



The interpretation of indicative and subjunctive concessives

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ABSTRACT

Using a priming paradigm in the context of a reading comprehension task, the possibilities that people keep in mind in order to understand indicative and subjunctive concessive sentences were examined and compared to those from factual and counterfactual 'if A, not-B' conditionals. The length of time it took people to read conjunctive descriptions (i.e., A and B, A and not-B, not-A and B, not-A and not-B) after they had been primed by the different types of linguistic form was measured. The results suggest that, whereas indicative 'even though' concessives and 'if, not' conditionals are understood by keeping in mind just a single possibility ('A and B' and 'A and not-B', respectively), the initial representations of subjunctive 'even if' concessive-conditionals and 'if, not' counterfactuals are compatible with a multiple-model representation. The implications of these results are discussed within the mental models framework.

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1. Introduction

Whereas conditionals have long been recognised as central to human thought and extensively studied by both philosophers (e.g., Edgington, 1995) and psychologists (e.g., Evans, Newstead, & Byrne, 1993; Johnson-Laird & Byrne, 2002), concessives have received much less attention in these fields. The most natural way to communicate a concessive assertion is by using a grammatical form such as *even though* A, B, e.g., 'even though it rained a lot, we enjoyed our holiday'. Semantically, there is a general consensus that factual concessive sentences have two main properties (see, e.g., Flamenco, 1999). First, there is a contrasting relationship between the propositional content of the clauses connected by the connective; second, they seem to cancel a reader or listener's presupposition about the causal link between them, e.g., 'normally, if it rains, people do not enjoy their holiday' (Rodríguez-Rosique, 2001). So, from the linguistic perspective, the comprehension of such sentences would imply the representation of the contrasting relation between the expressed clauses, but also the cancelled expectation about them. However, in the field of conditional reasoning, previous studies show that the cancelled presupposition is not necessarily represented by reasoners (see, e.g., Handley & Feeney, 2004, 2007; Moreno-Ríos, García-Madruga, & Byrne,

2008). In these studies, the mental representation that people construct when they understand concessive sentences is indirectly apprehended from the inferences that reasoners make from these statements.

Our aim was to obtain more direct evidence than that obtained from traditional deductive tasks about the possibilities people keep in mind in order to understand the meaning of indicative 'even though A, B' and subjunctive 'even if A, B' concessives (in Spanish, the indicative and subjunctive *aunque*¹ A, B), particularly, about the presence of the cancelled presupposition. For this purpose, we used a priming methodology. The procedure is based on the priming effect (Meyer & Schvaneveldt, 1971), that is, a reduction in the time required to respond to a target stimulus when the same stimulus or a related one has been previously processed. Priming is generally explained by assuming the existence of a mental representation activated by the first stimulus, which facilitates processing of the subsequent stimulus. It has been used in many areas of psychology (e.g., see Glenberg, 1997, in comprehension; see Fazio, Jackson, Dunton, & Williams, 1995, in social cognition) to evaluate which mental representation is activated. More recently, the priming paradigm has also been used in reasoning studies (see, e.g., Espino & Santamaría,

¹ We used the Spanish connective *aunque*. This subordinating conjunction is the standard case of connective that is commonly used to express concessivity (see, e.g., Flamenco, 1999; Montolio, 1999), both in indicative concessives and in subjunctive concessive conditionals. It corresponds well to English subordination conjunctions that usually introduce concessive meanings, such as *although*, *even though* (a stronger form of *although*) and *even if* (see Moreno-Ríos et al., 2008, for details of correspondence between connectives in the two languages).

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2008; Espino, Santamaría, & Byrne, 2009; Moreno-Ríos & García-Madruga, 2002; Santamaría & Espino, 2002; Santamaría, Espino, & Byrne, 2005). The length of time it takes to understand an assertion after it has been primed by different concessive and conditional formulations provides valuable information about what is kept in mind. The findings are discussed within the framework of the mental model theory (Johnson-Laird & Byrne, 2002).

1.1. The mental model theory

Johnson-Laird and Byrne (Johnson-Laird, 1983; Johnson-Laird & Byrne, 1991, 2002) formulated a theory of the meaning of conditionals, of how this meaning is modulated by semantics and pragmatics, and of its use in reasoning. There is considerable evidence to support their view (see Johnson-Laird, 2006, for a review). Mental model theory holds that reasoning is based on semantic processes of constructing and manipulating mental models representing situations according to the premises. It assumes that reasoners use the meaning of premises and general knowledge to represent the different possibilities under consideration and keep them in mind in order to reach a conclusion. Several key principles guide the possibilities that people consider when they understand a conditional (Johnson-Laird & Byrne, 2002). First, the construction of mental models is guided by the *principle of truth*: individuals tend to construct mental models that represent explicitly only what is true and not what is false. For instance, for the conditional 'if A, then B' people might construct the following true possibilities: A and B, not-A and B, not-A and not-B. Second, for most conditionals, several possibilities could be true, but people think about as few alternatives as possible because of the limitations of their working memories and, accordingly, they do not keep in mind the full set of true possibilities. The initial representation of basic conditionals normally makes explicit only the possibilities whose antecedents are true, while only implicit mental models are constructed for the possibilities whose antecedents are not satisfied (*principle of implicit models*). However, although people tend to keep in mind only true possibilities (Espino et al., 2009), they can think about what might have been because they can envisage possibilities that were once true but are not so any longer (see Byrne, 2005, for a review). For instance, initially most people mentally represent a factual 'if A, then B' conditional by thinking about just the single possibility that corresponds to the putative facts (A and B), but during their comprehension of a counterfactual 'if A had been the case, then B would have been the case' conditional, they think about two possibilities from the outset, noting one as the 'facts' (not-A and not-B) and the other as 'imagined' (A and B) possibilities (Johnson-Laird & Byrne, 2002). Existing evidence that supports this account lies in the observation that (1) people make different frequencies of inferences from counterfactual and factual conditionals (Byrne & Egan, 2004; Byrne & Tasso, 1999; Thompson & Byrne, 2002), and (2) counterfactuals prime people to read the descriptions of both factual and imagined possibilities, whereas factual conditionals prime the description of only the factual possibility (Santamaría et al., 2005; see also De Vega, Urrutia, & Riffo, 2007; Stewart, Haigh, & Kidd, 2009).

