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Assessing a Core Statistical Reasoning Concept Across the University: Discipline Specific and Discipline General Understanding of "Correlation versus Causation"

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Abstract:

In a world faced with pressing social policy issues such as climate change, poverty, and pandemic diseases, the ability to understand scientific evidence has never been more important yet often is lacking (Krauss & Colombo, 2020). Key to understanding scientific evidence is the ability to understand the statistical information and conclusions upon which the science is based. While the goal of promoting statistical literacy is instantiated as part of the common core for the colleges of Arts & Sciences, Nursing, and Business at Creighton University, this statistical education occurs in various "client departments" across colleges (cf. Schwab-McCoy, 2019). As the assessment of this statistical literacy is also based on what each client department emphasizes, we seek to develop and conduct a common assessment across departments by examining students' understanding of a core concept in statistical reasoning, namely the ability to distinguish correlation from causation, and to examine (a) to what extent this is emphasized in disciplines across the university, (b) to what extent students' ability to reason effectively about correlation versus causation is discipline-specific, and (c) how this ability changes as a result of completing designated statistical reasoning courses in departments that emphasize experimental versus non-experimental research methods.