Deliverable-1 Report

Dataset - Non-Twin Dataset

Initial Processing

- read the data from the data Excel file and converted them to a Pandas dataframe.
- Dropped the rows with blank/NaN values.
- Found the average of all columns/features.
- Plotted the average decisions vs Aggression(Reactive and Proactive both) score when playing against different preprogrammed partners for future reference.

Question being answered :

Does the partner's deviation from their initial pattern (as pre-programmed) cause a change in state (e.g preference) in the child?

Our Approach:

1. To see how the preference of the child is changing after the partner's deviation from initial pattern, we plotted the average cooperation and defection rate after the 3rd and 7th round, as the pre-programmed partner is deviating from its usual pattern of cooperating/defecting in the 3rd and 7th round.(Figure-1)
2. To see how the aggressiveness of the child is linked to their preference change, we plotted the average cooperation and defection rate after 3rd and 7th round, for each of reactive, proactive and total aggression. For each of the 3 plots we considered the children if their aggression score was more than the mean reactive/proactive/total aggression score. (Figure-2,3,4)

1) The pre-programmed partner plays the 10 round in the following way:

TFT Partner - It co-operates for the 1st round and then in the subsequent rounds it just copies how the child behaved in the previous round.

Cooperative Partner - The cooperative partner cooperates in all rounds except the 3rd and the 7th round.

Defecting Partner - The defecting partner defects in all rounds except the 3rd and the 7th round.

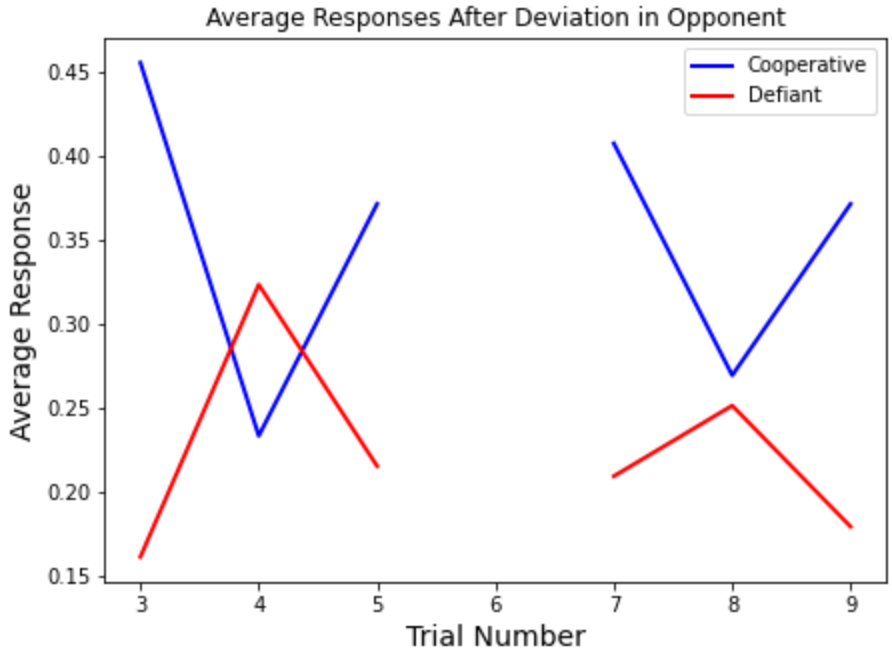
To answer the above question we are looking at the cooperative and defecting partner's initial pattern. The pre-programmed partner is deviating from its usual pattern of cooperating/defecting in the 3rd and 7th round.

So we plotted the average cooperative and defiant response of the subjects to see how the response was changing in two rounds following 3rd and 7th rounds where the partner is deviating from the normal pattern. As can be seen from the plots below:

Figure 1 - Here we have plotted the average cooperative and defiant responses of all subjects in the rounds 3-5 and 7-9. The blue line represents the average response of the subjects to the cooperative partner and the red line represents the average response of the subjects to the

defecting partner. We can see here how the average response of the cooperative/defecting partner in the 4th/8th round decreases/increases as the partner defects from the initial pattern in the 3rd/7th round respectively.

Figure-1



2)Figure-2 represents the average response vs Trial number considering the average response of only the subjects which qualifies as Reactive Aggression. The qualification criteria chosen here is - greater than mean(Will be changed after discussion with Peter). So if the reactive aggression score is greater than the mean reactive aggression score of all subjects, only then the subject is considered for the plot.

