# Re-Examining Instrumental Subjects from an Empirical Stance

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Instrumental Subjects (ISs) ("The ball hit the window") stand as counterexamples to the generalization that subjects are agentive and animate, and as such pose a challenge to theories of argument structure. The restrictions on ISs are subtle—not all instruments can be subjects for all predicates ("The crane/*shovel loaded the truck"). Grimm (2007) proposes that the restrictions on ISs fall out from a fine-grained theory of argument structure in which verbal entailments and nominal properties interact. Here we evaluate, and generally validate, this account with naturally-occurring data.

Grimm defines subjects as a set of verbal entailments, inspired by Dowty (1991), generating a semantic space of acceptable subjects. Grimm argues that ISs correspond to a natural subpart of this space, that of the entailments *motion* and *instigation* (entailed when the event described is necessarily brought about by the argument in question), both agnostic towards animacy. Nominals are described by properties, e.g. mobile (entities which can move or be moved) and potent (entities having their "own internal power" (Chafe 1970:109)), corresponding to a feature-based version of the animacy hierarchy:

> immobile inanimates ($\emptyset$) < mobile inanimates (mobile), potent inanimates (potent) < mobile potent inanimates (mobile, potent) < animates (sentient, mobile, potent) ...

Thus, an NP filling the subject of a verb must have nominal properties consistent with the verb's entailments for its subject. If a verb entails *motion* on its subject, the NP must have mobile, otherwise it is unacceptable, and similarly for *instigation* and potent.

To evaluate if the space generated by the proposed entailments corresponds to naturally-occurring ISs, we conducted an empirical study on three verbs representing semantic subtypes permitting ISs: *kill* (change-of-state), *hit* (impact) and *push* (imparting force). 100 instances of each verb with ISs, excluding metaphorical uses, were extracted from the written texts of the British National Corpus. To generalize over the corpus data, we grouped the ISs into 11 ontological categories: e.g. body part, weapon. The categories found with each verb matched the verbal entailments that Grimm's theory predicts. For instance, the verb *hit* lexically entails its subject to be in motion, thus only nominals possessing the property mobile can serve as its subject. The attested uses all possess a subject which is explicitly or implicitly in motion, as supported by the most frequently appearing categories for *hit*: projectile ('ball') (24%), vehicle (24%), artifact ('parachute') (22%) and natural force (18%).

A similar match between predicted and attested uses was observed for *kill* and *push*. Both verbs entail *instigation*, requiring a potent nominal: the subjects of *kill* satisfy the potent property in multiple manners (disease, poison, weapon), whereas the subjects of *push* are potent only in terms of kinetic energy. While the feature potent captures the notion of "internal power" at an abstract level, the data indicate that what counts as potent is appropriately differentiated across predicate classes.

This study complements Grimm's account by providing positive evidence that the space generated by the theory's system of verbal entailments tightly describes naturally-occurring ISs.