corpus. Despite these problems, I will present the results of some frequency counts below, because I think frequency of use may, to some extent, reflect factors such as order of acquisition and comprehension, which in turn may reflect the level of complexity in form and meaning.

Table 1 below gives the number of tokens of body-posture verbs found in the available child language corpora.

Table 1. Frequency of body-posture verbs in child data

	Markus[11] (1;3.19-2;7.24)	Harry (2;3.4-2;4.23)	Åsa (2;0.24-2;4.0)	Patrik (1;8.5-1;10.5)	Embla (1;8.0-2;1.0)	Total
sitta	16	20	42	10	10	98
stå	14	0	0	0	4	18
ligga	24	0	9	2	8	43
sätta	3	0	14	7	0	24
ställa	3	0	0	0	0	3
lägga	4	0	0	0	0	4

The intransitives occur more frequently than the transitives, overall. There are 159 instances of intransitive uses, and only 31 instances of transitive uses. The verb *sitta* is the most common of the intransitives, and its transitive counterpart *sätta* is the most common of the transitives. The verbs *ligga* and *lägga* come second in frequency in the intransitive and the transitive groups, respectively. *Stå* and *ställa* are the least frequent of the body-posture verbs analyzed here.

The results in Table 1 are compatible with the results of Viberg (1993). Viberg lists the 20 most common words used in recordings of 12 monolingual Swedish children (p.354-55). Among these 20 words we find *sitta, ligga, stå,* and *sätta,* which are the most frequent in Table 1. The intransitives are more frequent than than the transitives. The verb *sitta* is number 7 on the list, and thereby the most frequent of the body-posture verbs. The verb *ligga* is number 8, *stå* is number 12 and *sätta* is number 17. The ordering is thus a bit different, but the results in Table 1 are compatible with Viberg's results insofar as the verbs *ställa* and *lägga* are the least frequent.

The speech of adults on CHILDES was compared to the child data, in order to determine whether or not the child data directly reflect the adult data. The adult speech from eleven sessions was examined; six from Markus and five from Harry.[12] The instances of the adult uses of the body-posture verbs in these sessions were examined. The results are displayed in Table 2.

---

[11]I counted the verbs in following sessions: ma20_05.cha, ma22_25.cha, and ma28_18.cha. These sessions were randomly selected.

[12]Markus: ma15_19.cha, ma20_05.cha, ma22_25.cha, ma 23_00.cha, ma27_28.cha, and ma28_18.cha. Harry: har18_20.cha, har21_15.cha, har23_18.cha, har26_00.cha, and har28_23.cha. These sessions were randomly selected.

Table 2. Frequency of body-posture verbs in adults' speech to Harry and Markus

	Adult to Harry	Adult to Markus	total
sitta	33	31	64
stå	6	22	28
ligga	16	10	26
sätta	5	34	39
ställa	0	18	18
lägga	18	19	37

In a Swedish frequency dictionary (Allen 1972), all of the body-posture verbs were found within the group of the 100 most frequent verbs in a corpus derived from Swedish newspapers. The order of frequency was the following: *stå* (18), *ligga* (22), *sätta* (37), *ställa* (38), *lägga* (42), *sitta* (61) (the numbers in parentheses indicate the placement in the frequency list). Note that this is very different from what we see in Table 2. One striking difference is that *sitta* is the most common body-posture verb in the CHILDES adult data, whereas the newspaper count shows that *sitta* is the least common one. This presumably reflects the fact that newspaper language is very different from child directed speech.

Table 3 compares the child results of Table 1 to the adult results of Table 2. The order in the table reflects the order of frequency.

Table 3. Child vs. Adult frequency in CHILDES

Child		Adult	
sitta	(98)	sitta	(64)
ligga	(43)	sätta	(39)
sätta	(24)	lägga	(37)
stå	(18)	stå	(28)
lägga	(4)	ligga	(26)
ställa	(3)	ställa	(18)

There are some similarities in the adult and the child frequencies. For example, *sitta* is the most common body-posture verb in both adult and child production, and *ställa* is the least common one. Also, if the intransitives and the transitives are considered separately, the order of frequency is very similar. The only difference is then that *stå* is the least frequent intransitive in the child data, whereas *ligga* is the least frequent intransitive in the adult data.

However, the results are by no means parallel, so we cannot say that the child data directly reflects the frequencies in the adult data.

Let us now briefly look at Korean and English children's order of acquisition of body-posture verbs. The age of emergence of certain spatial verbs in two English-speaking children, C and E, is given in Bowerman and Choi 1991 (pp.97-98). The data cited are collected from diary data on spontaneous production. Table 4 shows the age of the first instance of each body-posture verb.

Table 4. English-speaking children's acquisition of body-posture verbs[13]

Age in months	The child C	The child E
17-18	**sit** (intransitive)	**sit** (intransitive & transitive)
19-20	**lie** (intransitive)	**stand**(intransitive&transitive) **lie** (intransitive)
21-22	**lie** (transitive) **sit** (transitive)	

Table 4 shows that the first transitive form of a given body-posture verb appeared in the transcription either later than or at the same age as the same verb appeared with an intransitive use. This is similar to the Swedish results of Table 1, in that a transitive never comes *before* its intransitive counterpart. Another similarity is that the first body-posture verb found in the spontaneous production of English-speaking children is 'sit', the equivalent of Swedish *sitta*, which emerges before the other Swedish body-posture verbs. Recall that a general difference between Swedish and English is that transitive use of these verbs are not very common in English, but it is common in Swedish.

Korean has intransitive, but not transitive, counterparts of the Swedish body-posture verbs. The verb which corresponds to 'sit' is first produced by Korean children at 17-18 months of age. The verbs corresponding to 'lie' and 'stand' both emerge at 21-22 months (Choi and Bowerman 1992: p. 104). The Korean data is thus consistent with the English and Swedish data, in that the verb corresponding to 'sit' is present in children's spontaneous production at an earlier age than the verbs corresponding to 'lie' and 'stand'.

[13]Choi and Bowerman do not talk about these verbs as intransitives and transitives, but rather as involving spontaneous or caused motion.

4.2. Other observations

Markus seemed to master all six verbs at an early age. The first occurrence of one of these verbs is at age 1;7.25, where Markus repeats *hätta* after his father uses *sätta*. The first spontaneous use appears at 1;10.14, when he says about a boat that it *stå*. All the body-posture verbs occur frequently in the production data from Markus, and he seems to be using them correctly, judging from the context and the intervening utterances from his parents.[14]

Harry is rather late in his speech development, as mentioned above. This is reflected in his uses of the body-posture verbs. Of the six verbs, Harry uses only *sitta*. This verb is quite frequent in Harry's production, and he uses it only for humans and a teddy bear. He crucially does not use it for inanimates. As far as it is possible to tell from his production, Harry uses this verb correctly. In situations where one of the other body-posture verbs would be appropriate, Harry typically leaves out the verb or replaces it with the neutral *är* (pronounced [e]) 'is'.

The data from the other children (Embla, Patrik and Åsa) indicate that the body-posture verbs are learned relatively early. There are a few cases where it seems as if an intransitive is over-extended to a transitive. Except for this, the body-posture verbs cited in these studies appear to be used correctly.

Cederschiöld 1944 contains a collection of examples of child utterances from hundreds of children all over Sweden. The examples have been reported to Cederschiöld by the children's caretakers. The material in this book mostly concerns mistakes that children make. All kinds of mistakes are included; phonological, morphological, syntactic, lexical and semantic. It worth noting that none of the six verbs of placement are included in this book[15]. This is another indication that the children learn the meaning of these verbs with relative ease.