The mental model view accepts that more realistic and everyday conditionals, for which background knowledge is relevant, are subject to mechanisms that Johnson-Laird and Byrne (2002) describe as semantic and pragmatic modulation. The background knowledge can help people to think about more possibilities, it can help them to enrich those possibilities, and it can also eliminate possibilities from a model set. One prediction the theory makes is that different contents and the context of the utterance lead to different interpretations of conditionals, and the mental models that people construct would thus differ in the possibilities that they keep in mind. For instance, an 'if A, then B' conditional

may be interpreted by reasoners as consistent with two possibilities (A and B, not-A and not-B) in a biconditional interpretation; and even with a third possibility (not-A and B) in a conditional interpretation. Likewise, the initial representation that people construct from conditionals may be influenced by the type of linguistic expression used, particularly the connective used to describe the conditional relation (e.g., Byrne, 2007; Egan, García-Madruga, & Byrne, 2009; García-Madruga, Carriedo, Moreno-Ríos, Gutiérrez, & Schaeken, 2008; García-Madruga, Moreno-Ríos, Quelhas, & Junos, 2009). Different connectives may convey different nuances of meaning, which ensure that individuals represent the events described in subtly different ways and make different information available in their initial representation (e.g., Johnson-Laird & Byrne, 1991). Our interest is the representation of concessive formulations.

1.2. Indicative and subjunctive concessive sentences

The connective 'even though' emphasises the concessive nature of the sentence it introduces (Haspelmath & König, 1998), e.g., 'even though it rained a lot, we enjoyed our holiday'. It seems to mean something very different from the corresponding indicative 'if' conditional. Semantically, concessive sentences indicate that the situation described in the main clause (B) is contrary to what is expected in relation to what is expressed in the subordinate clause (A) (Flamenco, 1999; König, 1986; Rodríguez-Rosique, 2001). For instance, the connective 'even though' introduces the idea that 'we enjoyed our holiday despite the fact that it rained a lot'. Moreover, the sentence may lead the reader or listener to recover a contextual assumption like, e.g., 'if it rains a lot, normally, people do not enjoy their holiday', but the connective seems to cancel the presupposition. This constituent part of the meaning of the concessive can be captured by a conditional of the form 'normally if A, not-B' (König, 1986). A second basic property of factual concessive sentences is that they entail the propositional content of both the main and the subordinate clauses (König, 1985). Logically, these two constituent parts of the meaning of the concessive can be formulated as follows (see, e.g., Flamenco, 1999; König, 1986): *even though A, B = [if A, not-B] and [A (true) & B (true)]*. The cancelled presupposition is expressed by the 'if, not' conditional, whereas the contrasting relation between the propositional content of the clauses connected by the connective is expressed by the logical connective '&', equivalent to the linguistic connective 'and'. Both the concessive sentence and the conditional are true if A and B are true, but false in the case that either A or B is false. The truth conditions of the concessive seem to be captured by 'A and B'. However, this is missing an important point, since the structure of 'A and B' is one of coordination and, by contrast, the concessive sentence involves subordination. It seems doubtful whether the conjunction, a case of coordination, can accurately capture the meaning expressed by utterances of sentences involving subordination (Iten, 1998).

In the field of conditional reasoning, prior research suggests that concessives appear to make available in the initial set of models more information than just the affirmative case (A and B). Evidence comes mainly from the finding that people tend to make different frequencies of inferences from indicative 'even though' and 'although' concessives (Byrne, 2007; Moreno-Ríos et al., 2008, Experiment 2) and subjunctive 'even if' concessive conditionals (e.g., Handley & Feeney, 2004, 2007; Moreno-Ríos et al., 2008) compared to indicative 'if' conditionals. Linguists emphasise the concessive nature of subjunctive 'even if' sentences such as 'even if it had rained a lot, we would have enjoyed our holiday' (e.g., Dancygier, 1998; Flamenco, 1999; König, 1986; Schwenter, 2001), called semifactuals by philosophers (e.g., Chisholm, 1946). They possess the characteristic of hypotheticality that is typical

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