

The concepts of IF in natural language: An experimental approach

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1 Background

The concept of conditionality is central to human thought and action, which is manifested by a rich repertoire of conditional expressions in natural language. A conditional sentence of the form, for example, ‘If P, Q’, is constructed by a conditional connective *if*, an antecedent (P) and a consequent (Q). In the literature of formal semantics and pragmatics, the meaning contribution of conditional connectives (CCs) has been long debated. According to the restrictor analysis (Kratzer 1986/1991), English *if* is an operator with no semantics on its own and *if*-clauses are used to restrict overt or covert modal operators or generic frequency operators. This analysis has inspired many insightful follow-up studies through which it becomes clear that the interpretation of conditional sentences and their semantic/pragmatic properties are subject to a process of semantic and pragmatic modulation. Among others, CCs can influence the interpretation of conditional sentences in various ways. For example, while a conditional sentence can get a counterfactual reading by use of past perfect in English or through a combination of present perfect and subjunctive mood in German, counterfactuality can be realized by specific CCs in Mandarin conditional sentences (e.g. Jiang 2019). Moreover, it has been observed that CCs can turn a conditional sentence into a bi-conditional one semantically or (arguably) pragmatically (e.g. Geis and Zwicky 1971 and subsequent works), that CCs can express non-at-issue speaker attitudes towards the antecedent and/or the consequent (e.g. Visconti 1996). However, the existing results are far from conclusive. In this paper, I will report a series of recent studies on the modulating role of CCs in conditional sentences and their effect in the discourse domain.

2 Speaker comment of CCs

The first set of case studies I will report are concerned with the non-at-issue speaker attitudes that CCs convey across different languages.

In Author1, I report a case study of the CCs *wenn/falls* ‘if/when, if/in case’ in German. Using distributional evidence and experimental methods, I show that in addition to the conditionality, *wenn* and *falls* differ in lexical pragmatics: They express different degrees of speaker commitment (i.e., credence) toward the

modified antecedent proposition at the non-at-issue dimension. This contrast can be modeled using the speaker commitment scale (Giannakidou and Mari, 2016), i.e., *More committed* < *WENNp, FALLSp* > *Less committed*.

In Author2, I report a case study of CCs in Mandarin focusing on *ruguo*, *yaoshi*, *jiaru*, *wanyi*. The results show that in terms of speaker commitment, neither *jiaru* nor *yaoshi* differs from *ruguo*, 2) *wanyi* and *yaoshi* do not differ, but 3) *wanyi* differs significantly from *ruguo* and from *jiaru* in that it expresses a lower speaker commitment than the latter two.

The theoretical background and methodological details of the studies will be presented in the talk.

3 Semantics processing and discourse expectations of CCs

The second set of case studies I will report are concerned with how lexical semantics and pragmatics of CCs impact the interpretation of conditionals with regard to (bi)conditionality and how this shapes discourse expectations.

In Author3, the meaning and processing of the German CCs including *wenn* ‘if’ and *nur wenn* ‘only if’ are investigated. In Experiment 1, participants read short scenarios containing a conditional sentence (i.e., If P, Q.) with *wenn/nur wenn* ‘if/only if’ and a confirmed or negated antecedent (i.e., P/not-P), and subsequently completed the final sentence about Q (with or without negation). In Experiment 2, participants rated the truth or falsity of the consequent Q after reading a conditional sentence with *wenn* or *nur wenn* and a confirmed or negated antecedent (i.e., If P, Q. P/not-P. // Therefore, Q?). Both experiments showed that neither *wenn* nor *nur wenn* were interpreted as biconditional CCs. Modus Ponens (If P, Q. P. // Therefore, Q) was validated for *wenn*, whereas it was not validated in the case of *nur wenn*. While Denial of the Antecedent (If P, Q. not-P. // Therefore, not-Q.) was validated in the case of *nur wenn*, it was not validated for *wenn*. The same method was used to test *wenn* vs. *unter der Bedingung, dass* ‘on condition that’ and *vorausgesetzt, dass* ‘provided that’. Taken together, the results show that in German, *unter der Bedingung, dass* is the most likely candidate of biconditional CCs whereas all others are not biconditional.

In Author4, we assume that different types of conditionals in natural language modulate the meaning of the conditional construction in various ways. To test differences in processing and interpretation of conditionals, as well as the effect of conditionals on discourse expectations, we compared conditionals with the CCs *wenn* ‘if’ vs. *nur wenn* ‘only if’ in German. Assuming that the conditional ‘Only if P, Q’ entails the primary meaning component ‘if not-P, not-Q’ (Herburger, 2015, 2019), while the bare ‘If P, Q’-conditionals entails ‘if P, Q’ (with no particular conclusion being triggered if the antecedent P was not the case), we tested participants’ discourse expectations in stories that contain ‘If/Only if P, Q’-conditionals plus the minor premise ‘not-P’. We hypothesized

that in ‘Only if’-conditionals, participants expect a continuation containing ‘not-Q’, while in conditionals containing bare ‘If’, participants do not generate particular expectations about the discourse continuation. In a self-paced reading study, we found that reading times of discourse continuations are influenced by the type of conditional used, with reading times for not-Q continuations being read faster after *nur wenn* conditionals than after *wenn* conditionals. We have also conducted an EEG study using the same materials with the data analysis ongoing. These results show that comprehenders form distinct predictions about discourse continuations based on differences in the lexical semantics of the tested CCs, shedding light on the role of CCs in the online interpretation of conditionals in general.

4 Summary

The studies to be reported show that CCs have an important role in modulating the interpretation of conditionals and in shaping discourse expectations. In the talk, I will take it from here and add a linguist’s perspective of the concept *if* in general.

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