In the adult data examined, all of the body-posture verbs are used with both inanimates and animates[16].

---

[14]There are a few instances where Markus seems to be overextending the verb *sitta*. For example, on one occasion he incorrectly says that a boat is 'sitting' on the table. This suggests that Markus assumed is that *sitta* could be used on any occasion where *sätta* can be used in the corresponding transitive situation. For discussion, see Toivonen 1996.

[15]On pp. 52-53 in Cederschiöld, there are a few examples of children who make mistakes when forming the past tense of these verbs. For example, the past tense of *lägga* is *lade* but instances of the incorrect **läggde* are reported. These are, however, the only references to the body-posture verbs in the book, and the tense inflections are not important to the issues at hand in this paper, so they will be disregarded here.

[16]Teddy bears and other stuffed animals which can *sit*, *stand* and *lie* were counted as animates.

4.3. Summary

These preliminary studies indicate that the Swedish body-posture verbs are part of children's early vocabulary and children learn how to distinguish among them at an early age. The frequency findings suggest that the verbs are acquired in the following order: *sitta, ligga, stå* (intransitives), and *sätta, lägga, ställa* (transitives). Recall, however, that the adult frequency is not completely consistent with the child frequency. The frequency findings also suggest that intransitives are acquired before transitives. Note that this is the opposite of what the cross-linguistic studies discussed in Section 3 led us to believe. Finally, this preliminary research indicates that children use the body-posture verbs for human and human-like participants before they use them for inanimates. The findings we have so far are sometimes contradictory and in places incomplete. The experimental data will help us fill out the picture of the developmental course children follow.

5. Experiments

5.1. Setting for experiments

The children and adults that participated in the study all live in Åland, a Finnish island which is monolingually Swedish. The parents of all participants are native speakers of the Åland dialect of Swedish. I knew most of the children and all the adults prior to the study. Most of the participants were from Svartsmara, my home village of 84 people in the center of the island. I told the children that we would play some games. I explained to the older children that some of the games would be recorded, and that I would use the recordings for a paper for school. Each child was brought into a room where the materials used in the experiment were set up beforehand on a table. At the beginning of each session, the child and I played with the props for five to fifteen minutes.

There were four tasks; production, comprehension, forced choice, and imitation. The production task was performed first in every session, since that was the only task that did not involve the experimenter using the target body-posture verbs. This eliminated the possibility that children might pick up clues from the experimenter's use of these verbs. The imitation task was always performed last, since this task involved incorrect uses of some of the verbs by the experimenter. By saving this task for last, possible confusions that this task might have caused would not be reflected in the other tasks. Roughly half of the children got the remaining tasks, comprehension and forced choice, in that order, and the other half in the reverse order. Each task involved a series of questions or instructions randomized separately for each child within the task.

5.2.Subjects

Thirteen children took part in this study, eight male and five female. Specific children will be referred to by letters of the alphabet. Their ages ranged from 1; 11 to 5;11. I divided the children into three age groups. The first contains three children (A 1;11.10, B 2;0.20, C 2;0.20), the second contains five children (D 2;10.22, E 3;0.1, F 3;1.1, G 3;4.5, H 3;6.27) and the third also contains five (J 4;3.9, K 4;5.20, L 5;4.19, M 5;4.26, N 5;11.1). All the children came from monolingual homes and were learning Swedish as their first language.

5.3. Experiments

Predictions

I summarize here the predictions I derived from the survey of the literature in Section 3 and my own preliminary studies of the Swedish corpus data in Section 4.

- Body-posture verbs are part of children's early vocabulary and children will learn how to distinguish between them early. (Sections 3 and 4)
- Verbs that are used with clothing will be learned early. (Section 3)
- Verbs that relate to attachment will be learned early. (Section 3)
- Children will use body-posture verbs for human and human-like participants before they use them for inanimate objects. (Section 4)
- Intransitives will be learned before transitives. (Section 4)

As has already been noted, there is one paradox in the predictions at the ends of Sections 3 and 4: The cross-linguistic study led us to predict that transitives are learned before the intransitives, and the Swedish corpus study led us to predict the opposite. Despite this contradiction, there are several reasons to predict that intransitive body-posture verbs are learned earlier than the transitives in Swedish First of all, recall that this prediction comes from Swedish child language data, and the opposite prediction comes from cross-linguistic data. Since this study is concerned with Swedish data, the former prediction is more likely to prove correct than the latter. Second, Clark and Garnica (1974) found that intransitive deictic verbs are learned earlier that their transitive counterparts in English. This gives reason to believe that the conclusion of Bowerman et al. discussed in Section 3, regarding the order of acquisition of transitives versus intransitives, may not be correct.

As for the exact order of acquisition of these verbs, the preliminary data offer a mixed picture. The frequency in the child data suggests that the intransitive verbs are learned in the following order: *sitta, ligga, stå*, and the transitives: *sätta, lägga, ställa.* The order of the transitives is consistent with the adult CDS (child directed speech), but the intransitive order of frequency in the CDS differs from that of the child language (CDS: *sitta, stå,l igga*). The CDS frequency also give us reason to doubt the prediction that intransitives are learned before transitives. In the CDS frequency, we find two transitives among the three most frequent words. If we were to hypothesize that children's comprehension of a form directly reflects the frequency of that form in the CDS, then we would predict that children first master the most frequent words in CDS, and later the least frequent. However, I believe that factors other than CDS frequency may influence a child's level of understanding of a form. I therefore predict that the experimental data will parallel the child frequency, rather than the CDS frequency.

5.3.1. Production

Materials

Included among the materials were two Playmobile figures; one baby (about 5 cm) and one man (about 10 cm), which could be made to sit, stand and lie. Also included were

a bucket (about 20 cm high), a plastic shovel (about 25 cm long), and a Playmobile boat the appropriate size for the Playmobile man and baby. I also used two blocks, one cube and one rectangular solid. A puppet from *Winnie the Pooh,* called Tigger, was placed on the table.

Procedure

Tigger was placed facing away from the child and the props. The child was told that Tigger wanted to look away because he was very shy. However, Tigger still wanted to know what was being done on the table, so the child should tell him about it. The experimenter used the props to illustrate eleven states (to elicit the intransitive body-posture verbs) and eleven actions (to elicit the transitives). The exercise was designed to elicit these verbs in situations which involved clothing, placement of humans, placement of objects with inherent posture, and placement of objects without inherent posture. Each situation in this task is listed in Appendix 1 together with its target verb. The experimenter gave each child instructions about what to tell Tigger. The first instruction was usually "tell Tigger what you see here". If this instruction did not elicit an answer with a body-posture verb, more specific instructions were given. Typical follow-up instructions were "tell Tigger what I am doing to X (e.g. the man)" and "tell Tigger what X (e.g. the man) is doing".

On a few occasions, a child gave an answer and then changed it to another answer. The change often occurred after I asked the child to repeat the utterance (for the production and imitation tasks) or action (for the comprehension and forced choice task). All the answers have been counted. This, of course, is taken into account for the calculation of percentages. For example, if 8 children responded *sitta*, 4 responded *stå*, and 1 responded *sitta* and *stå*, then there were 14 responses total, and the percentages were calculated in the following way: 9/14 (64%) *sitta* and 5/14 (36%) *stå*.

Twelve of the thirteen children participated in this task.

Results

The main results of the production study are presented below. A complete summary of all the production responses is given in Appendix 4.

