

The Role of NP Animacy and Expletives in Verb Learning

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Running Head: NP Animacy and Expletives in Verb Learning

Abstract

I describe the results of an experiment that bears on how children learn the lexical and syntactic properties of abstract verbs (*seem*, *try*) in order to distinguish the subclasses of raising (*seem*) and control verbs (*try*). Previous research suggested that an inanimate subject in certain contexts leads children to suppose that the subject and main verb are not thematically related, and thus that the verb is a raising verb. Here I address two alternative possibilities. One possibility is that children lack the adultlike restriction that subject and verb must match in animacy, which I counter with evidence from the developmental literature. The other possibility, addressed by the experiment, is that children's control verbs are thematically related to their subject but do not require the subject to be animate. I will argue, instead, that the presence of an expletive/inanimate subject coerces a raising analysis of the verb, and a concomitant "bleached" semantics of the verb in that context.

The Role of NP Animacy and Expletives in Verb Learning

1. Introduction

This brief article concerns the role of certain semantic properties in nouns, specifically animacy and referentiality, in children's learning of verb meanings. The literature on children's early knowledge of animacy shows that children place adult-like restrictions on noun-verb combinations and therefore can use information from NP (Noun Phrase) animacy to make judgments about the semantic well-formedness of linguistic expressions. A novel experiment shows that at ages 3 and 4 children can use non-referential NPs as a clue to the thematic properties of abstract verbs.

Following upon Landau & Gleitman (1985) and Gleitman (1990), much work in the verb learning literature points to children's exploitation of regularities in the syntax-semantics mapping in language in forming hypotheses about the meanings and lexical characteristics of verbs. This strategy is plausible because the number and category of a verb's arguments constrain what a verb is likely or unlikely to mean. In effect, children assume that a 1-place predicate could mean something like 'sleep' but is unlikely to mean 'hit' or 'give', a 2-place predicate could mean 'hit' but is unlikely to mean 'sleep' or 'give', and a 3-place predicate could mean 'give' but is unlikely to mean 'sleep' or 'hit' (Goldin-Meadow & Mylander 1984, Landau & Gleitman 1985, Naigles et al. 1993, Gleitman & Newport 1995, Fisher, Gleitman & Gleitman 1991, among many others). This approach to children's verb learning is known as the syntactic bootstrapping hypothesis.

Crucially, in exploiting these regularities children assume that the NPs adjacent to a verb are the verb's arguments. This assumption is a safe one in most cases, but not in all cases: not all linearly adjacent relations are thematic, and not all thematic relations are linearly adjacent. That is, children have to handle long-distance thematic dependencies in language. One construction in

which linear adjacency is not a reliable indicator of thematic relations is the Raising-to-Subject construction, illustrated in (1).

(1) John_i seems [*t_i* to be clever]

In the raising construction, the subject *John* is not an argument of *seem* (John is not a “seemer”). Rather, *John* is the thematic subject only of the lower predicate, *be clever*. But there are other constructions that are similar on the surface in which the verb and subject *are* thematically related. For example, in a control sentence, such as (2), the subject *John* is an argument of the verb *claim* (John is a “claimer”).

(2) John_i claims [PRO_i to be clever]

Assuming that children do not have prior knowledge of the lexical meanings of verbs in these contexts (e.g. *seem*), the question is how a learner could determine whether an adjacent NP is in fact thematically related to the verb. In turn, knowing this would help a learner distinguish the class of verbs like *seem* (raising verbs) from the class of verbs like *claim* (control verbs).

In addition to the number of NP arguments of a verb, the meanings of those NPs can provide some information about the likely meaning of a verb (Bowerman 1973, Pinker 1996) (this is related to the semantic bootstrapping hypothesis). In fact, certain semantic properties are associated with certain argument positions crosslinguistically. There is a general tendency in languages for the following associations to hold: NP subjects of transitive verbs are agentive and animate (Keenan 1976); NPs having an agent role are subjects and are animate (Dowty 1991); and animate NPs are subjects and take an agentive role (Clark & Begun 1971). The strength of these associations depends to a large degree on the predicate in the clause. The large majority of English verbs either require or permit an animate subject, but very few prohibit an animate

subject (*arise, subtend, coagulate*). Psycholinguistic evidence from adults suggests that these tendencies are represented in the minds of speakers (Clark & Begun 1971).

