## Research on Student Learning

Students of all ages show a tendency to uncritically infer cause from correlation. [1] Some students think even a single co-occurrence of antecedent and outcome is always sufficient to infer causality. Rarely do middle-school students realize the indeterminacy of single instances, although high-school students may readily realize it. Despite that, as covariant data accumulate, even high school students will infer a causal relation based on correlations. Further, students of all ages will make a causal inference even when no variation occurs in one of the variables. For example, if students are told that light-colored balls are used successfully in a game, they seem willing to infer that the color of the balls will make some difference in the outcome even without any evidence about dark colored balls. [2] Faced with no correlation of antecedent and outcome, 6th-graders only rarely conclude that the variable has no effect on the outcome. Ninth-graders draw such conclusions more often. A basic problem appears to be understanding the distinction between a variable making no difference and a variable that is correlated with the outcome in the opposite way that the students initially conceived. [3]

## References

[1] Kuhn, D., Amsel, E., O'Loughlin, M. (1988). The development of scientific thinking skills. *The development of scientific thinking skills.*.

[2] Kuhn, D., Amsel, E., O'Loughlin, M. (1988). The development of scientific thinking skills. *The development of scientific thinking skills.*.

[3] Kuhn, D., Amsel, E., O'Loughlin, M. (1988). The development of scientific thinking skills. *The development of scientific thinking skills.*.