Correct usage

Table 1 shows how often the children responded to the production instructions with

the target body-posture verb[17].

Table 1. Correct production of the body-posture verbs

target verb	%
sitta	38%
stå	27%
ligga	29%
sätta	67%
ställa	0%
lägga	6%

The intransitive *sitta* was used correctly more often than the other intransitives, and *sätta* was used correctly more often than the other transitives. *Stå* and *ställa* are used less often than the other intransitives and transitives, respectively. The ordering is thus as follows, from high to low: *sitta, ligga, stå* (intransitive); and *sätta, lägga, ställa* (transitive). This compares directly to the frequency of children's use of the body-posture verbs in the longitudinal corpora examined in Section 4 (cf. Section 4.1).

Clothing verbs

The children performed better on tasks that involved describing the act of putting a piece of clothing on a human or a human-like figure than on the other tasks. The accuracy of 78% in the tasks referring to clothing can be compared to the average accuracy of 29% across all production items. The number of correct uses of the verb *sätta* in the different contexts where *sätta* is the only possible body-posture verb is given in Table 2. The first row in Table 2 shows the number of correct uses of *sätta* in situations that involve putting an item of clothing on a doll or a puppet. The second row shows the number of correct uses of *sätta* in situations involving placement of human-like figures. The numbers in parentheses reflect the results that adult-like responses would have given.

[17]The percentages were calculated in the following way: If the body-posture verb *sitta* was the target verb for X number of instructions (that is, adult-like performance would have given the number X), and the children responded with *sitta* Y number of times, Y was divided by X.

Table 2. Children's use of *sätta* for "dressing" vs. placement of human figures

	sätta used	% correct uses
CLOTHING	28 (36)	78%
HUMAN	6 (12)	50%

Table 2 shows that the children were more likely to produce *sätta* when it was elicited for placement of clothing than when it was elicited for placement of humans. The set of production tasks did not include any other tasks where *sätta* was the only correct body-posture verb to use[18].

Recall from Section 2 that *sätta* may (at least in the Åland dialect of Swedish) be used as a generic verb of placement. That is, in a given situation, *ställa* or *lägga* may be the most idiomatic body-posture verb to use, but *sätta* is also acceptable. In the items in the production task where *sätta* was possible (but not completely idiomatic), the children used *sätta* 32% of the time, which is much less often than for clothing.

These results show that children learn which verb is appropriate to use for the act of dressing relatively early, as predicted.

Intransitives and transitives

Ten out of twelve children produced only one transitive body-posture verb, *sätta*. This contrasts with their production of intransitives, where they ranged from producing no intransitive body-posture verb to producing all three. Table 3 shows the distribution of the types of body-posture verbs in the different age groups. Here, the first group consists of only two children, because one of the children in the youngest group did not want to participate. Groups two and three consist of five children each.

Table 3. Number of body-posture verbs (types)

	INTRANSITIVES			TRANSITIVES		
Age groups	sitta	stå	ligga	sätta	ställa	lägga
I (→ 2;1)	0	0	0	2	0	0
II (2;11 - 3;7)	3	4	3	5	0	1
III (4;3 - 5;11)	4	5	5	5	0	1

[18]Some items involving attachment were originally used, but they were excluded due to inconsistency in the parallel adult study (cf. Section 5.4 and Appendix 6). Attachment is another category where *sätta* is the only appropriate body-posture verb (cf. discussions of *sitta* and *sätta* in Sections 2.1 and 2.2).

All of the children produced the transitive verb *sätta*, which is the most general transitive body-posture verb in Swedish. This verb was employed in appropriate contexts, but also where *ställa* or *lägga* would be more idiomatic and therefore normally used by adults. Two of the children produced the transitive *lägga* in addition to *sätta*. One of these children, E, produced *lägga* only once, and he did not produce it until the examiner had asked the question four times. The other child J who produced two transitives relied on the verb *lägga* more than on *sätta*. J seemed to treat *lägga* as a general-purpose transitive body-posture verb and overextended it on several occasions. He produced *sätta* only when talking about clothing.

Two children specified body-posture by saying *sätta å stå/ligga* 'set to stand/lie', and J likewise used *lägga å stå* 'lay to stand'. The three children who employed this option were all 4;3 or older[19].

Seven children used intransitives on occasion instead of transitives. When the children substituted intransitives for transitives, all except one child chose the appropriate intransitive[20]. These results indicate that children have a better command of the intransitives than the transitives, as predicted at the end of Section 4. At the same time, the fact that the two youngest children produced one transitive verb and no intransitives is consistent with the cross-linguistic findings. These data appear to conflict with each other. However, I think the reason why the first verbs are transitives can be explained by the fact that motion is very salient to infants (Mandler 1996) and verbs that refer to motion of some kind are often part of children's first vocabulary (Bowerman 1996). On the other hand, the exact meanings that refer to different body-postures will be sorted out earlier in verbs that are semantically simple, than in verbs that are semantically more complex. This hypothesis will be discussed in more detail in Section 6.

Replacement of body-posture verbs

Some children preferred to talk about the normal functions of the props, rather than employ a body-posture verb to describe state and caused motion. For example, two children answered *gräver* 'digs' when the situation involved a shovel, and *läser* 'reads' when the situation involved a book. Similarly, some children replaced the body-posture verbs for humans with *åker/kör båt* 'rides/drives boat', or *sover* 'sleeps'. About half the children seemed to prefer these kinds of replacements to uses of body-posture verbs.

---

[19]The expressions *sätta å stå/ligga* are acceptable (though marginal) in my dialect of Swedish, but *lägga å stå* is absolutely unacceptable.

[20]This child only produced two body-posture verbs, *sitta* and *sätta*. She used *sitta* for objects with inherent posture and for humans, and *sätta* for objects with no inherent posture and for clothing.

However, most of them eventually produced a body-posture verb when the experimenter insisted "but what is X doing **right now**?"

5.3.2. Comprehension

Materials

All the materials used in the production task were available for the child in this task. A book and the *Winnie the Pooh* figure Piglet were added to the materials.

Procedure

The child was told that Piglet does not understand Swedish. If I said something, the child should act it out with the props so that Piglet could understand it. All 22 instructions I gave included a body-posture verb: 9 intransitives and 13 transitives. One instruction concerned clothing, six referred to placement of humans (i.e. the Playmobile figures), ten referred to placement of objects with inherent posture (the book and the bucket) and five referred to objects without inherent posture (the blocks). The instructions used are listed in Appendix 2.

Results

Accurate comprehension of all six body-posture verbs

Table 4 below shows how often the children responded in an adult-like fashion to each body-posture verb.

Table 4. Comprehension of the body-posture verbs

target verb	%
sitta	85%
stå	65%
ligga	74%
sätta	73%
ställa	59%
lägga	67%

The children responded correctly more often to the instructions that included the intransitive *sitta* than to the instructions that included another intransitive body-posture verb. Likewise, children performed better when the instructions included the transitive *sätta* (the transitive counterpart of *sitta*) than when the instructions included other transitives. They performed

next best on the pair *ligga/lägga*, and third best on the pair *stå/ställa*. These findings parallel the production results given in Table 1, and also the frequency results in Section 4.1.

If we compare the comprehension across different categories, we find that the children did best on the tasks that involved putting on clothes. In this category, all children responded correctly. In the category that involved objects without inherent posture (the blocks), 84% of the tasks received correct answers. The category of tasks with human-like participants and the category with objects with inherent posture both got 70% correct answers.

