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**Aspects of students' reasoning about variation in empirical sampling distributions.**

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Summary: Sampling tasks and sampling distributions provide a fertile realm for investigating students' conceptions of variability. A project-designed teaching episode on samples and sampling distributions was team-taught in 6 research classrooms (2 middle school and 4 high school) by the investigators and regular classroom mathematics teachers. Data sources included survey data collected in 6 research classes and 4 comparison classes both before and after the teaching episode, and semistructured task-based interviews conducted with students from the research classes. Student responses and reasoning on sampling tasks led to the development of a conceptual lattice that characterizes types of student reasoning about sampling distributions. The lattice may serve as a useful conceptual tool for researchers and as a potential instructional tool for teachers of statistics. Results suggest that teachers need to focus explicitly on multiple aspects of distributions, especially variability, to enhance students' reasoning about sampling distributions.

*Classification:* K70 K40

*Keywords:* sampling; mathematics teachers; middle schools; high schools; probability; experiments; statistical inference; inferences; student reaction; intervals; sample size; prediction; statistics; variation  
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