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## *Assessment of Hungarian preservice teachers ` beliefs about nature of science and scientific reasoning*

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Among the main objectives of science education, there is a great emphasis on understanding the nature of science (NOS) and improving scientific reasoning. To achieve these goals, teachers themselves must have accurate beliefs and developed reasoning skills. However, preservice teachers' beliefs may not be sophisticated enough (Cofré et al, 2019), and their scientific reasoning could be further improved (Koenig et al, 2012).

In our study we assessed Hungarian first-year preservice teachers' beliefs about NOS and scientific reasoning skills. Our research questions were:

- How sophisticated beliefs do they have about the NOS?
- How developed are their scientific reasoning?
- Are there any differences in those by major as a background variable?

Participants were 84 Hungarian first-year preservice teachers (Mage=20.16, SD=1.45, 28.6% male). Among them 72.6% have a major connected to humanities, social-sciences and arts, while 27.4% have a major connected to science. Beliefs about NOS were assessed with the adapted, paper-and-pencil version of Liu and Tsai's (2008) questionnaire Scientific Epistemological Views (SEV). The instrument contains 20 items (GLB=0.91) with five-point scales (1: completely disagree, 5:

completely agree) covering the following aspects of NOS: standards of scientific research (SSR), social dialogue (SoD), sources of ideas (SI), the role of creativity (RC), cultural impacts and changing and tentative feature of science knowledge (CT). The higher scores indicate more sophisticated beliefs. Background questions were added to explore respondents' age, gender, faculty and major. Scientific reasoning was assessed with the digitalized version of Lawson's (2000) Classroom Test of Scientific Reasoning (LCTSR) (GLB=0.93), comprising 24 force-choice items. The data were collected in February 2020. Participation was voluntary.

Regarding the beliefs about NOS, the highest mean was recorded on SoD (M=3.89, SD=0.67) and the lowest on SI (M=3.28, SD=0.78). Students with science major gave significantly higher scores on SSR ($t(39,8)=2.48$, $p<.05$) and RC ($t(61,0)=2.78$, $p<.05$). The average performance on the LCTSR was moderate (M=44.3%, SD=17.5%) without any significant difference by faculty. Since the scores on SEV questionnaire and LCTSR were lower than we expected, we believe our students could benefit from additional support in each aspect of NOS and scientific reasoning. In order to improve our teacher training, it would be useful to assess preservice teachers' content knowledge as well.

## Acknowledgments

The study was supported by the ÚNKP-19-3 New National Excellence Program of the Hungarian Ministry for Innovation and Technology.

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