Intransitives and transitives

The children did better on instructions with intransitives than transitives when the body-posture verbs referred to humans. Intransitive instructions received adult-like responses 87% of the time, versus only 53% of the time for transitives. The percentages of correct responses are displayed in Table 5.

Table 5. % of correct responses to instructions involving human figures[21]

	INTRANSITIVES			TRANSITIVES		
Age groups	sitta	stå	ligga	sätta	ställa	lägga
I (→ 2;1)	67%	33%	67%	25%	0%	66%
II (2;11 - 3;7)	80%	100%	100%	0%	40%	100%
III (4;3 - 5;11)	100%	100%	100%	60%	80%	80%

All age groups performed better on the intransitives than the transitives, as shown in Table 5.

Ten children reacted to the instruction with *ställa* by laying the man down in the boat, and only 4 correctly stood the man up in the boat. This suggests that children use the act of laying down as a default, maybe because (in this particular case) it is simpler. If you want to stand the playmobile man up in the boat, that involves balancing it until it can stand by itself. If you want to make it sit in the boat, that involves manipulating its legs, so that they bend. It is therefore easier to simply lay it down. This hypothesis is consistent with the finding of Wilcox and Palermo (1974). They show that when a child is faced with a

[21]Remember that when reading the tables, it must be taken into account that the different age groups include different numbers of children. Moreover, the fact that some children gave more than one answer to some questions will determine the actual numbers used for calculating the percentages (for the exact tokens, see Appendix 5). Since this is true for both intransitives and transitives, the percentages are still representative.

task, s/he tends to opt for the simplest motor response; especially if they do not fully understand all the words in the instruction. It should also be pointed out that these children live on an island, and they have been told many times that it is not allowed to stand up in boats. In fact, two of the children protested to my instruction to stand the man in the boat, and said that you have to sit down when you are in a boat. For these reasons, it is likely that Table 5 does not accurately mirror the children's actual understanding of the transitive verbs. The 85% correct for *lägga* probably over-estimates children's real understanding of the verb. This means that the difference in understanding of intransitives and transitives may actually be greater than Table 5 suggests. When the instructions involved the placement of non-humans, there was no difference in correctness between intransitives and transitives (cf. Appendix 5).

Canonical versus non-canonical position of objects

The children showed a strong tendency to put objects with an inherent posture in their normal or canonical positions. This is illustrated in Table 6, which contains the percentage of children's laying versus standing a book and a bucket in response to the verb *sätta*. In this context, *sätta* does not give any clues as to the expected posture of the objects.

Table 6. Responses to the neutral *sätta*

	lie	stand
book	85%	15%
bucket	7%	86%

Table 6 shows that the children prefer to lay books down and stand buckets up, rather than standing books up and laying buckets down. All of the adults tested showed the same preference; they laid the book down and stood the bucket up as a response to intructions with *sätta*. Tables 7-8 show that children tend to stick to this preference even when they are given a body-posture verb that is inconsistent with the preference.

Table 7 shows the correct answers for instructions involving laying and standing the book and the bucket.

Table 7. Correct responses to the verbs *ligga/lägga* and *stå/ställa*

	BOOK		BUCKET	
Age groups	lie	stand	lie	stand
I (→ 2;1)	100%	0%	25%	67%
II (2;11 - 3;7)	70%	38%	40%	91%
III (4;3 - 5;11)	100%	50%	64%	100%

As can be seen in Table 7 above, the children were much more likely to respond correctly to instructions that involved lying books down and standing buckets up, than to instructions that involved standing books up and lying buckets down.

Table 8 below summarizes *all* the responses, regardless of the instruction given. Half of the instructions with *ligga/lägga* involved a book and the other half involvet a bucket, and this is also true for the instructions with *stå/ställa*[22]. An adultlike performance would thus have given 50% in each box of Table 8. This was in fact confirmed by an adult study (Section 4.4).

Table 8. Responses to all instructions

	lie	stand
book	80%	20%
bucket	24%	72%

These results all lead to the same conclusion, namely that children pay more attention to the canonical positions of objects with inherent posture than to positions indicated by body-posture verbs. This is consistent with previous studies on the acquisition of the English prepositions 'in', 'on' and 'under' (Clark 1973, Wilcox & Palermo 1974, Grieve et al. 1977). Different hypotheses have proposed for why this should be the case. Clark and Wilcox&Palermo have taken the stand that these results reflect the fact that before children learn the relevant lexical items and syntax, they rely on non-linguistic strategies, such as the perceptuall properties of objects, e.g. containers contain things (Clark 1973); or knowledge of every-day relations between objects, e.g. teapots normally go *on* tables (Wilcox & Palermo 1974). Grieve et al. claim that things are not that simple. When children are confronted with an instruction to manipulate objects, they get two sets of clues about what to do: one, the construal of context (non-linguistic),

[22]Cf Appendix 5.

and two, the linguistic instruction. If these sets of clues are contradictory, Grieve et al. argue, the child might choose to ignore the linguistic cue, especially if the child is young and still has an incomplete grasp of the language. The present study supports the confliciting clues hypothesis of Grieve et al., since the children did better on tasks that referred to objects without inherent posture than on tasks where the objects did have an inherent posture.

5.3.3. Forced Choice

Material

The materials here consisted of a bottle, about a liter of pink soda, two pairs of glasses, some uncooked spaghetti and a cylindrical spaghetti container.

Procedure

This task was introduced as a game, where the child could win little "prizes", such as stickers. The child was told to answer the questions by pointing. The first task involved the two pairs of glasses. One pair was lying on the table, and the other pair was worn by me. I took my glasses off and put them back on, so that the child would be aware that they were part of the game. I then asked "where *sitta* the glasses?" The second question concerned the spaghetti. Some spaghetti was lying on the table and some was in a container, which was standing upright. The child was asked "where *stå* the spaghetti?" Lastly, some soda was poured onto a plate and some was inside the upright bottle. The child was asked "where *ligga* the soda?"

Results

Eleven of the children participated in this forced choice task. The table below shows the number of correct answers for each question.

Table 9. Forced choice responses to *stå*, *sitta* and *ligga*

	number of correct answers	percentage of correct answers
spaghetti *stå*	8	73%
glasses *sitta*	2	18%
soda *ligga*	10	91%

We cannot draw any strong conclusions from these results, since this task was so limited. However, it is worth noting that the children had problems with the verb *sitta* for attachment. This is surprising, since the preliminary studies suggested that *sitta* is normally

acquired before other body-posture verbs (see section 4). Recall also that English, Korean, Tzotzil, and Dutch children learn terms that involve separating and joining early on (Section 3). There are several reasons why the score for the "glasses exercise" is so low. First of all, although *sitta* is frequent in the child data, it may be used primarily for humans, and only learned later for inanimates. For attachment of inanimates, the children may learn *sitta fast* ('be stuck') as a fixed expression, and not analyze its components. If so, there is no reason for them to think that *sitta* is appropriate for objects that are not stuck to anything. Another possibility is that children assume that the intransitive *sitta* can be used in all contexts where the transitive *sätta* can be used (recall that the CHILDES child Markus seeemed to assume this, cf. footnote 13). Under this hypothesis, *sitta* should be fine to use for the glasses on the table, since *sätta* can be used for putting them there. However, this hypothesis should give a 50/50 score, and not the score shown in Table 9. I will leave these possibilities for further investigation, since the data here are too limited for further conclusions.

5.3.4. Imitation

Materials

Included in this task were a Playmobile man, a Playmobile boat, a toy bucket, a toy shovel, a book and two blocks: one cube and one rectangular solid. Introduced as a third "participant" in the task was a teddy bear.

