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The lexical representation of verbs: The case of the verb "have"

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Abstract

This paper has three goals: (i) to present a partial description of the intricate semantic selectional restrictions on the noun phrases in what we call here the Causal Have Construction (CHC), (ii) to show that four- and five-year old children are sensitive to these selectional restrictions without much exposure to CHCs, and (iii) to discuss some implications of these findings for theories of language and language acquisition. Our interest in this topic derives from the possibilities it opens up for a deeper understanding of the organization of the mental structures that give rise to these semantic selectional facts, an understanding which we believe implicates an intricate and nontrivial interaction between grammatical and conceptual knowledge.

The Causal "Have" Construction (CHC) and its Semantic Restrictions

The main verb "have" has many uses, each with what appears to be its own special idiosyncratic properties. Some uses of main verb "have" follow (from Ritter & Rosen, 1993):

(1) a. John had a good time.   (experience)
     b. Harold has a dinner party.   (cause/creation)
     c. John has a new cabinet.   (possession)
     d. The cabinet has a stereo in it.   (location)
     e. John had his students walk out on him.
                                       (experience)
     f. John had his student go to the principal's office
                                       (cause)

We focus here on the causal interpretation of sentences such as (1f), which we will call Causal Have Constructions (CHCs). CHCs include what appear to be two subjects -- the subject of "have", and the subject of the core event (e.g., "his student" in (1f)). The subject of "have" is interpreted as somehow causing the occurrence of the core event.[1] The two subjects in CHCs are subject to an intricate set of restrictions in the way they are interpreted. For instance, the two subjects tend to be restricted to animate noun phrases.[2]

(2) a. In last night's storm, <u>the man</u> had the children cover their heads.
     b. #In last night's storm, <u>the lightning</u> had the children cover their heads.
(3) a. The man had <u>the boy</u> break the vase.
     b. #The man had <u>the ball</u> break the vase.

The restriction against an inanimate subject of "have" in CHCs does not reduce to a general restriction against inanimate causes because (i) inanimate causes are easily understandable, and (ii) inanimate causes can appear as matrix subjects (underlined in the examples in (4)) in other periphrastic causative constructions:

(4) a. In last night's storm, <u>the lightning</u> made the children cover their heads.
     b. In last night's storm, <u>the lightning</u> caused the children to cover their heads.

Similarly, inanimate subjects are acceptable when the core event appears as a simple sentence (as in (5)), and when the core event appears as the core event in other types of periphrastic causative constructions (e.g., with "make" and "cause", as in (6)):

(5)   <u>The ball</u> broke the vase.
(6) a. The man made <u>the ball</u> break the vase.
     b. The man caused <u>the ball</u> to break the vase.

Even so, the selectional restrictions on CHCs are even more complex. The animacy of the subject of "have" and the subject of the core event is not sufficient for the acceptability of CHCs, as the example in (7) shows:

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[1] Because of this, CHCs are often described as a periphrastic causative construction (e.g., Givon, 1974; Goldsmith, 1984; Pustejovsky, 1995).

[2] We will call these semantic selectional restrictions, though the character and nature of these restrictions tend to differ from the normal use of the term.

(7)   John had Bill drop the ball (#by sneaking up and scaring him).

Again, whatever results in the unacceptability of (7) when it appears with the parenthesized material, it does not transfer to other periphrastic causatives, showing that it too is not a general restriction on sentences which express causation events:

(8) a. John made Bill drop the ball by sneaking up and scaring him.
     b. John caused Bill to drop the ball by sneaking up and scaring him.

Some notion of intention accompanies the sentence in (7), and the unacceptability of the same sentence with the parenthesized material present seems to be related to the lack of intention signaled by that parenthesized material. But it is unclear whether this lack of intention is a lack of intention on the part of the subject of "have" (i.e., John), or on the part of the subject of the core event (i.e., Bill). In fact, it seems to be the case that the intention of both the subject of "have" and the subject of the core event are necessary for the acceptability of the sentence in (7). That is, if we construct contexts which eliminate the intention of only one of the two subjects, the sentence becomes unacceptable:

(9) a. Intention of both subjects: John and Bill are involved in a plot to rob a bank. They develop an intricate system of signals to communicate with one another covertly once in the bank. When John scratches his nose, this is a signal for Bill to distract people by dropping a vase. When the time was right, John gave the signal, and Bill dropped the vase.
    a". John had Bill drop the vase.

