Examining Students’ Perceived Autonomy Support as a Source of Self-Efficacy in Mathematics

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Theoretical Framework
- In the academic domain, self-efficacy is defined as the belief students hold about their capability to successfully perform and complete academic tasks. Bandura (1997) hypothesized four primary sources of self-efficacy:
  - Mastery Experiences: Interpretation of one’s own performance
  - Vicarious Experiences: Observations of others’ performances
  - Social Persuasions: Messages received from others (e.g., teachers, parents, friends)
  - Physiological States: Emotional and somatic states (e.g., anxiety and stress)

- Bandura’s model contains important information about how students assess their efficacy; however, other sources, such as an autonomy supportive environment, might account for how efficacious students feel.

- Self-determination theory posits that humans have a basic psychological need for autonomy to provide the motivational function needed for optimal functioning (Ryan & Deci, 2000).

- Students who feel autonomous are intrinsically motivated to perform tasks with a higher degree of aspiration and a sense of choice, without being pressured by external factors (Jang, Reeve, Ryan, & Kim, 2009).

- When they feel autonomous, students likely also experience a stronger belief in their own competence (Ryan & Deci, 2000).

Participants and Data Sources
Participants were 1,820 students enrolled in Grades 6 to 8 from four middle schools in the southeastern United States. Students completed an online survey designed to assess their beliefs about learning and doing mathematics. They were asked to provide judgments about how true or false they found a particular item.

Method
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Measure of Mathematics Self-Efficacy
Three self-efficacy measures were used to assess the diverse mathematics efficacy beliefs: General Mathematics Self-Efficacy, Mathematics Skills Self-Efficacy, and Math Skills Self-Efficacy.

Hierarchical Linear Regression Analysis
Hierarchical linear regression analysis was used to examine the predictive model. A series of regression coefficients were calculated, with each step representing the addition of a new source of self-efficacy. The model was then compared to a baseline model to determine if the new source added predictive value.

Results
- Table 1: Sample Items Used in the Study
- Table 2: Means, Standard Deviations, and Zero-Order Correlations for Variables in the Study
- Table 3: Hierarchical Linear Regression Results for the Prediction of Mathematics Self-Efficacy
- Table 4: Hierarchical Linear Regression Results for the Prediction of Mathematics Self-Efficacy by Gender

Key Findings
- Correlations among all measures were statistically significant. Consistent with previous research, the highest correlation was found between mastery experiences and general mathematics self-efficacy. The four sources of self-efficacy and perceived autonomy support were significantly interrelated (see Table 2).

- Regression results revealed that all four hypothesized sources significantly predicted mathematics self-efficacy. Mastery experience was the strongest predictor.

- When perceived teacher autonomy support was considered as an additional source, the regression model revealed it to be a significant source of mathematics self-efficacy, explaining a significant proportion of the variance in each type of self-efficacy other than explained by the four Bandura’s hypothesized sources.

- Perceived autonomy support explained a significant portion of the variance in both girls’ and boys’ self-efficacy in mathematics. Girls tended to rely on more sources of efficacy information than did boys.

Conclusions and Implications
- This study combines constructs from two prominent theories of motivation as its conceptual framework. Therefore, our findings may provide a wider lens for education researchers who are interested in the multiple factors that can influence self-efficacy.

- The findings of this research study suggest that in addition to Bandura’s sources of self-efficacy perceived autonomy support is also a significant source of self-efficacy. Our findings are consistent with other researchers who have found that mastery experience is the most influential source of self-efficacy both for girls and for boys.

- The significance of our findings could play an essential role in initiating discussions and future studies related to the influence of autonomy support on student motivation and offer insights to transform teaching and learning.

References

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