How Effective Are Discrepant Events in Changing Student Misconceptions in Science?

Methods
The study group, which was heterogeneous for ability, consisted of 19 female and 10 male seventh grade science students, three students had IEPS. Students were pre-assessed for misconceptions prior to being shown a discrepant event. The eight discrepant events used, were designed to address student misconceptions on a variety of physical science topics, and were presented before any formal instruction took place. Students were first asked to write down their predictions as to what would happen before making observations. After each discrepant event, students were interviewed about their predictions and asked to explain their observations. They were also given a Cognitive Conflict Levels Test, (Lee et al., 2003), to determine the level of cognitive conflict induced by the discrepant event. Finally, students were given a post-event assessment probe to determine the percentage of students who had changed their misconceptions.

Data Analysis
Pre-assessment probes revealed that an average of 74% of students had misconceptions with regard to the topics presented during the study. Post-event interviews with students revealed that 71% had made incorrect observations, This may indicate, denial of the discrepant event. The Cognitive Conflict Levels Test, showed that the average conflict levels generated by discrepant events were relatively low, as indicated in the graph. Post-event assessments revealed that on average only 14% of students were able to change their misconception to the correct form, 22% changed their conception to another incorrect form and 64% of students did not change their misconceptions at all.

Conclusion
The experiment revealed that discrepant events were insufficient to cause students to change their misconceptions to the correct form. While a useful “engage” strategy, as indicated by higher interest levels, discrepant events may be better utilized as part of a larger teaching model such as 5E, that addresses the conditions needed for conceptual change (Strike & Posner, 1982).

References