

1125-N1-2166

Sybilla Beckmann* (sybilla@uga.edu), Department of Mathematics, Boyd Graduate Studies Building, University of Georgia, Athens, GA 30602. *Could a variable parts perspective on proportional relationships be useful in trigonometry, calculus, and probability?* Preliminary report.

Recent theoretical work in mathematics education identified a variable parts perspective on proportional relationships and noted that the perspective had been largely overlooked in mathematics education research. From this perspective, we view covarying quantities as consisting of fixed numbers of parts, where each part is the same size as the others, but the common size of the parts varies. Preliminary empirical work from an ongoing study suggests that the variable parts perspective is useful for generating and explaining equations in two variables, including for lines in a coordinate plane. Proportional relationships are an essential foundation for undergraduate mathematics, yet we know that reasoning about these relationships is a challenge, especially in cases involving geometric similarity. A variable parts perspective is in some sense naturally suited to handling cases of geometric similarity, and may therefore be a valuable foundation for some undergraduate topics. This paper discusses how topics in trigonometry, calculus, and probability could be approached from a variable parts perspective. Topics include radians, degrees, and trigonometric ratios; difference quotients and their limit (the derivative); and probability distributions and the law of large numbers. (Received September 19, 2016)