

The Semantics of Control: Evidence from English Control Shift

Background. A classic observation is that PRO, the null subject of an infinitival clause, is more constrained in its interpretation than ordinary pronouns—so-called obligatory control (OC). When in a complement clause, PRO must refer to one of the arguments of the immediately superordinate verb (Landau 2013). Moreover, it is often constrained as to which argument it refers to: in (1a), it must refer to the subject; in (1b), it must refer to the object. The latter fact has been central to prominent syntactic theories of OC, such as the Movement Theory of Control (Hornstein 1999) and other approaches that emphasize the Minimal Distance Principle (Rosenbaum 1967).

- (1) a. Julie_i promised Nick_k [PRO_{i,*k} to take better care of herself/*himself in the future].
b. Julie_i begged Nick_k [PRO_{k,*i} to take better care of himself/*herself in the future].

However, it has long been observed that control relations can sometimes shift. For instance, *promise* shifts to object control in (2a), while *beg* shifts to a subject control in (2b).

- (2) a. Johnny's mom promised him_i [PRO_i to be allowed to stay up and watch the fireworks].
b. Johnny_i begged his mom [PRO_i to be allowed to stay up and watch the fireworks].

Control shift poses a serious challenge for simple syntactic approaches to OC, which do not predict this kind of flexibility. While semantic approaches such as Landau (2015) leave room for control shift, they do not explain the conditions under which a shifted interpretation arises.

This Study. We present a pair of English language experiments testing the hypothesis that control shift is driven by benefactive role assignment (Panther & Köpcke 1993, Jackendoff & Culicover 2003). Our results show that the availability of control shift across verbs is highly correlated with the prior likelihood that the shifted controller (e.g., the direct object in (2a)) is the one most likely to benefit from the eventuality described by the embedded clause. This outcome favors a theory in which OC is governed by the matching of thematic roles within matrix and embedded clauses (e.g., Baker 2024). Rather than falling at the fringes of our theorizing, control shift can and ought to play a central role in our understanding of OC.

Methods. Stimuli for Experiment 1 ($N=120$) were 144 test sentences such as (3), created by crossing 12 matrix verbs with 12 passive voice complements. Matrix verbs included 10 object control verbs (*advise, ask, beg, compel convince, encourage, force, instruct, persuade, tell*) and 2 subject control verbs (*promise, offer*). On each trial, participants answered a forced-choice question about the identity of the embedded subject (e.g., *If Emma got what she wanted, who would be given credit?*). Each participant saw 6 test sentences along with 6 control sentences with active voice complements and 12 filler sentences, randomly presented.

- (3) Emma persuaded Daniel to be given credit for the new breakthrough.

Stimuli for Experiment 2 ($N=60$) were 144 test sentences such as (4), created by crossing 12 matrix verbs with 12 active voice complements, all of which were not obviously biased as to who the action was done for. The matrix verbs were the same as those included in Experiment 1. On each trial, participants answered a forced-choice question asking who was most likely to benefit from the event described by the complement (e.g., *Who is most likely to benefit from Daniel coming early?*). Each participant saw 12 test sentences, randomly presented.

- (4) Emma persuaded Daniel to come early.

Results. First, the likelihood of control shift in Exp. 1 and the likelihood of picking the shifted controller as the one most likely to benefit in Exp. 2 were estimated for each matrix verb using logistic mixed effects modeling. Comparison of these two measures is shown in **Figure 1**. Visual

inspection of the data revealed one outlier, the verb *force*. Excluding *force*, we found the two measures to be highly positively correlated: $r(9) = .93$, $p < .001$, 95% CI [.76, .98].

Discussion. Our findings lend strong support to a theory of OC rooted in thematic role matching. Following Baker (2024), we take it that matching specifically applies between the embedded eventuality and a *result state* of the matrix eventuality (possibly denoted by a matrix ResP, as in Ramchand (2008)). We assume that the two compose via Event Identification (Kratzer 1996), such that the embedded eventuality is identical to the result state of the matrix eventuality. Alignment of the thematic roles associated with the embedded eventuality and those associated with the matrix result is thus enforced by Thematic Uniqueness: for any event, only one referent can fill a given role. When the embedded subject is an agent, it is identified with the agent of the result state (e.g., the person who intends to act in some way as a result of being persuaded, as in (5a)). When the embedded subject is not an agent but is a benefactive, it is matched with the benefactive of the result state (e.g., the person for whom the intended action would be carried out, as in (5b)).

