Abstract

The difficulties introductory statistics students have with formal statistical inference are well known in the field of statistics education. "Informal" statistical inference has been studied as a means to introduce inferential reasoning well before and without the formalities of formal statistical inference. This mixed methods study investigated the development of introductory statistics students' informal inferential reasoning and its relationship to their formal inferential reasoning. A pre/posttest was administered to 136 students enrolled in introductory statistics classes taught in their secondary schools. Four task-based interviews were also conducted with seven pairs of those students.

With probabilistic reasoning essential for formal statistical inference, students' informal inferential reasoning related to sampling and estimating probabilities did improve significantly. Additionally, the strong informal inferential reasoners, those strong at the beginning and remaining so at the end of the study, and the 14 students who took part in the task-based interviews demonstrated strong formal inferential reasoning at the end of their course. However, when the interviewees drew informal inferences based on a sampling distribution, the majority of them sought to reduce variability by taking several samples. This study provided insight into why students were not using the probabilities associated with the normality of the sampling distribution when drawing an informal inference and how this then impacted their formal inferential reasoning. Implications for practice and suggestions for further research are included.