WHAT DO FUTURE MATHEMATICS TEACHERS EVALUATING AN IMPLICATION WHEN FACING THE CASE OF PREMISE FALSENESS?

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We propose a poster linked to a Short Oral communication by J. Rogalski and M. Rogalski, organised around the main results of a study about how future mathematical teachers deal with different types of implications, when confronted to the falseness of the premise. Such situations not only appear in advanced mathematical thinking but also when teachers are confronted to students' reasoning: their control is part of the competence of a mathematics teacher in secondary and high school. It will present:

• 1. examples of the variety of items: factual non computable implications with a false premise; assessment of a formal rule (two versions of the "classical" selection task of Wason); implication with a false premise in a social contract ("*if somebody solves the problem, I will give sweets to everybody*") computable mathematical implications: hypothesis always clearly false (such as: "*if 1=2 then 2=3*"); hypothesis unknown: the implication may be proved without looking at the value of the premise (which will be proved to be always false); the case of the falseness of the hypothesis has to be considered in a twofold quantified implication (such as: "*for every x and for every m, if* $x^2-2mx+2m+3\leq 0$ *then* $|x|\leq(m-1)^2-4$");

• 2. examples of typical students answers oriented toward "logic" (expected correct answer), "relevance" of the implication, or "falseness" due to the false premise;

• 3. results of a test proposed to 71 future mathematics teachers, aiming at: a) testing the generality of results of a previous study with 107 other teacher-students (Rogalski & Rogalski, 2001); b) evaluating the effect of changes in wordings (introducing the canonical form "*if ... then...*" in some critical items); c) identifying factors involved in the management of the falseness of the premise in mathematical implications (proposition *vs* predicate, premise always false *vs* falseness for some values).

• 4. discussion of the global results: the rationality of future mathematics teachers in their use of implication appears not to be resilient to atypical situations, interactions with a somehow difficult mathematical content, or unusual students' arguments. Consequences for their use of logic as an indispensable tool in teaching mathematics (Hanna & Jahnke, 1993) will be discussed.

References (to be extended in the poster)

Hanna, G., & Jahnke, H.E. (1993). Proof and application. *Educational Studies in Mathematics*, 24, 421-438.

Rogalski, J., & Rogalski, M. (2001). How do graduate students evaluate assertions with a false premise? In M. van der Heuvel-Panhuizen (Ed.) *Proceedings PME25@NL* (pp. 4.33-4.41). Utrecht: Freudenthal Institute.

Stanovich, K. E., & West, R. F. (2000). Individual differences in reasoning: Implications for the rationality debate? *Behavioral and Brain Sciences, 23* (5), 645-665.