Procedure

The child was told that the teddy bear could not hear very well. The child got to hold the teddy bear, and s/he was instructed to repeat to the bear the sentences that I used to describe the activities on the table. I then placed the props in different positions and described the situations. Two sentences were about the human-like figure (the Playmobile man), eight about the objects with inherent posture (bucket and book), and three were about the objects without inherent posture (the blocks).[23] Some of my utterances correctly reflected the normal adult usage of the six body-posture verbs, but sometimes I deliberately used the "wrong" verb, to see if the child would correct it.

Eleven of the children took part in this study. Two of the youngest children (child A and child B) did not want to participate.

---

[23]All situations with their corresponding sentences are listed in Apppendix 3.

Results

The children tended to repeat the sentences back without changing them, whether or not the body-posture verb was appropriate for the situation.[24] Therefore, it is difficult to draw any conclusions from the results of this task. There are, however, certain tendencies worth noting.

Human intransitives

Two of the thirteen sentences of this task involved intransitives applied to humans. The first one contained *sitta*. As I said this sentence, I pointed to the Playmobile man, who was sitting in the boat. All children correctly included *sitta* in their imitation, except one child, who did not attempt to imitate at all. For the other human intransitive, I said *stå*, while pointing at the man who was lying (not standing) in the boat. This time, the responses were mixed. Seven children immediately repeated back my sentence with *stå*. However, four of these seven children tried to repeat it a second time, and then they changed the verb. Two changed it to the correct *ligga*, one to *sitta* and one to the general *är* 'is'. Three children had changed *stå* to *ligga* in their first attempts at imitation, and one child refused to attempt an imitation.

In sum, only three children accepted the incorrect body-posture verb, six changed it to a correct verb, and one changed it to an incorrect body-posture verb. This contrasts with the sentence with an appropriate body-posture verb. Here, the children repeated the sentence back without changing the verb. This suggests that children have a good sense of what verb goes with what human body-posture.

Inherent posture

A few sentences involved objects with inherent posture, a book and a bucket. Twice the children were asked to repeat a transitive sentence with *lägga*, once while I was laying down the book, and once the bucket. Table 10 show the body-posture verbs included in the children's responses. The category "other" includes instances where a child said nothing at all, or started talking about something else.

[24]This is in fact exactly what the adults did in the parallel study. No matter how inappropriate it was, the adults repeated the sentence back exactly the way I had first said it. After all, the instructions I gave in the beginning of the "game" was to imitate my utterances so that the teddy bear could hear them.

Table 10. Experimenter said and did *lägga*; children's "imitations"[25]

Item	lägga	sätta	ligga	ställa	other
book	7	1	0	0	4
bucket	6	2	1	1	2

The children were more likely to change *lägga* when the object was a bucket, whose canonical position is standing upright, than when it was a book, whose canonical position is lying down (at least when the supporting surface is a table). One child even changed the verb *lägga* to *ställa*, which is the transitive verb normally used for buckets, although it is inappropriate for this situation. No child changed *lägga* to *ställa* when the target object was a book.

The children were also presented with a situation where I used a verb which would be appropriate if the object affected was placed in its canonical position, but where the object was actually placed in a non-canonical position. For the book, I said *lägga*, but I actually stood it up on the table. For the bucket, on the other hand, I said *ställa*, although I laid it on the table. The results are presented in Tables 11 and 12.

Table 11. Experimenter said *lägga* but did *ställa*, children's "imitations"

Item	lägga	ligga	sätta	other
book	6	1	1	3

Table 12. Experimenter said *ställa* but did *lägga*, children's "imitations"

Item	ställa	stå	lägga	other
bucket	8	1	1	2

Tables 11-12 show that the children did not in general react to the fact that what I actually did to the book and the bucket was not compatible with the verbs I used. Most of the children simply repeated back the verbs I had used. Only one of the children that changed the verb, changed it to the appropriate one; this child changed *ställa* to *lägga* in the bucket item.

The results presented in Tables 10-12 are quite subtle, since most children simply imitated my utterance without reflecting on it further. However, the findings are consistent

[25]Recall that although eleven children participated in the task, the total number of responses is not always eleven, since some children gave more than one response and some children did not answer every question.

with the findings of the comprehension task: children pay more attention to the canonical positions of objects than to actual positions.

5.4. Adults

I also gave the same tasks to an additional group of four adults, so as to provide an independent check on the adult criteria for the meanings of the Swedish body-posture verbs. All four adults were native speakers of the same Swedish dialect as the experimenter and the children in the study. The adults' performances were largely identical to the experimenter's , that is, they were as indicated in Appendices 1-3. There are a few differences between the exact adult production responses and the sentences in parentheses in Appendix 1. For example, the adults often used relative clauses. For example, instead of *Gubben står i båten* 'The man stands in the boat', they would sometimes say *Det är en gubbe som står i båten* 'It is a man who stands in the boat'. The children did not do this. Unlike the children, the adults never gave the functions of the objects (such as 'digs' for a shovel) instead of a body-posture verb. In the imitation task, the adults imitated what I said, even when I used an incorrect verb; that is, they followed my instructions exactly. However, they also typically commented afterwards about that it was strange that I used the wrong word, or they would offer a corrected version of the sentence after they had imitated me.

In a few cases, the adults showed inconsistency and confusion, indicating that the specific tasks were badly designed. Not surprisingly, the children also had problems with the same tasks; they mostly refused to answer. Because these tasks proved confusing and unclear for both the adults and the children, they have been excluded from this paper.[26] The items excluded all involved *sitta* for attachment.

5.5. Summary

The frequency count presented in Section 4 led to the prediction that the intransitives are mastered in the following order: *sitta, ligga, stå*, and the transitives in the following order: *sätta, lägga, ställa.* This prediction was supported by both the production and the comprehension task. Among the intransitives, the children performed best on items that involved *sitta*, followed by *ligga* and *stå*, in that order. The best transitive body-posture verb was *sätta*, followed by *lägga* and *ställa.* Note that the order of the transitives mirrors the order of the intransitives. The children had best command of the pair *sitta/sätta,* followed by the pair *ligga/lägga*, followed by *stå/ställa.*

---

[26]The excluded tasks and the adult responses to these tasks are given in Appendix 6.

The children seemed to have a good knowledge of the transitive *sätta* when it was used for clothing. This can be seen in both the production and comprehension tasks. This finding is compatible with the cross-linguistic data presented in Section 3.

The children performed better in tasks that involved intransitive body-posture verbs than in tasks involving transitives. This conclusion can be drawn from the production task, where the children produced more intransitives than transitives (Table 2). The comprehension task provides further evidence for this conclusion. The children showed a better understanding of intransitives than transitives for the sentences that involved humans. The imitation task further supports the finding that the children first acquire a good knowledge of the intransitives, at least when they refer to humans. This finding supports the prediction derived from the Swedish corpus study (Section 4), and runs counter to the prediction based on cross-linguistic observations (Section 3). However, in the production task the two youngest children only produced one verb, the transitive verb *sätta*: these two children did not produce any intransitives. This is consistent with the prediction of Section 3, but not with that of Section 4.

Finally, in both the comprehension and the imitation task the children paid more attention to the canonical position of an object with inherent posture than to the verb in the instruction.

