An Experiment on Trust Behavior: The Endowment and Reputation Effect on Fear, Temptation, and Cooperation in Continuous Trust Game

By

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DECLARATION

It is hereby declared that,

1. The thesis is my original work, and I submitted it to complete my master's degree in the Master of Science in Applied Economics (MSAE) at BRAC University.
2. The thesis only includes material previously published or written by another person, provided it is appropriately cited through accurate, full referencing.
3. The thesis does not incorporate, in whole or in part, material submitted for a degree or diploma at this or any other university or institute of higher learning.
4. I have diligently acknowledged all significant sources of help and expressed my gratitude for their invaluable contributions to my work.

Signature of Supervisor

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APPROVAL

The thesis/project titled "**An Experiment on Trust Behavior: The Endowment and Reputation Effect on Fear, Temptation, and Cooperation in Continuous Trust Game,**" submitted by Shamsul Shahriar Bhuian, BRAC University, ID: 22275016, in Fall 2023, has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Master of Science in Applied Economics on 31st October 2024.

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ABSTRACT

This thesis explores the dynamics of trust and trust-based behaviors such as fear, greed, and cooperation in a continuous trust game experiment, comparing a model based on the Prisoner's Dilemma with a proposed theoretical model for the FTC (Fear, Temptation, and Cooperation) Index. The study hypothesizes that financial conditions, specifically initial endowments and social conditions, such as Reputation, would influence trust-related decisions by reducing fear and greed and promoting cooperation. The research explored various non-parametric analyses and regression to explore the latent effect of the Endowment and Reputation through their mediators on fear, greed, and cooperation. Surprisingly, initial endowment proved insignificant across both models and regression analyses, suggesting that financial factors may not play as vital a role as anticipated. Instead, social factors, particularly reputation, significantly influenced trust behavior. The findings indicate that a healthy, trust-promoting environment fosters cooperation more effectively than financial incentives alone. The proposed model better captures these social dynamics and outperforms the Prisoner's Dilemma-based model in predicting trust-related outcomes. This research underscores the complexity of human decision-making, where psychological and social elements, such as reputation, often outweigh financial considerations in fostering trust and cooperation, reducing societal and individual fear and greed.

Key Words: Game Theory, Experiment, Behavioral Economics, Trust, Fear, Temptation, Cooperation, Reputation, Endowment, Continuous Trust Game, Prisoner's Dilemma, Structural Equation Modeling

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CHAPTER 1: INTRODUCTION

1.1 Background and Research Motivations

Trust is the nucleus of all interactions, from relationships to business ones. It binds society together and builds civilizations. When trust is healthy, people can gain collective Pareto superior outcomes. When trust diminishes, individuals may succumb to avarice, resulting in unequal and inefficient distributions of power and resources.

McAllister (1995) says trust means believing what someone says, does, and decides. Holmes and Rempel (1989) see it as a positive and confident expectation of motivation, especially when things are dangerous. According to Krueger et al. (2019), trust is the willingness to take risks and expect future positive behavior from the other. However, Rousseau et al. (1998) say that trust is a psychological state that accepts susceptibility because of the optimistic expectations of the intentions of others. Trust is still there when there is a lot of danger and doubt (Alós-Ferrer and Farolfi, 2019).

Arrow (1972) and Fukuyama (1995) stated that the level of trust in society is strongly correlated with its economic success. Trust keeps financial systems stable in business, cutting costs and making things run more smoothly. Trust is necessary for monitoring and enforcing affordable agreements, leading the market to inefficiency or failure. So, how trust dynamics respond with cooperation, greed, and fear is essential to comprehending the decision-making process.

Experimental economics try to quantify trust in controlled settings and observe behavior. The Trust, Dictator, and Ultimatum games show that people often Strategize between self-interest and reciprocity. This notion goes against the Classical economic view that people are naturally selfish. Behavioral economics examines how emotions, biases, and social actions and preferences affect people's choices.

Our study will conduct a continuous trust game lab experiment to investigate how trust interacts with Fear, Temptation, and Cooperation (FTC). We will analyze the continuous trust experiment from the existing Prisoner's Dilemma paradigm as staring point and then propose a new theoretical concept to measure the FTC index based on the findings. We will examine how factors like reputation awareness and financial situations impact decisions to cooperate, act selfishly, or take risks; understanding of trust dynamics in economic and social contexts.

1.2 Research Gap and Question

Researchers have been experimenting with various economic, social, and psychological aspects through various economic experiments. One commonly used laboratory experiment is the Trust Game, specifically the Binary Trust Game, as its payoff matrix is similar to Prisoner's Dilemma and easy to interpret. However, there has been a notable interest in the Continuous Trust Games in recent years. The researcher has focused on individuals' trust dynamics, such as Fear, Greed, and Cooperation, in continuous trust game settings. There are experiments and literature on the Binary Trust game but very few on the Continuous Trust game on the FTC index.

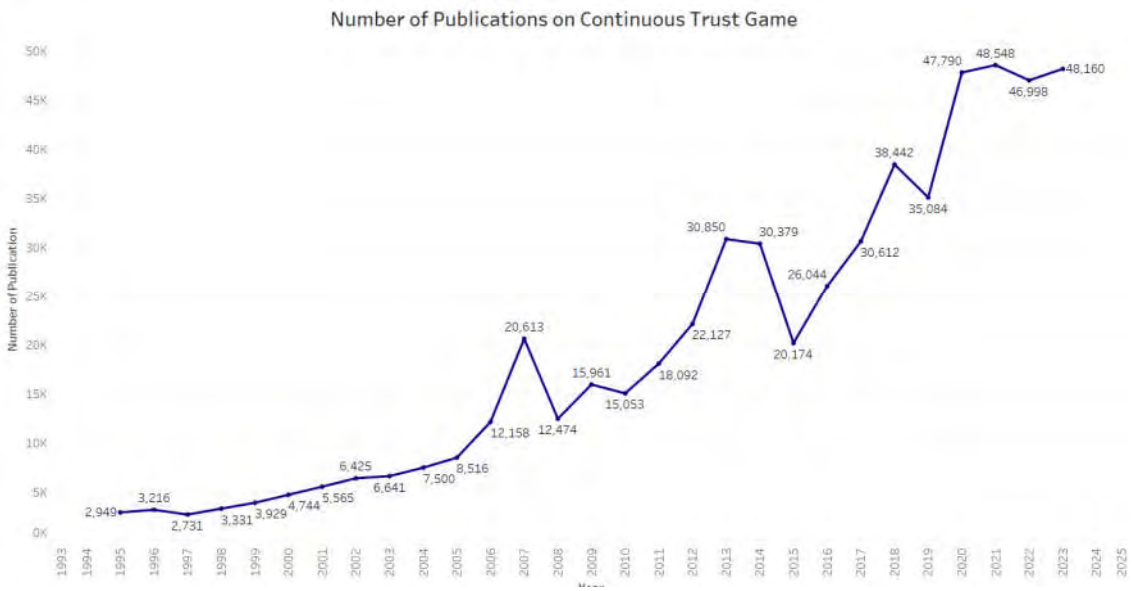

Figure 1: Number of Publication on Continuous Trust Game

The researcher aims to explore this research gap between binary and continuous trust games by addressing the "Initial Endowment" as the financial condition variable and the "Reputation Awareness Dummy" variable as the social condition variable and to explore how their financial and/or social condition influence their trust dynamics in a continuous trust game laboratory experiment in fear, greed, and cooperation raising the question:

"How do initial endowments and reputation awareness impact fear, greed, and cooperation in continuous trust games?"

Furthermore, we will investigate whether gender plays a role in reciprocity and explore expectation versus reality in terms of coopration.

CHAPTER 2: LITERATURE REVIEW

2.1. Trust Game

Trust-building is a fundamental aspect of the social sciences. Trust is a concept that transcends the boundaries of various social disciplines, including sociology, anthropology, economics, and psychology. It is an essential and emergent process in social interactions and market dynamics, as scholars such as Creed and Miles (1994) and Etzioni (1988) emphasize. According to Camerer and Weigelt (1988) and Berg, Dickhaut, and McCabe (1995), trust is commonly seen as a rational behavior where individuals choose to trust others only when it is advantageous for them to do so. Standard game theory suggests that when all players are opportunistic and untrustworthy, they act in their self-interest and defect. This is because, in a one-shot interaction, betraying the other players offers the highest potential individual gain, regardless of the actions taken by others. As a result, the collective outcome tends to be suboptimal, with all players worse off compared to a scenario where cooperation and trust were possible.

However, Berg, Dickhaut, and McCabe (1995) conducted their famous' Investment Game', where they still showed reciprocity even when subjects were anonymous. This observation suggests that self-interest is not always what drives people. They are sometimes willing to make decisions that benefit others, even when those decisions do not directly benefit themselves. They experimented by asking subjects to play a game with a random anonymous partner. In the game, one player (the sender) could send any money to the other player (the receiver). The receiver could either retain the money or return it to the sender. Berg, Dickhaut, and McCabe's findings indicate that reciprocity can supersede the assumption of purely self-interested decision-making, emphasizing the role of societal facors and the enlightening influence of social history in promoting trust and reciprocity. Their 'Investment Game' is the original trust game, often called the BDM game. Later, many researchers and economists conducted different versions and iterations of the BDM game.

However, Kreps (1990) discussed a theoretical framework for repeated games and incomplete information. Though we know the original Trust game is the BDM game, Kreps (1990) uses the name "Trust Game" in a more straightforward binary trust game.

Alós-Ferrer and Farolfi (2019) reviewed various trust game paradigms, including traditional and alternative formats, to investigate trust and trustworthiness. They discussed how multiple factors, such as information asymmetry and contextual variations, can affect trust and highlighted the drawbacks of conventional trust games. The trust game they use has a variation

in which the trustee receives two tokens. When he chooses, the trustee will get double the quantity of the reciprocated tokens. After that, the trustee can either abuse or uphold the trust. Reciprocities between the trustee and the trustee can only be in whole numbers.

The experimental literature was beginning to show signs of convergence of ideas and cross-mixing of different experiments when the trust game was introduced. Countless other experiments were developed to identify, quantify, and differentiate among similar constructs, such as "trust," "reciprocity," and "fairness." Cox (2004) employed a triadic experimental design that included a betrayal, dictatorship, and trust game to discern between reciprocity and trust in economic games. Dasgupta, P. (1988) demonstrated that trust is a resource that can improve collaboration and lower transaction costs in his Dishonest Salesman Game. Lyons and Mehta (1997) investigate the roles of the two types of trust mechanisms in opportunistic behavior and contractual relationships in the trading game: 'Self-Interested Trust' (SIT) and 'Socially-Oriented Trust' (SOT).

An especially intriguing experiment involves combining or mimicking the Prisoner's dilemma with the Trust game. Fehr and Rockenbach (2003) used a modified investment game akin to a Prisoner's Dilemma, where punishment sometimes backfires and reduces cooperation, primarily driven by selfish motivations. Charness and Dufwenberg (2006) used another modified version of the trust game where they discovered that communication played a crucial role in improving cooperation between players, a finding that keeps the audience engaged and interested, as the second player is reluctant to break promises due to guilt aversion. Iris Bohnet and Richard Zeckhauser (2004) employed a modified binary trust game similar to Prisoner's Dilemma but not the same. They demonstrated that the emotional cost of potential betrayal is crucial in decision-making, especially when the risk and stakes are more significant.

Johnson and Mislin (2011) conducted a significant meta-analysis of trust games to investigate the factors influencing trust and trustworthiness. They analyzed data from 162 replications of the trust game involving more than 23,000 participants. The results of the meta-analysis revealed that if players have information on the multiplier effect, if the receiving player is a real subject, not a simulated program, if the sender and recipient played both roles in the game, and if the player is a student, they are more likely to send money. In the case of Trustees, the rate of return, roles, and student subjects significantly affect their trust behavior.

The study "The Impact of Order Effects on the Framing of Trust and Reciprocity Behaviors" (2023) by Davood Bayat et al. explores how the sequence of decision-making influences trust

and reciprocity. In their experiment, participants engaged in a two-round trust game, with the first round framed as either "take" or "give" and the second round framed oppositely. The results showed that participants who started with a "take" frame were more likely to trust in the subsequent "give" frame, and those who began with "give" were more inclined to reciprocate in the following "take" frame. This effect is linked to the anchoring bias, where initial experiences heavily influence later decisions.

The purpose of this study is to conduct the original BDM experiment, except the initial endowment will be varied among the senders, and the trust reputation rating will be used as a motivation for cooperation. Our experiment investigates how fear, temptation, greed, and overall benefit influence the payoff matrix in the trust game for varying endowment and reputation effects. The trust reputation rating will shape the trust behavior towards group cooperation. The individual will be tested on personal payoff versus reputation and motivated to achieve their maximum probable collective group benefit. We will explore the impact of the sender's fear, the receiver's temptation, and their collective benefit on the outcomes and decisions of the participants. By manipulating these factors, we aim to uncover the dynamics that shape trust-based interactions and their resulting payoffs. The study will use Prisoner's Dilemma/ Binary Trust Game's payoff matrix as the starting point of the investigation, and based on the findings, a more appropriate theoretical approach for the FTC index will be adopted and analyzed.

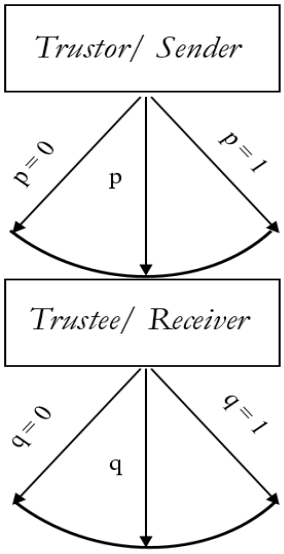

Figure 2: Tree Diagram of Original BDM Trust game experiment

Carpenter, Verhoogen, and Burks (2005) used dictatorial and ultimatum games with varying degrees of the endowment effect. Still, in these games, the receiver or Trustee has less freedom to influence the payoff matrix than in the trust game. We will use the repeated, continuous trust game to measure the sender's risk/fear index, the receiver's temptation/greed index, the overall cooperation index for optimum benefit, and the resulting payoff matrix.

Our experiment used a modified version of the original BDM (Berg, Dickhaut, and McCabe) trust game to explore the impact of varying endowments and reputation awareness on fear, greed, and cooperation. Unlike the fixed $10 endowment in the original BDM experiment, our version allows for variable endowments, providing greater flexibility in manipulating the game's parameters. We have also kept the rate of return constant at 3, consistent with the BDM experiment, as Ackert et al. (2011) and Mislin, Williams, and Shaughnessy (2015) showed that a higher rate of return ensures higher monetary gains, resulting in higher efficiency. While the BDM framework is versatile, we also incorporate the concepts of the fear/ risk index, greed/temptation index, and cooperation index, traditionally used in binary trust games like the Prisoner's Dilemma, which offer clear and precise measurements of these behaviors due to their simple payoff matrices. Many scholars, such as Engel and Zhurakhovska (2016) and Insko, Wildschut, and Cohen (2013), used prisoner's dilemma in binary trust game settings to investigate the role of fear and greed in reducing the cooperative behavior of the participants. However, despite the simplicity and clarity binary trust games provide, they limit participants' choices and outcomes. To address this, we have adopted similar concepts using their respective payoff functions for the fear/ risk index from the trustor's payoff function, the greed index from the Trustee's payoff function, and the cooperation index from the Trustor and Trustee's payoff functions, tailored to our continuous trust experiment. We aim to observe how endowment and reputation awareness variables influence the dynamics of fear, greed, and cooperation.

