

EXAMINING SECONDARY STUDENTS' ALGEBRAIC REASONING:
FLEXIBILITY AND STRATEGY USE

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ABSTRACT

Recent curricular recommendations (NCTM, 2000; RAND, 2003) call for the development of student flexibility in relation to algebraic reasoning. In response to these recommendations, this study focused on the algebraic strategies employed by the participants and their flexibility in understanding various generalization strategies when generalizing numeric situations. Algebraic flexibility consisted of two components: (a) Within-task flexibility (recognizing appropriate generalization strategies that could be used for a particular task) and cross-task flexibility (recognizing when a generalization strategy could be applied to various tasks).

Eleven tenth-grade students from two rural schools participated in active interviews (Holstein & Gubrium, 1995) centered on developing generalizations for

contextualized algebraic tasks. Following the development of a generalization for a particular task, participants were provided alternative student strategies to examine.

The results demonstrated that secondary students employ the same generalization strategies as elementary and middle level students: explicit, whole-object, recursive, and chunking. Participants used recursive (92.3%) and chunking (90%) strategies with the greatest success, while the explicit strategy was the least effective (correctly used 60% of the time).

Participants classified as exhibiting a high level of flexibility did not necessarily demonstrate that ability in initially generalizing tasks. The participants fell along a range for both within-task and cross-task flexibility. Participants classified as exhibiting a high level of flexibility were able to determine the applicability of a strategy and develop contextually-justified rules. Students with low flexibility were unable to determine the applicability of a strategy or justify their rules.