HOW DIFFERENT REGIONS AFFECT PAYOFF IN PRISONER'S DILEMMA

The differences in demographics play an important role in analyzing the people's decisions in real life. In this research, we will assess and analyze **how three regions affect the result of payoff in the prisoner's dilemma when choosing to defect.**

INTRODUCTION

- Prisoner's Dilemma is a game whose players' strategies are to cooperate or defect.
- If one of two people in a pair decides to cooperate, then their shared payoff will be the highest in case the other has the same decision; otherwise, that 'cooperate' player will gain the least outcome. The choice to defect, however, will gain any player a higher individual payoff whatever strategy adopted by the other partner.
- The effect of cultural priming on the choice to cooperate will not be confirmed without a context-specific element as the deciding factor between cultural perception and realistic behaviors (for example, whether their partners are friends or strangers).[1]
- Communication, compared to identification, further increases the solidarity rate.[2]
- The result of this game will have been linked with the problem about the decision of people from different demographics, suggesting the question of whether a certain type of demographics makes them earn the most interest.

HYPOTHESIS

The differences in culture, economic development, and the communication rate among players will affect the means of the payoff of people who choose the same decision from different regions.

PREDICTION

The population means of people from three regions who choose to defect will be different from the others.

METHODOLOGY

- The experiment was conducted at QR class and Machine Learning of Fulbright University Vietnam, HCMC, Vietnam.
- Data was collected from over 189 students during their playing in 6 types of classic games of game theory.
- Their demographics were collected; the payoff of PD game was calculated through the decision to defect/cooperate of the players and their contradictors. During the game, they did not communicate with others.
- We create three variables of three regions (North, South, Central) and calculate the payoff of people in three regions who chose to defect.
- For each variable, we calculate some statistics value of each variable such as the count, mean, standard deviation, minimum value, maximum value. And then we use them to draw the boxplot, confidence interval with programming.

GROUP 6

XUAN MAI – NHAN NGUYEN – HA NGUYEN – NGOC HA

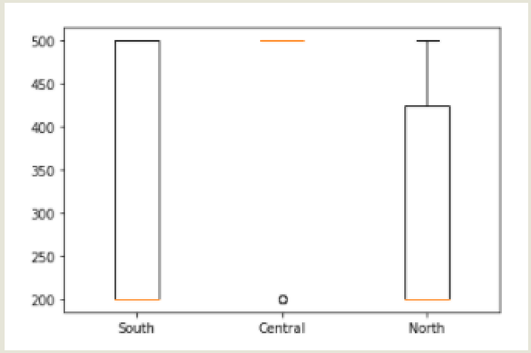
RESOURCES

(1) Wong, R. Y. M., & Hong, Y. Y. (2005). Dynamic influences of culture on cooperation in the prisoner's dilemma. Psychological science, 16(6), 429-434.

(2) Bohnet, I., & Frey, B. S. (1999). The sound of silence in prisoner's dilemma and dictator games. Journal of economic behavior & organization, 38(1), 43-57.

ANALYSIS

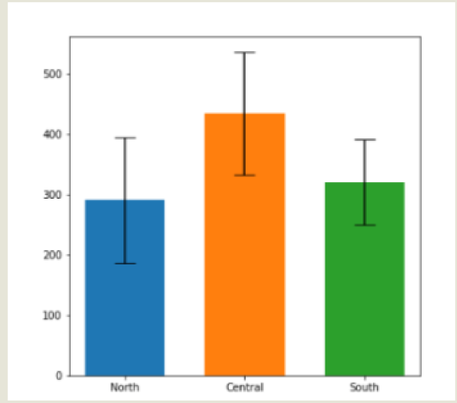
The population mean of payoff from people in the Central who choose to defect is different from the two other regions'



Boxplot

Looking at the boxplot and confidence interval, we can see that most of the data of the Central focus on the value of 200 and the mean of the Central is significantly bigger than the others. Combining with the test above, **the population mean of payoff from people in the Central who choose to defect is bigger than the two other regions'.**

Using the Mann-Whitney U test to define whether the population means of three regions are different from each other. The p-value for the results between Central-North and Central-North is smaller than 0.05 (p-value(North-Central)=0.023<0.05; p-value(Central South)=0.034<0.05).
However, the p-value of North-South is 0.308, which is bigger than 0.05)



Confidence interval

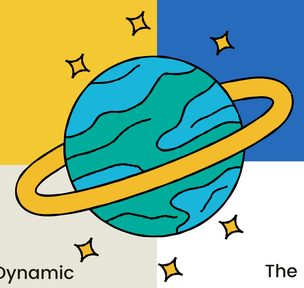
But when we look at the sample size of three regions, those of the Central and the North are smaller than the South's (Central = 9, North = 10, South = 20). This is because most of the students in Fulbright come from the South, which contributes to more students with more types of payoff for the same decision. Perhaps, this statistical result can only be applied to the population in Fulbright University Vietnam.

DISCUSSION AND FUTURE WORK

Based on the analyzed result, we can conclude that people who choose to defect in the Central at Fulbright University Vietnam tend to achieve higher payoff compared to those with the same decision but from different regions.
The limit of treatments is that all pairs are randomly assigned, as well as no communication is allowed, and blurred differences in contexts between QR_dummy and ML_dummy, which offer fewer reliable findings to be verified, and discovered in our research project.
Moreover, small and unequal sample sizes among three regions make it inadequate to conclude about a regionally specific tendency of cooperation or defection.
In the future, we suggest collecting data from a bigger sample size of participants from three regions to have more comprehensive data. And we can allow players to set the user's name and communication.

Future questions and work:

How do the differences in local culture and regional economic development affect the cooperative decision?
If the players can communicate to know their patterns' gender, age and education, how will the cooperative decision change?
Comparing the cooperative rate before and after the introduction or short conversation between two players.



RESULTS/FINDINGS

The people in the Central choosing to Defect tend to achieve higher payoff than those from the other regions with the same decision.
However, due to different sample sizes, those of the Central and the North are significantly smaller in comparison with the South's. This is because most of the students in Fulbright came from the South, which contributes to more students with more types of payoff in the same decision. So maybe this statistical result can only apply to the populations in Fulbright University Vietnam.