Logical competence and reasoning in natural language.

Maria Spychalska

January 26, 2010

The notion of *logical competence* is used in cognitive psychology, analogously to the notion of *linguistic competence* introduced by Naom Chomsky, to name a specific cognitive mechanism enabling completing logical tasks, for example performing reasoning in natural language. Assuming that human mind is equipped with such mechanism we differentiate between *passive* and *active* logical competence, thus between: ability to *evaluate*, on a basis of given premises, a given conclusion as a correct or incorrect inference and ability to *generate*, on a basis of given premises, a correct conclusion, accordingly.

The traditional approach to logical competence puts the main stress on how logical competence differs from logical correctness and defines the later with respect to classical logic. In the psychological literature it is a widespread view that reasoning is a proceeding according to some pre-established logical laws and thus may be either correct of incorrect – depending on whether it stays in accordance with these laws or not. A list of logical mistakes most frequently made by people (e.g. fallacies of syllogistic reasoning, problems with conditional reasoning, etc.) is usually given together with attempts of explanation why people tend to make these mistakes. Such an approach leads to a conclusion that people in general do not reason logically, and bases on a false conjecture that what is a correct or incorrect reasoning is somehow decided by the laws of classical logic and disobeying these laws is a malfunction of our logical competence mechanism.

In our talk we explain why we reject the traditional view on logical competence and propose to follow the alternative approach formulated by Michiel van Lambalgen and Keith Stenning in *Human Reasoning and Cognitive Science* (2008) according to which logic of reasoning is domain-dependent. The authors propose that human reasoning consists of two stages: *reasoning towards an interpretation* (establishing the domain in which one reasons and

its formal properties) and *reasoning from an interpretation* (following the formal laws that are implied by the fixed interpretation).

We use various experimental data from researches on different sorts of reasoning as well as our own research on reasoning with quantifiers (Spychalska , 2009) to illustrate how the proposed theory may work as a proper model of human thinking.

References

Lambalgen M. van, Stenning K. (2008) *Human Reasoning and Cognitive Science*.

Spychalska M., (2009) *Scalar Implicatures and Existential Import: Experimental Study on Quantifiers in Natural Language*, ILLC Publications Series, MoL-2009-10. (http://www.illc.uva.nl/Publications/ResearchReports/MoL-2009-10.text.pdf)