- (5) a. $\exists e.[\text{persuade}(e) \ \& \ \text{Ag}(e) = x \ \& \ \text{Th}(e) = y \ \& \ \exists e'.[\text{cause}(e,e') \ \& \ \text{intend}(e') \ \& \ \underline{\text{Ag}(e')} = y \ \& \ \text{Ben}(e') = x \ \& \ \dots \ \& \ \underline{\text{Ag}(e')} = \text{PRO}]]$
 b. $\exists e.[\text{persuade}(e) \ \& \ \text{Ag}(e) = x \ \& \ \text{Th}(e) = y \ \& \ \exists e'.[\text{cause}(e,e') \ \& \ \text{intend}(e') \ \& \ \text{Ag}(e') = y \ \& \ \underline{\text{Ben}(e')} = x \ \& \ \dots \ \& \ \underline{\text{Ben}(e')} = \text{PRO}]]$

Relative compatibility with control shift thus comes down to verb-driven biases about who is most likely to benefit. An exception to this in our study was *force*, which biases association of the benefactive role towards the subject but resists shift to subject control. Divergence between *force* and *compel* in our study points away from an explanation rooted in the implicative nature of *force*'s complement, contrary to Landau' (2015) Two-Tiered Theory of Control. Instead, we attribute this resistance to the fact that *force* is compatible with an ECM complement (cf. (6)) Participants that settled on an ECM parse would have necessarily failed to get a control shift interpretation since, in an ECM complement, there is no control to begin with.

- (6) Covid precautions had forced there to be fewer people — including family members of George Floyd and Mr. Chauvin — in the courtroom itself. [NYT 3/29/2021]

These results highlight the importance of semantics, especially lexical semantics and thematic roles at the syntax/semantics interface, to theories of obligatory control.

References. Baker (2024). *Complementizers relating to noun phrases: Rare constructions within a theory of universal grammar*. Hornstein, (1999). Movement and control. Jackendoff & Culicover (2003). The semantic basis of control in English. Kratzer (1996). Severing the external argument from its verb. Landau (2013). *Control in generative grammar*. Landau (2015). *A two-tiered theory of control*. Panther & Köpcke (1993). A cognitive approach to obligatory control phenomena in English and German. Ramchand (2008). *Verb meaning and the lexicon: A first-phase syntax*. Rosenbaum (1967). *The grammar of English predicate complement structures*.

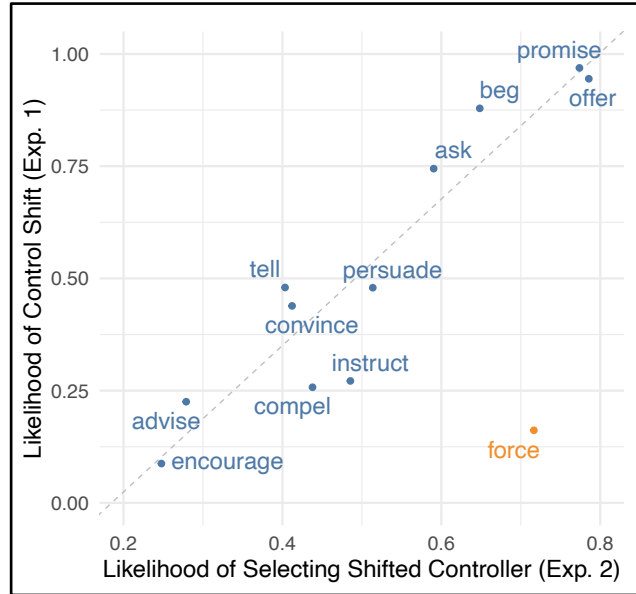


Figure 1. Likelihood of control shift (Exp 1) vs. likelihood of selecting the shifted controller as the one most likely to benefit (Exp 2).