Figure-2

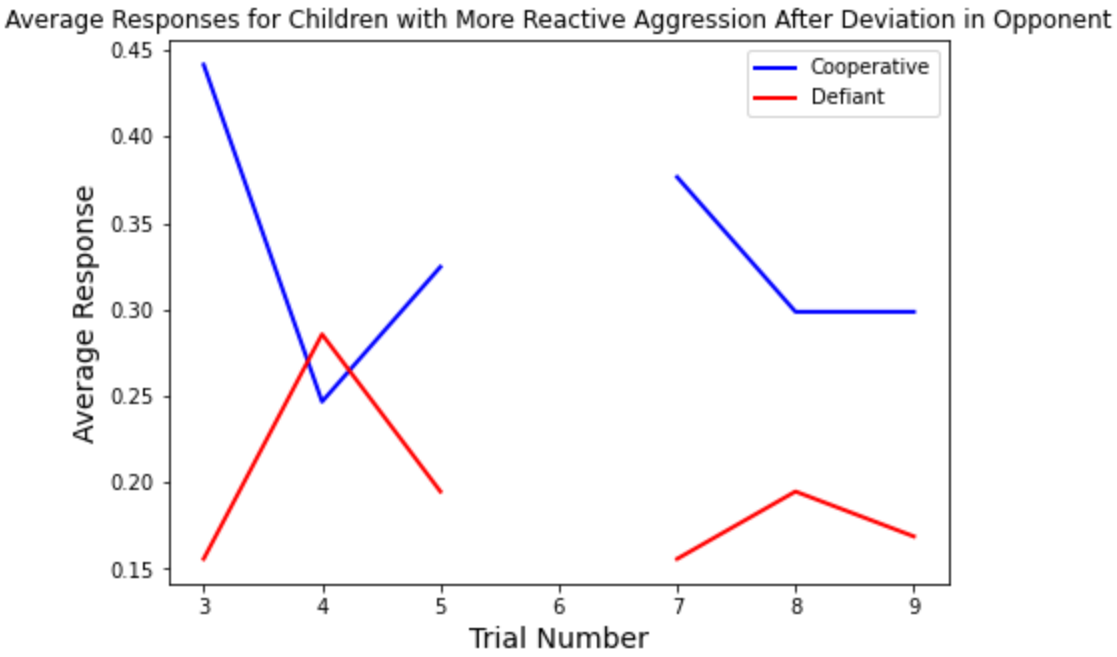


Figure-3 represents the average response vs Trial number considering the average response of only the subjects which qualifies as Proactive Aggression. The qualification criteria chosen here is - greater than mean(Will be changed after discussion with Peter). So if the Proactive aggression score is greater than the mean Proactive aggression score of all subjects, only then the subject is considered for the plot.