If animate subjects tend to be agentive arguments, perhaps *inanimate* subjects suggest a nonargumental (nonthematic) relationship between subject and verb in certain types of sentences.¹

2. Background

Two previous experiments, one with adults and one with children, showed that inanimate subjects trigger the supposition of a raising verb given a particular sentence frame. In the study with adults (Becker 2005), participants filled in a blank with a plausible verb, as in (3) and (4).

(3) The salesman _____ to advertise an interesting new product. (animate subject)

(4) The banner _____ to advertise an interesting new product. (inanimate subject)

Animacy was manipulated across conditions, and participants' written responses were categorized. The main result of interest was that participants completed the sentence with a raising verb (e.g., *seem*) significantly more frequently when the subject was inanimate than when it was animate (43.8% vs. 18.8%). Conversely, participants wrote a control verb (e.g., *try*) significantly more when the subject was animate than when it was inanimate (52.5% vs. 17.5%). (Please see Becker 2005 for a discussion of other types of responses.) Thus, animacy of the subject in these sentence frames had a large effect on adults' interpretation of the missing verb as being thematically related or unrelated to the subject.

An experiment with children showed that young children likewise make use of subject animacy in determining whether a verb is thematically related to the subject or not (Becker 2006). Children ages 3 to 5 years were asked to judge the acceptability of utterances (spoken by a puppet) in which the subject was *inanimate* and the main verb was either a raising or a control

verb (e.g., *The door is trying to be purple*; *The hay seems to be on the ground*). Since control verbs nearly always select an animate subject, sentences with a control verb should have been judged as silly (not acceptable), while sentences with a raising verb should have been judged as OK as long as the predicate in the lower clause was semantically plausible.

(5) #The door is trying to be purple/be friendly

(6) The hay seems to be on the ground/#be excited

The result of this experiment was that the youngest children (3- and some 4-year-olds) tended to accept sentences or reject them based solely on whether the lower predicate was semantically compatible with the subject: they accepted sentences with a compatible lower predicate (*be purple/be on the ground*) but rejected sentences with an incompatible lower predicate (*be friendly/be excited*), regardless of main verb type. (Five-year-olds gave mostly adult-like judgments, rejecting sentences with control verbs.) Notice that if we replace *try* with *seem* the sentences can be judged for acceptability simply by the lower predicate (*The door seems to be purple/#be friendly*). The explanation offered in Becker (2006) is that children are biased to assume that verbs in this sentential context are raising verbs. However, this explanation is actually rendered unlikely by a further experiment described in Becker (2006), which showed that when used with an animate subject, 3-year-olds appropriately analyze verbs like *try* as control verbs. Here I will argue, instead, that it is the presence of an inanimate subject that coerces a raising analysis of these verbs. But let us consider two other possibilities:

- i. Hirsch & Wexler (2007) suggest that children's responses in the experiment above are driven by their non-adultlike concepts of animacy. That is, young children either believe that inanimate things are alive or sentient, or they at least permit subjects and predicates to clash in their animacy values.

ii. Like adults, children analyze verbs like *try* as being control verbs, but, unlike adults, children's control verbs do not place an animacy requirement on their subject. Thus, in a sentence like *The door is trying to be purple* the control verb *try* selects (and assigns a theta role to) the subject *door*.

While it is well known in the field of psychology that preschool-aged children have adult-like concepts of animacy, and therefore can distinguish conceptually between living and nonliving things from a very young age, this fact is not as widely known in the linguistics community. At least, the alternative explanation offered by Hirsch & Wexler (2007), above, is frequently suggested to me by other colleagues in the field of linguistics. Thus, it seems worthwhile to review evidence that bears on children's non-linguistic and linguistic restrictions on animacy.

