



Making sense of Kafka: Structural biases induce early sense commitment for metonyms



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ARTICLE INFO

Article history:

Received 7 May 2013

revision received 10 June 2014

Available online 12 July 2014

Keywords:

Sentence processing

Metonymy

Polysemy

Eye tracking

Underspecification

Thematic role assignment

ABSTRACT

Prior research suggests that the language processor initially activates an underspecified representation of a metonym consistent with all its senses, potentially selecting a specific sense if supported by contextual and lexical information. We explored whether a structural heuristic, the *Subject as Agent Principle*, which provisionally assigns an agent theta role to canonical subjects, would prompt immediate sense selection. In Experiment 1, we found initial evidence that this principle is active during offline and online processing of metonymic names like *Kafka*. Reading time results from Experiments 2 and 3 demonstrated that previous context biasing towards the metonymic sense of the name reduced, but did not remove, the agent preference, consistent with Frazier's (1999) proposal that the processor may avoid selecting a specific sense, unless grammatically required.

Published by Elsevier Inc.

Introduction

Interpreting polysemes requires that the language processor integrates sentential information with lexical and semantic knowledge to choose one sense of a word from among many, possibly dozens of, related senses (Zipf, 1945). For example, it must be able to entertain the possibility that the word *Vietnam* may refer to a country, a war, a group of people, a government, a United Nations delegation, or a soccer team, and then utilize some salient piece of information to select the correct meaning in context (Cruse, 1986; Nunberg, 1979). Despite the availability of multiple related senses for polysemes, the language processor often seems to avoid simply committing to the most frequent sense, in contrast with homonymous words like *bank* (e.g., Frazier & Rayner, 1990, cf. Duffy, Morris, &

Rayner, 1988; Swinney, 1979). In this paper, we aim to demonstrate that syntactic position has a powerful and immediate impact on whether a specific interpretation is selected. In particular, we present evidence from three experiments supporting the view that the language processor utilizes information from a default structural heuristic to make immediate sense selection decisions, but delays when faced with weaker contextual information.

Metonymy

Metonyms are a type of polyseme, a word with two or more senses (i.e., related meanings). For regular metonymy, it is commonly thought that there is a single base sense and one or more related senses derived via various types of metonymic rules (Nunberg, 1995, 2004). From among the several views concerning how related senses are stored and accessed during real time processing (see Frisson & Pickering, 2001, or Frisson, 2009, for review), we concentrate on the *Underspecification Model*, in which the language processor accesses the meaning of a polyseme in two stages (see Frazier & Rayner, 1990; Frisson, 2009; Frisson & Pickering, 1999, 2001, 2007,

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among others). Upon first encountering a polysemous word, the processor activates a semantically underspecified representation, in which certain, specific semantic features of the lexical representation go unexpressed in favor of a more general, vague, or nonspecific representation. This underspecified representation facilitates equal access to all senses of the polysemous word, so that any non-literal senses are no more difficult to access over its literal sense. Second, the processor selects a specific sense consistent with the available contextual and lexical information, if required. This secondary ‘homing-in’ stage is affected by several factors, including the importance of the word in the sentence, the strength of contextual information, as well as the demands and requirements of the task, although the language processor may elect to forgo this stage if such factors are not sufficiently compelling (Frisson, 2009).

