Drift Diffusion Models of children's interactions in a Repeated Prisoner's Dilemma Game	
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Organization	BU CAS Dept of Psych & Brain Sciences
Organization Description	In the Social Development & Learning Lab we study how children become cooperative members of society. We use experimental methods to understand the cognitive and social mechanisms that support and drive social interactions.
Project Type	Data Science
Project Description	We have two data sets from a repeated prisoner's dilemma game conducted with children between 9 and 17 years of age (N=150, N=230 twins). In this game, children play 3 pre-programmed partners designed to elicit aggressive and possibly forgiving responses. They play each partner in a 10 round game (30 decisions per child total) and we have recorded reaction times. Children make a binary decision in each round - cooperate or defect - at the same time as the partner. The first type of pre-programmed partner uses a tit for tat strategy that makes the same decision that the child made in the previous turn. The second strategy is cooperates 80% of the time and the third strategy defects 80% of the time. The children believe that they are playing another real child rather than a pre-programmed computer. We are interested in advanced statistical models that can integrate the decision and reaction time data. Standard analyses include predicting current round decisions based on past decisions by the child and the partner, change with age, and child traits from standard questionnaires (aggression, impulsivity, prosociality, bullying) as predictors. A focus is reactive vs non-reactive aggression. We have predictions for these variables and are also interested in exploratory analyses to use preliminary data for grants. The students will be involved in prepping the data sets and conducting the statistical analyses guided by our predictions.

Data Sets	We have two data sets collected from two different samples that played the same version of the RPD. One groups of 9-11 year olds (N=150) and one group of twins between 9 and 17 years of age (N=230, thus 115 twin pairs). The twin data is underpowered for typical twin analyses, but we can use one half of each pair to run one analyses or develop exploratory models that we then test on the other half. We are open to other ways to use the twin data. Each child in the data set has 30 binary decisions (cooperate or defect), reaction times for each decision and continuous trait measures (aggression, impulsivity, etc). https://drive.google.com/open?id=1Lys9et8owVpOkjG0h9lWLcDs_mkA_mFz
Additional Info	https://drive.google.com/open?id=1vdPl1kv8Nf1C0_8P9KulnfMmDQyhnDzZ
Questions to be answered in Analysis	We use the repeated prisoner's dilemma task to study children's social interactions and specifically what cognitive and social factors affect children's aggressive versus forgiving responses. We hope that the advanced statistical models such as drift diffusion models will help us explain the mental processes that lead to aggression and forgiveness. Are children with higher aggressive traits more less likely to return to cooperation over the three rounds after partner defection (less likely to forgive)? Does the partner's deviation from their initial pattern (as pre-programmed) cause a change in state (e.g., preference) in the child? - State refers to the child being generally cooperative vs defecting most of the time. Can we predict these changes in state (positive and negative) based on the child's traits?
Additional Information	**Tools and Methods** For scraping - Scrapy, Selenium webdriver, and/or Beautiful soup. For cleaning and preprocessing use Pandas to organize the dataset into dataframes for faster computation. Data visualization libraries such as Matplotlib, Seaborn, and Bokeh (interactive web-integratable visualizations).