2.2. The Endowment Effect

The endowment effect is a psychological phenomenon in behavioral economics where individuals assign a greater significance to their owned objects than objects they do not. This effect occurs because ownership increases the perceived value of an item, making people less willing to part with it, even if they would not have valued it as highly before acquiring it. The discrepancy between the "willingness to accept" (WTA) compensation for giving up the owned item and the "willingness to pay" (WTP) to acquire the same item before owning it serves as an illustration of this effect. Typically, people demand more money to give up something they

own (WTA) than they would be willing to pay to acquire it (WTP), showing the endowment effect. Richard Thaler (1980) observed that people overvalue their items, which deviates from the traditional economic concept. The endowment effect has become a fundamental concept in behavioral economics. According to the prospect theory by Kahneman and Tversky, the endowment effect can be attributed to loss aversion, reference dependence, probability weighting, and diminishing sensitivity. People evaluate the state of things by benchmarking their current state of affairs, and they are more likely to avoid losses to acquire gains. The endowment effect results from how people perceive and weigh their losses versus gains. Kahneman, Knetsch, and Thaler (1990) found strong evidence of the endowment effect, challenging the Coase theorem and underscoring how people are more psychologically biased than traditional economics suggests. The endowment effect is pivotal in experimental economics as it challenges the participants' decision-making process. In trust games, participants can maximize their gains by trusting and reciprocating, expect others to do the same, or minimize their losses by not trusting. This affects their trust behavior, leading to varying levels of cooperation, greed, and equality perceptions depending on various conditions.

In the original BDM experiment, the Trustee is given an endowment of $10. The Trustee can choose to trust by giving any percentage of this endowment to the Trustee or choose not to trust, which results in no further interaction. If the Trustee decides to trust, the amount given is tripled (with a rate of return of 3), and the Trustee receives three times the amount sent. The Trustee then decides to betray the trust by keeping the entire amount or honor it by reciprocating and returning any percentage of the money received to the Trustee. The experiment results showed that the participants' altruistic behavior opposed the conventional economic theory that people are inherently selfish.

Carpenter, Verhoogen, and Burks (2005) used two laboratory experiments in which participants played dictator and ultimatum games with different stakes. The stakes ranged from $0.01 to $100. The experiment results showed that trust behavior decreased as the stakes increased. This suggests that people are less likely to trust when stakes are higher. As the stakes get higher, the interchange of the individuals gets lower, indicating a reduced level of cooperation and an increase in selfish and greedy behavior.

Ho and Weigelt (2001) found that when the funds in their multi-stage trust game were expanded tenfold, the trust level and credibility of the participants improved substantially. This suggests that more significant stakes in trust games can enhance both trust and trustworthiness among

participants. The increase in potential returns likely motivates players to act more cooperatively, reflecting higher levels of trust in situations where the rewards are significant.

Kuroda, Kamijo, and Kameda (2020) found that higher endowment or stake size increases trust behavior, as higher stakes are more rewarding. This leads participants to act more trustworthy and trust others, even if they initially hold pessimistic beliefs about trustworthiness. More significant potential returns help counteract this pessimism, promoting cooperative behavior.

Hertwig and Ortmann (2001) analyze experimental practices in economics and their implications for psychologists. They highlight how varying stake sizes in experiments can significantly impact participant behavior, with more significant stakes often leading to more pronounced and reliable economic decisions. The study emphasizes the importance of methodological rigor, noting that the size of stakes can influence outcomes like trust, cooperation, and risk-taking, thereby challenging psychologists to consider these factors carefully in experimental design.

The study by Bejarano et al. (2018, 2020) suggests that while inequality impacts trust and trustworthiness, the source of inequality (random shock or initial condition) is less critical to second movers. Fehr et al. (2020) suggested that economic inequality undermines social capital by reducing trust and cooperation. Perceived unfairness weakens social ties and lowers community cohesion, making it essential to address inequality to maintain social capital.

Amalia Rodrigo-González et al. (2021) found that unequal wealth endowments significantly decrease trust and reciprocity. Participants were less likely to trust and reciprocate when faced with unequal distributions, highlighting the negative impact of inequality on cooperative behavior.

While endowment has an inconsistent pattern with trust behavior in different literature, especially in terms of cooperation, we can assume that in a society that harbors a healthy, trustful environment, people tend to be less afraid, greedy, and more cooperative. Thus, our hypothesis for the endowment effect stands as:

H1: *Higher endowment is negatively associated with Fear/ Risk*

H2: *Higher endowment is negatively associated with Greed/Temptation*

H3: *Higher endowment is positively associated with Cooperation*

2.3. Reputation

The original BDM game showed that people engaged in reciprocating behavior despite being anonymous, defying the traditional economic sense. Robert Aumann (1985) showed how reputation affects players' strategies and outcomes in economic interactions in repeated games. It explores how incomplete information about other players' payoffs or strategies affects decision-making and cooperation. Aumann demonstrates that the aspiration to maintain a positive reputation can encourage players to cooperate more frequently, as this fosters trust and prevents adverse outcomes in future interactions, ultimately supporting cooperative equilibrium in economic environments. This highlights the importance of reputation in building cooperation in society and economics, from entities to institutions.

According to Andreas Diekmann and Wojtek Przepiorka (2005), they used a computer simulation to model the agents' interactions. They found that trust and reputation can emerge even in a population of initially selfish and distrustful agents. They also discovered that several variables can affect trust and reputation, including population size, interaction frequency, and the cost of cheating.

Nowak and Sigmund (1998) present a novel theoretical framework for the development of cooperation based on indirect reciprocity. Indirect reciprocity is a mechanism of cooperation where third parties reward or punish individuals based on their past behavior towards others. Nowak and Sigmund's computer simulation model shows that cooperation can evolve in the model even if the cost of cooperation is high. This is because the benefits of cooperation are also high, in the form of a good reputation. The paper by Nowak and Sigmund is an essential contribution to the literature on the evolution of cooperation. It shows that indirect reciprocity can be a powerful mechanism for promoting cooperation, even in settings without an opportunity to build a direct reputation.

Teck-Hua Ho (2005) investigated the trust-building process between strangers in a laboratory setting. Ho uses a novel multi-stage trust game to study how people trust others when they do not know them and will not interact with them again. The results of Ho's study show that people are more inclined to trust others when they have more information about them.

Li, Z.H., Ran, S., Huang, Z.H., Yang, S.M., and Pu, R.R. (2021) investigated the effect of the payoff matrix on the trust game using a binary trust game. They found that rewards and penalties significantly affect participants' trust and cooperative behavior. They also found that participants with higher reputations tended toward fairness and reciprocity and were likelier to cooperate. However, sometimes larger endowments lead to increased greed, reducing cooperation among participants.

Dirk Engelmann and Urs Fischbacher (2009) investigated indirect reciprocity and strategic reputation building in an experimental helping game. Indirect reciprocity is a mechanism for cooperation where third parties reward or punish individuals based on their past behavior towards others. Strategic reputation building is behaving in a way designed to improve one's reputation in the eyes of others, even if this behavior is not directly beneficial to the individual. The researchers find pure indirect reciprocity exists, but strategic considerations also substantially affect helping decisions. Specifically, they find that strategic players do better than non-strategic and non-reciprocal players do better than reciprocal players. This suggests that strategic reputation-building can promote cooperation without direct reciprocity.

Barclay and Smith (2012) examined 147 experimental studies on trust games, representing 52 countries with diverse cultures. The findings revealed significant cultural differences in trust behavior, indicating that participants from individualistic cultures were likelier to trust than those from collectivist cultures. These results highlight the influential role of culture in shaping trust behavior.

Bolton, Katok, and Ockenfels (2004) examine how strangers cooperate when they have minimal information about each other's reputations. The authors argue that even when strangers have very little information about each other, they can still cooperate to a significant extent. This is because cooperation is often mutually beneficial, and strangers can learn about each other's reputations over time. The authors carried out an experiment in which strangers participated in a game where they could either cooperate or cheat. The experiment results showed that even when strangers had no information about each other's reputations, they still cooperated significantly. However, the level of cooperation was higher when strangers had information about their partner's recent prior action and reputation, leading to more equitable and fairer outcomes as the player considers the welfare of others.

Eun-Soo Park (1999) found that players' reputations can significantly affect their negotiating strategies and the resulting agreements. Specifically, individuals with solid reputations for fairness or reliability tend to secure better outcomes and foster more cooperative behavior in bargaining situations. The paper highlights that a positive reputation can lead to more equitable and mutually beneficial agreements, as players are motivated to uphold their reputation by behaving more fairly and cooperatively.

The reputation has a consistent pattern with trust behavior leading to increased cooperation and reduced fear and greed; thus, our hypothesis is as follows:

H4: *Higher reputation is negatively associated with Fear/ Risk*

H5: *Higher reputation is negatively associated with Greed/ Temptation*

H6: *Higher reputation is positively associated with Cooperation*

CHAPTER 3: EXPERIMENT DESCRIPTION

3.1. Preliminary Details

The experiment was executed in the Behavioral Experiment Lab at BRAC University and was funded by BRAC University. We also obtained approval from the Institutional Review Board (IRB) before experimenting. The trust game for the experiment was developed virtually on 'oTree,' a web-based open-source platform for web-based interactive tasks such as behavioral experiments, multiplayer strategy games, surveys, psychology games, auction markets, etc. A total of 146 participants participated in the experiment, of which 78 were male, 40 were female, and 28 preferred not to reveal their gender. Most of the participants are undergraduate and Master's students at BRAC University. Students voluntarily signed up for the experiment through Google Forms and were randomly assigned to their preferred time slots. The participants were given instructions on the game's rules and signed consent forms to acknowledge their voluntary participation before the commencement of the sessions. Declaration from the experimenter was also given to the participants as the data collected from the experiment will solely be used for academic/ research purposes, safeguarding their personal information.

3.2. Group Formation, Roles, and Number of Observations

The participants were given a 6-letter token to log in to the game in the virtual trust game. They were divided into groups randomly and remained anonymous to their respective group member for the entire game duration. Every group consists of 2 participants. Every group has two roles: Trustor / Sender and Trustee/ Receiver. One participant assumes the role of Trustor / Sender and another Trustee/ Receiver. This is a sequential, continuous trust game where the game starts with the decision of the Trustor, and depending on that decision, the game stops there or shifts to the Trustee for his/her decision. Since every group comprised two participants, for a total of 146 participants, the total number of groups was 73. Since every group played four rounds of the game, there were group interactions or observations of 292, with 73 observations for each round.

3.3. Pre-Game Instructions, Signals, and Payment

Before the commencement of the game, players were provided with a set of instructions and information.

1. The rate of return for the Trustor's reciprocated amount to the Trustee is 3.
2. After all the rounds are completed, the group with the highest trust rating will be rewarded with doubling the payoffs of each group participant.
3. Similarly, the group with the lowest trust ranking will be penalized with a 75% reduction of payoff for the participant with the lowest trust rating in that group.
4. Participants can leave any experiment at any time but will only be paid if they finish the game. Upon completion of the game, participants will be given a show-up fee of 150 taka for their valuable participation in the experiment.
5. Additionally, participants can cash the virtual points they have accumulated in the game, adjusted for reward and penalty (if applicable). However, they will not be informed of the exchange rate of virtual points to Taka.

3.4. Game Objective

The game challenged the participants' trust behavior by maximizing individual pay-off versus group collective pay-off. The players can choose to maximize their payoff. Still, they risk facing a penalty if their trust rating is the lowest. Alternatively, they can cooperate with their anonymous partner by trusting each other, thus potentially being rewarded if their trust rating is the highest, which is a Pareto superior outcome. Introducing rewards and penalties motivates participants to cooperate especially for the Trustee, who has no economic motive to reciprocate.

3.5. Game Rules

1. Two randomly selected participants will form groups, with one participant assuming a 'Trustor' role and another assuming a 'Trustee' role. Since every group required 2 participants, every game session was conducted with an even number of participants. If the total number of participants is 2m, then this experiment will have m number of groups. Since we had a total of 146 participants, the number of the group was 73.
2. This game has four rounds. The first two are called the 'Trust Evaluation Stage,' and the last are called the 'Reputation Signal Stage.'
3. Players in each group alternate between the 'Sender'/'Trustor' and 'Receiver'/'Trustee' roles. Initially, one member will be the 'Sender'/'Trustor' while the other takes the

'Receiver'/'Trustee' role. Roles will reverse in subsequent rounds, allowing both participants to play both roles sequentially. This Role reversal happened in the 'Trust Evaluation Stage' and 'Reputation Signal Stage.'

4. The Trust Evaluation Stage (Rounds 1 & 2) will formulate the players' individual and group Trust Reputation Rating based on their level of reciprocity in those rounds.
5. Before starting the Reputation Signal Stage (Rounds 3 &4), Individual and Aggregate Group Trust Ratings will be computed using trust behavior data from Rounds 1 and 2. Subsequently, groups will be ranked according to their Aggregate Group Trust Ratings. Players will have access to their individual and group trust ratings and virtual payoff, reflecting the level of trust between them and their counterparts in previous rounds, as well as perceive their rankings among other groups.
6. At the beginning of the game, each group's Sender/Trustor will receive a fixed number of virtual points in their account. This amount may be the same or different for all groups and will be randomized. The Endowment = nx where, x 1000 points and n ~ Uniform{1,2,3,4}
7. The Sender makes the first decision based on his trust level, p, and p: p∈ [0, 1]. The Sender/Trustor can transfer some of their virtual points to the other participant or refrain from doing so.
    i) Distrust - The Sender will not invest and keep everything where the Receiver has none. The resulting payoffs are (nx, 0). The sender's Trust Reputation, $W_S = 0$.
    ii) Trust - The sender will reciprocate 'pnx,' keeping 'nx-pnx,' The sender's Trust Reputation, W_S = (Amount Sent by sender)/ (Amount Initially owned by the sender) = (pnx)/ (nx) = p
8. The rate of return for the reciprocated amount of Sender, k = 3. So if the Trustor donates a 'pnx' amount from his endowment, the Trustee will receive a 'kpnx' amount of points.
9. If the Sender trusts the Receiver, he/she will also decide based on his/her trust level, q, and q: q∈ [0, 1].
    i) Distrust - The receiver betrays the sender's trust and keeps all the money. The resulting payoffs are (nx-pnx, pknx). Trust Reputation of "Trustee", $W_R = 0$
    ii) Trust - The receiver reciprocates by honoring the trust by giving back 'kpqnx' and keeping 'kpnx-kpqnx'. The resulting payoffs are (nx-pnx+kpqnx, kpnx- kpqnx). The receiver's Trust Reputation, W_R = (Amount Returned by sender)/ (Amount Trusted by the receiver) = (pqknx)/ (pknx) = q

10. In round 2, Player 1 Will be the Receiver/Trustee, and Player 2 will be the Sender /Trustor). So, the roles are reversed between the players every two rounds.
11. The trust reputation rating of each player is formulated from Rounds 1 & 2.