    b. Eliminating the intention of the subject of "have": John and Bill are involved in a plot to rob a bank. They develop an intricate system of signals to communicate with one another covertly once in the bank. When John scratches his nose, this is a signal for Bill to distract people by dropping a vase. In the middle of the robbery, John's nose started to itch and he scratched it, forgetting that this was the signal to Bill to drop the vase, and Bill dropped the vase.
    b". #John had Bill drop the vase.

    c. Eliminating the intention of the subject of the core event: John and Bill are involved in a plot to rob a bank. Unbeknownst to Bill, John plans to distract people in the bank by the dropping of a vase which Bill was carrying. When the time was right, John pushed Bill, and Bill dropped the vase.
    c". #John had Bill drop the vase.

The interpretation which emerges, at least with respect to sentences such as that in (7), is that both the subject of "have" and the subject of the core event must be intentional

agents. In fact, the normal interpretation of CHCs involves "a notion of co-agency [between the subject of 'have' and the subject of the core event], brought about by agreement or contractual obligations" (Pustejovsky, 1995; see also Givon, 1974; Goldsmith, 1984).[3]

Experiment One: Adult Knowledge of Constraints on CHCs

We designed an experiment to test whether naive native speakers of English know these intricate selectional restrictions on the subjects of "have" and the core event. In particular, the experiment focused on whether native speakers of English share the intuitions we and our informants have that the subject of the core event must be intentionally involved in the action he/she performs. For purposes of comparison, we collected information about people's interpretations of sentences where the verb "make" replaced "have" as the causative verb.

Method

Participants.   Participants were twelve undergraduate students at San Francisco State University. They were all native speakers of English and participated in the study for course credit.

Design.   The experiment was a single factor, between-subjects design. The independent variable was Question Type. Six participants were asked only "have" questions; six participants were asked only "make" questions.

Materials and Procedure.   Each participant was read four two-part scenarios. Toy figures, representing the characters in the narratives, acted out the story. One of these two-part scenarios follows:

PART A -- Unintentional subject of core event: Sue is in the block area building a large structure with blocks. Her block structure is really nice. She tells Doris, a friend who is close by, that she really likes the building that she is making. Meg comes over. She thinks that it would be fun to watch the large building that Sue is making get knocked over. Sue can't see Meg and she doesn't know that Meg is there. Meg doesn't want to ask Sue to knock over the blocks, so she thinks of another way that she can get Sue to knock the blocks over. Meg goes up to the door to the outside. Meg grabs the door handle and slams the door shut. It makes a loud booming noise. Sue is scared and starts to run away. She runs by the block structure and accidentally gives it a push, knocking it over. The blocks fall all over the ground with a loud crash.

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[3] There is much more to say about CHCs at the level at which we have been describing them, e.g., CHCs discussed by Ritter and Rosen (1993) which have quasi-arguments/expletive noun phrases as the subject of the core event, etc. For present purposes, the facts outlined here are sufficient.

PART B -- Intentional subject of core event: Later that day, Sue is back in the block area building a large structure with blocks. She has built a structure that is really tall. She tells Doris, a friend who is close by, that she really likes the building that she is making. Cindy comes over. Cindy thinks that it would be fun to watch the large building that Sue is making get knocked over again. Cindy asks Sue nicely if Sue would go up to the building and knock the blocks down. When Sue hears Cindy's suggestion, she smiles and tells Cindy that it would be a great idea to knock over the blocks and watch them fall. Sue goes over to the structure and gives it a big push, knocking it over. The blocks fall all over the ground with a loud crash.

The three figures -- Doris (the friend who is an innocent by-stander), Meg (who scared Sue), and Cindy (who asked Sue to knock over the blocks) in the narrative presented above -- were then placed in random positions in front of the participant. After the figures were placed on the table, the participant was asked one of the following two questions (depending on whether the participant was in the "have" question condition or the "make" question condition):

Have Condition:
Which one had Sue knock over the blocks?

Make Condition:
Which one made Sue knock over the blocks?

An identical procedure was used for the three additional narratives that the each participant heard during a test session. For each participant, the two scenarios within an item were presented in random order (and adjusted for time-relevant linguistic elements, e.g., "later that day....").