6. Discussion

The experimental data presented in Section 5 has shown that the six body-posture verbs in Swedish are not as easy to learn as the preliminary research in Sections 3 and 4 led us to believe. Not even the oldest children in the study demonstrated adult-like command of these verbs. The children performed best in tasks involving the pair *sitta/sätta*, next best on *ligga/lägga* and least well on *stå/ställa*.[27] The data in this study are not sufficient to establish why this should be the case, but it should be noted that this order does not reflect the overall frequency in adult speech.

There is an interesting asymmetry between the children's performance in tasks with intransitives and tasks with transitives: the children did much better in tasks with intransitives than with transitives. This is problematic for the hypothesis proposed in Bowerman et al. 1995, that children prefer words with richer semantics. Recall that this hypothesis was proposed in order to explain why Korean and Tzotzil children start to use transitive path verbs long before they start to use intransitive ones. Since the Swedish children were better at sorting out the difference between sitting, standing and lying in intransitives than in transitives, we must look for another explanation for the Korean and Tzotzil facts than that given by Bowerman et al. Further evidence that Bowerman et al.'s hypothesis is not correct comes from Clark and Guernica 1974. They found that the intransitive deictic verbs 'to come' and 'to go' are easier for children to comprehend than their transitive counterparts 'to bring' and 'to take'. This follows from the hypothesis of Clark 1973, that more complex words (words that involve more semantic features or more thematic roles) are harder for children to handle than less complex ones; a conclusion which seems intuitively correct. Why then do my two youngest subjects produce only *sätta*, which is transitive, but not any intransitives? Further research is needed to provide a definite answer for this question. However, research on preverbal infants shows that very young children pay attention to the motion of objects (Mandler 1996), and studies on early child language find that early comments on space often concern motion (Bowerman 1996). My guess is that since motion is something babies like to look at, it is also something that they want to talk about. Therefore one of the first body-posture verbs learned may be one that involves motion, such as transitive *sätta*. However, the meaning that the baby attaches to this word may be something as simple as 'someone causes an object to move' or 'something moves'. The matter becomes more complex when the child has to sort out the more fine-grained lexical differences that involve the posture of a person or an object. If

[27]This appears to be the order of acquisition in English and Korean children, too.

we hypothesize that concentrating on one issue at the time facilitates children's learning of the lexicon, it follows that the distinctions among sitting, standing and lying should be learned for intransitives before they are learned for transitives. When learning intransitive body-posture verbs, the child only has to concentrate on which position the object is in, whereas learning the transitives in addition involves distinguishing between the mover and the moved object, and also knowing which participant's posture that must be taken into account. This hypothesis, if correct, might explain why children start using a transitive (Swedish *sätta*, or the Korean and Tzotzil path verbs) before intransitives, but at the same time, they show they can distinguish between the three intransitives before they distinguish between the three transitives in Swedish.

The specific body-posture verb the that proved the easiest for the children was *sätta* as used for putting on clothes. It appears to be cross-linguistically true that children learn the words for the act of putting on clothing at an early stage. The reason for this might simply be that children get dressed and undressed every day, and since caretakers often talk to children about the here and now, they may refer rather frequently to the act of getting dressed.

The children who participated in the experiment paid closer attention to the canonical position of objects than to the actual position of the object. This can be seen as evidence for a general learning strategy in children: when trying to figure out what a specific word means or what they are supposed to do in a certain situation, they draw upon their general knowledge of the world. Part of that knowledge is awareness of the canonical positions of objects. When responding to an instruction, children thus seem to rely more upon an evaluation of what is reasonable or normal in a given situation, than on what is actually said. Recall that the children were better at distinguishing between the three body-posture verbs when the objects involved did not have an inherent posture and no canonical position. That is, the children do better when they can concentrate only on what is being said, and when they are not distracted by non-linguistic knowledge about what would be "normal" in a situation. For example, the normal position of a bucket is standing up. Blocks are not associated with a canonical position, so everyday knowledge about blocks is no distraction for children when the task regards blocks. These findings support the hypothesis of Grieve et al. 1977 (this study was briefly mentioned in Section 5). They argue that the young child's comprehension of instructions involves an interaction between the instruction's linguistic meaning and the child's construal of context.

Here, I would like to make a couple of general remarks about what the results of this study tells us about child language experiments in general. First, recall that the children were quite good at distinguishing between *sitta*, *stå* and *ligga*, but they were not

good at distinguishing between the transitive *sätta, ställa* and *lägga.* If only the transitives had been examined, the conclusion would have been that the children have not yet learned how to distinguish between the three different body-postures. However, we know that such a conclusion would not have been correct since we also considered data on the intransitives. Second, the children paid more attention to canonical position than to actual position. If the experiment had not invoved tasks where objects were placed in their non-canonical position, the children would have performed much better, and we would have concluded that their knowledge of the body-posture verbs was much better than it actually is.

Finally, has this study helped us to gain any insight into the question posed in the beginning: whether or not children map the spatial words they hear directly onto prelinguistic spatial categories? The conclusion we have to draw from the results of this study is that even though children do know a lot about spatial organization before they start to speak (Mandler 1996), the connections between this non-linguistic knowledge and its representation in language take a long time to establish. One interesting thing to consider is the asymmetry between the intransitive and the transitive body-posture verbs. Even when children know that Swedish distinguishes among sitting, standing and lying (shown by the fact that they distinguish among the three intransitives), and that Swedish also distinguishes between intransitives and transitives, they do not distinguish between the three transitive verbs *sätta, ställa,* and *lägga.* This indicates that when children learn the spatial vocabulary of their language, there are other factors involved in addition to mapping pre-linguistic knowledge and the relevant words in the input. Some relevant factors are familiarity (for example, *sätta* in clothing situations is very familiar to the children), complexity (the fact that transitives are learned after intransitives because they may be more complex than the intransitives), and frequency. Some pragmatic factors may also be involved; the canonical vs. non-canonical position results of this study suggest that words that occur in situations that are easily analyzed and made sense of, might be easier to understand and use than words that occur in less usual situations. This suggests that Bowerman is right in arguing that learning the spatial system of a language involves many complications, and cannot be seen as a simple mapping onto pre-linguistic concepts. This should not come as a surprise, since we already know that languages differ vastly with respect to their lexicon. There are therefore many different hypotheses that a child could come up with before fixing on the correct one.

Appendix 1. Production

Listed below are all the scenarios displayed in the production task. Following each scenario, the adult answer is given in parentheses.

CLOTHING

transitive: (1) Experimenter puts a shirt on. (Ida sätter på sig skjortan.
I. put on self shirt)

(2) Experimenter puts a hat on the man. (Ida sätter hatten på gubben
I. put hat-the on man-the)

(3) Experimenter puts a cap on Tigger. (Ida sätter mössan på Tigger.
I. put cap-the on T.)

