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Investigating high school students' science experiences and mechanics understanding.

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Summary: This research study was designed to provide an introductory examination of how high school students' out-of-school science experiences, particularly those relevant to the physical sciences, relate to their learning of Newtonian mechanics. A factor analysis of the modified Science Experiences Survey (SES, Mason & Kahle, 1988) was performed, leading to three factors: Learning Attributes Related to Science, Physical Science Experiences, Nature Experiences. The students' learning of Newtonian mechanics was measured by their gain score from a pre-instruction/post-instruction administration of the Force Concept Inventory (FCI; Hestenes, Wells, & Swackhamer, 1992). An analysis of variance showed that females and males in honors physics courses demonstrated similar gain scores, while males in non-honors courses demonstrated larger gains (p less than 0.05) than the females. When the students' total SES and SES factor scores were correlated with their FCI pretest and gain scores, the SES Physical Science Experience score was found to be significantly related to the FCI pretest score ($p = 0.01$). No other correlations were significant. (Contains 4 tables.) (ERIC)

Classification: M53 D63 C63

Keywords: mechanics (physics); pretests posttests; high school students; statistical analysis; females; physical sciences; males; factor analysis; comparative testing; correlation

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