3. Children's Knowledge of Animacy Restrictions

The literature on infants' and children's development of the concept of animacy is vast, and it is far beyond the scope of this article to review all of it (see Gelman & Opfer 2002 for a good overview). Instead, I will highlight only a few relevant studies. Regarding children's nonlinguistic concepts of animacy, work by Ball (1973), Carey (1985), Gelman (1990), and Woodward et al. (1993) has shown that infants as young as 7 months of age have correct expectations about the physical properties of living and nonliving things. For example, they show surprise (indicated by longer looking times) when an inanimate thing moves spontaneously (that is, without being pushed by another object). But infants do not hold this expectation of humans: they show no surprise when a human moves spontaneously. Legerstee (1994) showed that even 4-month-olds respond differently when an inanimate object or a person goes behind an obstructing door. For inanimate objects, 4-month-olds touched the door; for people, the infants vocalized to the person. Other evidence suggests that even younger infants and neonates show differential

behavior towards people vs. dolls (Legerstee, et al. 1987), and drawings of faces vs. drawings of non-faces (Fantz, et al. 1975).

Massey & Gelman (1988) showed that preschoolers make a mostly adultlike distinction between animate and inanimate things in judging what objects or animals are capable of doing. Massey & Gelman asked 3- and 4-year-olds to judge whether a number of depicted objects (including mammals, non-mammals, statues of animals, wheeled vehicles and rigid objects) could move up or down a hill by themselves. Both 3- and 4-year-olds said that mammals and non-mammals could move up or down a hill by themselves, that statues of animals and rigid objects could do neither, and that wheeled vehicles could not go uphill by themselves. Interestingly, the large majority of the children's nonadult-like answers involved judging that animals could *not* go up the hill (as opposed to judging that nonliving things *could* go up the hill by themselves). In some cases it was because the child judged the animal to be too small to go up a big hill; in other cases it was because the animal's feet were not shown in the picture.

Many of the children's justifications of their responses in the Becker (2006) experiment also indicated an adult-like understanding of animacy. Some examples of children's appropriate justifications are given in (7).

- (7)
- a. *The bucket wants to play in the sandbox*: "Buckets don't have feet" (3;10)
 - b. *The flower wants to be pink*: "Flowers don't talk" (4;0)
 - c. *The basket appears to be hungry*: "It doesn't have a mouth" (3;10)
 - d. *The paint is trying to drip on the ground*: "OK, because paint is messy" (*E: Could the paint try to drip on the ground?*) "Yes ... actually no, paint doesn't try, it just drips" (4;3)

In addition to establishing that children at this age have the relevant *concepts*, we want to know whether they have the same *linguistic* restrictions as adults. That is, children may know conceptually that animate things are capable of self-propelled motion while inanimate things are

not, but they may not have yet acquired the relevant grammatical restrictions on the pairing of subjects and predicates on the basis of animacy. Children might allow inanimate subjects to be paired with animate predicates for at least two reasons. One is that they might not limit subjects of transitive verbs to agent roles (i.e., they are more permissive than adults regarding the subject category). Another is that they might not limit animate predicates to requiring animate subjects (i.e., they are more permissive than adults regarding predicate meanings).

Some evidence that preschool-aged children are in the process of developing these linguistic restrictions comes from a study by Gelman & Koenig (2001). Gelman and Koenig were interested in knowing whether preschoolers would prefer an inanimate referent to be the patient subject of the verb *move* when the verb was used intransitively. The verb *move* can be either transitive or intransitive (*The girl moved the rock; The rock moved*). When it is transitive, typically the subject is animate and the object inanimate. When it is intransitive, an animate subject is typically an agent (*The girl moved (across the yard)* means the girl moved by herself), while an inanimate subject is typically a patient (*The rock moved (across the yard)* means someone moved the rock; thus, the rock's movement was caused by an external force). In Gelman and Koenig's experiment, children were shown videos of animals or toys either moving on their own, being carried from one location to another (while not themselves moving) or not moving at all. Gelman and Koenig found that 5-year-olds and adults were significantly more likely to say that a toy moved in a caused motion situation than that an animal moved in the same caused motion situation (being carried by a hand). Three-year-olds, however, did not show a significant difference between toys and animals in this condition. Thus, the older participants were reluctant to allow an animate referent to be the patient subject of intransitive *move*, but younger participants did not have a significant bias.

