

## Studying the Beginnings of Strategic Behavior

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**Abstract :** Are children sensitive to their relative strength in competitions against others? Performance on tasks that require cooperation or coordination (e.g. the Ultimatum Game) indicates that early precursors of adult-like notions of fairness and reciprocity, as well as altruistic behavior, are evident at an early age. However, not much is known regarding developmental changes in interactive decision-making, especially in competitive interactions. Thus, it is important to study the developmental aspects of strategic behavior in these situations. The present research focused on cognitive-developmental changes in a competitive interaction. Specifically, it aimed at revealing how children engage in strategic interactions that involve the allocation of limited resources over a number of fields of competition, by manipulating relative strength. Relative strength refers to situations in which player strength changes midway through the game: the stronger player becomes the weaker one, while the weaker player becomes the stronger one. An experiment was conducted to find out if the behavior of children of different age groups differs in the following three aspects: 1. Perception of relative strength. 2. Ability to learn while gaining experience. 3. Ability to adapt to change in relative strength. The task was composed of a resource allocation game. After the players allocated their resources (privately and simultaneously), a competition field was randomly chosen for each player. The player who allocated more resources to the field chosen was declared the winner of that round. The resources available to the two competitors were unequal (or equal, for control). The theoretical solution for this game is that the weaker player should give up on a certain number of fields, depending on the stronger opponent's relative strength, in order to be able to compete with the opponent on equal footing in the remaining fields. Participants were of three age groups, first-graders (N = 36, mean age = 6), fourth-graders (N = 36, mean age = 10), and eleventh-graders (N = 72, mean age = 16). The games took place between players of the same age and lasted for 16 rounds. There were two experimental conditions - a control condition, in which players were of equal strength, and an experimental condition, in which players differed in strength. In the experimental condition, players' strength was changed midway through the session. Results indicated that players in all age groups were sensitive to their relative strength, and played in line with the theoretical solution: the weaker players gave up on more fields than the stronger ones. This understanding, as well as the consequent difference in allocation between weak and strong players, was more pronounced among older participants. Experience led only to minimal behavioral change. Finally, the children from the two older groups, particularly the eleventh graders adapted quickly to the midway switch in relative strength. In contrast, the first-graders hardly changed their behavior with the change in their relative strength, indicating a limited ability to adapt. These findings highlight young children's ability to consider their relative strength in strategic interactions and its boundaries.

**Keywords :** children, competition, decision making, developmental changes, strategic behavior

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