I would if I could but I can’t: Different types of non-prototypical Actor arguments are processed in a qualitatively similar manner

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Introduction

Language is a uniquely human ability and also one of the most complex human cognitive skills. It thus appears plausible to assume that there is an intimate relationship between the structure of human language(s) and basic characteristics of human neurobiology/ neuropsychology.

One possible way of shedding further light on this relationship is to draw conclusions about possible “universals” of language by identifying cross-linguistically recurring patterns of language processing. These universals can be considered potential candidates for links between language and cognition/neurobiology.

A potential universal of language processing that has been identified in this way is the tendency towards unambiguous identification of the “actor”, i.e. the participant primarily responsible for the state of affairs described (Bornkessel-Schlesewsky & Schlesewsky, 2009).

The aim of the present study was to provide a more fine-grained characterization of linguistic acthood and its neurocognitive ramifications by examining the role of “volitionality” as a key feature of prototypical actors.

Actorhood and Volitionality: A Cross-linguistic View

In English, states of affairs such as (1) and (2) are encoded in a grammatically identical manner. Prima facie, this appears to suggest that linguistic structure is primarily attuned to encoding causality or the “starting point” of an event (MacWhinney, 1977): the protagonist, an old man

previous position (order of events)

... is treated identically whether he volitionally causes the event (example 1) or experiences the event (example 2). In many languages, by contrast, non-volitionality of an actor can be grammatically encoded, for example via dative case marking as in example (3) from Tamil:

(1) The old man killed Mary.
(2) The old man loved Mary.
(3) Tha man ney Marra.[Old man knows Guy.]

Similar structures occur in a range of other languages, e.g. Hlubi, Japanese, Icelandic, and Russian. This recurring pattern suggests that volitionality may be a key feature in the definition of linguistic actors, since non-volitional actors are consistently flagged with additional morphological marking.

Previous Neurocognitive Findings

Previous studies examining the processing of non-volitional actors have focused on inanimate actors. In this regard, it has been demonstrated for several languages (including German, English, Chinese and Tamil) that inanimate actors engender an N400 effect in terms of event-related brain potentials (ERPs) and that this effect can be reduced neither to lexical differences between animate and inanimate nor to the infrequency of inanimate Actors for (an overview, see Bornkessel-Schlesewsky & Schlesewsky, 2009).

However, inanimate actors are not only non-volitional but also lack other prototypical actor properties such as sentience and the capability for autonomous movement (Primus, 1999).

Previous findings on inanimate actors are thus not suited to isolating the individual actor characteristics that are particularly important for the cognitive definition of a prototypical actor.

The aim of the present study was to isolate the neurophysiological response to non-volitional actors and compare it to that for inanimate actors. To this end, we examined the processing of “dative subject” constructions in Tamil (example 3).

Participants listened to question-answer pairs such as those in Table 1. The context questions ensured that dative arguments would be interpreted as actors rather than as indirect objects. All sentence types were also presented in a neutral context.

The critical dialogues were interspersed with a range of fillers including intrasentential sentences, transitive sentences with a dropped subject and sentences with dative indirect objects.

Participants:
30 right-handed, native speakers of Tamil from India, mostly students living in Germany at the time of the experiment.

Materials:
• 72 sets of the conditions in Table 1, subdivided into two lists of 38 sentences each (per condition).

Each list was interspersed with 576 filler sentences and presented in two experimental sessions.

Procedure:
• Participants were presented with dyads of question-answer pairs via loudspeakers.

After each dialogue, participants answered a comprehension question.

EEG Recording and Preprocessing:
• 25 Ag/AgCl-electrodes placed according to the international 10-20 system (ground: AFz, reference-left mastoid, re-referenced to linked mastoids offline).

• EEG data were filtered with a 0.3-20 Hz bandpass (offline) in order to remove slow signal drifts.

Results

When a dative-marked noun was unambiguously designated as a non-volitional actor by the context, it engendered a broadly distributed negativity (N400) followed by a late positivity in comparison to when the acoustically identical target sentence was presented in a non-specific context (Figure 1). Notably, this effect only occurred for dative-initial sentences.

Figure 1: Grand average ERPs timedocked to the onset of an animate non-volitional actor (“dative subject”, onset at the vertical bar) in sentence-initial position for specific (SPEC) vs. non-specific (NEUT) contexts. Negativity is plotted upwards.

In contrast to the results for non-volitional (dative) and inanimate (nonomatic) actors, ERPs to dative indirect objects and inanimate nominatives were not modulated by context, thus attesting to inanimate actors engaged a qualitatively similar negativity (Figure 2), though for a non-specific vs. specific context: This effect was only observable for inanimate nominatives in the second position, i.e. for inanimate nominatives preceded by an animate actor.

Non-volitional animate actors (dative subjects) engaged an N400 - late positivity pattern when they occurred as the clause-initial argument in a target sentence following a specific context question. This result attests to the language comprehension system’s reluctance to analyse an animate dative as a non-volitional actor (dative subject) as such an interpretation appears to require both contextual and word order support (dative subject typically occurs in the clause-initial position). This is in line with the proposal that animate actors are preferentially interpreted as volitional agents via a pragmatic reference (Holisky, 1987).

The assumption that, in addition to realising non-prototypical actors, the dative subjects in our experiment conflicted with a pragmatic preference is supported by the observation of a late positivity. These effects have been associated with pragmatic inferences, as required in situations of reference transfer such as the ham sandwich over in the corner wants another coffee (Schumacher, to appear).

Inanimate actors engaged a qualitatively similar negativity effect (N400) to non-volitional actors. This effect was observably in a non-specific vs. a specific context, i.e. when the inanimacy of the actor argument was not known in advance, and when the inanimate nominative argument was unambiguously identifiable as an actor because it was preceded by an accusative.

Discussion

Our findings suggest that volitionality plays a central role in the definition of a prototypical actor. Non-volitional animate actor arguments engender a qualitatively similar negativity effect (N400) to inanimate actors, thereby indicating that the language processing system’s response to animate actors is conditioned by their lack of volitionality as opposed to their incapacity for autonomous movement or sentence. The additional late positivity observed for non-volitional animate actors, likely reflects a pragmatic preference for animate actors to be interpreted as volitional.

The neural language comprehension system thus appears to be attuned to volitionality as a key feature of acthood: non-volitional actors are penalised and, conversely, animate event participants are preferentially interpreted as volitional (i.e. responsible for their actions).

Conclusion

References


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