Evidence for semantic underspecification of polysemes was observed by Frazier and Rayner (1990), who found processing costs for homographs like *pitcher*, but not for polysemes like *newspaper*, when subsequent material supported a subordinate sense. Frisson and Pickering (1999) compared contextually relevant place-for-institution interpretations (*convent*) against those with unfamiliar place-for-institution metonymies (*stadium*), finding processing costs only for unfamiliar metonymies. Later work with producer-for-product metonymies suggests that the costs associated with processing unfamiliar metonyms are effectively mitigated by prior supporting context (Frisson & Pickering, 2007). Further evidence for underspecified semantic representations comes from the finding that polysemous words show a processing advantage over homonyms across a variety of paradigms, including lexical decision (e.g., Klepousniotou, 2002; Klepousniotou & Baum, 2007; Williams, 1992), eye movements (e.g., Frisson & Frazier, 2004) and magnetoencephalography (Beretta, Fiorentino, & Poeppel, 2005), though there are other interpretations of such effects (Foraker & Murphy, 2012; Klein & Murphy, 2002; see also Pykkänen, Llinás, & Murphy, 2006 for the nuanced view that individual senses are represented on distinct nodes under a single abstract representation of the polyseme).

One concern that has been raised (see Foraker & Murphy, 2012, for discussion) with the Underspecification Model is that, in studies such as Frazier and Rayner (1990) and Frisson and Pickering (1999), the central evidence presented as support for the model manifests in the form of null results. Even though others (Frisson & Pickering, 2007; McElree, Frisson, & Pickering, 2006) show that readers are sensitive to closely related manipulations like complement coercion (Jackendoff, 1997; Pustejovsky, 1995), it remains a possibility that there is a subtle processing cost for accessing the non-literal sense, and that the disambiguating contexts manipulations used were not strong enough to produce an effect. The studies presented below address this concern indirectly: accessing the non-literal sense of a regular metonym is shown to be costly in one syntactic position, but not another.

Homing in and contextual strength

We assume that selectional information from a verb prompts the processor to select a specific sense of such

metonyms, and it does so without penalty. We concentrate here on producer-for-product metonymy, in which the name of an author or artist like *Kafka* refers not to the literal individual Kafka, but to the works associated with the individual: here, Kafka’s writings. For instance, the verb *read* in *The students read Kafka* subcategorizes for a readable object, initiating sense selection for the metonymic, literature sense of *Kafka*. We assume an early stage of lexical access in which an underspecified representation, consistent with both literal and metonymic senses, is activated prior to homing in. We posit that at this stage there is no cost for accessing the metonymic interpretation over controls supporting the literal sense, as in *The students met Kafka* (Frisson & Pickering, 1999, 2001). Other sentence contexts may leave the metonym unresolved, as in *The students discussed Kafka*, where either sense is permitted; as such, the processor may *opt out* of a finer sense selection process in certain cases. Of course, the processing system may elect to use more general discourse context, e.g., in a situation that primes or otherwise supports one specific sense, for further sense selection.

Numerous questions regarding sense selection processes remain. Can other types of linguistic information besides subcategorization requirements tempt the processor into making an immediate sense selection? Or is the processor required to select a particular sense only when it is forced to by specific lexical selection requirements? We discuss two possibilities below.

Only lexical constraints mandate sense selection

On one view, the language processor will be forced to make an immediate sense selection only if the metonym is subject to strong and local lexical constraints (as in subcategorization requirements) at the point of interpretation. Under this more restricted account, the processor will be forced to select a specific sense only in such cases, possibly forgoing the sense selection stage in ambiguous cases like *The students discussed Kafka*, mentioned above.

Appealing as such a model is, however, evidence from prior experiments suggests that the processor may be tempted to rule out certain sense interpretations before reaching subcategorization restrictions, as in lexical processing more generally (see, e.g., Morris, 2006, for review). For example, experiments probing the resolution of number ambiguities (Bader & Häussler, 2009), and distributed and collective readings of noun phrases (Frazier, Pacht, & Rayner, 1999) indicate that the processor commits to highly specific interpretations of words before reaching a disambiguating verb. While it remains possible that metonyms are a special case, we believe it is likely that other types of constraining information entice the processor to immediately select for a specific sense, as well. Indeed, the experiments below show that grammatical constraints, in addition to purely lexical constraints, may tempt the processor to select a more specific sense.

Only grammatical constraints mandate sense selection

Another possibility is that the processor must respond to syntactic decisions by immediately committing to

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