It is worth noting that although the younger children did not show a significant difference between the two types of object being moved, their responses did show a clear trend in the same direction as the older children and adults. Moreover, it should be kept in mind that the question

posed was ambiguous: *Is X moving?* could be correctly answered ‘yes’ or ‘no’ in the caused motion condition. Thus, it is possible that the 3-year-olds in this experiment failed to reach significance not because they have different grammatical requirements from the older children, but because they were thrown off by the ambiguity of the question.

Evidence suggesting that preschoolers *do* apply adult-like animacy restrictions to subject-predicate pairings comes from work by Keil (1979), who showed that by age 4 children could correctly reject sentences that applied animate properties to inanimate subjects (e.g., *The chair is asleep*). In addition, Lempert (1989) showed that preschoolers’ syntactic category of “subject” is heavily tied to animacy.

In sum, preschool-aged children have not only an adult-like concept of animacy, but also adult-like linguistic restrictions on the pairing of animate and inanimate subjects and predicates. Thus, the claim that preschoolers accept sentences like *The door is trying to be purple* because they think that doors are alive or that *door* could be the subject of *try* is unlikely to be correct.

4. Experiment: Expletives and Argument Selection

The experiment from Becker (2006) showed that children younger than 5 years permit control verbs to occur with inanimate subjects. In section 3 we ruled out the explanation based on allowing non-adult pairings of inanimate subjects and animate predicates generally. The possibility remains that children analyze verbs like *try* as control verbs but do not assume these verbs place an animacy restriction on their subject. That is, perhaps for them *try* selects its subject argument but does not require it to be animate. If this is the correct analysis of the result, then children of the same age should not permit control verbs to occur with expletive subjects (e.g., *it*, *there*). The reason is that expletive subjects cannot bear a thematic role. Therefore, when an expletive occurs it is necessarily the case that its position in the sentence has *not* been assigned a thematic role (i.e., it has not been selected by the verb). Only raising and weather predicates permit expletive subjects, as shown in (8).²

- (8) a. It is raining.
b. There seems to be a problem.
c. *It/there left.³
d. *There tried to be a problem.

The primary distinction between raising and control verbs lies in the fact that control verbs, but not raising verbs, assign a thematic role to their subject (control verbs select their subject while raising verbs do not). Therefore, if a verb permits an expletive in its subject position, as in (9), the verb must be a raising predicate.

- (9) It verbed to be raining/There verbed to be a problem.

The following experiment tested children's tolerance for expletive *it* subjects with control verbs. If children reject sentences with a control verb and an expletive subject (**It tried to rain*), then we can conclude that children's control verbs, like those in adult grammar, assign a thematic role to their subject. If, on the other hand, children accept these sentences, this would suggest that children allow these verbs to behave as raising verbs, such that they permit an expletive subject.

Forty-eight children ages 3- and 4 years old participated. There were 24 3-year-olds (mean age 3;6, range 3;3-3;11, 10 males and 14 females) and 24 4-year-olds (mean age 4;5, range 4;0-4;11, 11 males and 13 females). Participants were not screened for hearing or cognitive deficits, but according to parental report all were developing typically, were exposed only to English (or other languages only minimally), and had no difficulties with language.

4.1 Procedure

This experiment was a grammaticality judgment task. Children were shown a series of cartoon pictures of weather events and were asked to judge Marvin the Monkey's (a hand puppet's) comment about each picture as being either OK (grammatical) or silly (ungrammatical).

Two lists were created, and each child received one list of sentences. Each list contained four test sentences, two with raising verbs and two with control verbs, and filler sentences interspersed. Example test sentences are given in (10); a complete list is available in the appendix (<http://www.unc.edu/~mbecker/LABAappendix.html>). All of the pictures, including those for filler sentences, depicted outdoor scenes or weather events.

- (10) a. It seems to be snowing. (raising)
b. It's trying to be sunny. (control)

The filler sentences were structured so as to ensure against 'yes' or 'no' biases (see Appendix). Data from children who were incorrect on two or more fillers were discarded (N=5).

4.2 Results

Table 1 shows children's mean percentage of "OK" responses (the proportion of the time they accepted these sentences), according to verb type.

