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Exploring student perceptions of introductory physics

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There is a large body of research suggesting that marginalized students hold negative attitudes and beliefs towards physics that manifest in high-school. These perceptions of physics can negatively impact student learning and have been repeatedly associated with the gender gap in performance in introductory physics courses at the university level. Many universities offer multiple streams of introductory physics, some can act as pre-requisites to upper year courses while others do not. As such, students self-select into cohorts based on their high-school perceptions of the subject. This decision potentially limits their ability to pursue physics, before ever taking a university level physics course. At McMaster University there are three streams of introductory physics that can each act as pre-requisites to upper year physics courses. Each course is marketed towards a different student interest group; life sciences, physical sciences and engineering, respectively. The goal of our study was to assess whether student perceptions of physics differed between the cohorts before and after taking an introductory level course. We hypothesized that marginalized students with more negative perception of physics would self-select into the life-sciences cohort, resulting in diversity differences at the introductory level that would persist into upper year courses. To test this hypothesis, we surveyed students' perceptions and interest in physics before and after taking one of the three introductory physics courses. We focused on student feelings of preparedness from high-school for university. We also collected data on demographics, high-school education, career aspirations and degree program. Finally, we surveyed upper-year physics students to determine if introductory physics stream correlated with the propensity to pursue physics. The long-term goal of our study is to track how students' perceptions of physics changes as they progress through their undergraduate training in the hopes of reducing barriers to entry into the program

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