Brief article

The semantic origins of word order

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ABSTRACT

Where do the different sentence orders in the languages of the world come from? Recently, it has been suggested that there is a basic sentence order, SOV (Subject–Object–Verb), which was the starting point for other sentence orders. Backup for this claim was found in newly emerging languages, as well as in experiments where people are asked to convey simple meanings in improvised gesture production. In both cases, researchers found that the predominant word order is SOV. Recent literature has shown that the pragmatic rule 'Agent first' drives the preference for S initial word order, but this rule does not decide between SOV and SVO. This paper presents experimental evidence for grounding the word order that emerges in gesture production in semantic properties of the message to be conveyed. We focus on the role of the verb, and argue that the preference for SOV word order reported in earlier experiments is due to the use of extensional verbs (e.g. *throw*). With intensional verbs like *think*, the object is dependent on the agent's thought, and our experiment confirms that such verbs lead to a preference for SVO instead. We conclude that the meaning of the verb plays a crucial role in the sequencing of utterances in emerging language systems. This finding is relevant for the debate on language evolution, because it suggests that semantics underlies the early formation of syntactic rules.

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1. Introduction

Many languages have a basic ordering of the subject (S), object (O), and the verb (V), and among the languages of the world, all six possible basic word orders exist. Of these six orders, SVO and SOV make up a large majority of the totality of languages (Dryer, 2011). Recent work on the origins of human language has seen an increase of interest in the origins of basic word order.

Givon (1979) observes that SOV basic word order is common among the languages of the world and that many other word orders can be reconstructed back to an SOV stage. He speculates that the first basic word order for

human language was SOV, and other word orders appear to have descended from that order (Givon, 1979). Newmeyer (2000) claims that the earliest human language had rigid SOV order. In comparative linguistics, Gell-Mann and Ruhlen (2011) studied the distribution of the six possible word orders in a sample of 2135 languages, compared them to the putative phylogenetic tree of human languages, and concluded that SOV must have been the word order of the 'ancestral language'.

In sign language linguistics, SOV occupies a special position as well. Studies of newly emerging sign languages (Al Sayyid Bedouin Sign Language and Nicaraguan Sign Language) show a preference for (S)OV word order, despite influences from surrounding languages (Sandler, Meir, Padden, & Aronoff, 2005; Senghas, Coppola, Newport, & Supalla, 1997). In experimental psychology, Goldin-Meadow, So, Özyurek, and Mylander (2008) report an

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experiment in which naive individuals communicated about simple events using only gesture and no speech. They show that speakers of languages with different dominant word orders use the same gesturing order, an order consistent with the word order Subject–Object–Verb (SOV). The authors conclude that SOV word order 'may reflect a natural disposition that humans exploit not only when asked to represent events nonverbally, but also when creating language anew' (Goldin-Meadow et al., 2008, p. 9167).

It is intriguing that such diverse sources of evidence point in a similar direction: that SOV word order had a special status in the emergence of language. The preference for S initial word order may be traced back to Jackendoff's (2002) observation that in language systems without full grammar, the element that has most control (the agent, or actor) is expressed first in utterances. Dowty (1991) argues that the argument (of a given predicate) that has the most prototypical agent properties is realised syntactically as the subject. However, this do not yet explain why besides SOV, SVO is such a prominent word order in the languages of the world.

Recently, Goldin-Meadow et al.'s experimental methodology was taken up to investigate possible roles of SVO basic word order. It has been suggested that SVO order arises because it is preferred by the computational module in human cognition (Langus & Nespor, 2010), or that SOV/SVO variation comes from communicative pressures: the language user's sensitivity to the possibility of noise corrupting the signal (Gibson et al., 2013). The latter used nonreversible events such as 'rollerskater kicks ball', in which the word order is not essential for obtaining the right interpretation because a ball cannot kick a rollerskater, versus reversible events such as 'fireman kicks girl', in which both nouns could in principle be the agent and word order is essential. They reported an increased usage of SVO order for reversible events. This finding was accounted for by appeal to a general preference to avoid expressing two plausible agents ('fireman' and 'girl') at the same side of the verb. Hall, Mayberry, and Ferreira (2013) report a similar preference for SVO ordering in reversible events, but explain this in terms of cognitive constraints on production: when an event has a human agent and patient (which is typically the case for reversible events), the gesturer will often use the body-as-agent strategy. That is, they act out the agent and patient by 'impersonating' the participants. This strategy leads to confusion when a patient is followed by an action (as it would be the case in SOV order).

Notwithstanding the importance of communicative pressures, and computational constraints on human cognition in shaping natural language, we pursue a different avenue here, and argue that word order is grounded in semantics. In support of this view, we report an improvised gesture experiment. In this task, there is no pre-existing system of linguistic conventions, so people can organise their utterances flexibly. We will show that the choice between SOV and SVO order depends on the meaning of the message to be conveyed. In the experiment we observed the gesturing orders used by naive participants for two kinds of events: extensional and intensional

events. In our experiment, extensional events are instantiated by motion verbs like *throw* or *carry*, also used by Goldin-Meadow et al. (2008). Such verbs are transitive (contain a subject/actor and an object/patient), and involve some action through space. Intensional events (e.g., 'pirate searches guitar,' 'pirate thinks of guitar', but also 'pirate hears guitar' and 'pirate builds guitar'), by contrast, are typically described using intensional verbs (see Forbes, 2010), and for the interpretation of such sentences, the *intension* (meaning) of the direct object is more important than its *extension* (object in the world). Forbes (2010) defines three features that characterise direct objects of intensional verbs: (1) resistance to substitution (i.e., *Mary admires Mark Twain* does not necessarily mean the same as *Mary admires Samuel Clemens*); (2) the possibility of an non-specific reading (such as in the sentence *Mary is looking for a man, but not one in particular*), or (3) existential neutrality (i.e., a sentence like *John is looking for a unicorn* is possible, in which the unicorn does not exist).

We claim that the semantic differences between intensional and extensional verbs form the direct basis of an expected order difference in improvised gesture, by appealing to existing literature. Recall that S-initial word order is expected to be dominant, because of the role of the 'Agent First' principle (cf. Dowty, 1991, Jackendoff, 1992). Goldin-Meadow et al. (2008), who only discuss extensional events, state that O is naturally sequenced before V, because 'entities are cognitively more basic and less relational than actions, which might lead participants to highlight entities involved in an action before focusing on the action itself'. Together these observations allow us to hypothesise that extensional events are gestured in SOV order. Intuitively, an extensional event like 'pirate throws guitar' can be paraphrased as 'You know the pirate? You know the guitar? He throws it.'

Direct objects that are arguments of extensional verbs refer to concrete objects that are identified as existing independently of the event, but intensional verbs take direct objects that are possibly non-specific or non-existent. This makes direct objects in intensional events more abstract and more dependent on the action than those in extensional events, and this is, we hypothesise, a reason to describe them *after* the verb. If one would paraphrase an intensional event like 'pirate thinks of guitar' it is much less natural to use this order to present the information in ('You know the pirate? You know the guitar? He thinks of it.'). Given that the guitar is dependent on the pirate's thoughts, we *need the thought bubble before the object within it*. Thus, for intensional events, we expect the linear order SVO rather than SOV.

We can then use the contrast between extensional and intensional events to test the hypothesis that the meaning of the message conveyed drives the sequencing of gestures in an improvised production task: two different orders (SOV and SVO) are expected for extensional and intensional events, respectively. Moreover, these orders are predicted to occur independently of the structure of the native language of participants, because we take the improvised gesture production to be a communicative system without full grammar, that circumvents the linguistic conventions of the native language. In order to test this, we carried