Results and Discussion

The dependent measure was the proportion of times each participant chose the cooperative instigator (i.e., who asked the actor to act intentionally) in response to the question. If the participants knew that the subject of the core event in CHCs must be intentionally involved in the event, then they should have picked the cooperative instigator, (i.e., Cindy, the one who asked Sue to knock over the blocks). The subjects that heard the "make" question were not expected to confine their responses to this choice.

The mean proportion of times participants chose the cooperative instigator for each of the two Question Type conditions is displayed in the first column of Table 1. A one-way ANOVA revealed that the difference between the means for the "have" and "make" question conditions was significant ($\underline{F}(1,10) = 8.033$, $\underline{p} < .05$).

Table 1: Mean Proportion of Responses Adults Made for Each Character in the Narrative

Condition	cooperative	uncooperative	bystander
Have	.958	.042	.000
Make	.375	.625	.000

Thus, when faced with the question "Who had John drop the ball?", native speakers of English were considerably more likely to choose a character who asked John to perform the action intentionally. They almost never chose a character who scared the actor (John) into performing the action. However, in response to the "make question" participants did not show this bias. This evidence shows that adult, native speakers of English are sensitive to at least one of the restrictions on the relationship between the subject of "have" and the subject of the core event in CHCs.

Transcript Analysis: Children's Experience with CHCs

The second experiment in this study tested children's knowledge of the same CHC constraint. However, before we discuss the second study, a description of children's exposure to the CHC is useful in providing an idea of what children's direct experience with the CHC is.

We analyzed the language transcripts for the three children -- Adam (ages: 2;3.4-4;10.23), Eve (ages: 1;6-2;3), and Sarah (ages: 2;3.5-5;1.6) -- in the Brown (1973) corpus available in the CHILDES database (MacWhinney & Snow, 1987). From these transcripts we culled out the adult utterances which included "have". We then categorized the utterances based on the following categories of the use of "have": Alienable Possession, Inalienable Possession, Auxiliary, Modal, Location, Nominal (both stative and eventive), the experiencer-have-construction (EHC) (see sentence (1f) and below), and the causal-have-construction (CHC). CHCs and EHCs are the least frequent constructions for each of the three children (proportion of uses of "have" in parentheses):

Table 2: Number of Instances of CHCs and EHCs in Children's Linguistic Input

	CHC	EHC	Total "have"
Adam	4 (.003)	3 (.002)	1148
Eve	2 (.002)	2 (.002)	938
Sarah	11 (.006)	11 (.006)	1175

The relative paucity of CHCs in children's linguistic input is one reason to suspect that the acquisition of this construction is at least in part independent of children's experience with CHCs. However, even if we allow that the minimal experience children gain with the CHC is adequate for them to develop mastery of it, we suggest that EHCs -- which are equally frequent in children's linguistic experience according to these analysis -- potentially confuse the learning situation for the child because CHCs (10a) and EHCs (10b) share the same basic surface form:

(10) a. The teacher had his students walk out (by telling them to.)
     b. The teacher had his students walk out (even though he told them not to.)

Though these two constructions have the same surface forms, they do not share the same sorts of interpretive constraint. For instance, it is possible for the subject of the

core event to be an inanimate object in EHC's (as in (11)), or that both the subject of the core event and the subject of "have" are unintentionally involved in the event (as in (12)).

(11)   Fred had the hammer fall on his toes.
(12)   Timmy had the teacher step on his toes.

For the child to master the CHC, he/she must determine based on identical surface forms when the construction is a CHC and when the construction is an EHC, and not confuse the properties of what is observed for one construction as being relevant to the other construction. In our transcript searches, we discovered that this is more than a hypothetical problem. In the following EHC, from Eve's mother to Eve, there is no shared intention implied:

(13)   see how frustrating it is # Eve # to have people stomping their feet when you're trying to cook ?

Similarly, in the following EHC, from Sarah's mother to Sarah, the subject of the core event -- i.e., a commercial -- is not animate:

(14)   she can be sound asleep # (a)n(d) have a commercial come on # wake up # look at the commercial (a)n(d) when the commercial's over # right back sound asleep again .

These transcript analyses suggest that children's exposure to CHCs is rather limited, and that learning the semantic restrictions on CHCs by observing the contexts in which they appear is complicated by other factors as well. If children at these ages are sensitive to the semantic restrictions on CHCs that native English-speaking adults showed knowledge of in Experiment One, it is unlikely that they would be able to learn them based on observing the few situations in which CHCs are used in their presence.