    Player 1 Trust Rating, $W_1 = W_{S1}+W_{R2,}$

    Player 2 Trust Rating, $W_2 = W_{S2}+W_{R1}$

    Aggregate Group Trust Rating for Round 1 & 2, $WG_1 = W_1 + W_2$
12. The game continues in the Reputation Signal Stage (Rounds 3 & 4) with the same rules as in the Trust Evaluation Stage (Rounds 1 & 2). However, players now have additional information about the level of trust and virtual payoffs within their group and their overall ranking, reflecting their cooperation. This information is provided before these rounds begin. The aggregate Group Trust Rating for Rounds 3 & 4, WG_2, will be calculated. We will also calculate the Total Aggregate Group Trust Rating, $WG = WG_1 + WG_2$
13. From the collected data from all rounds, final individual and group trust ratings will be calculated, and groups will be ranked accordingly. As mentioned, the group with the maximum aggregate trust reputation rating, WG_{max}, will be rewarded by doubting each member's points. In contrast, the group with the lowest aggregate reputation rating, $WG_{min,}$ will be penalized with a 75% deduction for the member with the lowest trust rating.
14. In each round, the contestants were also questioned about their expectations of their opponents. While the senders are asked their expectations from their receivers ($\hat{q}$), the receivers are also asked the same ($\hat{p}$). This is to understand how much they trust each other compared to how much they perceive their trust levels.
15. The participants will cash their game winnings with show-up fees, adjusted for rewards and penalties (if applicable), and sign in to the payment register for their collected money.

3.6. Payoff Functions and Tree Diagram

i) Endowment = nx where, x = 1000 and n ~ Uniform{1,2,3,4}, Rate of return = 3

ii) Sender's Trust Level, p: $p\in[0,1]$

iii) Receiver's Trust Level, q: $q\in[0,1]$

iv) Sender's Perceived Trust Level, $\hat{p}$: $\hat{p}\in[0,1]$

v) Receiver's Perceived Trust Level, $\hat{q}$: $\hat{q}\in[0,1]$

vi) Sender's Pay-off function = (nx-pnx+pqknx)

vii) Receiver's Pay-off function = (pknx-pqknx)

viii) Reward Function = {2(nx-pnx+pqknx), 2(pknx-pqknx)}

ix) $$Penalty\ Function = \begin{cases} \{0.25(\text{nx} - \text{pnx} + \text{pqknx}), \text{pknx} - \text{pqknx}\}, & W_1 < W_2 \\ \{\text{nx} - \text{pnx} + \text{pqknx}, 0.25(\text{pknx} - \text{pqknx})\}, & W_2 < W_1 \end{cases}$$

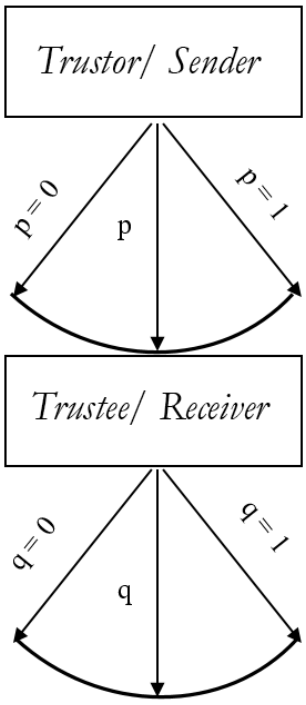

Figure 3: Tree Diagram of our Continuous Trust game experiment (BDM Experiment)

3.7. Ethical Guidelines

The experimental procedures were approved by BRAC University (Department of Economics and Social Science) and the Institutional Review Board (BRAC University) (BRACUIRB220240001). Dr. A S M Shakil Haider, Assistant Professor in the Department of Economics and Social Science and Director of the Behavioral Experiment Lab at BRAC University, supervised the experimental sessions.

The ethical protocol was strictly followed as per IRB guidelines and university rules. Participation was voluntary and spontaneous. The participants signed informed consent forms before the games, and upon completion, they were paid a participation fee of 150 Taka along with the game winnings. All their personal information, consent forms, and payment records were kept confidential. All the data collected from the experiment will be used only for academic/ research purposes, and only authorized personnel can access it.

3.8. Funding

The experiment was funded by BRAC University (Department of Economics and Social Science).

CHAPTER 4: METHODOLOGY

4.1. Dataset Preparation and Cleaning

All experiment session data were collected and merged in a single mother file. The mother dataset was cleaned and trimmed using Python for the required variable only. The dataset was trimmed down to the Sender and Receiver's round-wise trusts, expectations, payoffs, reputation dummies, role reversal dummies, initial endowments, and variables calculated from this information such as cooperation index, expected cooperation index, greed index, and fear index. Since the participants were not required to divulge their personal information in the optional field in the game platform, fields such as education and gender were left blank. These empty cells were replaced with 'PNTS' as 'Prefer Not to Say.' Also, in the 'Age' field, ages lower than 16 years and greater than 60, which were unrealistic, were replaced with 'NA' values for analytical clarity. Undefined values of the dependent variables are replaced with their respective mean values for analytical purposes. Suppose the 'Trustor' decides not to trust his counterpart, i.e., the Trustee received nothing, and the Greed Index in such a situation becomes an undefined value. We have also created round-wise (Round 1, 2, 3, and 4), stage-wise (Round 1& 2 combined and Round 3 &4 combined) and endowment-wise (Endowment 1000, 2000, 3000 and 4000) datasets. The data cleaning and analysis were performed using R, Python, and Microsoft Excel.

4.2. Variable Description and Formulation

4.2.1. Costs and Dependent Variables

4.2.1.1 From Prisoner's Dilemma Concept

Researchers such as Rapoport (1967), Zheng, Kendrick, and Yu (2016), Li, Z.H., Ran, S., Huang, Z.H., Yang, S.M., and Pu, R.R. (2021), etc. used binary trust games in investigating and determining various aspects of Fear, Temptation, and Cooperation (FTC) indexes because its payoff structure is more straightforward than BDM paradigm. The payoff matrix of a binary trust game is similar to a prisoner's dilemma paradigm, except the difference is that in a prisoner's dilemma, the Trustor and Trustee make the decision simultaneously, whereas, in a binary trust game, the decisions are made sequentially, started by the Trustor and followed by the Trustee (if applicable). The Fear and Cooperation indexes are measured from the Trustor's point of view, and the Temptation/ Greed index is calculated from the Trustee's perspective.

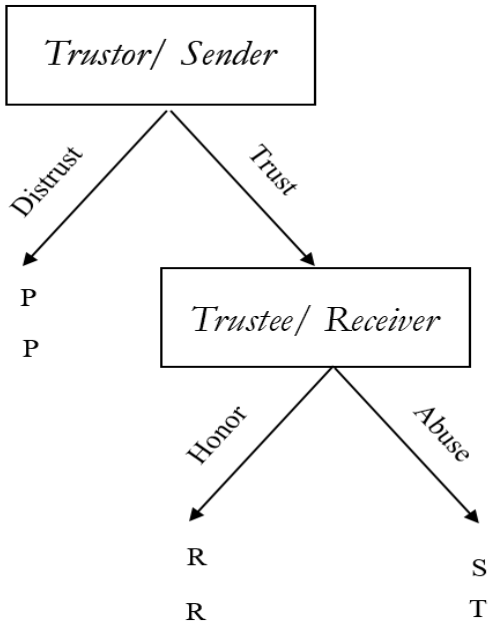

Figure 4: Tree Diagram of Binary Trust Game

The binary Trust game's payoff matrix resembles the Prisoner's dilemma. The binary trust game is sequential, and the prisoner's dilemma is simultaneous. In the Prisoner's Dilemma paradigm, the payoff depends on the trust decision of both the Trustor and the Trustee. If both decide not to cooperate, i.e., both distrust, they will get a punishment payoff (P). If one chooses to cooperate and the other betrays, the cooperative one gets sucker payoff (S), and the non-cooperative one gets Temptation payoff (T). If both of them decide to cooperate by trusting each other, they both get a Reward payoff (R). The prisoner's dilemma parading payoff follows the relationship $S < P < R < T$, and $2R = T + S$. The payoff matrix of the prisoner's dilemma is as follows:

	Receiver's Decision	
Sender's Decision	Trust	Don't Trust
Trust	R, R	S, T
Don't Trust	T, S	P, P

Table 1: Payoff Matrix of the Prisoner's Dilemma

The cost of fear, temptation, and cooperation can be derived as follows:

i) Cost of Fear/ Risk: The cost of Fear is the loss aversion for the Trustor as he/she better get Punishment Payoff (P) than the Sucker Payoff (S) as P>S, and the cost of Fear/Risk = P-S

ii) Cost of Temptation/ Greed: The Cost of Temptation is the additional payoff by the trustee for betraying the trust. If the Trustor decides to put faith in him, the Trustee gets a Temptation Payoff (T) for his betrayal or Reward Payoff (R) for honoring the trust and T>R, and the cost of Temptation/ Greed = T-R.

iii) Cost of Cooperation: The cost of Cooperation is the difference between the reward payoff (R) for their cooperation by trusting each other and the punishment payoff (P) for non-cooperation by betraying each other, as R>P and The Cost of Cooperation = R-P

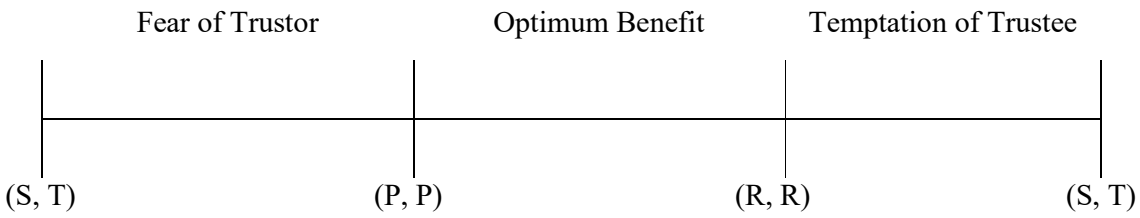

Figure 5: Cost of Fear, Temptation, and Cooperation in Prisoner's Dilemma Paradigm

From the cost of fear, temptation, and cooperation, the Fear, Temptation, and Cooperation indexes can be derived from a prisoner's dilemma. The paradigm is as follows:

i) Fear/ Risk Index: The fear/ risk index in the trust game is the ratio of the cost (when the Trustor distrusts to avoid cost) to the benefit (when the Trustor trusts for potential gain). It quantifies the trade-off between potential costs and benefits when making trust decisions.

$$\text{Fear/Risk Index} = \frac{P - S}{R - S}$$

ii) Temptation Index: The temptation index measures the difference in payoffs between defecting and cooperating when the other player cooperates. It reflects the additional benefit the Trustee perceives when he/she considers betraying the trust of a cooperative player.

$$\text{Temptation/Greed Index} = \frac{T - R}{T}$$

iii) Cooperation Index: The cooperation index is calculated by comparing the personal benefit of trusting behavior to the financial difference resulting from betrayal after trust. It reflects the individual's evaluation of the potential gains from trust and the associated risks of betrayal.

$$\text{Cooperation Index} = \frac{R - P}{T - S}$$

Unlike the Prisoner's Dilemma, our experiment was a continuous trust game in which decisions were made by Trustees and Trustees not simultaneously but sequentially. So, we cannot use the same payoff matrix to measure the Fear, Temptation, and Cooperation Index. Also, the Prisoner's dilemma paradigm does not measure the relative difference in the payoffs between the trustors and trustees to formulate an equality index. So, using the prisoner's dilemma paradigm payoff matrix as a foundation for our experiment, we develop simplified formulas for the Fear/Risk index from the Trustor's payoff function, the Greed index from the trustee's payoff function, and the Cooperation index from the Trustor and trustee's payoff functions.

	Receiver's Decision	
Sender's Decision	Trust	Don't Trust
Trust	nx-pnx+kpqnx, kpnx-kpqnx	nx-pnx, kpnx
Don't Trust	nx, 0	nx, 0

Table 2: Payoff Matrix of the experiment

The Sender's and Receiver's payoff functions are as follows:

$$Trustor/\ Sender's\ Payoff\ Function = nx - pnx + kpqnx$$

$$Trustee/\ Receiver's\ Payoff\ Function = kpnx - kpqnx$$

Now, we will reconfigure Figure 1 from the Prisoner's Dilemma paradigm using Trustor and Trustee's payoff function and similar logic as follows:

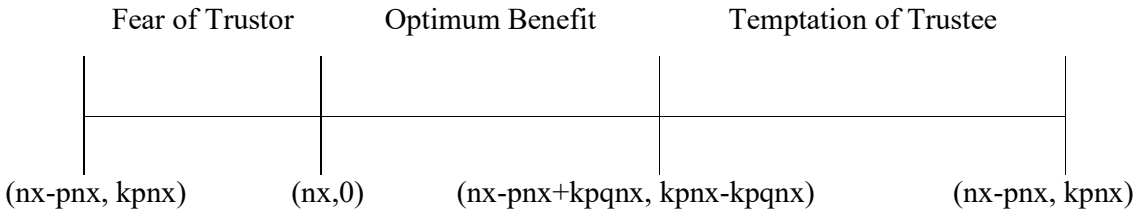

Figure 6: Cost of Fear, Temptation, and Cooperation in from Experiment

The Trustor receives an initial endowment of 'nx,' at the beginning of each round. If the Trustor decides to distrust, he/she better get a punishment reward of (P=nx) than be ripped off for a lesser payoff (S= nx-pnx) by the Trustee in case the Trustee betrays. In case of such betrayal, the Trustee hogs himself/herself with the Temptation payoff (T=kpnx), but if he/she decides to cooperate by honoring the trust back, he/she will receive (R = kpnex-kpqnx). This 'kpqnx' is the amount they cooperated on. So the costs and indexes functions are as follows:

i) Cost of Fear/Risk: When the Trustor/ Sender distrusts the Trustee in fear of the Trustee's betrayal, the difference between the respective payoffs (P-S) is the cost of Fear/ Risk.

$$Cost\ of\ Fear/Greed = nx - (nx - pnx) = pnx$$

So 'pnx' is the portion of the payoff the Trustor/ Sender reciprocates to the Trustee/ receiver.

ii) Cost of Temptation/Greed: When the Trustee/ Receiver distrusts the Trustor in temptation/ greed for a more significant payoff, the difference between the respective payoffs of the Trustee (T-R) is the cost of Temptation/ Greed.

$$Cost\ of\ Temptation/Greed = kpnx - (kpnx - kpqnx) = kpqnx$$

So 'kpqnx' is the portion of the payoff the Trustee/ Receiver returns to the Trustee/ receiver.

iii) Cost of Cooperation: In the Prisoner's Dilemma Game, when the Sender and Receiver trust each other, both get an equal reward payoff of 'R,' but in our continuous trust game, when the sender and the receiver trust each other, the cooperated amount is 'kpqnx.' So, the cost of cooperation is the difference between the cost of Greed/Temptation and Fear/Risk.

$$Cost\ of\ Cooperation = (nx - pnx + kpqnx) - nx = kpqnx - pnx$$

Now, the dependent variables of our experiment can be written as follows:

i) Fear/ Risk Index: The fear/ risk index in the trust game is the ratio of the cost (when the trustor distrusts to avoid cost) to the benefit (when the Trustor trusts for potential gain). It quantifies the trade-off between potential costs and benefits in decision-making.

$$Fear/Risk_{Trustor} = \frac{nx - (nx - pnx)}{(nx - pnx + kpqnx) - (nx - pnx)} = \frac{pnx}{kpqnx}$$

So, if the Trustor distrusts, i.e., p=0, then the Fear/ Risk Index becomes undefines; if the Trustor's trust level increases, the Fear/ Risk index decreases.

ii) Greed/ Temptation Index: The Greed Index is the ratio of the Trustees' cost of Temptation/ Greed relative to their received endowments from the receiver when applicable.

