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Aviva Halani* (aviva.halani@asu.edu), AZ. *Students' Ways of Thinking about Solution Sets Envisioned as Unions of Subsets and Their Relation to Over Counting in Combinatorics.*

This presentation aims to address students' ways of thinking about the set of elements being counted in enumerative combinatorics problems, known as the solution set. In particular, it will identify ways of thinking about solution sets students envisioned as the union of subsets and their relation to over counting the size of solution sets. Three undergraduate students with no formal experience with combinatorics participated in a teaching experiment in spring 2012, conducted as two phases. This presentation focuses on two particular ways of student thinking which emerged from the data analysis: Addition and Union. Addition involves thinking locally first and counting the size of a subset of the solution set before adding on the size of its supposed complement. Students engaging in Union think globally first and view the solution set as the union of subsets, which they may believe to be disjoint. If the subsets are not disjoint, the students over count the size of the solution set. Through instructional interventions involving Venn diagrams, the student in the second phase was successful in attending to the intersection of the subsets and adjusting his solutions. We will discuss how an instructor might build upon students' thinking to help them recognize and avoid over counting. (Received September 22, 2012)