Figure-3

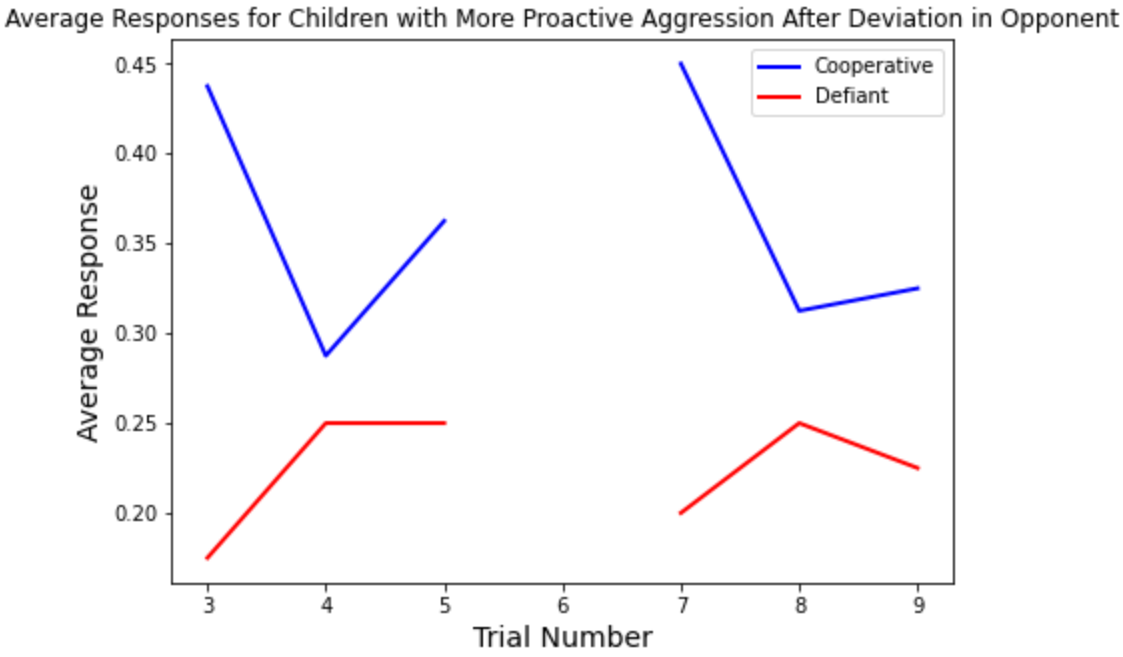
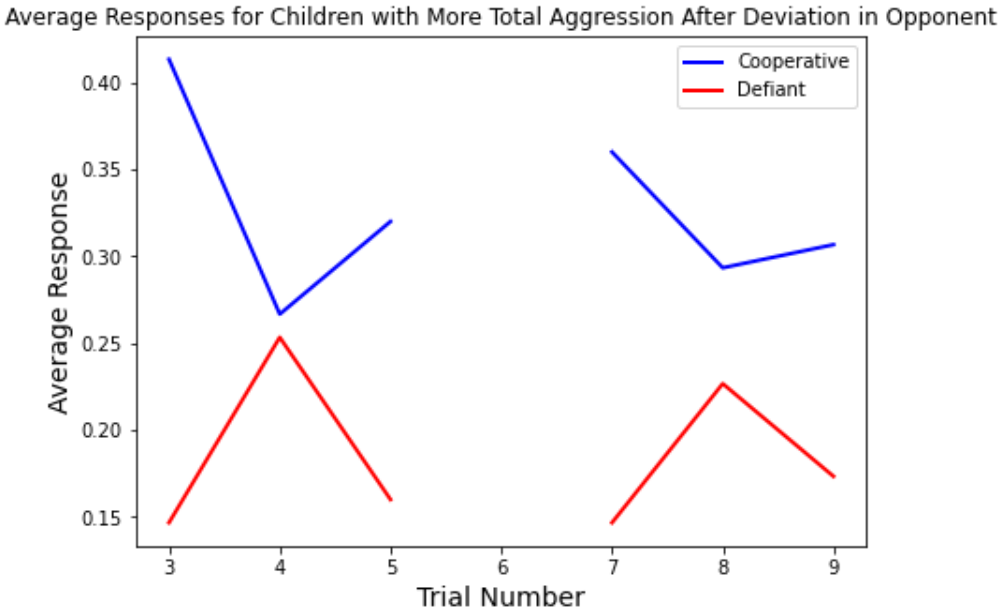


Figure-4 represents the average response vs Trial number considering the average response of

only the subjects which qualifies as Aggressive. The qualification criteria for being Aggressive is - greater than mean(Will be changed after discussion with Peter). So if the Total aggression score is greater than the mean Total aggression score of all subjects, only then the subject is considered for the plot.

Figure-4



Determining participant preference from reaction time data

A preliminary determination of a participant's state was constructed using the difference in reaction times between cooperation and defection choices in subsequent rounds. In addition to raw cooperation and defection data, this model will be useful in investigating the long-term change in a participant's preference over many rounds. The preliminary model assesses relative reaction times after a round specified by the user. In the future, this function will take into account the overall trends in reaction time. Additionally, the model does not account for roughly equal cooperative and uncooperative reaction times. What constitutes roughly equal reaction times will need to be discussed with Peter. There seems to be significant differences between cooperative and uncooperative reaction times for many participants. A formal drift diffusion model will eventually be required for a rigorous analysis of the primary research questions covered in this project.

Note

The initial data processing steps are explained in the file 'data_processing.py' (Python file) and 'data_processing.ipynb' (Jupyter Notebook). The data file is 'Blake_RPD_Dataset_NonTwin.xlsx'. All these files are placed in the 'Deliverable_1' folder inside the 'Deliverables' folder.
The code has to be further optimized and structured for better understanding and presentation.