$$Greed/\ Temptation\ Index_{Trustee} = \frac{kpnx - (kpnx - kpqnx)}{kpnx} = \frac{kpqnx}{kpnx}$$

After being reciprocated by the Trustor, if the Trustee keeps it all betraying that trust, then the Greed Index reaches its maximum value of 0. Conversely, if the Trustee gives away all the amount he/she received from the Trustor, the Greed index reaches its minimum value of 1. If the Sender does not trust the Receiver, the denominator becomes 0, and the Greed index value becomes undefined.

iii) Cooperation Index: The cooperation Index is the ratio of the cost of cooperation to the cost of betrayal.

$$Cooperation\ Index = \frac{(nx - pnx + kpqnx) - nx}{kpnx - (nx - pnx)} = \frac{kpqnx - pnx}{kpnx - nx + pnx}$$

iv) Expected/ Perceived Cooperation Index: In our experiment, we also asked our participants how much they expected from their counterparts in every round ($\hat{p}$, $\hat{q}$), both in the sender and receiver roles. Based on their expectations, we calculated their perceived/ expected payoffs and later calculated the perceived/expected cooperation index, indicating the level of cooperation they expect from each other. This index is similar to the Cooperation Index, except that perceived/ expected costs are used in the same formula instead of actual costs. The perceived/ expected cooperation index is the ratio of the perceived cost of cooperation to the perceived cost of betrayal.

$$Perceived/\ Expected\ Cooperation\ Index\ = \frac{k\hat{p}qnx - \hat{p}nx}{k\hat{p}nx - nx + \hat{p}nx}$$

4.2.1.2. Proposed Model for FTC Index

Since the Prisoner's Dilemma paradigm differs from our continuous trust game based on the original BDM paradigm, we adopt a simplified approach to explaining our dependent variables. We will analyze the prisoner's dilemma and the proposed model for their respective variables and compare them using their metrics to find the better-fit model.

i) Fear/ Risk Index: The fear/ risk index in the trust game is the ratio of the Trustor's payoff when the Trustee betrays (nx-pnx) to the Trustor's payoff when the Trustee also trusts (nx-pnx).

$$Fear/Risk\ Index_{Trustor} = \frac{nx - pnx}{nx - pnx + kpqnx}$$

So, if the Trustor and/or the Trustee distrusts, i.e., p, q=0, the Fear/ Risk Index = 1; if the Trustor's trust level increases, the fear decreases. The fear index gives an undefined value when the Trustor trusts fully, i.e., p=1, but the trustee distrusts, i.e., q=0.

ii) Greed/ Temptation Index: The Greed Index is the ratio of the Trustee's payoff when he/she trusts (kpnx-kpqnx) to the payoff when he/she betrays (kpnx) when applicable.

$$Greed/\ Temptation\ Index_{Trustee} = \frac{kpnx - kpqnx}{kpnx}$$

After being reciprocated by the Trustor, if the Trustee keeps it all, i.e., q=0, betraying that trust, then the Greed Index reaches its maximum value of 1. Conversely, if the Trustee gives away all the amount he/she received from the Trustor, i.e., q=1, the Greed index reaches its minimum value of 0. The Greed index value becomes undefined if the Sender does not trust the Receiver, i.e., p=0.

iii) Cooperation Index: The cooperation Index is the ratio of the cooperated amount (kpqnx) when the Trustor and the Trustee trust each other to the initial endowment (nx) given to the Trustor at the beginning of the round.

$$Cooperation\ Index = \frac{kpqnx}{nx} = kpq$$

iv) Expected/ Perceived Cooperation Index: Similarly, the expected/ perceived cooperation Index is the ratio of the expected/ perceived cooperated amount (kp̂q̂nx) when the Trustor and the Trustee expect to trust each other to the initial endowment (nx) given to the Trustee at the beginning of the round.

$$Perceived/\ Expected\ Cooperation\ Index = \frac{kp\hat{p}\hat{q}nx}{nx} = kp\hat{p}\hat{q}$$

4.2.2. Independent Variables

The independent variables that are used in the analysis are as follows:

i) Initial Endowment:

At the start of each round, the Trustor/Sender received a random endowment of either 1,000, 2,000, 3,000, or 4,000 virtual points. The participants played the role of Trustor/ Sender in each round and received these random endowments. The initial endowment represents the experiment's financial condition and how it influences our trust behavior for the targeted dependent variables. Initial Endowment was used to analyze all the dependent variables. The variable is denoted as 'Initial_Endowment' in the analysis and 'nx' in the formula where x = 1000 and n ~ Uniform {1, 2, 3, 4}.

ii) Sender/ Trustor's Trust:

The Trustor made their respective trust decisions after receiving the endowment. Either they distrust their partner, i.e., trust level 0% and keep all to themselves, or they can reciprocate at any percentage of their endowment. They can reciprocate from any number from 1% to 100%. The sender's trust level for each round is also their trust rating, which was later used to calculate group and individual trust ratings and ranking. Sender's Trust is used to analyze the Cooperation, Geed, and Equality Index. The variable is denoted as 'Sender_Trust' in the analysis and 'p' in the formula where p: p∈ [0, 1].

iii) Receiver/ Trustee's Trust:

If the Trustor reciprocates, the Trustee will receive the donated amount three times (Rate of return = 3). In such cases, the Trustee will have similar choices, either to honor or betray the trust. If he/she decides to betray the trust, i.e., trust level 0%, keeping everything or honor back with any percentage of his/her received amount from 1% to 100%. If the Trustor does not trust the Trustee or donate anything, the Trustee will not have the option to make these decisions. Like Sender's Trust, the receiver's trust in each round is also the trust rating of the respective participant, which will later be used to calculate group and individual ratings and rankings. Receiver's Trust is used to analyze the Cooperation, Geed, and Equality Index. The variable is denoted as 'Receiver_Trust' in the analysis and 'q' in the formula where q: q∈ [0, 1].

iv) Sender/ Trustor's Perceived/Expected Trust:

The experiment collected the Sender's expectations from the Trustee. This was used to calculate the payoff they expected from their respective Senders. This variable also ranged from 0% to 100% and was used in calculating the Expected Cooperation Index. The variable is denoted as 'Sender_Expectation' in the analysis and '$\hat{p}$' in the formula, where $\hat{p}$: $\hat{p} \in [0, 1]$.

v) Receiver/ Trustee's Perceived/Expected Trust:

Similarly to the Sender/ Trustor's Perceived/Expected Trust, the experiment also collected the Receiver's expectations from the Sender. This was used to calculate the payoff they expected from their respective receivers. This variable also ranged from 0% to 100% and was used in calculating the Expected/Perceived Cooperation Index. The variable is denoted as 'Receiver_Expectation' in the analysis, and '$\hat{q}$' in the formula, where $\hat{q}$: $\hat{q} \in [0, 1]$.

vi) Reputation Dummy:

The Reputation effect in the experiment is measured by the dummy variable Reputation Dummy. Before the start of round 3, the participants were informed of their respective individual and group trust ratings and payoffs. So, they were aware of the trust dynamics within the group. However, in the first and second rounds, they were unaware of the trust levels of their partners in the group. So, for the first and second rounds, the reputation dummy is 0, and for the third and fourth rounds, the reputation dummy is 1. This variable acted as the social condition of reputation awareness in the experiment and how reputation affects trust behavior for cooperation, greed, and equality fairness. The variable is denoted as 'Reputation_Dummy' in the analysis.

vii) Role Reversal Dummy:

In the subsequent rounds, the participants swapped their Sender and Receiver roles to make trust decisions as both Sender and Receiver. So if a participant assumed the role of Trustor in 1st round and his/her partner assumed the receiver role, they would keep alternating between the roles till the final rounds. This control variable limits the effect of role reversal on the analysis. The values of the Role Reversal dummy are 0 in the 1st and 3rd rounds and 1 in the 2nd and 4th rounds. The variable is denoted as 'Role_Reversal_Dummy' in the analysis.

CHAPTER 5: RESULT AND ANALYSIS

5.1. Descriptive Statistics

The summary statistics of the variables are provided round-wise (Rounds 1, 2, 3, and 4), stage-wise (Rounds 1 and 2 combined and 3 and 4 combined), endowment-wise (Endowment 1000.2000, 3000 and 4000) and all rounds.

5.1.1. Round-Wise

Round 1

	Min	**Median**	**Mean**	**Max**	**SD**
	Independent Variables				
Initial Endowment	1000	2000	2342.47	4000	1056.98
Sender Trust	0.10	0.50	0.52	1.00	0.24
Sender Expectation	0.008	0.50	0.495	1.00	0.24
Receiver Trust	0.10	0.50	0.489	1.00	0.23
Receiver Expectation	0.00	0.43	0.464	1.00	0.23
Reputation Dummy	0.00	0.00	0.00	0.00	0.00
Role Reversal Dummy	0.00	0.00	0.00	0.00	0.00
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	-0.55	0.175	0.249	1.91	0.42
Greed Index	0.10	0.50	0.49	1.00	0.23
Cooperation Index	-0.70	0.18	0.30	2.55	0.53
Expected Cooperation Index	-0.93	0.25	0.27	3.00	0.58
	Proposed Concept				
Fear Index	0.00	0.43	0.43	0.97	0.25
Greed Index	0.00	0.50	0.51	0.90	0.23
Cooperation Index	0.03	0.68	0.77	2.91	0.55
Expected Cooperation Index	0.00	0.57	0.69	2.67	0.53
Sender No Trust = 0.00%	*Receiver No Trust = 0.00%*			*Mutual Trust = 100.00%*	
Observation = 73	*Average Sender Payoff 29.31 Taka*			*Average Receiver Payoff 19.13 Taka*	

Table 3: Descriptive Statistics of Round 1

Key Insights:

In Round 1 of the experiment with 73 observations, notable statistics show that the Initial Endowment ranges from 1000~4000, with a mean of 2342.47 and a high standard deviation of 1056.98. Trust levels (Sender and Receiver Trust) and expectations are relatively balanced, with mean values around 0.50 and moderate variation (SD~0.23–0.24). In The Prisoner's Dilemma concept, the Fear, Greed, and Cooperation Index have a mean of 0.249, 0.49, and 0.30, respectively. In the Proposed Concept, the Fear Index, Greed, and Cooperation Index have a mean of 0.43, 0.5, and 0.77, respectively. There are no changes in the Reputation Dummy and Role Reversal Dummy as they remain at 0 throughout.

Round 2

	Min	Median	Mean	Max	SD
	Independent Variables				
Initial Endowment	1000	3000	2671.23	4000	928.78
Sender Trust	0.00	0.50	0.483	1.00	0.27
Sender Expectation	0.00	0.50	0.486	1.00	0.25
Receiver Trust	0.00	0.50	0.575	1.00	0.28
Receiver Expectation	0.00	0.50	0.553	1.00	0.28
Reputation Dummy	0.00	0.00	0.00	0.00	0.00
Role Reversal Dummy	1.00	1.00	1.00	1.00	0.00
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.67	0.75	4.76	0.63
Greed Index	0.00	0.50	0.59	1.00	0.26
Cooperation Index	-01.85	0.33	0.33	2.55	3.00
Expected Cooperation Index	-1.05	0.17	0.18	1.13	0.41
	Proposed Concept				
Fear Index	0.00	0.40	0.44	1.00	0.29
Greed Index	0.00	0.50	0.41	1.00	0.26
Cooperation Index	0.00	0.75	0.90	3.00	0.70
Expected Cooperation Index	0.00	0.72	0.84	3.00	0.69
Sender No Trust = 0.00%	*Receiver No Trust = 0.00%*			*Mutual Trust = 100.00%*	
Observation = 73	*Average Sender Payoff 38.00 Taka*			*Average Receiver Payoff 14.77 Taka*	

Table 4: Descriptive Statistics of Round 2

Key Insights:

In Round 2, the Initial Endowment shows a narrower range compared to Round 1, with a mean of 2671.23 and a standard deviation of 928.78, indicating moderate variation. Trust levels (Sender and Receiver Trust) remain balanced around 0.48–0.57, with slightly higher variation in Receiver Trust and Expectation (SD ~0.28). The Reputation Dummy remains at 0, while the Role Reversal Dummy is set to 1 for all participants. In the Prisoner's Dilemma concept, the Fear Index displays a higher mean (0.75) and a more comprehensive range (0.33 to 4.76) compared to Round 1. At the same time, the Cooperation Index shows a mean of 0.33 but an extensive range (-1.85 to 2.55), with significant variation (SD = 3.00). In the Proposed Concept, the Cooperation Index has a mean of 0.90 and a maximum value of 3.00, indicating more positive cooperation outcomes. At the same time, the Expected Cooperation Index shows a similar positive trend with a mean of 0.84 and a range of 0.00 to 3.00.

Round 3

	Min	Median	Mean	Max	SD
	Independent Variables				
Initial Endowment	1000	2000	2315	4000	1052.47
Sender Trust	0.05	0.70	0.697	1.00	0.28
Sender Expectation	0.00	0.60	0.659	1.00	0.27
Receiver Trust	0.10	0.60	0.654	1.00	0.25
Receiver Expectation	0.00	0.60	0.613	1.00	0.26
Reputation Dummy	1.00	1.00	0.00	1.00	1.00
Role Reversal Dummy	0.00	0.00	0.00	0.00	0.00
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.56	0.63	3.33	0.43
Greed Index	0.10	0.60	0.65	1.00	0.25
Cooperation Index	-1.10	0.40	0.37	1.33	0.36
Expected Cooperation Index	-0.87	0.40	0.50	0.96	3.00
	Proposed Concept				
Fear Index	0.00	0.17	0.24	0.95	0.27
Greed Index	0.00	0.40	0.35	0.90	0.25
Cooperation Index	0.04	1.20	1.47	3.00	0.93
Expected Cooperation Index	0.00	0.96	1.29	3.00	0.89
Sender No Trust = 0.00%	*Receiver No Trust = 0.00%*			*Mutual Trust = 100.00%*	
Observation = 73	*Average Sender Payoff 42.06 Taka*			*Average Receiver Payoff 13.92 Taka*	

Table 5: Descriptive Statistics of Round 3

Key Insights:

In Round 3, the Initial Endowment remains consistent with previous rounds, with a mean of 2315 and a standard deviation of 1052.47. Trust levels (Sender and Receiver Trust) are notably higher, with means around 0.65–0.70 and moderate variation (SD ~0.25–0.28). The Reputation Dummy is 0 for most, while the Role Reversal Dummy remains 0 for all. In the Prisoner's Dilemma concept, the Fear Index has a mean of 0.63, with a moderate range (0.33 to 3.33), while the Greed Index has increased to a mean of 0.65. The Cooperation Index shows a low mean of 0.37 and substantial variability (SD = 0.36). The Proposed Concept shows a much lower Fear Index (mean = 0.24) and a higher Cooperation Index (mean = 1.47), indicating a more substantial trend toward cooperation. The Expected Cooperation Index has increased, with a mean of 1.29 and a maximum value of 3.00.