HUMAN

intransitive: (4) The man is standing in the boat. (Gubben står i båten.
man-the stand in boat-the)

(5) The man is sitting in the boat. (Gubben sitter i båten.
man-the sit in boat-the)

(6) The man is lying in the boat. (Gubben ligger i båten.
man-the lie in boat-the)

transitive: (7) Experimenter puts the baby in the boat, so that the baby is lying down.
(Ida lägger barnet i båten.
I. lay child-the in boat-the)

(8) Experimenter puts the man in the boat, so that the man is sitting down.
(Ida sätter gubben i båten.
I. set man-the in boat-the)

(9) Experimenter puts the baby in the boat. so that the baby is standing up.
(Ida ställer barnet i båten.
I. stand child-the in boat-the)

OBJECTS WITH INHERENT POSTURE

intransitive: (10)The book is standing upright on the table. (Boken står på bordet.
book-the stand on table-the)

(11) The shovel is standing in the bucket. (Spaden står i hinken.
shovel-the stand in bucket)

(12) The book is lying on the table. (Boken ligger på bordet.
book-the lie on table-the)

(13) The shovel is lying on the table. (Spaden ligger på bordet.
shovel-the lie on table-the)

transitive: (14) Experimenter puts the bucket on the table, so that it is standing.
(Ida ställer hinken på bordet.
I. stand bucket-the on table)

(15) Experimenter puts bucket on table, so that the bucket is lying down.
(Ida lägger hinken på bordet.
I. lie bucket-the on table-the)

OBJECTS WITHOUT INHERENT POSTURE

intransitive: (16) The rectangular solid is standing upright on the table.
(Klossen ligger på bordet.
block-the lies on table-the)

(17) The rectangular solid is lying down on the table.
(Kossen ligger på bordet.
block-the lie on table-the)

(18) The cube is on the table. (Klossen står på bordet
block-the stand on table-the)

(19) Experimenter puts the rectangular solid on the table, so that it is standing upright.
(Ida ställer klossen på bordet.
I. stand block-the on table-the)

(20) Experimenter puts the rectangular solid on the table, so that it is lying down.
(Ida lägger klossen på bordet.
I. lay block-the on table)

(21) Experimenter puts the cube on the table.
(Ida ställer klossen på bordet.
I. stand block-the on table-the)

Appendix 2. Comprehension
The children were presented with the sentences below.

CLOTHING
transitive: (1) (CHILD[28]) sätter mössan på gubben.
set cap-the on man-the

HUMAN
intransitive: (2) Gubben står i båten.
man-the stand in boat-the

(3) Gubben sitter i båten.
man-the sit in boat-the

(4) Gubben ligger i båten.
man-the lie in boat-the

transitive: (5) (CHILD) ställer gubben i båten.
stan man-the in boat-the

(6) (CHILD) sätter gubben i båten.
set man-the in boat-the

(7) (CHILD) lägger gubben i båten.
lay man-the in boat-the

INHERENT POSTURE
intransitive: (8) Boken står på bordet.
book-the stand on table-the

(9) Hinken står på bordet.
bucket-the stands on table-the

(10) Boken ligger på bordet.
book-the lie on table-the

(11) Hinken ligger på bordet.
bucket-the lie on table-the

transitive: (12) (CHILD) ställer boken på bordet.
stand book-the on table-the

(13) (CHILD) ställer hinken på bordet.
stand bucket-the on table-the

(14) (CHILD) lägger boken på bordet.
lay book-the on table-the

(15) (CHILD) lägger hinken på bordet.
lay bucket-the on table-the

(16) (CHILD) sätter boken på bordet.
set book-the on table-the

---

[28]The name of each child inserted here.

(17) (CHILD) sätter hinken på bordet.
set bucket-the on table-the

NO INHERENT POSTURE
intransitive: (18) Klossen står på bordet.
block-the stand on table-the

(19) Klossen ligger på bordet.
block-the lie on table-the

transitive: (20) (CHILD) ställer klossen på bordet.
stand block-the on table-the

(21)(CHILD) lägger klossen på bordet.
lie block-the on table-the

(22) (CHILD) sätter klossen på bordet.
set block-the on table-the

Appendix 3.
Listed below are the sentences the children were presented with for the imitation task. Where the utterances given by the experimenter used the incorrect verb, I have corrected the correct verb in parentheses.

HUMAN
intransitive: (1) * Gubben ligger i båten. (correct: *stå*)
man-the lie in boat-the

(2) Gubben sitter i båten.
man-the sit in boat-the

OBJECTS WITH INHERENT POSTURE
intransitive: (3) Spaden står i hinken.
shovel-the stand in bucket-the

(4) * Boken sitter på bordet. (correct: *ligga*)
book-the sit on table-the

transitive: (5) * Ida ställer hinken på bordet. (correct: *lägga*)
I. stand bucket-the on table-the

(6) * Ida sätter hinken på bordet[29]. (correct: *ställa*)
I. set bucket-the on table-the

(7) * Ida sätter hinken på bordet. (correct: *lägga*)
I. set bucket-the on table-the

(8) Ida lägger hinken på bordet.
I. lay bucket-the on table-the

(9) Ida lägger boken på bordet.
I. lay book-the on table-the

(10) * Ida lägger boken på bordet. (correct: *ställa*)
I. lay book-the on table-the

OBJECTS WITH NO INHERENT POSTURE
intransitive: (11) Klossen står på bordet.
block-the stand on table-the

(12) * Klossen står på bordet. (correct: *ligga*)
block-the stand on table-the

(13) * Klossen sitter på bordet. (correct: *ligga*)
block-the sit on table-the

---

[29]As mentioned in Section 2, it is not ungrammatical to use the verb *sätta* in transitive clauses like (6) and (7). However, in these sentences, *ställa* and *lägga* are more idiomatic.

Appendix 4. Production results

The numbers in parentheses after the verbs in the table refers to Appendix 1, where the exact situations used for each elicitation is listed.

Table 1. CLOTHING

Target BP verb	Correct BP verb		Incorrect BP verb		Other[30]	
sätta (123)	28	78%	0	0%	8	22%

Table 2. HUMAN

Target BP verb	Correct BP verb		Incorrect BP verb		Other	
stå (4)	7	58%	0	0%	5	42%
sitta (5)	5	42%	0	0%	7	58%
ligga (6)	8	67%	1 sitta	8%	3	25%
ställa (7)	0	0%	4 stå 3 sätta 1 sitta 1 ligga	69%	4	31%
sätta (8)	6	40%	6 sitta	40%	3	20%
lägga (9)	0	0%	6 sätta 1 sitta 1 ligga 1 sätta å ligga[31]	75%	3	25%

Table 3. OBJECTS WITH INHERENT POSTURE

Target BP verb	Correct BP verb		Incorrect BP verb		Other	
stå (10)	4	33%	0	0%	8	67%
stå (11)	0	0%	1 lägga å hänga[32] 8%		11	92%
ligga (12)	1	8%	1 stå	8%	10	83%
ligga (13)	3	25%	0	0%	9	75%
ställa (14)	0	0%	7 sätta 1sitta	67%	4	33%
lägga (15)	0	0%	4 sätta 1 ligga 1 sätta å ligga	50%	6	50%

[30]"Other" includes responses without a body-posture verbs (e.g. *Där!* 'there'), as well as no response at all.
[31]Sätta å ligga =set to lie
[32]Lägga å hänga = lay to hang

Table 4. OBJECTS WITHOUT INHERENT POSTURE

Target BP verb	Correct BP verb		Incorrect BP verb		Other	
stå (16)	5	42%	0	0%	7	58%
ligga (17)	2	15%	2 stå	15%	9	75%
stå (18)	4	33%	1 sitta	8%	7	58%
ställa (19)	0	0%	5 sätta 1 stå 1 sätta å stå 1 lägga å stå	67%	4	33%
lägga (20)	2	17%	6 sätta 1 sätta å ligga	58%	3	25%
ställa (21)	0	0%	7 sätta 1 lägga å stå	67%	4	33%

Appendix 5. Comprehension results

Table 5. CLOTHING

Target BP Verb	Correct BP verb		Incorrect BP verb		Other	
sätta (1)	13	100%	0	0%	0	0%

