

**ZMATH 2015b.00860**

**Noll, Jennifer; Hancock, Stacey**

**Proper and paradigmatic metonymy as a lens for characterizing student conceptions of distributions and sampling.**

Educ. Stud. Math. 88, No. 3, 361-383 (2015).

Summary: This research investigates what students' use of statistical language can tell us about their conceptions of distribution and sampling in relation to informal inference. Prior research documents students' challenges in understanding ideas of distribution and sampling as tools for making informal statistical inferences. We know that these ideas are complex and difficult for students, but little is known about the ways in which students' language mediates their statistical problem-solving activities within the realm of distribution, sampling, and informal inference. This study uses examples from semi-structured interviews with eleven undergraduate students from two universities. Interview tasks focused on (1) distinctions between distributions of populations, samples, and sample statistics; (2) properties of sampling distributions; and (3) how to use sampling distributions to make informal inferences. Analysis focused on students' use of metonymy (i.e., the substitution of the name of an attribute or adjunct for that of the thing or idea meant). We observed two particular metonymies. The first was a paradigmatic metonymy in which students applied the properties of the normal distribution to all distributions. Second, we observed a proper metonymy in which students talked about sampling distributions as compilations of many samples. The potential impact of these metonymies on students' ability to solve problems and the implications for teaching are discussed.

*Classification:* K70 K40 C30 C50

*Keywords:* introductory statistics; statistical reasoning; distributions; samples and sampling; informal statistical inference; informal inferential reasoning; metonymy

doi:10.1007/s10649-014-9547-1