Round 4					
	Min	**Median**	**Mean**	**Max**	**SD**
	Independent Variables				
Initial Endowment	1000	3000	2589	4000	1038.64
Sender Trust	0.10	0.55	0.594	1.00	0.30
Sender Expectation	0.00	0.50	0.598	1.00	0.27
Receiver Trust	0.00	0.70	0.631	1.00	0.34
Receiver Expectation	0.00	0.60	0.635	1.00	0.29
Reputation Dummy	1.00	1.00	1.00	1.00	0.00
Role Reversal Dummy	1.00	1.00	1.00	1.00	0.00
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.48	0.79	6.67	0.97
Greed Index	0.00	0.70	0.63	1.00	0.34
Cooperation Index	-1.82	0.45	0.38	3.00	0.65
Expected Cooperation Index	-1.55	0.25	0.24	0.86	0.41
	Proposed Concept				
Fear Index	0.00	0.31	0.37	1.00	0.32
Greed Index	0.00	0.30	0.37	1.00	0.34
Cooperation Index	0.00	1.05	1.22	3.00	0.96
Expected Cooperation Index	0.00	0.96	1.21	3.00	0.94
Sender No Trust = 0.00%	*Receiver No Trust = 8.22%*			*Mutual Trust = 91.78%*	
Observation = 73	*Average Sender Payoff 44.12 Taka*			*Average Receiver Payoff 12.99 Taka*	

Table 6: Descriptive Statistics of Round 4

Key Insights:

In Round 4, the Initial Endowment remains slightly higher with a mean of 2589, while trust levels are balanced, with Sender Trust and Receiver Trust around 0.59–0.63. The Reputation Dummy and Role Reversal Dummy are consistently set at 1 for all participants. In the Prisoner's Dilemma concept, the Fear Index shows a significant increase, with a mean of 0.79 and a wide range (up to 6.67), indicating heightened fear levels. The Greed Index remains relatively stable at 0.63, while the Cooperation Index shows variability with a mean of 0.38. The Proposed Concept highlights a lower Fear Index (mean = 0.37). At the same time, cooperation trends remain positive, with a Cooperation Index mean of 1.22 and an Expected Cooperation Index mean of 1.21, with a maximum of 3.00, indicating continued cooperation expectations.

5.1.2. Stage-Wise (Pre- Reputation and Post- Reputation Rounds)

Trust Evaluation Stage (Round 1 & 2)

	Min	Median	Mean	Max	SD
	Independent Variables				
Initial Endowment	1000	3000	2507	4000	1005.14
Sender Trust	0.00	0.50	0.502	1.00	0.26
Sender Expectation	0.00	0.50	0.49	1.00	0.25
Receiver Trust	0.00	0.50	0.532	1.00	0.26
Receiver Expectation	0.00	0.50	0.509	1.00	0.26
Reputation Dummy	0.00	0.00	0.00	0.00	0.00
Role Reversal Dummy	0.00	0.50	0.50	1.00	0.50
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.67	0.83	4.76	0.64
Greed Index	0.00	0.50	0.54	1.00	0.25
Cooperation Index	-1.85	0.25	0.31	3.00	0.60
Expected Cooperation Index	-1.05	0.19	0.22	3.00	0.50
	Proposed Concept				
Fear Index	0.00	0.43	0.44	1.00	0.27
Greed Index	0.00	0.50	0.46	1.00	0.25
Cooperation Index	0.00	0.72	0.83	3.00	0.63
Expected Cooperation Index	0.00	0.60	0.77	3.00	0.62
Sender No Trust = 1.37%	*Receiver No Trust = 2.05%*			*Mutual Trust = 96.58%*	
Observation = 146	*Average Sender Payoff 33.66 Taka*			*Average Receiver Payoff 16.95 Taka*	

Table 7: Descriptive Statistics of Rounds 1 and 2 combined

Key Insights:

In the Trust Evaluation Stage (Round 1 & 2 Combined), the Initial Endowment had a mean of 2507, with a moderate standard deviation (SD = 1005.14). Trust and Expectation levels for both Sender and Receiver are around 0.50–0.53, with moderate variation (SD~0.25–0.26). Reputation Dummy is consistently 0 for all participants, while the Role Reversal Dummy has a median of 0.50. In the Prisoner's Dilemma Concept, the Fear Index shows a relatively high mean of 0.83, with a wide range (0.33 to 4.76), indicating some fear among participants. The Greed Index has a mean of 0.54, showing moderate greed tendencies, while the Cooperation Index is relatively low (mean = 0.31), indicating limited cooperation at this stage. The Expected Cooperation Index is also low, with a mean of 0.22. In the Proposed Concept, the Fear Index shows lower levels, with a mean of 0.44, indicating less fear than the Prisoner's Dilemma Concept. The Greed Index is slightly lower (mean = 0.46), and the Cooperation Index shows a higher mean of 0.83, indicating more cooperation in this concept. The Expected Cooperation Index is also higher in this concept, with a mean of 0.77, suggesting increased expectations of cooperation among participants in this stage.

Reputation Signal Stage (Round 3 & 4)

	Min	Median	Mean	Max	SD
	Independent Variables				
Initial Endowment	1000	2000	2452	4000	1050.99
Sender Trust	0.01	0.60	0.645	1.00	0.29
Sender Expectation	0.00	0.60	0.629	1.00	0.27
Receiver Trust	0.00	0.65	0.643	1.00	0.30
Receiver Expectation	0.00	0.60	0.624	1.00	0.28
Reputation Dummy	1.00	1.00	1.00	1.00	1.00
Role Reversal Dummy	0.00	0.50	0.50	1.00	0.50
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	-1.00	0.51	0.71	2.00	0.75
Greed Index	0.00	0.65	0.64	1.00	0.30
Cooperation Index	-1.82	0.40	0.37	3.00	0.52
Expected Cooperation Index	-1.55	0.33	0.37	3.00	0.55
	Proposed Concept				
Fear Index	0.00	0.25	0.31	1.00	0.30
Greed Index	0.00	0.35	0.36	1.00	0.30
Cooperation Index	0.00	1.08	1.34	3.00	0.95
Expected Cooperation Index	0.00	0.96	1.25	3.00	0.92
Sender No Trust = 0.00%	*Receiver No Trust = 4.11%*			*Mutual Trust = 95.89%*	
Observation = 146	*Average Sender Payoff 43.09 Taka*			*Average Receiver Payoff 13.45 Taka*	

Table 8: Descriptive Statistics of Rounds 3 and 4 combined

Key Insights:

In the Reputation Signal Stage (Rounds 3 & 4 Combined), the Initial Endowment averaged 2452 with a standard deviation of 1050.99, indicating a moderate endowment spread across participants. Sender Trust and Receiver Trust and Expectations are relatively high, averaging around 0.63~0.64, suggesting increased trust levels and expectations. Reputation Dummy is fixed at 1 for all participants in this stage, representing the introduction of the reputation factor, and the Role Reversal Dummy is split equally (median = 0.50) between participants. In the Prisoner's Dilemma Concept, the Fear Index has a moderate mean of 0.71, ranging from -1.00 to 2.00. The Greed Index is relatively high (mean = 0.64), indicating a tendency towards self-interest. The Cooperation Index remains low, with a mean of 0.37, indicating limited cooperation, while the Expected Cooperation Index also reflects low expectations of cooperation (mean = 0.37). In the Proposed Concept, the Fear Index shows reduced levels, with a mean of 0.31. The Greed Index is slightly lower, with a mean of 0.36. The Cooperation Index is much higher, with a mean of 1.34, indicating greater cooperation when reputation is factored in. Similarly, the Expected Cooperation Index is significantly higher (mean = 1.25), reflecting a greater expectation of cooperation in this concept.

5.1.3. Endowment-Wise

Initial Endowment = 1000					
	Min	**Median**	**Mean**	**Max**	**SD**
	Independent Variables				
Sender Trust	0.01	0.50	0.54	1.00	0.27
Sender Expectation	0.09	0.50	0.54	1.00	0.23
Receiver Trust	0.00	0.55	0.51	1.00	0.27
Receiver Expectation	0.00	0.50	0.567	1.00	0.25
Reputation Dummy	0.00	1.00	0.53	1.00	0.50
Role Reversal Dummy	0.00	0.00	0.35	1.00	0.48
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.67	0.86	3.33	0.62
Greed Index	0.00	0.50	0.51	1.00	0.27
Cooperation Index	-1.85	0.21	0.27	1.88	0.54
Expected Cooperation Index	-1.55	0.25	0.25	2.10	0.51
	Proposed Concept				
Fear Index	0.00	0.44	0.42	1.00	0.29
Greed Index	0.00	0.50	0.49	1.00	0.27
Cooperation Index	0.00	0.59	0.88	3.00	0.74
Expected Cooperation Index	0.00	0.74	0.85	3.00	0.65
Sender No Trust = 0.00%	*Receiver No Trust = 4.84%*			*Mutual Trust = 95.16%*	
Observation = 62	*Average Sender Payoff 13.39 Taka*			*Average Receiver Payoff 73.79 Taka*	

Table 9: Descriptive Statistics for Endowment 1000

Key Insights:

For Initial Endowment = 1000, based on 62 observations, the independent variables show moderate trust levels, with Sender and Receiver Trust and Expectation averaging 0.51~0.57. The Reputation Dummy has a mean of 0.53, indicating it's mixed-use, while the Role Reversal Dummy is less common, with a mean of 0.35. In the Prisoner's Dilemma Concept, the Fear Index is relatively high (mean = 0.86), and the Greed Index averages at 0.51. Cooperation is lower, with the Cooperation Index averaging just 0.27. Expectations for cooperation remain modest, with the Expected Cooperation Index at 0.25. For the Proposed Concept, the Fear Index decreases (mean = 0.42), while Greed remains similar (mean = 0.49). Cooperation increases significantly, with the Cooperation Index averaging 0.88, and expectations are higher, as reflected in the Expected Cooperation Index (mean = 0.85).

Initial Endowment = 2000

	Min	Median	Mean	Max	SD
	Independent Variables				
Sender Trust	0.00	0.50	0.58	1.00	0.28
Sender Expectation	0.00	0.50	0.56	1.00	0.26
Receiver Trust	0.00	0.60	0.64	1.00	0.29
Receiver Expectation	0.00	0.60	0.61	1.00	0.29
Reputation Dummy	0.00	1.00	0.52	1.00	0.50
Role Reversal Dummy	0.00	0.00	0.49	1.00	0.50
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.56	0.64	3.33	0.42
Greed Index	0.00	0.60	0.65	1.00	0.28
Cooperation Index	-1.70	0.34	0.36	2.96	0.57
Expected Cooperation Index	-0.87	0.30	0.31	3.00	0.48
	Proposed Concept				
Fear Index	0.00	0.32	0.34	1.00	0.26
Greed Index	0.00	0.40	0.35	1.00	0.28
Cooperation Index	0.00	0.90	1.17	3.00	0.86
Expected Cooperation Index	0.00	0.75	1.08	3.00	0.87
Sender No Trust = 1.20%	*Receiver No Trust = 2.41%*			*Mutual Trust = 97.59%*	
Observation = 83	*Average Sender Payoff 31.84 Taka*			*Average Receiver Payoff 11.42 Taka*	

Table 10: Descriptive Statistics for Endowment 2000

Key Insights:

For Initial Endowment = 2000, based on 83 observations, the independent variables show moderate to high trust levels, with Sender Trust averaging 0.58 and Receiver Trust at 0.64. Expectations closely follow trust levels, with Sender and Receiver Expectations averaging 0.56 and 0.61, respectively. The Reputation Dummy averages 0.52, indicating mixed reputation usage, while the Role Reversal Dummy is balanced at 0.49. In the Prisoner's Dilemma Concept, the Fear Index shows moderate levels with a mean of 0.64, and the Greed Index is relatively higher at 0.65. The Cooperation Index remains low, with a mean of 0.36, and expectations for cooperation (mean = 0.31) are also modest. For the Proposed Concept, the Fear Index decreases to a mean of 0.34, and the Greed Index reduces to 0.35. Cooperation improves substantially, with the Cooperation Index increasing to 1.17, and expectations for cooperation rise significantly, with the Expected Cooperation Index at 1.08.

Initial Endowment = 3000

	Min	Median	Mean	Max	SD
	Independent Variables				
Sender Trust	0.05	0.50	0.58	1.00	0.29
Sender Expectation	0.10	0.50	0.57	1.00	0.28
Receiver Trust	0.00	0.55	0.56	1.00	0.29
Receiver Expectation	0.00	0.50	0.55	1.00	0.28
Reputation Dummy	0.00	0.00	0.45	1.00	0.50
Role Reversal Dummy	0.00	0.00	0.57	1.00	0.50
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.61	0.90	6.67	0.98
Greed Index	0.00	0.55	0.56	1.00	0.29
Cooperation Index	-0.74	0.34	0.39	3.00	0.54
Expected Cooperation Index	-0.50	0.30	0.39	3.00	0.61
	Proposed Concept				
Fear Index	0.00	0.33	0.39	1.00	0.32
Greed Index	0.00	0.45	0.44	1.00	0.29
Cooperation Index	0.00	0.97	1.07	3.00	0.84
Expected Cooperation Index	0.00	0.84	1.01	3.00	0.82
Sender No Trust = 0.00%	*Receiver No Trust = 3.26%*			*Mutual Trust = 96.74%*	
Observation = 92	*Average Sender Payoff 44.67 Taka*			*Average Receiver Payoff 19.93 Taka*	

Table 11: Descriptive Statistics for Endowment 3000

Key Insights:

For Initial Endowment = 3000, based on 92 observations, the independent variables show balanced trust and expectation levels, with Sender Trust and Receiver Trust averaging around 0.58 and 0.56, respectively. Similarly, Sender and Receiver Expectations are both near 0.57 and 0.55. Reputation Dummy is relatively lower at 0.45, while Role Reversal Dummy shows a slightly higher value of 0.57. In the Prisoner's Dilemma Concept, the Fear Index is higher at 0.90 with significant variability (SD = 0.98). The Greed Index is more moderate at 0.56, while the Cooperation Index remains low with a mean of 0.39. Expectations for cooperation are modest, with an Expected Cooperation Index of 0.39. For the Proposed Concept, the Fear Index reduces to 0.39, and the Greed Index is slightly lower at 0.44. Cooperation improves, with the Cooperation Index increasing to 1.07 and expectations for cooperation rising to 1.01, indicating a more optimistic outlook under the proposed model.

Initial Endowment = 4000					
	Min	**Median**	**Mean**	**Max**	**SD**
	Independent Variables				
Sender Trust	0.00	0.50	0.60	1.00	0.30
Sender Expectation	0.10	0.50	0.56	1.00	0.30
Receiver Trust	0.00	0.60	0.63	1.00	0.26
Receiver Expectation	0.00	0.54	0.59	1.00	0.27
Reputation Dummy	0.00	1.00	0.53	1.00	0.50
Role Reversal Dummy	0.00	1.00	0.56	1.00	0.50
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.56	0.66	3.33	0.48
Greed Index	0.10	0.60	0.64	1.00	0.25
Cooperation Index	-1.82	0.40	0.36	3.00	0.25
Expected Cooperation Index	0.00	0.34	0.33	1.00	0.62
	Proposed Concept				
Fear Index	0.00	0.31	0.33	1.00	0.28
Greed Index	0.00	0.40	0.36	1.00	0.25
Cooperation Index	0.00	1.00	1.24	1.00	0.92
Expected Cooperation Index	0.00	0.75	1.08	1.00	0.89
Sender No Trust = 1.82%	*Receiver No Trust = 1.82%*			*Mutual Trust = 96.36%*	
Observation = 55	*Average Sender Payoff 65.86 Taka*			*Average Receiver Payoff 21.82 Taka*	

Table 12: Descriptive Statistics for Endowment 4000

Key Insights:

For Initial Endowment = 4000, based on 55 observations, the independent variables show higher Sender Trust and Receiver Trust levels, averaging at 0.60 and 0.63, respectively. Sender Expectation (0.56) and Receiver Expectation (0.59) are relatively aligned. Reputation Dummy and Role Reversal Dummy are around 0.53 and 0.56, indicating the presence of reputation and role reversal in half of the interactions. In the Prisoner's Dilemma Concept, the Fear Index averages 0.66, indicating moderate fear, while the Greed Index is slightly higher at 0.64. The Cooperation Index remains relatively low at 0.36, and expectations for cooperation are modest, with an Expected Cooperation Index of 0.33. In the Proposed Concept, fear and greed remain low, with the Fear Index at 0.33 and the Greed Index at 0.36. However, the Cooperation Index shows a significant increase to 1.24, suggesting improved cooperation, while the Expected Cooperation Index is slightly lower at 1.08.