Table 6. HUMAN

Target BP Verb	Correct BP verb		Incorrect BP verb		Other	
stå (2)	11	85%	2 sitta	15%	0	0%
sitta (3)	11	85%	1 stå 1 ligga	15%	0	0%
ligga (4)	12	92%	1 stå	8%	0	0%
ställa (5)	4	29%	10 lägga	71%	0	0%
sätta (6)	6	46%	4 lägga 3 ställa	54%	0	0%
lägga (7)	11	85%	2 ställa	15%	0	0%

Table 7. INHERENT POSTURE

Target BP Verb	Correct BP verb		Incorrect BP verb		Other	
stå (8)	3	23%	10 ligga	77%	0	0%
stå (9)	11	85%	2 ligga	15%	0	0%
ligga (10)	12	92%	1 stå	8%	0	0%
ligga (11)	8	57%	5 stå	36%	1	7%
ställa (12)	5	38%	8 lägga	62%	0	0%
ställa (13)	13	93%	1 lägga	7%	0	0%
lägga (14)	11	85%	2 ställa	0%	0	0%
lägga (15)	5	33%	10	66%	0	0%
sätta (16)	11 lägga 2 ställa	100%	0	0%	0	0%
sätta (17)	12 ställa 1 lägga	93%	0	0%	1	7%

Table 8. NO INHERENT POSTURE

Target BP Verb	Correct BP verb		Incorrect BP verb		Other	
stå (18)	9	69%	3	23%	1	7%
ligga (19)	7	54%	5	38%	1	7%
ställa (20)	10	77%	3	23%	0	0%
lägga (21)	9	69%	4	31%	0	0%
sätta (22)	6 ställa 6 lägga	92%	0	0%	1	7%

Appendix 6.
Listed below are the items that were excluded from the tasks, because the adults gave inconsistent answers to these items. Three of the excluded items were from the set of production tasks, two from the set of comprehension tasks and one from the set of imitation tasks.

Production:
(i) A spoon is put through the handle of a cup.
(ii) A hat is placed on the head of the playmobile man.
(iii) A knife is in the Playmobile man's hand.

Expected body-posture verb: *sitta*

Verbs in adult answers:
(i) *är* 'is', *ligger* 'lies'
(ii) *är* 'is, *har* 'has' (the man has the hat on his head)
(iii) *är* 'is', *hålls* 'is held', *ligger* 'lies', *står* 'stands'

Comprehension:
(i) Kniven sitter i handen. 'A knife sits in the hand'.
(ii) Mössan sitter på gubbens huvud. 'A hat sits on the hand of the man.'

The adults performed correctly on these, put since they did not use the verb *sitta* in the similar production sentences, theses items could not be taken to be good tests for an understanding of *sitta*, and they were therefore excluded.

Imitation

(i) Kniven står i handen på gubbben.
Correct body-posture verb (according to experimenter): *sitta.*

This item was excluded, because two of the adults made clear that they thought it was incorrect, but in their corrected version, they had changed the whole sentence to 'the man holds the knife in his hand' rather than changing the verb to *sitta*. Also, in the parallel production sentence, one adult spontaneously used the vertb *stå*.

Bibliography

ALLÉN, STURE. 1972. *Tiotusen i topp: ordfrekvenser i tidningstext.* Stockholm: Almqvist & Wiksell.

BERENTHAL, BENNETT. 1993. Infants'perception of biomechanical motions: Intrinsic image and knowledge-base constraints. In C. Granrud (ed.), *Visual perception and cognition in infancy*, 175-214. Hillsdale, NJ: Erlbaum.

BOWERMAN, MELISSA. 1996. Learning how to structure space for language: A crosslinguistic perspective. In Paul Bloom et. al. (eds), *Language and Space*.. Cambridge, Mass: MIT Press.

BOWERMAN, MELISSA; L DE LÉON; and SOONJA CHOI. 1995. Verbs, particles, and spatial semantics: Learning to talk about spatial actions in typologically different languages. In E.V. Clark (ed.), *Proceedings of the Twentieth-seventh annual Child Language Research Forum*, 101-110. Stanford, CA: Center for the Study of Language and Information.

BOWERMAN, MELISSA AND SOONJA CHOI. 1994. Linguistic and nonlinguistic determinants of spatial semantic development. Paper presented at the BU Conference on Language Development, January.

BROWN, PENELOPE. 1993. The role of shape in the acquisition of Tzeltal (Mayan) locatives. In E.V. Clark (ed.) *Proceedings of the Twenty-fifth Annual Child Language Research Forum.* Stanford, CA: CSLI.

CAREY, SUSAN. 1994. Does learning a language require the child to reconceptualize the world? *Lingua*, 92, 143-167.

CEDERSCHIÖLD,VILHELM. 1944. *Barnspråk.* Stockholm: Wahlström och Widstrand.

CHOI, SOONJA, and MELISSA BOWERMAN. 1991. Learning to express motion events in English and Korean: The influence of language-specific lexicalization patterns. *Cognition*, 41, 83-121.

CLARK, EVE. 1973. Non-linguistic strategies and the acquisition of word meaning. *Cognition*, 2, 161-182.

CLARK, EVE AND OLGA GARNICA. 1974. Is he coming or going? On the acquisition of deictic verbs. *Journal of verbal learning and verbal behavior*, 13, 559-572.

GRIEVE, ROBERT; ROBERT HOOGENRAAD, AND DIARMID MURRAY. 1977. On the young child's use of lexis and syntax in understanding locative instructions. *Cognition*, 5, 235-250.

GENTNER, DEDRE, AND MUTSUMI IMAI. A further examination of the shape bias in early word learning. In E.V. Clark (Ed.) *Proceedings of the Child Language Research Forum*, 167-176. Stanford, CA: CSLI.

HANSEN, ERIK. 1974. Stå, sidde, ligge. *Mål &Male 2*. University of Copenhagen.

OOSTEN, JEANNE VAN.1985. Sitting, standing and lying in Dutch: A cognitive approach to the distribution of the verbs Zitten, Staan, and Liggen. Dutch Linguistics at Berkeley. Berkeley, CA.

LANDAU, BARBARA; L.SMITH, AND S JONES. 1988. The importance of shape in early lexical learning. *Cognitive Development*, 3, 299-321..

LESLIE, ALAN M. 1984. Infant perception of a manual pick-up event. British Journal of Developmental Psychology, 2, 19-32.

MANDLER, JEAN. 1996. Preverbal representation and language. In Paul Bloom et al. (eds.), Language and space. Cambridge, Mass: MIT Press.

PINKER, STEVEN. 1984. *Language learnability and language development.* Cambridge, MA: Harvard UP.

PLUNKETT AND STRÖMQVIST, SVEN. 1992. Markus, Eva. CHILDES.

STRÖMQVIST, SVEN ET Al. 1993. Anton, Harry. CHILDES.

TOIVONEN, IDA. 1996. Swedish verbs of placement. Ms, Stanford University.

QUINE, WILLARDVAN ORMAN. 1960. *Word and object.* Cambridge, Mass: MIT Press.

VIBERG, ÅKE. 1985. Lexical andraspråksinlärning: Hur polsk-, spansk-, och finskspråkiga lär in svenskans placeraverb. In: *SUM-rapport 2.* Centre for Research on Bilingualism. Stockholm: Stockholms universitet.

VIBERG ÅKE. 1993.Crosslinguistic perspectives on lexical organization and lexical progression. In: Hyltenstam, Kenneth and Åke Viberg (eds.), *Progression & regression in language*, 340-385. Cambridge university press.

WILCOX, STEPHEN AND DAVID S. PALERMO. 1974. *In, on,* and *under* revisited. *Cognition*, 3(3), 245-254.