

## RESULT and PURPOSE relations with and without ‘so’

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Received 11 April 2013; received in revised form 2 May 2014; accepted 7 May 2014

Available online



### Abstract

Coherence relations differ in their tendency to be explicitly marked. How such relations are recognized and what determines their tendency to be marked is a matter of debate. The connective *so* represents a special case: it can be used to signal RESULT coherence relations and the more specific cause-effect relation of PURPOSE, but overt marking has been claimed to be required for PURPOSE and optional for RESULT. We present written corpus and experimental results on the use of *so* that show that RESULT and PURPOSE with this connective can be reliably distinguished from each other, and that the modal auxiliaries *can/could* and *will/would* are strongly associated with PURPOSE. In the corpus study, PURPOSE always occurs with explicit *so*, while RESULT is often left unmarked. These results are in line with recent claims based on annotated corpus data that implicit (unmarked) and explicit (marked) coherence relations can be qualitatively different (e.g. Sporleder and Lascarides, 2008; Webber, 2009). However, in our experiments using strongly purposive event pairs, 35–40% of examples were identified as PURPOSE without a connective or a modal verb cue. We argue that the difference between the corpus results and the experimental results can be explained as a difference between the tasks of speakers and hearers, and we outline an explanation for how marking can be obligatory for PURPOSE relations and yet optional for RESULT. We also propose that nonveridicality seems to play a key role in a marking requirement for PURPOSE, and explain why the unusual marking pattern found makes it difficult to give a pragmatic account similar to more well-known language asymmetries.

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**Keywords:** Coherence relations; PURPOSE; RESULT; Marking; Implicit relations; (Non)veridicality

### 1. Introduction

In order to correctly understand texts, readers<sup>2</sup> need to recognize the coherence relations holding between discourse segments. Sometimes these relations are explicit, such as the RESULT coherence relation in (1) and the PURPOSE coherence relation in (2), where the relation is unambiguously marked by multi-word linguistic expressions like *as a result* and *in order to*:

- (1) **R**<sup>3</sup>: It rained all night and **as a result** the streets are wet.  
(2) **P**: He exercises a lot **in order to** keep his weight down.

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<sup>2</sup> We believe that the relationships and features found also apply to dialogue and speakers, but for simplicity we will refer to texts and readers in the paper.

<sup>3</sup> We use **R** at the beginning of an example to signal a RESULT relation and **P** to signal a PURPOSE relation for clarity.

However, marking can also be ambiguous. For example, the connective *so* can be used to signal both RESULT (3) and PURPOSE (4):

- (3) **R:** Mathilda often borrows her sister's clothes, **so** her sister gets upset with her.  
 (4) **P:** Mathilda often borrows her sister's clothes, **so** she can look younger and more attractive.  
 (5) **R:** Mathilda often borrows her sister's clothes. Her sister gets upset with her.

The above examples already introduce two of the major challenges in coherence relation research. First, some explicit markers are ambiguous and can be used to signal more than one coherence relationship. These can be very different relations that are easy to disambiguate (e.g. *since* is both a temporal and a causal marker), but the two usages can also be closely related. This is the case with RESULT and PURPOSE relations marked by *so*. Both (3) and (4) have the same event as their first argument.<sup>4</sup> They differ in the features of the event in the second argument and in how the first and second events relate to each other. Our first research question therefore addresses the problem of connective disambiguation by looking at the nontrivial case of distinguishing RESULT from PURPOSE: what linguistically tangible features in the conjoined events and the relationship between the event pairs allow readers to disambiguate between a RESULT and a PURPOSE relationship?

The relationship between overtly marked relations like (3), and implicit relations with no explicit marking, like (5), is matter of extensive debate in discourse coherence relation research. Many believe that understanding the relationship would give a definitive answer about the nature of discourse relations in general. In a neutral characterization of coherence relations (see e.g. Webber et al., 2012) they are discourse structures holding between two abstract objects (Asher, 1993), e.g. propositions, facts, events or situations, which are expressed by two discourse segments. These can be conjoined clauses, separate sentences and in some theories even text segments. Renkema (2004) argues that coherence relates to “the connections which can be made by the reader or listener based on knowledge outside the discourse”, linking coherence relation recognition to the recognition of lexical and world knowledge. There are two competing views of the nature of these discourse structures. One view considers discourse relations to be ontological primitives (Asher and Lascarides, 2003; Asher, 2013). The competing view considers them to be pragmatically derived meanings, whose ambiguous or unmarked interpretations can be explained with a neo-Gricean accounts of cooperation and rational interpretation (Zeevat, 2006; Blakemore and Carston, 2005; Jasinskaja, 2007, 2013).

The RESULT–PURPOSE distinction when marked with *so* is a particularly interesting case of two different (albeit closely related) coherence relations because the theoretical literature has claimed that PURPOSE relations need overt marking, while RESULT does not require explicit cues. Our second research question investigates whether PURPOSE relations indeed require explicit connectives and, whether or not there is a qualitative difference between explicitly marked and implicit versions of PURPOSE and RESULT relations.

Based on proposals found in the theoretical literature we began with a corpus study, looking at naturally produced RESULT and PURPOSE relations with and without *so* as a marker in two corpora: the British National Corpus (BNC) (Hoffman et al., 2008) and the Penn Discourse Treebank (PDTB, Prasad et al., 2007). Combining these results with earlier proposals in the theoretical literature we then carried out six experiments on the interpretation of RESULT and PURPOSE events, as well as events that are ambiguous between a RESULT and PURPOSE relation, with and without *so*. Since our corpus results suggested that *can/could* or *will/would* are reliable markers of PURPOSE relations, we examined this systematically in our experiments. In light of the results obtained we conclude that *can/could* are indeed strong PURPOSE indicators, even if no connective is present, contrary to many theoretical claims. Moreover, the use of an explicit *so* leads to more event pairs intended to be interpreted as PURPOSE being classified as such, but the presence or absence of *so* has little effect on RESULT relations. We also found that when the relationship between event pairs is stereotypically purposive, but there is no explicit marking with *so* or *can/will*, subjects still recognize examples as PURPOSE about 40% of the time, even though our corpus study suggests that PURPOSE needs to be explicitly marked with a connective like *so*. We argue that this result stems from the difference between production and comprehension, and suggest that the corpus findings may be the corollary of a strong requirement to explicitly mark nonveridical relations, and that the experimental results may instead be a consequence of readers being able to use world knowledge in their interpretation. We further discuss how to account for the marking patterns of the two relations and conclude that most standard neo-Gricean approaches are unable to deal with this type of pattern. Finally, we briefly sketch how a similar pattern of marking has been dealt with within optimality theory (OT, Blutner, 2000; Beaver and Lee, 2004; Hendriks, 2014) and in the conclusions section we make explicit how our work and results are relevant for several different areas of coherence relation research.

<sup>4</sup> We follow the convention of the Penn Discourse Treebank (Prasad et al., 2007) by referring to the connective marked clause/sentence of a coherence relation as the second argument, and the other clause/sentence as the first argument.

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