Experiment Two: Children's Knowledge of Constraints on CHCs

Experiment Two tested whether children were sensitive to the CHC constraint that adults demonstrated knowledge of in Experiment One.

Method

Subjects. Participants were 20 four and five year old children (mean age of 4;4) at the Child Study Center at San Francisco State University. All spoke English fluently.

Materials and Procedure. Except for the addition of a third question group and a practice phase, the procedure for this experiment was identical to the one used with adult participants. The third condition was a "see - question":

See Condition:
Which one saw Sue knock over the blocks?

Because all three characters in a given narrative sees the actor, we included children's pattern of responses to the "see"

question to obtain a baseline measure of children's preferences for the three characters in the narratives. A practice phase was also added in order to test children's knowledge of other uses of "have" (namely, the locational and the modal uses), and to familiarize children with the experimental procedure. If children failed the practice test, their data were excluded from the analysis; two of the twenty children failed to answer both practice questions correctly. The remaining eighteen participants were evenly distributed across the three Question Type conditions.

Results and Discussion

The dependent measure was the proportion of times each participant chose the cooperative instigator in response to the question. If the participants knew that the subject of the core event in CHCs must be intentionally involved in the event, then they should have picked the cooperative instigator in response to the "have" question. The participants that heard the "make" or "see" questions were not expected to confine their responses to this choice.

The mean proportion of times participants chose the cooperative instigator for each of the three Question Type conditions is displayed in the first column of Table 3. A one-way ANOVA revealed that the difference between the means for the "have", "make", and "see" question conditions was significant ($\underline{F}(2,15) = 4.687$, $\underline{p} < .05$).

Table 3: Mean Proportion of Responses Children Made for Each Character in the Narrative

Condition	cooperative	uncooperative	bystander
Have	.763	.180	.055
Make	.333	.625	.042
See[4]	.292	.318	.360

A Tukey-B post hoc analysis showed that the group means differed significantly ($\underline{p} < .05$) in pairwise comparisons of the mean proportion of cooperative instigator responses between the "have" question group and the "make" question group, and between the "have" question group and the "see" question group. (The pairwise difference between the "make" and "see" question groups was not significant.)

Children in this experiment show the same general pattern of responses as adults did in Experiment One. Thus, these results indicate that children at these ages are sensitive to the constraint on CHCs that the subject of the core event must be intentionally involved in the event. Together with the transcript analysis from the previous section (which shows that children do not receive much, if any, experience with CHCs), these findings cast serious doubt on any account of the acquisition of these constraints which depend on children's exposure to them.

[4]The proportions for the See condition do not add up to 1.000 because one participant in that condition did not always respond with one of the three characters we provided.

General Discussion

The results of the experiments and transcript analyses described above place very tight constraints on theories of how the complex set of semantic restrictions on CHCs is acquired. For instance, the entire class of theories of language learning that relies solely on statistical properties of children's linguistic experience as the basis for language acquisition would seem to be unsuited for accounting for the acquisition of such knowledge. Of course, this is not to say that all theories of language learning which depend on at least some exposure to the constructions being learned fail to account for these particular acquisition facts. But these findings do clarify the exact nature of the learning problem facing children acquiring CHCs, and a nontrivial gap between experience and knowledge that such theories must explicitly account for.

Another class of theories which can be (tentatively) eliminated based on these findings are those which suppose that the many uses of "have" have associated with them distinct lexical entries in which learned idiosyncratic information may be stored. If there were many verbs "have", each of which has its own learned idiosyncratic properties, children's little experience with the "have" in CHCs would not be sufficient for accounting for their knowledge of the constraints on CHCs.

This line of argument brings us close to the central assumption in Ritter and Rosen (1993, 1997). Ritter and Rosen show that (much of) the range of interpretations of the subject of "have" across the range of syntactic constructions within which "have" appears may be derived from: (i) the syntactic form and interpretation of the complement of "have", and (ii) principles of Event Structure (e.g., Grimshaw, 1990; Tenny, 1992). Because of the minimal role that the verb "have" plays in assigning an interpretation to its subject, Ritter and Rosen assume that "have" does not assign an interpretation to its subject at all, and that there is a single, semantically unspecified lexical entry for main verb "have".

