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## Error Recognition in Calculus Problems: What Characterizes Expertise?

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## ERROR RECOGNITION IN CALCULUS PROBLEMS: WHAT CHARACTERIZES EXPERTISE?

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Previous research in the area of expert-novice comparisons of mathematical problem solving has focused on the differences in categorization of and performance on math problems. These studies have led to the conclusion that while solving or categorizing problems, experts focus on deep processing and novices focus on surface structure. Other research dealing with true/false multiplication equations has shown that adults (considered experts in multiplication) can reject false answers before processing the equation. This study attempts to extend these findings by looking at the differences between experts and novices in the recognition of errors in true/false calculus verification expressions. The participants were professors (experts) and two groups of math students (novices). The experiment consisted of participants answering 76 true/false calculus expressions (equations or conditionals) at three levels of difficulty. Reaction time, accuracy, and level of confidence were recorded. Data was analyzed using a  $3 \times 3 \times 2 \times 2$  (experience level by problem difficulty by problem type by truth value) ANOVA. Based on the previous studies, experts are expected to be able to process errors at a faster rate. This will provide further support for the hypothesis that experts are not only quantitatively better at task performance, but qualitatively different from novices in the type of processing they employ. Results and implications will be discussed.