Table 1 about here

For half of the sentences an "OK" response was correct, and for half of the sentences a "silly" response was correct. Therefore, a plausible assumption is that chance is 50%. Children's "OK" and "silly" responses were analyzed using a logistic regression adjusted for multiple observations within participants. For all contrasts of interest, a Wald's chi-square value associated with the logistic regression was calculated. For both age groups, mean "OK" responses to items

with raising verbs are significantly above chance (for 3-year-olds, chi-square = 11.96, $p < .01$, $df = 1$; for 4-year-olds, chi-square = 23.19, $p < .01$, $df = 1$). For the items with control verbs, the 3-year-olds are above chance at the .05 level in their OK responses (chi-square = 4.82, $p = .03$, $df = 1$), and the 4-year-olds are almost, but not quite, significantly above chance (chi-square = 3.46, $p = .06$, $df = 1$).⁴ An overall test of equality of the means was significant (Wald's chi-square = 10, $p = .02$).

However, it is also possible that chance is not exactly 50%, since the semantic match between the depicted weather event in the cartoon (e.g. rain falling) and the embedded proposition in the sentence (e.g. "to be raining") may have led children to answer "OK" on the basis of this match. In this case, chance cannot be determined. Therefore, children's mean responses to raising items and control items were also compared to each other. A comparison between raising and control verbs within age groups revealed a significant difference for the 4-year-olds but not the 3-year-olds (3-year-olds: Wald's chi-square = 3.04, $p = .08$, $df = 1$, two-tailed; 4-year-olds: Wald's chi-square = 5.41, $p = .02$, $df = 1$, two-tailed). There was no significant difference between age groups for either verb type (3 vs. 4 for raising: chi-square = 1.45, $p = .23$, $df = 1$; 3 vs. 4 for control: chi-square = .02, $p = .90$, $df = 1$).

4.3 Discussion

Both age groups gave largely adult-like responses to the items containing raising verbs. Children of both ages were somewhat less inclined to accept control verbs with expletive *it*, but they still accepted them two-thirds of the time.

The fact that 3-year-olds did not show a significant difference between raising and control verbs might suggest that these children are still mapping out the boundaries between the two verb classes. That 4-year-olds showed a significant difference between these verbs indicates that they do distinguish the two verb classes. However, the fact that they allow control verbs to occur with an expletive subject suggests that children can coerce these verbs into being raising

verbs when they are used in contexts appropriate for raising verbs (i.e., with an inanimate or expletive subject). Such coercion is not unusual in language. In fact, as argued by Gentner and France (1988), adult speakers are more likely to transform a verb's lexical meaning to fit a semantically odd sentence, rather than to alter noun meanings or perform other semantic permutations in order to comprehend the sentence. This is known as the "verb mutability effect" (Gentner and France 1988). What my data suggest is that children apply the verb mutability effect to control verbs that are paired with an expletive *it* subject, bleaching the semantics of the verb just enough to make sense of the sentence. To the extent that adults also allow a sentence like *It's trying to rain* they are doing the same thing: bleaching or metaphorically extending the meaning of *try* such that it no longer assigns a subject theta role. We will return to what this means in the general discussion.

Although children were significantly above chance in accepting raising items, the 3-year-olds still rejected them 17% of the time (and 4-year-olds about 8% of the time); such responses were further probed by the experimenter (*Why is that silly?*).⁵ When children rejected raising verb items the reason was either unclear (the child did not give a justification), or the rejection seemed to stem from an objection to the particular picture or picture-sentence pair for reasons that were unrelated to the main verb. For example, one of the sentences was "It seems to be windy" and the accompanying picture showed a person holding an umbrella that had been blown inside out. One child who rejected this sentence pointed to the umbrella and said it was raining, even though there was no rain in the picture.

Children often did not provide justifications for their (correct) rejections of control verb items, but when they did two kinds of justifications emerged. One kind was rejection based on grammaticality (i.e., "It can't try to be sunny"). The other kind of justification indicated that children did not find the sentences ungrammatical but rather inappropriate for the picture. For example, in the picture accompanying "It wants to be raining" there was a picture of a cloud and a few drops of rain coming out of it. Some of the children said that sentence was wrong/silly

“because it *is* raining.” The picture accompanying “It’s trying to be sunny” showed a drawing of a sun on a clear-blue sky. Some children objected that it *was* sunny. Asked whether it could try to be sunny three of the children said yes (but their original response (rejection) was counted for the statistics).

