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Pragmatic enrichment in the processing of coordinated sentences by Chinese learners of German

The meaning of conjunctive coordinators such as *and* in English or *und* in German is more complex in natural languages than the logical conjunctive operator ∧. The logical operator ∧ conjoins the truth-conditional meaning of two propositions symmetrically as the order of the conjuncts does not affect the meaning of the coordinated propositions. For example, the two logical expressions $p \land q$ and $q \land p$ have an identical truth-conditional meaning but sentences conjoined by natural linguistic coordinators may have asymmetric meanings.

(1a) Anna betrat das Klassenzimmer und Marie öffnete das Fenster.
(1b) Marie öffnete das Fenster und Anna betrat das Klassenzimmer.

Although (1a) and (1b) describe the same events, they seem to have two different temporal sequences, with the event in the first conjunct being interpreted as taking place earlier than the one in the second conjunct. In addition to the truth-conditional meaning, these sentences are pragmatically enriched as being temporally successive.

However, this does not apply to all languages. For example, in Chinese, there is no semantically neutral conjunctive coordinator that is compatible with an implicit, temporally successive relation between the events in the conjoined sentence. It is, therefore, not possible to use an underspecified coordinator like *und* in (1) to conjoin two clauses in Chinese. Instead, such sentences should be coordinated either paratactically or the temporal sequential meaning must be indicated explicitly using the semantically loaded conjunction *ranhou* 'then'.

In view of the differences between German and Chinese regarding the meaning of coordinated sentences, the question arises as to how the implicit temporal sequence in sentences such as (1) is processed by Chinese learners of German as a foreign language (GFL) whose first language (L1) does not have an equivalent structure.

Current theories of pragmatics give different explanations for asymmetric conjunction, among which Levinson's theory of generalised conversational implicature (GCI) and relevance theory are the most important ones. In terms of the source of asymmetric meanings, GCI theory takes the position that the temporally successive reading is the default interpretation, unless otherwise specified due to a mechanism of conjunction buttressing, while in relevance theory, no interpretation has a default status and the temporal reading will be more accessible when a cognitive script with the stereotypical order of events is available. In the context of second language (L2) pragmatics, GCI theory proposes that the inference mechanism for conjunctively coordinated sentences is gradually acquired through learning while relevance theory turns to the innate natural processing path of the human cognitive system and sees no fundamental distinction between L1 and L2 in terms of the processing of pragmatic inferences.

In the present study, we use behavioural methods within the framework of experimental pragmatics to answer the following research questions:

1) Are L2 speakers able to enrich coordinated sentences pragmatically even when similar constructions are not available in their L1?

2) Is the temporally successive interpretation the default interpretation or do cognitive scripts also play a role in the processing of coordinated sentences?

Using truth-value judgement tasks, we tested how Chinese GFL learners interpret German coordinated sentences. We recruited participants whose L1 was Chinese and who were learning German as a foreign language. In the experiment, the participants were asked to read German sentences and decide whether the Chinese sentences which followed were correct. The critical items used in the experiment were German sentences that described two events. The critical German materials were divided evenly into two groups: one group of sentences had a corresponding cognitive script for each of them, describing two events in accordance with their stereotypical chronological order, and the other group of sentences had no cognitive scripts. The Chinese sentences that appeared after the German stimuli included the same events but three different types of sentence conjunction were used: the temporal conjunction *ranhou* 'then', the adversative conjunction *danshi* 'but' or parataxis. The sentences with the temporal marker expressed the pragmatically enriched proposition. Judgements of these sentences are directly relevant to the present study as they show whether the participants could recognise the implicit temporal relation in German sentences and accept the enriched proposition.

We collected and analysed the reading times for the German sentences, the reaction times to the Chinese sentences and the truth-value judgements of the participants. The analysis of the reading times indicates that the German sentences with cognitive scripts were read more quickly than the German sentences for which no cognitive script was available. With regard to the reaction times to the Chinese sentences, the processing of a sentence coordinated by the temporal conjunction was faster if a cognitive script was available. The judgements of the Chinese sentences provided by the participants show that the sentences with cognitive scripts were more likely to be judged as correct. For the sentences conjoined by the adversative conjunction and the paratactically coordinated sentences, there was no statistically significant difference in terms of the reaction times and the truth-value judgements between cases with and without cognitive scripts.

The results show that the Chinese GFL learners are able to enrich coordinated sentences in their L2 as having asymmetric temporal relations; likewise, the availability of a cognitive script has a facilitating role in the processing of coordinated sentences with implicit temporal sequences. On the one hand, the participants rated the majority of the Chinese sentences coordinated with an explicit temporal marker as being correct, indicating that the original sentences were pragmatically enriched and interpreted as having a temporal successive meaning. By contrast, the sentences with a contrastive conjunction were more frequently rejected, signalling that the participants could distinguish between a plausible relation and an implausible relation between the conjuncts. On the other hand, the present study provides evidence that the temporally successive reading is not automatically the preferred choice. The availability of a cognitive script increased the proportion of affirmative answers to Chinese sentences with the temporal conjunction and reduced the processing times of these sentences.

In conclusion, the study provides evidence that is more in favour of relevance theory, which assumes that pragmatic performance is based on a universal human cognitive system rather than on a language-specific device. According to relevance theory, the processing of sentences with a temporal relation does not depend on an acquired buttressing mechanism but on the interaction between the natural processing path and the cognitive scripts that apply for both the L1 and the L2.

The present study aimed to provide more empirical data that help to choose between competing theoretical approaches. Further studies can include more variables such as L2 proficiency, gender, age and the context of learning German to draw more general conclusions. Technically, eye-movement measurements and electrophysiological techniques can be used to obtain more accurate data in the future.