5.1.4. All Rounds

All Rounds					
	Min	**Median**	**Mean**	**Max**	**SD**
	Independent Variables				
Initial Endowment	1000	3000	2479	4000	1026.92
Sender Trust	0.00	0.50	0.574	1.00	0.28
Sender Expectation	0.00	0.50	0.56	1.00	0.27
Receiver Trust	0.00	0.55	0.587	1.00	0.28
Receiver Expectation	0.00	0.50	0.567	1.00	0.27
Reputation Dummy	0.00	0.50	0.50	1.00	0.50
Role Reversal Dummy	0.00	0.50	0.50	1.00	0.50
	Dependent Variables				
	Prisoner's Dilemma Concept				
Fear Index	0.33	0.61	0.77	6.67	0.70
Greed Index	0.00	0.55	0.59	1.00	0.28
Cooperation Index	-1.85	0.34	0.34	3.00	0.56
Expected Cooperation Index	-1.55	0.25	0.30	3.00	0.53
	Proposed Concept				
Fear Index	0.00	0.33	0.37	1.00	0.29
Greed Index	0.00	0.45	0.41	1.00	0.28
Cooperation Index	0.00	0.90	1.09	3.00	0.85
Expected Cooperation Index	0.00	0.75	1.01	3.00	0.82
Sender No Trust = 0.68%	*Receiver No Trust = 3.08%*			*Mutual Trust = 96.92%*	
Observation = 292	*Average Sender Payoff 38.37 Taka*			*Average Receiver Payoff 15.20 Taka*	
Average Game Payoff of Each Participant 122.91	*Show Up Fee 150 Taka*			*Average Total Payoff of Each Participant 272.91 Taka*	

Table 13: Descriptive Statistics of All Rounds

Key Insights:

For All Rounds (292 observations), the independent variables show moderate levels of Sender Trust (mean = 0.574) and Receiver Trust (mean = 0.587), with Sender Expectation (mean = 0.56) and Receiver Expectation (mean = 0.567) closely aligned. Reputation Dummy and Role Reversal Dummy are evenly distributed, with a median of 0.50. In the Prisoner's Dilemma Concept, the Fear Index has a mean of 0.77, and the Greed Index averages 0.59. The Cooperation Index is relatively low at 0.34, and the Expected Cooperation Index averages 0.30. In the Proposed Concept, the Fear Index is moderately low, averaging 0.37, and the Greed Index is similar, averaging 0.41. However, the Cooperation Index averaged 1.09, with an Expected Cooperation Index of 1.01. At the end of the experiment, the Participants' average income from the game is 122.91 taka. With an additional show-up fee of 150 taka, their average total payoff is 172.91 taka.

A Analysis of Model based on the Prisoner's Dilemma Game Concept

First, we check the distribution of the variables from the Prisoner's Dilemma model.

5.2. Normality Analysis

5.2.1. Histogram

First, we checked whether the variables were normally distributed. The histograms below show that the variables do not show a symmetrical distribution, and some are slightly skewed.

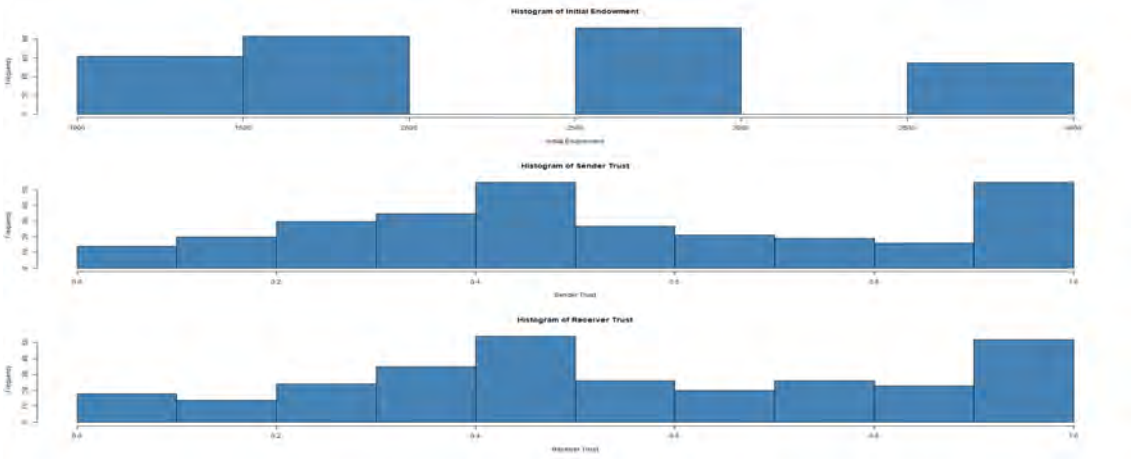

Figure 7: Histogram of the independent variables

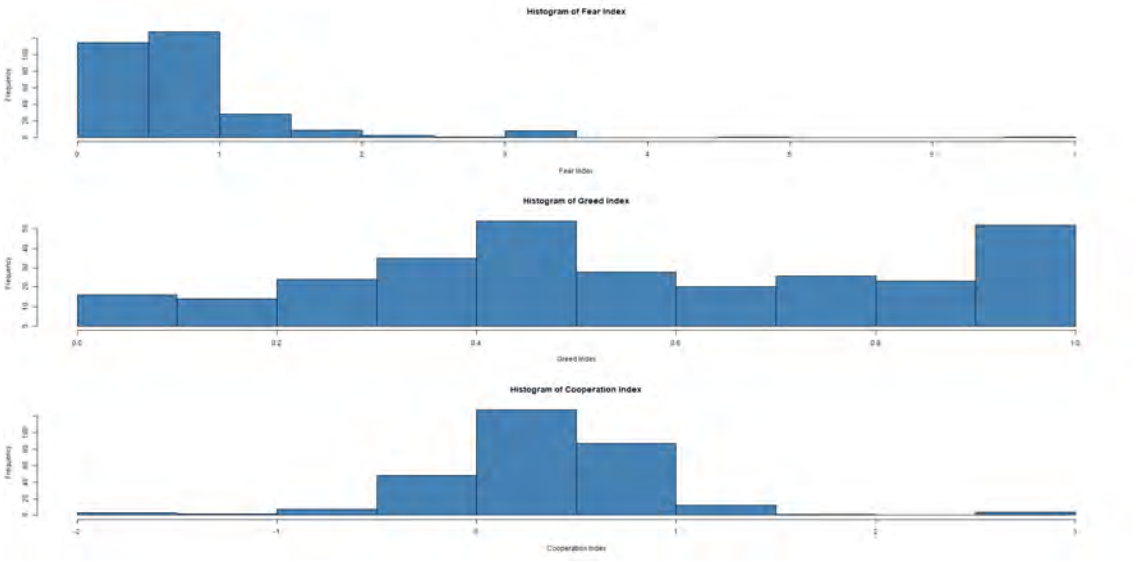

Figure 8: Histogram of the dependent variables

The Q-Q plots of the dependent and independent variables (Exhibits 1 and 2) can also help us understand the variables' distributions.

5.2.2. Normality Test

The number of Observations is 292. Since Shapiro-Wilk works well in small to moderate-sized sample sizes and Kolmogorov-Smirnov with Lilliefors Correction is suitable for large-sized samples, we opted for both tests to check the normality of our distribution. Additionally, since some variables (Cooperation Index and Fear Index) have moderate skewness, we have also used Anderson-Darling, which is more sensitive to tail deviations. So, we also checked the variables for Skewness and Kurtosis to check if their distribution is symmetrical or skewed.

Variables	*p-value*			*Skewness*	*Kurtosis*	*Remark*
	Shapiro-Wilk	KS Lilliefors	Anderson-Darling			
Initial Endowment	1.05e-14	3.68e-31	3.70e-24	-0.011	-1.146	Not normally distributed
Sender Trust	1.26e-09	7.76e-13	7.21e-13	0.098	-1.091	Not normally distributed
Receiver Trust	1.05e-08	2.40e-10	4.14e-10	-0.091	0.955	Not normally distributed
Sender Expectation	1.02e-08	2.08e-18	3.21e-12	0.191	-0.842	Not normally distributed
Receiver Expectation	5.41e-08	1.50e-11	2.68e-09	0.049	-0.865	Not normally distributed
Fear Index	2.44e-26	1.81e-58	3.70e-24	4.133	23.084	Not normally distributed
Greed Index	1.28e-08	2.03e-10	3.64e-10	0.075	-0.958	Not normally distributed
Cooperation Index	6.63e-14	1.19e-10	5.54e-16	0.613	6.363	Not normally distributed

Table 14: Normality Tests of the variables

Key Insights:

The normality tests (Shapiro-Wilk, KS Lilliefors, and Anderson-Darling) for all variables reveal non-normal distributions across the board. Skewness and kurtosis values further indicate deviations from normality. For example, the Fear Index shows extreme skewness and kurtosis, suggesting significant outliers or non-normal tails. Most other variables exhibit mild skewness with negative kurtosis, indicating distributions that are flatter than normal. None of the variables follow a normal distribution, suggesting that non-parametric methods and regressions are more appropriate for further analysis.

5.9. Correlation Analysis

We checked the correlations between the variables from the Prisoner's Dilemma model.

5.9.1. Correlation Test

Since the data is non-parametric, i.e., does not follow a normal distribution, parametric correlation tests like Pearson Correlation are unsuitable here. So, we have used Kendall's Tau and Spearman's Rank Correlation tests, which are more robust to outliers.

5.9.1.1. Kendall's Tau Correlation Test

Kendall's Tau Correlation test is adept at capturing ordinal relationships between the variables. It is advantageous in smaller datasets and detecting rank associations even when the relationships are not linear.

Kendall's Tau Correlation Test

(H0: There is no association between the variables)

Independent Variables	Fear Index		Greed Index		Cooperation Index	
	τ	p-value	τ	p-value	τ	p-value
Initial Endowment	-0.0724	0.10	0.0781	0.08	0.0557	0.2
Sender Trust	-0.23	4e-08***	0.224	1e-07***	0.114	0.005**
Receiver Trust	-0.963	<2e-16***	0.986	<2e-16***	0.638	<2e-16***
Reputation Dummy	-0.191	1e-04***	0.168	7e-04***	0.13	0.007**
Role Reversal Dummy	-0.0937	0.06	0.0754	0.10	0.0422	0.40

Table 15: Kendall's Tau Correlation Test of the variables

Key Insights:

The Receiver Trust is strongly associated with the indexes. The Sender Trust and Reputation Dummy have significant but moderate associations with the indices. However, the Initial Endowment and Role Reversal Dummy do not have significant associations with the indexes.

5.9.1.2. Spearman's Rank Correlation Test

Spearman's Rank Correlation test is ideal for assessing monotonic relationships between the trust variables and the behavioral indices. It does not require normal distribution and is robust to outliers, which is perfect for our non-parametric dataset.

Spearman's Rank Correlation test

(H0: There is no monotonic association between the variables)

Independent Variables	Fear Index		Greed Index		Cooperation Index	
	ρ	p-value	ρ	p-value	ρ	p-value
Initial Endowment	-0.0955	0.10	0.103	0.08	0.0749	0.20
Sender Trust	-0.311	6e-08***	0.30	2e-07***	0.177	0.002**
Receiver Trust	-0.984	<2e-16***	0.99	<2e-16***	0.737	<2e-16***
Reputation Dummy	-0.226	1e-04***	0.199	6e-04***	0.159	0.007**
Role Reversal Dummy	-0.111	0.06	0.0894	0.10	0.0513	0.4

Table 16: Spearman's Rank Correlation test of the variables

Key Insights:

The Sender Trust and Receiver Trust are strongly associated with the indexes. The Reputation Dummy also has significant but weaker associations with the indices. However, the Initial Endowment and Role Reversal Dummy do not have significant associations with the indexes.

5.3.2. Correlation Matrix

The correlation matrixes in the tables below show the relationship between the dependent and the independent variables and provide critical insights into their correlation.

5.3.2.1. Fear Index

	Fear Index	*Initial Endowment*	*Sender Trust*	*Receiver Trust*	*Reputation Dummy*	*Role Reversal Dummy*
Fear Index	**1.000**	-0.095	-0.311	-0.984	-0.226	-0.111
Initial Endowment	-0.095	**1.000**	0.048	0.096	-0.029	0.147
Sender Trust	-0.311	0.048	**1.000**	0.318	0.253	-0.126
Receiver Trust	-0.984	0.096	0.318	**1.000**	0.208	0.077
Reputation Dummy	-0.226	-0.029	0.253	0.208	**1.000**	0.000
Role Reversal Dummy	-0.111	0.147	-0.126	0.077	0.000	**1.000**

Table 17: Correlation Matrix of the Fear Index

Key Insights:

The Fear Index shows a strong negative correlation with Receiver Trust, indicating that higher receiver trust is associated with lower fear levels. There is also a moderate negative correlation between the Fear Index and Sender Trust, suggesting sender trust somewhat reduces fear. Interestingly, Initial Endowment has a weak correlation with all other variables, indicating it may have a limited impact on trust or fear. Reputation Dummy and Role Reversal Dummy show weak correlations with other variables, suggesting that these factors have minimal direct influence on trust or fear. The Correlation matrix Plot and Heat map (Exhibits 3 and 4) further clarify their relationships.

5.3.2.2. Greed Index

	Greed Index	*Initial Endowment*	*Sender Trust*	*Receiver Trust*	*Reputation Dummy*	*Role Reversal Dummy*
Greed Index	**1.000**	0.103	0.300	0.990	0.199	0.089
Initial Endowment	0.103	**1.000**	0.048	0.096	-0.029	0.147
Sender Trust	0.300	0.048	**1.000**	0.318	0.253	-0.126
Receiver Trust	0.990	0.096	0.318	**1.000**	0.208	0.077
Reputation Dummy	0.199	-0.029	0.253	0.208	**1.000**	0.000
Role Reversal Dummy	0.089	0.147	-0.126	0.077	0.000	**1.000**

Table 18: Correlation Matrix of the Greed Index

Key Insights:

The correlation matrix for the Greed Index highlights a very strong positive correlation with Receiver Trust, suggesting that higher receiver trust is strongly linked to higher levels of greed. Additionally, there is a moderate positive correlation between the Greed Index and Sender Trust, indicating that sender trust also contributes to increased greed. Initial Endowment has a weak positive correlation with the Greed Index, showing a small impact: reputation Dummy and Role Reversal Dummy exhibit weak correlations with the Greed Index. The Correlation matrix Plot and Heat map (Exhibits 5 and 6) provide further insights into their relationships.