Each child received two raising verb items and two control verb items. Thus, we can examine the number of children who were either correct or incorrect on both items of each type (i.e., they responded consistently), as opposed to being correct on one and incorrect on the other (i.e., they may have been guessing). The numbers are given in Table 2.

Table 2 about here

Here we can see that for the raising items, the large majority of children were correct on both items, and only a handful were correct on only one (only one 3-year-old was incorrect on both). For the control items the picture is different: very few children were correct on both, half or more were incorrect on both, and almost half of the 3-year-olds (but very few 4-year-olds) were correct on one out of two. Many of the 3-year-olds, then, may have been guessing on the control items, but it is unlikely that many children in either age group were guessing on the raising items. In fact, a test of no association between a participant’s first and second responses for control verb items was not significant for 3-year-olds (Fisher’s exact $p = .62$), but it was significant for 4-year-olds (Fisher’s exact $p = .01$).⁶

5. General Discussion

The goal of this paper was to address alternative explanations for the results of the original experiment with children (described in section 2). The first possibility is that children do not yet have adult-like grammatical restrictions on the pairing of subjects and predicates on the basis of animacy. A review of the literature revealed that preschool aged children do not accept

mismatches in animacy between a subject and a predicate, contra Hirsch & Wexler (2007). The second possibility is that children correctly analyze verbs like *try* as control verbs, but do not require these verbs to place an animacy restriction on their subject. That is, children's control verbs can assign a theta role to an inanimate subject argument. The experiment described in section 4 looked at children's willingness to allow raising and control verbs to occur with an expletive subject, which cannot bear a theta role.

The experiment showed that both 3-year-olds and 4-year-olds allow control verbs to occur with expletive subjects more than 50% of the time. These results fit well with the results of the original experiment: in both experiments, 3-year-olds accepted control verbs in an environment that requires a raising verb 67% of the time. Four-year-olds, who had accepted control verbs with an inanimate subject only 47% of the time in the previous experiment, accepted them with an expletive subject 68% of the time in the experiment reported here. This difference for 4-year-olds between the two experiments may reflect the fact that expletives serve as a stronger or more coercive cue that the main verb is a raising verb than inanimate subjects (adults also showed a stronger effect of offering raising verbs with expletive subjects than with inanimate subjects in the Becker (2005) experiment).

I interpret these results as indicating that an expletive (or inanimate) subject leads the child to coerce the main verb to be a raising verb in that context. Thus, children are applying verb mutability, or metaphorical extension, to these verbs in order to make sense of the sentence. This coercion carries with it a semantic alteration as well as a syntactic one, and so we must ask what children's (or an adult's, in the same situation) semantic interpretation of these verbs is. I believe children allow these verbs to function as a modal, with the epistemic meaning of FUTURE and/or POTENTIAL. A verb with such a meaning would not assign an external (Agent) theta role and therefore could occur with an expletive subject. It follows that such a verb would be a raising verb (traditionally, epistemic modals are analyzed as raising verbs: Ross (1967), Barbiers (1995); more recently, Wurmbrand (1999) argues that all modals are raising verbs).

Thus, a sentence such as *It wants/is trying to rain* could be uttered in a situation where it is not actually raining, but indications (such as dark clouds) suggest the possibility of a future raining event. This interpretation is illustrated in the following conversation (held on a rainy day) with SM (age 4;11).

(11) EX: Does it want to be raining today?

SM: No.

EX: Why?

SM: Because it IS raining.

EX: What if it was sunny? Could it want to be raining?

SM: No.

EX: Why?

SM: Because it's sunny.

EX: What if it was cloudy? If it was cloudy could it want to be raining?

SM: Yes. If it was a dark cloud.

It is worth noting that the verb meaning 'want' in Indonesian is argued to function either as a control verb or a raising verb (Polinsky & Potsdam 2006). Its meaning as a raising verb is not that of POTENTIAL, but it allows an interpretation of an embedded passive clause that could not obtain if it were only a control verb. Moreover, Gergel & Hartmann (2006) argue that the German verb *wollen* 'want', which is syntactically a modal verb, is a raising verb. Thus, the extension of such canonically control verbs as *want* to a raising interpretation is licensed by UG.

