Research Statement

Sining Wang

My main research interest is behavioral and experimental economics. A central focus of my work is to bridge economics and psychology, use lab experiments, game theory, and quantitative method such as machine learning to investigate questions that are of fundamental importance in social science research: why people make decisions in varied ways and how different social outcomes are achieved in interactive environments.

For example, in my job market paper "*Seeing is "behaving": using revealed-strategy approach to understand cooperation in social dilemma*, I look at behavioral heterogeneity in laboratory social dilemma experiments, use machine learning techniques to reveal different strategy patterns among the population, and then provide policy implications to improve the level of cooperation, as well as total social welfare, in society.

I developed this study in repeated linear public goods game. Past studies on social dilemma using public goods games have identified two types of players: people who make decisions without concern towards other's behaviors (i.e., free-riders and strong cooperators); and those who make decisions in accord with their beliefs about or observation of others' decisions (i.e., conditional cooperators). Yet, few studies have looked at whether there exist any additional types of players, and how they dynamically interact with others. The lack of knowledge on heterogeneous decision-rules in social dilemma has impeded the progress of our understanding on the origin and evolution of human cooperation.

In the repeated public goods game, I first defined key variables to capture a decision-maker's **strategy profile** by looking at how one makes decisions without the influence of others, and how one makes decisions in response to others. Then I used unsupervised machine learning (i.e., hierarchical clustering algorithm) to measure the similarity of any two strategy profiles, and identify distinct types of behavioral patterns according to the dendogram. From the sample, five distinct types were identified: free-riders, lower-than-signal cooperators, higher-than-signal cooperators, strong cooperators, and hump-shaped cooperators. This paper is the first work that has identified the hump-shaped cooperators in repeated public goods games.

Based on the characteristic of each strategy profile, I built five distinct "agents", put them into interactive scenarios, then examined how certain policies may influence their behaviors and the social outcome. I showed that when the policy-maker makes a one-instance change in the descriptive norm, sends a signal that indicates most people are

willing to cooperate, the overall cooperativeness, and therefore total social welfare, could be increased dramatically.

As one can see, my research emphasizes the importance of behavioral heterogeneity. In my view, understanding how people respond differently to external stimuli can have a profound influence on the interpretation of results from both theoretical and empirical studies. In another paper, *The Role of Risk Aversion and Cautiousness in Belief Formation*, I demonstrate that in a coordination game, a decision-maker's subjective belief is determined by their risk preference. I conducted a laboratory experiment where the participants played a repeated, fixed-partner stag-hunt game. In the experiment, I elicited the participants' subjective belief, risk aversion and cautiousness level. While the traditional measure of risk aversion in economics cannot explain people's behavior, just as past studies suggest, I find that the psychological concept of cautiousness plays a key role in determining the origin and the evolution of the decision-maker's belief. Specifically, I find that cautiousness affects the way people form the mental representation of their partners. A decision-maker with a higher cautiousness level is less likely to believe that their partner will choose the risky option. When the stag-hunt game was played repeatedly, a high cautiousness level prevented the decision-maker from updating their belief effectively, and consequently impeded cooperation between the players.

Well-designed experiments are critical to behavioral economics and decision-making research. As an effort to advance our knowledge on experimental methodology, I conducted the research *A Cognitive Dissonance Interpretation of the Context Effect in Economic Experiments: Evidence from a Laboratory Bribery Game*. In this paper, I argue it is inappropriate to assume that experimental manipulation can be studied apart from the cultural and social contexts that define its meaning. In particular, I proposed and experimentally tested the hypothesis that cognitive dissonance associated with the context plays a key role in determining people's behavior in social preference experiments. I conducted a laboratory bribery game experiment where the cognitive dissonance levels were controlled using different treatments (familiar-context treatment, unfamiliar-context treatment, and context-free treatment). With the aid of an independent attitude survey, I found that (i) in the unfamiliar-context treatment and the context-free treatment people experience the same cognitive dissonance level and we do not observe different behavior in the lab; (ii) in the familiar-context treatment people experience the most intensive cognitive dissonance level among all treatments and subjects are much less likely to behave unethically. These results unify the mixed findings from past social preference experiments. Conceivably, this approach that identifies the underlying mechanism through which the experimental context matters can be extended to investigate the context effect in general.

In addition to the above studies, I also try to apply the insights gathered from the laboratory experiments and psychology literatures to investigate important issues in labor economics. In the paper "*The Cost of Being Wonder Women: Agreeableness and Gender Wage Gap in Early Career Stage*", I use individual differences in agreeableness to explain the gender wage gap among recent graduates in China. Results indicate that a gender wage gap still exists and agreeableness, an important personality trait, has strong impacts on women's salaries. Using the data of a first-hand survey of college students in China, we

showed that agreeableness has a dramatic impact on women's starting salaries but negligible effect on men's. Under the same circumstance, disagreeable women face a sanction for violating the ascribed gender stereotypes. Less-agreeable women earn less than the others, and this effect is highly robust to changes in model specifications. Given the non-cognitive ability that plays a vital role in determining wage between genders, the investigation from an individual-culture dynamic perspective on personality traits and cultural stereotypes will help to narrow down the gender wage gap and to enhance the effectiveness of labor markets.

All the above papers have been submitted to peer-reviewed journals for publication. Aside from those projects, I have two other working papers nearing completion. One is on the topic of decision-making under uncertainty. In particular, I am interested in understanding the concept of "risk-aversion" in economics with insights gleaned from psychology. Another working paper is on unethical decision-making. Past studies have intensively examined how institutional factors (i.e., environment, punishment/reward, game rules, etc.) may influence unethical conducts, yet little is known about individual's psychological process of engaging in corrupt activities. In this paper, my coauthor and I will bring the psychological concept of "moral disengagement" into economic studies to look at how the interaction of personal and institutional factors affect behavioral outcome. I aim to complete and submit these papers within the next six months.

Moving forward, I will continue developing my research by applying what I have learned from behavioral science to understand decision-making related to economic issues. In recent years, the field of behavioral economics has been growing rapidly. One thing we have learned from this relatively new field is that our decisions often systematically deviate from theoretical, rational decisions. Starting from this observation, one topic that particularly interested me and my coauthors is the interaction between human beings and perfectly rational decision-makers (such as artificial intelligence). On this topic, we plan to conduct both laboratory and field experiments within the frame of incomplete information games. In 2015, I initiated a long-term research program with scholars from the United States, Canada and China. We have conducted, and will continue to conduct, a series of experiments in colleges from different countries. We try to explore how individual characteristics and institutional factors jointly determine people's decisions both in a laboratory environment and in their real lives. I expect to collaborate with new colleagues to grow this program over the next five years.

In the long-term, I will look for potential opportunities to engage myself into the study of neuro-economics. From my view, research focusing on the associations between decisions and neural science (such as brain activities) will play an increasingly important role in the future.