5.3.2.3. Cooperation Index

	Cooperation Index	*Initial Endowment*	*Sender Trust*	*Receiver Trust*	*Reputation Dummy*	*Role Reversal Dummy*
Cooperation Index	**1.000**	0.075	0.177	0.737	0.159	0.051
Initial Endowment	0.075	**1.000**	0.048	0.096	-0.029	0.147
Sender Trust	0.177	0.048	**1.000**	0.318	0.253	-0.126
Receiver Trust	0.737	0.096	0.318	**1.000**	0.208	0.077
Reputation Dummy	0.159	-0.029	0.253	0.208	**1.000**	0.000
Role Reversal Dummy	0.051	0.147	-0.126	0.077	0.000	**1.000**

Table 19: Correlation Matrix of the Cooperation Index

Key Insights:

The correlation matrix for the Cooperation Index shows a strong positive correlation with Receiver Trust, suggesting that higher receiver trust significantly promotes cooperation. Sender Trust has a weak positive correlation with cooperation, indicating a modest influence. Initial Endowment and the Reputation Dummy have very weak correlations with the Cooperation Index, suggesting minimal direct impact. The Role Reversal Dummy shows almost no correlation, implying little to no influence on cooperative behavior. Overall, Receiver Trust plays the most significant role in promoting cooperation. The Correlation matrix Plot and Heat map (Exhibits 7 and 8) provide further insights into their relationships.

5.3.4. Expected/ Perceived Cooperation Index

	Expected Cooperation Index	*Initial Endowment*	*Sender Expectation*	*Receiver Expectation*	*Reputation Dummy*	*Role Reversal Dummy*
Expected Cooperation Index	**1.000**	-0.017	0.762	0.178	0.186	-0.132
Initial Endowment	-0.017	**1.000**	0.021	0.071	-0.029	0.147
Sender Expectation	0.762	0.021	**1.000**	0.244	0.253	-0.066
Receiver Expectation	0.178	0.071	0.244	**1.000**	0.219	0.115
Reputation Dummy	0.186	-0.029	0.253	0.219	**1.000**	0.000
Role Reversal Dummy	-0.132	0.147	-0.066	0.115	0.000	**1.000**

Table 20: Correlation Matrix of the Cooperation Index

Key Insights:

The correlation matrix for the Expected Cooperation Index shows a strong positive correlation with Sender Expectation (0.762), indicating that higher sender expectations significantly predict higher levels of expected cooperation. Receiver Expectation also has a weak positive correlation (0.178), suggesting a modest influence on the expected cooperation. The reputation Dummy has a slight positive correlation (0.186), while the Initial Endowment has no notable influence (-0.017). The Role Reversal Dummy shows a weak negative correlation (-0.132), indicating a slight inverse relationship with expected cooperation. The Correlation matrix Plot and Heat map (Exhibits 9 and 10) further clarify their relationships.

5.4. Dummy Variables Effect Analysis

The experiment has two dummy variables: Role Reversal and Reputation dummies. Role Reversal in the game happens between Rounds 1 and 2 and between Rounds 3 and 4, respectively. The reputation dummy is introduced to differentiate between pre-reputation rounds (Rounds 1 and 2) and post-reputation rounds (Rounds 3 and 4).

5.4.1. Wilcoxon Signed Rank Test on Dummy Variables

First, we conducted the Wilcoxon Signed Rank Test between two similar groups to check their differences in central tendencies.

Dummy Factors (Round vs. Round)		*Wilcoxon Signed Rank Test (H0: The median of the differences between the paired observations is zero)*					
		Fear Index		Greed Index		Cooperation Index	
		p-value	Statistic	p-value	Statistic	p-value	Statistic
Role Reversal	Round 1 vs. Round 2	0.0055	1139.0	0.0019	417.5	0.1007	667.0
	Round 3 vs. Round 4	0.7785	632.5	0.5056	734.5	0.6921	789.0
Reputation	Round 1&2 vs. Round 3&4	6.52e-06	4340.0	0.0001	1653.0	0.0472	2623.5

Table 21: Wilcoxon Signed Rank Test on Dummy Variables

Key Insights:

1. Role Reversal Effect:

The significant difference in the Fear and Greed Index between rounds 1 & 2 suggests participants' behavior is influenced by role reversal on their median fear and greed levels; however, there are no significant differences in their median fear and avarice behavior between rounds 3 & 4. No significant differences in the cooperation Index between rounds 1 and 2 and 3 and 4 suggest that role reversal does not influence participants' behavior, affecting their median cooperation levels.

2. Reputation Effect:

A highly significant difference between pre-reputation rounds (1&2) and post-reputation rounds (3&4) suggests that introducing reputation after round 2 substantially affects the participants' median fear, avarice, and cooperative behaviors.

5.4.2. Two-sample Kolmogorov-Smirnov (K-S) test on Dummy Variables

We have also conducted the two-sample Kolmogorov-Smirnov (K-S) test between two similar groups to check their differences in distribution.

To check the distribution between the samples, the two-sample Kolmogorov-Smirnov (K-S) test

Dummy Factors (Round vs. Round)		*Two-sample Kolmogorov-Smirnov (K-S) test (H0: The two samples come from the same continuous distribution)*					
		Fear Index		Greed Index		Cooperation Index	
		p-value	Statistic	p-value	Statistic	p-value	Statistic
Role Reversal	Round 1 vs. Round 2	0.0549	0.2055	0.0866	0.1918	0.1228	0.1918
	Round 3 vs. Round 4	0.7686	0.0959	0.3766	0.1370	0.4673	0.1370
Reputation	Round 1&2 vs. Round 3&4	0.0028	0.2123	0.0028	0.2123	0.0012	0.2260

Table 22: Two-sample Kolmogorov-Smirnov (K-S) test on Dummy Variables

Key Insights:

1. Role Reversal Effect:

The Fear and Greed Index between rounds 1 and 2 are statistically significant at a 10% significance level, whereas the Cooperation index is statistically insignificant. No significant differences in the Fear, Greed, and Cooperation Index between rounds 3 and 4 suggest that role reversal does not influence participants' behavior regarding the distribution of fear, greed, and cooperation levels in those rounds.

2. Reputation Effect:

There are highly significant differences between pre-reputation rounds (1&2) and post-reputation rounds (3&4), which suggests that the introduction of reputation significantly affects the distribution of fear, greed, and cooperation levels.

5.5. Endowment Effect Analysis

The endowments used in the experiment were 1000, 2000, 3000, and 4000 points. We tested the Kruskal-Wallis Rank Sum Test on these initial endowments' fear, greed, and cooperation indexes. The endowment-wise box plot on the fear, greed, and cooperation indexes provides further insights into their means, spreads, and outliers.

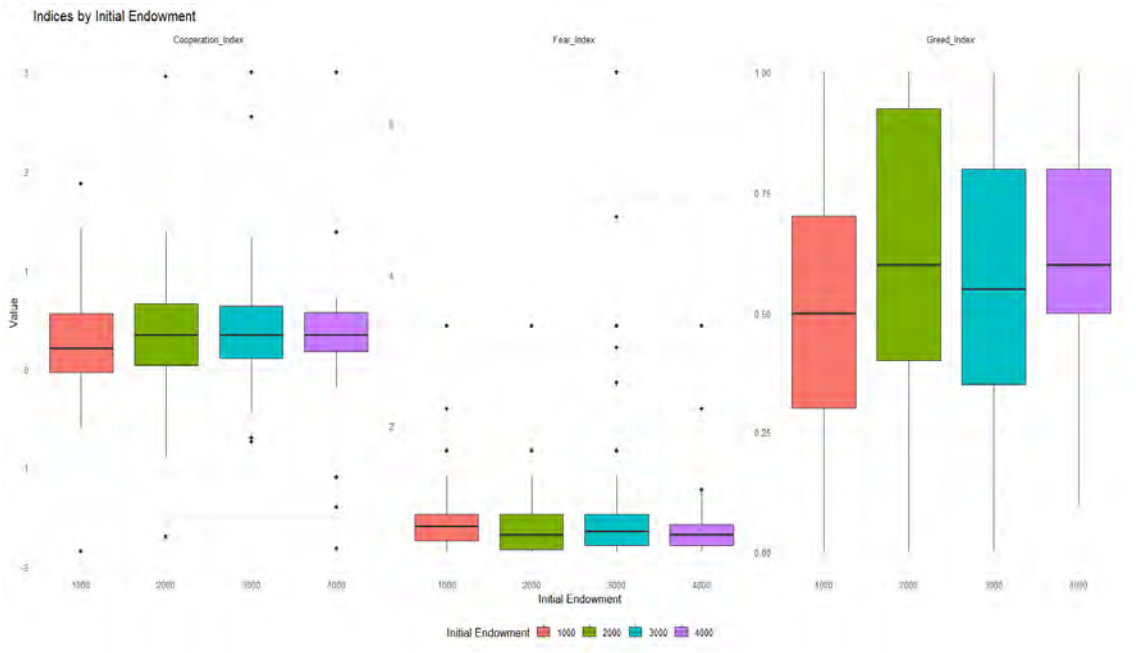

Figure 9: Box Whisker Plot for the Dependent variables on different endowment levels

5.5.1. Kruskal-Wallis Rank Sum test for different endowment levels

Kruskal-Wallis Rank Sum Test

(H0: The distributions of the groups are identical)

Index	p-value	Statistic	Remark
Fear Index	0.01756	10.122	Significant difference observed
Greed Index	0.007545	11.953	Significant difference observed
Cooperation Index	0.4062	2.9068	not Significant

Table 23: Kruskal-Wallis Rank Sum test for different endowment levels

Key Insights:

Significant differences are observed in the fear and greed indexes, suggesting endowments significantly affect fear and greed levels. However, no significant difference is observed in the cooperation index, meaning endowment has no observable effect on the cooperation index.

5.5.2. Dunn's Post Hoc Test

To find the pairwise comparison, we have conducted Dunn's post-hoc analysis.

Dunn's Post Hoc Test

(H0: There is no difference in the distributions between the two groups being compared.)

Pairwise comparison	Adjusted p-value			Remark
	Fear Index	Greed Index	Cooperation Index	
1000-2000	0.0129*	0.0064*	0.2250	Significant differences are observed in the fear and greed index; however, the cooperation index is insignificant.
1000-3000	0.1221	0.0891	0.4170	Statistically Insignificant
2000-3000	0.0988	0.0664	0.4961	Statistically Insignificant
1000-4000	0.0193*	0.0101*	0.1795	Significant differences are observed in the fear and greed index; however, the cooperation index is insignificant.
2000-4000	0.4578	0.4690	0.7259	Statistically Insignificant
3000-4000	0.1046	0.0907	0.5844	Statistically Insignificant

Table 24: Dunn's Post Hoc Test

Key Insights:

Significant differences are observed in the fear and greed indexes 1000-2000 and 1000-4000 pairs, suggesting that endowments significantly affect fear and greed levels from endowment level 1000 to endowment levels 2000 and 4000, respectively. However, no significant difference is observed in other pairs for fear and greed and cooperation indexes, suggesting that the endowment level does not affect cooperation.

5.6. Multicollinearity, Homogeneity, and Mediation Analysis

Before selecting and performing the appropriate regression analysis model, we tested the variables for multicollinearity, homogeneity, and mediation analysis, especially considering that since the variables are not normally distributed, we must adopt non-parametric regression analysis.

5.6.1. Multicollinearity

Though our variables are not normally distributed, we have used linear regression to estimate the Variance Inflation Factor (VIF) to detect the multicollinearity issue, if it exists.

Variables	*Fear Index*	*Greed Index*	*Cooperation Index*	*Remark*
	Variance Inflation Factor (VIF)			
Initial Endowment	1.01	1.01	1.01	No Multicollinearity Observed
Sender Trust	1.10	1.10	1.10	No Multicollinearity Observed
Receiver Trust	1.09	1.09	1.09	No Multicollinearity Observed
Reputation Dummy	1.05	1.05	1.05	No Multicollinearity Observed
Role Reversal Dummy	1.03	1.03	1.03	No Multicollinearity Observed

Table 25: VIF table for Multicollinearity

Since the VIF values of all the variables are less than 5, there is little or no multicollinearity among the variables.

5.6.2. Brown-Forsythe test for Homogeneity

Since our data is non-parametric, we have conducted the Brown-Forsythe test to check Homoscedasticity by testing the variance of dependent variables against the independent variables. Brown-Forsythe test is a variant of Levene's test, which uses median instead of mean, making it more robust to non-normal data to check homogeneity.

Brown-Forsythe Test

(H0: The variance of the dependent variable is equal across all levels of the independent variable					
p-values (At 5% Significance)	Initial Endowment	Sender Trust	Receiver Trust	Reputation Dummy	Role Reversal Dummy
Fear Index	0.09542	0.07738	6.771e-16***	0.7857	0.5762
Greed Index	0.4638	0.1089	0.006177**	0.00393**	0.01564*
Cooperation Index	0.9201	<2.2e-16***	0.04456*	0.717	0.04759*

Table 26: Brown-Forsythe test for Homogeneity

Key Insights:

For the Fear Index, Receiver Trust shows highly significant Heteroskedasticity; the rest of the variables are homoscedastic. Receiver Trust, Reputation Dummy, and Role Reversal Dummy have shown significant Heteroskedasticity against the Greed Index, whereas Initial Endowment and Sender Trust are homoscedastic. The Cooperation Index, Sender Trust, Receiver Trust, and Role Reversal Dummy have shown significant Heteroskedasticity; however, the Initial Endowment and Reputation dummy are homoscedastic.

5.6.3. Mediation Analysis

We have checked whether the Reputation Dummy and Initial Endowment can influence the Sender and Receiver Trust and the dependent variables. To calculate the indirect effects, we conducted a mediation analysis on the indices using non-parametric bootstrapping.

5.6.3.1. Fear Index

This mediation analysis used the Sender's Trust and the Receiver's Trust to mediate the relationship between the Reputation Dummy/ Initial Endowment and the Fear Index.

Effect	*Estimate*	*95% CI (BCa)/ p-value*	*Remark*
		Reputation Dummy	
		Indirect Effect	
Sender Trust	-0.0084	(-0.0459, 0.0224)	Not Significant
Receiver Trust	-0.1796	(-0.3056, -0.0754)	Significant
Total Indirect Effect	-0.188		
		Direct Effect	
Direct Effect	0.0652	0.312>0.05	Not Significant
		Total Effect	
Total verified Effect	-0.1228		
Total Effect	-0.1228	0.134>0.05	Not Significant
		Initial Endowment	
		Indirect Effect	
Sender Trust	-5.87e-07	(0.0000, 0.0000)	Not Significant
Receiver Trust	-4.15e-05	(-0.0001, 0.0000)	Not Significant
Total Indirect Effect	-4.21e-05		
		Direct Effect	
Direct Effect	2.31e-05	0.446 > 0.05	Not Significant
		Total Effect	
Total verified Effect	-1.9e-05		
Total Effect	-1.9e-05	0.634 > 0.05	Not Significant

Table 27: Effects of Fear Index

Key Insights:

The Reputation Dummy and initial endowment are insignificant in terms of their total and direct effect on the Fear index. However, receiver trust significantly mediates the relationship between the reputation dummy and the fear index, indicating that reputation influences the receiver's trust in fear behavior. On the contrary, it does not affect the sender's trust, as its indirect effect is insignificant. On the other hand, the initial endowment is insignificant in terms of the indirect effects on the fear index.

5.6.3.2. Greed Index

Similarly, this mediation analysis used the Sender's Trust and the Receiver's Trust as mediators in the relationship between the Reputation Dummy/ Initial Endowment and Greed Index. We calculated the respective indirect effects using the non-parametric bootstrapping method.