As for why acceptance rates are not at 100% and why the 3-year-olds give inconsistent responses for the control verb items, I would argue that these children are at a stage of lexical development in which they are finding out about the lexical boundaries of words: How many different meanings does a given word allow? How many different kinds of environments can a

single word occur in? Children are not confused about what the verbs *want* and *try* typically mean: children interpret them correctly when used with an animate subject (Becker 2006), and they use them correctly in spontaneous speech at this age. But young children appear to have a more flexible entry for these verbs than adults do, and therefore permit them in a wider range of contexts and with a wider range of meanings than adults do. This includes a more semantically bleached or modal meaning, which makes it plausible that these verbs might not select a subject argument.

One possible problem with the experiment is that children may have interpreted the *it* subject in weather sentences as referring to some object in the picture, rather than analyzing it as an expletive. The weather pictures contained very few objects and entities; nevertheless it is not possible to rule this out entirely. Perhaps a better way to test for children's use of true expletive subjects in restricting verb meanings would be to use existential *there* (*There seems to be a bear in the garden*), and I leave this for future research. Nevertheless, since referential *it* is the pronoun used with inanimate referents, even if children interpreted *it* as referring to an inanimate object in the picture, they should still reject its use with control verbs if their control verbs are adult-like.

In summary, the syntactic bootstrapping approach to verb learning assumes that verbs are thematically related to their adjacent NPs. While this assumption is correct in many cases and therefore a good strategy for learning many verbs (e.g., intransitive, transitive, ditransitive), it does not work for all constructions. I have argued that in particular sentence strings, children use semantic cues from the subject NP to determine the semantic (and syntactic) relationship between the subject and verb. Specifically, since animacy is a property strongly associated with agenthood crosslinguistically, children should assume that an animate subject is thematically related to its adjacent verb, but an inanimate subject need not be. That children do make this assumption is further suggested by the experiment presented here, which shows that children allow typically intentional verbs to occur with an expletive subject, which cannot bear a theta role.

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Table 1. Results of Experiment: Mean Percent “OK” Response

Verb Type	3-year-olds	4-year-olds
Raising	83.0	91.7
Control	66.7	68.1

Table 2: Number of Correct and Incorrect Responses

	Raising		Control	
	Age 3	Age 4	Age 3	Age 4
Both correct	18/24	19/24	3/24	5/24
One correct	5/24	5/24	9/24	3/24
Neither correct	1/24	0/24	12/24	15/24*

*One response was missing.

Endnotes

¹ Inanimate NPs can certainly be thematically related to an adjacent verb; e.g. in *The book fell*, *book* is an argument of *fell*. In fact, inanimate NPs are often the subjects of unaccusative verbs. While unaccusatives are thematically related to their subjects, the subject takes a Patient, rather than an Agent, theta role and raises from the internal argument position. This relationship between animacy and unaccusative arguments raises interesting issues related to raising, which I leave to future work.

² Unaccusative verbs (e.g., *arrive*) also permit expletive subjects (*There arrived a package*), as these verbs, like raising verbs, do not assign an external theta role. However, unlike raising verbs, unaccusatives do not take an infinitival complement and therefore are unlikely present confusion for learners in terms of distinguishing them from the raising class.

³ The string *It left* is grammatical only if the pronoun *it* is referential. The sentence is ungrammatical if *it* is taken to be an expletive.

⁴ The reason that the higher mean for the 4-year-olds is not quite significant, while the lower mean for the 3-year-olds is significant, is that there were slightly fewer observations for the 4-year-olds (47 vs. 48) because one 4-year-old child failed to respond to one of the items. A different statistical test (binomial distribution), however, indicates a significant effect for the 4-year-olds as well.

⁵ All and only rejections were probed, regardless of whether the child's rejection was correct or incorrect. Acceptances were not probed, since asking why a sentence is OK is infelicitous. As noted above in the text, filler sentences guarded against yes-/no- biases; thus, probes did not lead to a yes-bias. Additionally, probes did not lead children to change their answers.

⁶ The test of no association was performed on the raising items as well, but it was not significant for either age group because not enough participants gave incorrect responses, so there was not enough data to determine whether there was an association between correct first and second responses.