Physics expertise in light of cognitive and affective variables – Evidence from the PhysicsOlympiad

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ABSTRACT
Given the need for high-achieving students to engage in science, technology, engineering, and math (STEM), this study seeks to characterize successful students in the Physics Olympiad as a means to enable future educational efforts to be more in congruence with the characteristics of the students. On the basis of the expectancy-value model of achievement motivation and research in expertise, $N = 141$ students were tracked in their engagement with the Physics Olympiad and administered appropriate motivational and cognitive constructs. The dependent outcome variable was the success the students had in their participation in the Physics Olympiad. Results indicate that successful students can be characterized through high skills in physics problem solving and positive motivational attributes, namely a high expectation to be successful in the Physics Olympiad. These results pave the path to more transparency for what comprises expertise in domains like physics such that designated educational efforts can motivate and foster more students.

KEYWORDS
Problem solving, Physics competitions

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Disclosure statement

We are not aware of potential conflicts of interest that relate to the results reported in this study.

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1. Appendices