

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

The Cognitive Consequence of Whitewater: Social Inferences in Text Comprehension

Permalink

<https://escholarship.org/uc/item/9xs3v6c0>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 19(0)

Authors

Schmalhofer, Franz

Elst, Ludger van

Bourne, Lyle E. Jr.

Publication Date

1997

Peer reviewed

The Cognitive Consequence of Whitewater: Social Inferences in Text Comprehension

Franz Schmalhofer (SCHMALHO@DFKI.UNI-KL.DE) (1,2), Ludger van Elst (ELST@DFKI.UNI-KL.DE) (2)
and Lyle E. Jr. Bourne (LBOURNE@CLIPR.COLORADO.EDU) (3)

1) Interdisciplinary Center for Cognitive Studies, D-14469 Potsdam, Postfach 601553, Germany

2) German Research Center for Artificial Intelligence, D-67663 Kaiserslautern, Erwin-Schroedinger Str., Germany

3) Institute of Cognitive Science, University of Colorado, Boulder, Colo 80309, USA

Introduction

Over the last few decades, our newspapers have frequently alerted the general public about potential scandals of their politicians. The following text may serve as an example for the description and structure of such potentially scandalous behaviors.

Shortly before his election, the state governor and his friends started the Whitewater project. His friends supplied the funds for this capital investment. After the project had turned into a financial failure, the governor became quite instrumental in the State Government giving tax deductions to his friends.

When reading a newspaper article of this kind, the readers may wonder whether the politician was indeed cheating on the general public. Cheating behavior is much more easily detected than other sound inferences which have the same structural properties but a less pertinent contents (Gigerenzer & Hug, 1992).

In the current research, we are addressing the question how and when a reader would infer a social inference during the reading of a text. As a social inference, we define a (global) inference about the quality of the interaction of two or more people.

Computational Analysis

In inference generation, one generally distinguishes between strategic inferences, which may depend upon the specific behavioral goals of a reader and the more mundane inferences which are independent of such processing goals. (Graesser, Singer & Trabasso, 1994). Because social inferences are strategic, they are dependent upon the readers' goals and their prior domain knowledge. Through a computational analysis, we identified two possibilities for generating social inferences. 1) In a schema driven approach, some schema about social interactions would trigger a possible inference about cheating. 2) In a more bottom-up driven processing mode, constructive processes which operate on the reader's knowledge base and the text information may yield causal and motivational relations, that were neither stated in the text nor explicitly or implicitly contained in the reader's knowledge base. In other words, these relations emerge from interrelationships between the text and the knowledge base. While schema theories are well developed in cognitive science, the second approach is not yet as thoroughly researched.

We built on Kintsch's (1992) construction-integration theory. This theory assumes that readers construct pluralistic

views of the text. The representations may be inconsistent and redundant. By a subsequent integration process, the contextually most adequate representation is then selected, which has been termed the situation-specific circumscription (Schmalhofer, in press). A social inference would thus result from rather creative processes, consisting of construction and integration phases.

We implemented such a model with a previously developed tool, namely the EKI-tool (Schmalhofer, Franken & Schwerdtner, 1997). EKI stands for the Evolution of Kreative Inferences. The results show that the generation of social inferences requires at least two passes of cognitive processing. Because it requires a relatively large situational scope, which cannot be obtained without the situational abstractions generated only during the first reading, a social inference is thus only obtained on the second reading.

Experiments

We performed two experiments with texts that could imply a scandalous behavior of the protagonist, like a politician making a special deal with some business friends, an athlete intentionally disabling her opponent, a student cheating on his exam, or a scientist faking data. In these descriptions, the personality characteristics, the behavior of the protagonist and the goal achievement were manipulated. The experimental results are interpreted with respect to the proposed model.

References

- Gigerenzer, G., & Gug, K. (1992). Domain specific reasoning: Social contracts, cheating and perspective change. *Cognition*, 43, 127-171.
- Graesser, A. C., Singer, M., & Trabasso, T. (1994). Constructing inferences during narrative text comprehension. *Psychological Review*, 101, 371-395.
- Kintsch, W. (1992). A cognitive architecture for comprehension. In H. L. Pick, Jr., P. van den Broek, & D.C. Knill (Eds.) *Cognition: Conceptual and Methodological Issues*. Washington, D.C.: American Psychological Association, 143-164.
- Schmalhofer, F. (in press) *Constructive Knowledge Acquisition: A Computational Model and Experimental Evaluation*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Schmalhofer, F., Franken, L., & Schwerdtner, J. (1997). A Computer tool for constructing and integrating inferences into text representations. *Behavior Research Methods, Computers & Instrumentation*.