
Do connectives improve the level of understandability in mathematical modeling tasks?

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Previous studies (e.g. Sanders & Noordman 2000) give reason to assume that the use of connectives has a positive effect on comprehension, as they help to understand discourse relations in a text. However, there is no empirical evidence yet on whether and in which way connectives affect the formation of a coherent mental model when it comes to understanding mathematical modelling tasks. It is also unclear whether certain groups of students may benefit particularly from the use of connectives. Based on previous studies, it can be assumed that students with lower language skills (Becker & Musan 2014) and readers with little prior knowledge and interest in the topic (Kamalski 2007) are the ones to benefit most from the explication of coherence relations through connectives.

For this reason, for this study, six mathematical modelling tasks have been varied to create two identical variants, differing only in terms of whether coherence relations are explicitly expressed by connectives or are expressed implicitly. In order to test which of the two text versions enables 7th to 10th grade students ($n=390$) best to form a proper situation model, the students were asked to firstly solve mathematical tasks on the text. In addition, they were asked to answer so-called bridging inference questions (following McNamara & Kintsch 1996) on discourse relations expressed in the text. Initial evaluations show that students with low language proficiency did indeed perform better on the bridging inference questions when they had read the text version in which the discourse relations were made explicit through connectives. In contrast, students with high language proficiency were able to answer the reading comprehension questions slightly more often if they had read the text version without connectives. The opposite was true when it came to solving the mathematical tasks. Here, the linguistically strong students performed better after reading the more explicit version of the text, while the solution rate of the linguistically weak students even decreased. It seems, therefore, that although linguistically less proficient students benefit from the use of connectives when forming the situation model, they are then unable to use this advantage to solve the mathematical tasks.

References: • Becker, A., Musan, R. (2014). Leseverstehen von Sachtexten: Wie Schüler Kohärenzrelationen erkennen. • McNamara, D. S. & Kintsch, W. (1996). Learning from texts: Effects of prior knowledge and text coherence. *Discourse Processes* 22(3). 247–288. <https://doi.org/10.1080/01638539609544975>. • Sanders, T. J. M. & Noordman, L. G. M. (2000). The Role of Coherence Relations and Their Linguistic Markers in Text Processing. *Discourse Processes* 29(1). 37–60. https://doi.org/10.1207/S15326950dp2901_3.