



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Raam M. Tambe	Project Number 35669
Project Title The Effect of Neutral Agents on the Expansion of Ideology in a Hypothetical Social Space	
Abstract Objectives/Goals The majority of research in the field of evolutionary game theory uses computer models to predict the effects of ideas, values, and beliefs on a given population. This experiment attempts to incorporate the frequently documented "bystander effect" in existing computer models by creating a "neutral agent" that does not adopt any values or beliefs. The goal of this project is to ultimately refine the models that are currently used to collect such data by making them a more accurate representation of the real world. Methods/Materials Using Netlogo, a 50 by 50 grid is created to model a hypothetical social space, wherein each cell is an agent that can choose among a neutral, passive, or aggressive strategy. Each cell is awarded points based on a set of predetermined values and their neighbor's strategies, then adopts the strategy of the highest performing neighbor. An "Evolutionary Stable Strategy" is determined when it is no longer possible for cells, whether passive aggressive or neutral, can no longer outnumber the cells of the currently dominant trait. This model is contrasted with a more common model that exclusively allows for aggressive and passive strategies. Data was collected across 3 tests with 30 trials each. Results Across three tests, with thirty trials each, the average distance in from the average rate of convergence, or the amount of cycles in the program is 1.40 ticks for the model including neutral agents, compared to an average distance of 2.86 ticks for the model not including neutral agents. The model including neutral agents had a distance from the average expected cell count of 22.48, resulting in an average difference of 0.002 percent. Conclusions/Discussion These results indicate that modeling a social space to include neutral agents is feasible and can increase the statistical significance of data by reducing the variance per individual trial. This project can help inform other research concerning the expansion of ideas, whether it be focused on political polls, or likelihood of genocide.	
Summary Statement This project designs a new method of analyzing the ways in which ideas, beliefs, and values interact with individuals by trying to replicate a "bystander effect", and tested the model by comparing its accuracy to the current one.	
Help Received I received help from my father who works at USC.	