Ritter and Rosen's theory is broadly consistent with the facts described in this paper in the sense that their theory does not list in the lexical entry for "have" the idiosyncratic interpretations assigned to the subject of "have" for each construction type in which "have" appears (see (1)). Thus, Ritter and Rosen's syntactic analysis lends itself to a theory of the acquisition of "have" in which the single, semantically unspecified lexical entry for "have" may be learned based on children's experience with relatively frequent uses of "have", and in which the idiosyncratic semantic properties of constructions with "have" may be independently derived from the structure and interpretation of the complement of "have" and the principles of Event Structure. Though we see promise in such an approach, we remain agnostic here about Ritter and Rosen's theory because it does not explain the semantic restrictions on the CHC that we have discussed in this paper.

Finally, we would like to note that these facts cut at the heart of claims that CHCs are peripheral to linguistic theory. It is true that CHCs do not occur in all languages and that they are used only infrequently in English (den Dikken, 1997; Ritter & Rosen, 1997), but it is unlikely that CHCs are a class of frozen expressions or slang or idioms specific to English that acquire their meaning by conventional stipulation among language users in a speech community.[5]

But in light of our experimental findings, the relative rareness of CHCs among the world's languages seems not to be cause for dismissal, but cause for serious investigation -- something must account for the systematic knowledge of the subtle semantic restrictions on CHCs that children have acquired in the absence of relevant experience.

In the end, we see these facts as central to a certain sort of interdisciplinary endeavor. On the one hand, it seems that an explanation of these facts will involve linguistic analysis at its core. There is certainly some deep relevance to the fact that CHCs involve only one tense specification (and one event role, if Ritter and Rosen (1993) are correct) -- the verb "have" carries the tense information in the sentence; the verb in the core event is in its infinitival form. There is much to be gained from linguistic analyses regarding the individuation of lexical entries and the structure of the lexicon which may be relevant for the proper analysis of the facts described here. Much of the literature on causation and the semantic composition of predicates is linguistic literature.

On the other hand, it seems unlikely that a solely linguistic analysis will suffice for explaining these facts. In particular, answers to questions like: "Why must the subject of 'have' be an intentional agent in CHCs?" and "Why must the kind of causation describable with CHCs involve the cooperative agency between the subject of 'have' and the subject of the core event?" seem to be questions that will receive (at least part of their) explanations not from linguistic theory, but from a theory of the mental structures responsible for our understanding and conception of agency, causation, intention, and social interaction. Perhaps the semantic restrictions on CHCs are derivable from and will lead to insights about the properties of the interface between the linguistic level of Event Structure that Ritter and Rosen discuss and our capacity for understanding physical causation versus intentional interaction. We leave the explanation of these facts for future research, but hope that our empirical findings may direct the attention of cognitive scientists to develop integrated theories of language and cognition.

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[5]In fact, some of our British informants commented that CHCs are not found spontaneously in British English and that they sound extremely awkward -- "the way Americans talk," as one of our informants put it. But, as with the participants in the experiments we reported in this paper, these informants' intuitions concurred with ours when they were pressed to make judgments regarding the semantic restrictions on CHCs.

References

Brown, R. (1973). A first language. Cambridge, MA: Harvard University Press.

den Dikken, M. (1997). Introduction: The syntax of possession and the verb 'have'. Lingua, 101, 129-150.

Givon, T. (1974). Cause and control: On the semantics of interpersonal manipulation. In J. Kimball (Ed.), Syntax and Semantics 4. San Diego, CA: Academic Press.

Goldsmith, J. (1984). Causative verbs in English. In D. Testen, V. Mishra, & J. Drogo (Eds.), Papers from the Parasession on Lexical Semantics from the Twentieth Regional Meeting, Chicago Linguistics Society. Chicago, IL: Chicago Linguistics Society, University of Chicago.

Grimshaw, J. (1990). Argument structure. Cambridge, MA: MIT Press.

MacWhinney, B., & Snow, C. (1985). The child language data exchange system. Journal of Child Language, 12, 271-296.

Pustejovsky, J. (1995). The generative lexicon. Cambridge, MA: MIT Press.

Ritter, E., & Rosen, S.T. (1993). Deriving causation. Natural Language and Linguistic Theory, 11, 519-555.

Ritter, E., & Rosen, S.T. (1997). The function of 'have'. Lingua, 101, 295-321.

Tenny, C. (1992). The aspectual interface hypothesis. In I. A. Sag & A. Szabolcsi (Eds.), Lexical matters. Stanford, CA: CSLI Publications. Distributed by Chicago, IL: University of Chicago Press.