Novice conceptions and perception of single and two force interactions

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Abstract

Physics education and psychology research have found novices struggle to accurately predict the trajectory of objects, and perception research has found people cannot perceptually differentiate between plausible and implausible collision outcomes. Prior research focused on single force interactions, we explored predictions and perception of both one and two force interactions. Participants (N = 111) drew predicted paths of balls acted upon by a single force, two forces acting simultaneously, and two forces acting sequentially. Paths were categorized into: correct, curved, single force dominant, inaccurate angle, first force dominant, and recent force dominant. Participants also made perceptual naturalness and animacy ratings for animations portraying accurate solutions and high frequency alternate conceptions. Preliminary results suggest participants were accurate for forces aligned on one dimension, and less accurate for forces not aligned on one dimensionparticipants anticipated curved paths, paths taking an inaccurate angle, and paths aligned with only one of the forces.