Effect	*Estimate*	*95% CI (BCa)/ p-value*	*Remark*
		Reputation Dummy	
		Indirect Effect	
Sender Trust	-0.0029	(-0.0115, 0.0000)	Not Significant
Receiver Trust	0.1083	(0.0433, 0.1663)	Significant
Total Indirect Effect	0.1054		
		Direct Effect	
Direct Effect	-0.0028	0. 0.639>0.05	Not Significant
		Total Effect	
Total verified Effect	0.1026		
Total Effect	0.1026**	0.0017<0.05	Significant
		Initial Endowment	
		Indirect Effect	
Sender Trust	-3.49e-07	(0.0000, 0.0000)	Not Significant
Receiver Trust	2.51e-05	(0.0000, 0.0001)	Not Significant
Total Indirect Effect	2.46e-05		
		Direct Effect	
Direct Effect	2.96e-06	0.283 > 0.05	Not Significant
		Total Effect	
Total Verified Effect	2.77e-05		
Total Effect	2.77e-05	0.083 > 0.05	Not Significant

Table 28: Effects of Greed Index

Key Insights:

The Reputation Dummy has significant indirect effects on the greed index through the receiver's trust, but the indirect effect through the sender's trust is insignificant. The reputation dummy also significantly affects the total effect of the greed index; however, the direct effect is insignificant. The initial endowment is insignificant on the greed index in terms of total, direct, and indirect effects.

5.6.3.3. Cooperation Index

This mediation analysis used the Sender's and the Receiver's Trust to mediate the relationship between the Reputation Dummy/ Initial Endowment and the cooperation Index. The Indirect effects were computed through non-parametric bootstrapping.

Effect	*Estimate*	*95% CI (BCa)/ p-value*	*Remark*
		Reputation Dummy	
		Indirect Effect	
Sender Trust	-0.0161	(-0.0677, 0.0340)	Not Significant
Receiver Trust	0.1161	(0.0491, 0.2053)	Significant
Total Indirect Effect	-0.100		
		Direct Effect	
Direct Effect	-0.0417	0.484>0.05	Not Significant
		Total Effect	
Total verified Effect	0.0584		
Total Effect	0.0584	0.378>0.05	Not Significant
		Initial Endowment	
		Indirect Effect	
Sender Trust	-2.04e-06	(0.0000, 0.0000)	Not Significant
Receiver Trust	2.68e-05	(0.0000, 0.0001)	Not Significant
Total Indirect Effect	2.48e-05		
		Direct Effect	
Direct Effect	-5.253e-07	0.985 > 0.05	Not Significant
		Total Effect	
Total Verified Effect	2.418e-05		
Total Effect	2.418e-05	0.454 > 0.05	Not Significant

Table 29: Effects of Cooperation Index

Key Insights:

The Reputation Dummy has insignificant total and direct effects on the Cooperation index. However, the receiver's trust significantly mediates the relationship between the reputation dummy and the cooperation index, indicating that reputation influences the receiver's trust in cooperative behavior. On the contrary, it does not affect the sender's trust, as its indirect effect is insignificant on cooperation. The initial endowment's indirect, direct, and total effects are insignificant on the cooperation index.

5.7. Regression Model Analysis

As our variables are not normally distributed, we have modeled them using non-parametric regression analysis, which accounts for Heteroskedasticity and the significant latent effect of reputation dummy on the receiver's trust for all the indices.

5.7.1. Quantile Regression

We started with Quantile regression to see how the variables behave in different percentiles. Quantile Regression is robust against outliers, making it suitable for our no-parametric analysis.

Formula:

1. $Q_{Fear\ Index}(\tau \mid X) = \beta_0(\tau) + \beta_1(\tau)\text{Initial endowment}_i + \beta_2(\tau)\text{Sender trust}_i + \beta_3(\tau)\text{Receiver Trust}_i + \beta_4(\tau)\text{Reputation Dummy}_i + \beta_5(\tau)\text{Role Reversal Dummy}_i)$
2. $Q_{Greed\ Index}(\tau \mid X) = \beta_0(\tau) + \beta_1(\tau)\text{Initial endowment}_i + \beta_2(\tau)\text{Sender trust}_i + \beta_3(\tau)\text{Receiver Trust}_i + \beta_4(\tau)\text{Reputation Dummy}_i + \beta_5(\tau)\text{Role Reversal Dummy}_i)$
3. $Q_{Cooperation\ Index}(\tau \mid X) = \beta_0(\tau) + \beta_1(\tau)\text{Initial endowment}_i + \beta_2(\tau)\text{Sender trust}_i + \beta_3(\tau)\text{Receiver Trust}_i + \beta_4(\tau)\text{Reputation Dummy}_i + \beta_5(\tau)\text{Role Reversal Dummy}_i)$

Where τ = 0.25, 0.5 and 0.75 for 25th, 50th and 75th percentiles respectively

Quantile Regression

Variable	Quantile	Fear Index	Cooperation Index
Intercept	25th	1.06944*** (0.96023, 1.09656)	-0.32821*** -0.37137, -0.28844)
	50th	1.19493*** (1.105, 1.23376)	0.15612*** (-0.19255, -0.12111)
	75th	1.44444*** (1.3402, 1.54869)	0.0702 (-0.03532, 0.17573)
Initial Endowment	25th	-1e-05 (-2e-05, 0)	0 (-1e-05, 1e-05)
	50th	-1e-05 (-3e-05, 0)	0 (-1e-05, 1e-05)
	75th	0 (-2e-05, 2e-05)	-2e-05 (-4e-05, 1e-05)
Sender Trust	25th	0 (-0.02913, 0.0376)	-0.01455 (-0.13788, 0.03414)
	50th	0 (-0.04131, 0.07188)	-0.314*** (-0.35655, -0.25206)
	75th	0 (-0.03179, 0.00111)	-0.48193*** (-0.51622, -0.4222)
Receiver Trust	25th	-0.79365*** (-0.87405, -0.63483)	1.01394*** (1.00216, 1.14911)
	50th	-0.90172*** (-0.9574, -0.77387)	1.14822*** (1.09272, 1.2493)
	75th	-1.11111*** (-1.17437, -1.11111)	1.15255*** (1.04348, 1.23045)
Reputation Dummy	25th	-0.00595 (-0.02364, 0.01094)	-0.02849 (-0.03455, 0.00426)
	50th	0 (-0.03835, 0.0463)	-0.00441 (-0.02275, 0.00733)
	75th	0 (-0.00074, 0.02643)	0.0017 (-0.03944, 0.03041)
Role Reversal Dummy	25th	0 (-0.02751, 0.01636)	0.00209 (-0.0058, 0.01593)
	50th	0.0112 (-0.01514, 0.03479)	0.00332 (-0.00761, 0.01034)
	75th	0 (0, 0.04607)	0.02111 (-0.01285, 0.05185)

** Assuming significance level p = 0.05*

Table 30: Quantile Regression

Key Insights:

Only Receiver Trust significantly negatively affects the Fear Index; the other variables are statistically insignificant. Receiver Trust significantly positively affects the Cooperation Index, and its strength rises in higher percentiles. Similarly, Sender Trust is negatively associated with the Cooperation index, and its strength declines in higher percentiles, going from insignificant in the 25th percentile to significant in the 50th and 75th percentiles. The rest of the variables are statistically insignificant. The greed index provides null coefficients; hence, it is not shown in the table. The coefficient plot of the index (Exhibit 15) can provide further insights.

5.7.2. Generalized Estimating Equations (GEE) Regression

Since our variables are non-parametric, observations have repeated measures in group interactions in the experiment and have significant Heteroskedasticity; the Generalized Estimating Equations (GEE) Model was adopted.

Formula:

1. $g(E(Fear\ Index)_i) = \beta_0 + \beta_1 \text{Initial endowment}_i + \beta_2 \text{Sender trust}_i + \beta_3 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i)$
2. $g(E(Greed\ Index)_i) = \beta_0 + \beta_1 \text{Initial endowment}_i + \beta_2 \text{Sender trust}_i + \beta_3 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i)$
3. $g(E(Cooperation\ Index)_i) = \beta_0 + \beta_1 \text{Initial endowment}_i + \beta_2 \text{Sender trust}_i + \beta_3 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i)$

Where g () is a link function for the Expected value of the Dependent variable.

Variable	*Fear Index*	*Greed Index*	*Cooperation Index*
	Co-efficient	Co-efficient	Co-efficient
Initial Endowment	2.251e-05	2.40e-06	1.59e-08
	(0.413)	(0.45)	(1.000)
Sender Trust	-5.274e-02	-0.0188	-0.118
	(0.636)	(0.14)	(0.473)
Receiver Trust	-1.635***	0.976***	1.05***
	(2.22e-15)	(<2e-16)	(8.9e-10)
Reputation Dummy	6.707e-02	-2.62e-03	-0.0412
	(0.366)	(0.24)	(0.518)
Role Reversal Dummy	3.135e-02	6.80e-03	-0.0218
	(0.637)	(0.16)	(0.667)

 # The GEE model does not give R^2 and adjusted R^2 value directly, Observation = 292

** Assuming significance level p = 0.05.*

Table 31: Generalized Estimating Equations (GEE) Regression

Key Insights:

Only Receiver Trust is statistically significant for all the indices, positive for the Greed and Cooperation indexes and negative for the Fear Index. The rest of the variables are statistically significant. We can get further information from the relevant graphs such as residual plot, predicted vs. observed plot (given below), and effect plot (Exhibit 16-18).

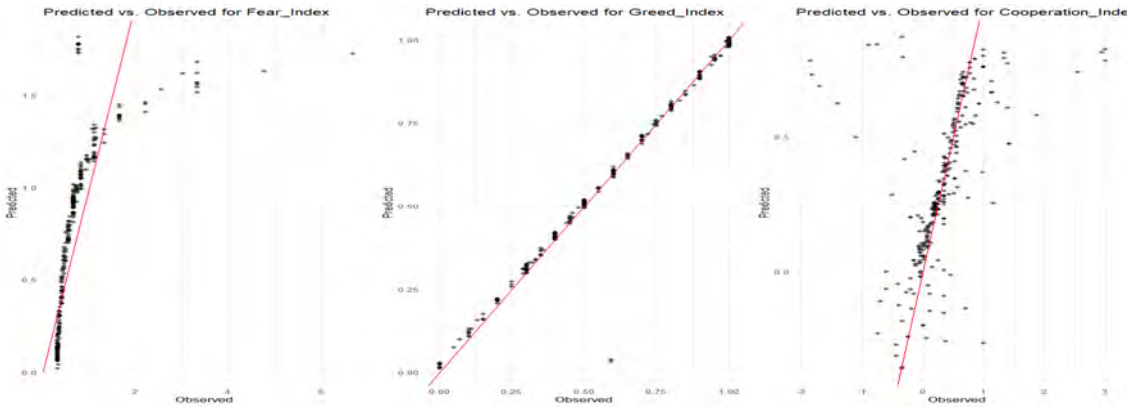

Figure 10: Predicted vs. Observed Plot for GEE Model for the indices

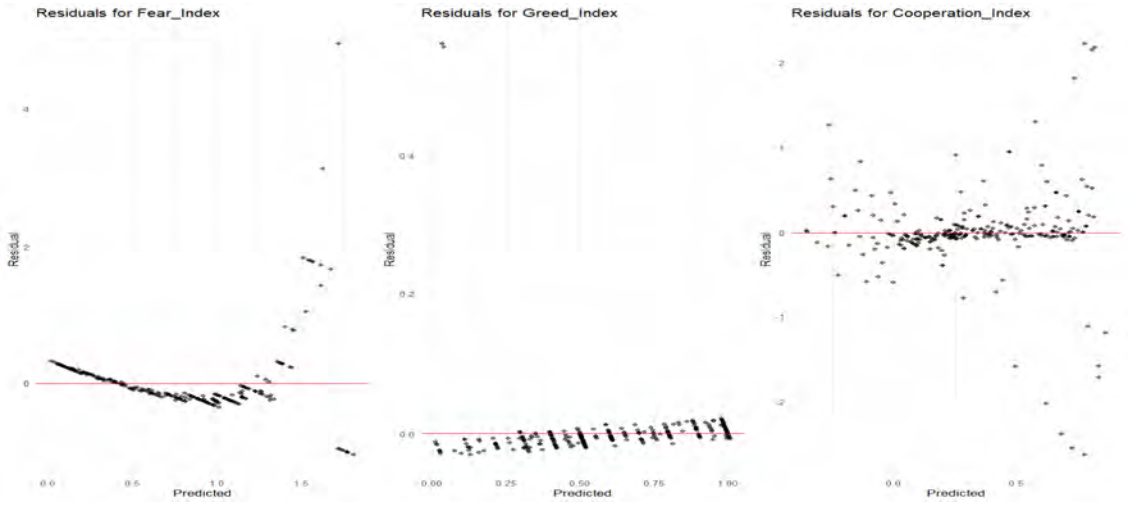

Figure 11: Residual Plot for GEE Model for the indices

5.7.3. Generalized Additive Models (GAM) Regression

Generalized additive model regression allowed us to model our data for its non-linear characteristics, accounting for Heteroskedasticity and distributional characteristics. Since some of our variables are non-parametric and have shown significant Heteroskedasticity, we adopted Generalized Additive model regression to understand their non-linear relationships and distributional characteristics better. GAM used smooth functions on the non-linear terms.

Formula:

1. $Cooperation\ Index_i = \beta_0 + \beta_1 \text{Initial endowment}_i + \beta_2 s_1 \text{Sender trust}_i + \beta_3 s_2 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i)$
2. $Greed\ Index_i = \beta_0 + \beta_1 s_1(\text{Initial endowment}_i) + \beta_2 s_2 \text{Sender trust}_i + \beta_3 s_3 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i)$
3. $Equality\ Index_i = \beta_0 + \beta_1 s_1(\text{Initial endowment}_i) + \beta_2 s_2 \text{Sender trust}_i + \beta_3 s_3 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i)$

Thin plate regression splines are used as smooth functions (s = s1, s2) in variables Sender Trust and Receiver Trust to capture their non-linear relationships with respective indices. Due to their linear relationship with the indices, initial endowments and dummy variables are used without smooth functions. β_0, β_1, β_2, β_3, β_4 and β_5 are the coefficients of the independent variables.

Variable	*Fear Index*	*Greed Index*	*Cooperation Index*
	Smooth Terms		
Initial Endowment	0.0270, 0.0239 (0.29)	1.27e-12, -0.00198 (0.29)	-0.03174, -0.00668 (0.86)
Sender Trust	0.1056, 0.0759, 0.0413, -0.0244, 0.022, -0.0441, 0.2266, 0.1148 (0.25)	0.0673, 0.863, 0.0523, -0.553, 0.123, 1.52, -0.487, 0.49 (<2e-16***)	0.12481, -2.748, 0.4915, 2.28384, -0.0055, 0.99036, -4.39669, -1.76089 (<2e-16***)
Receiver Trust	-1.4727, 7.9131, 0.8803, -6.296, -1.7554, -5.4461, 14.4675, 3.7309 (<2e-16***)	-0.0241, -0.0759, -0.0136, 0.0411, 0.00614, 0.0367, -0.1520, 0.201 (<2e-16***)	-0.02058, -0.05483, 0.01488, 0.0431, 0.02854, 0.03692, -0.18458, 0.24358 (<2e-16***)
	Parametric Variables		
Reputation Dummy	0.0374 (0.33)	-0.01201** (0.002)	-0.03174 (0.56)
Role Reversal Dummy	0.0114 (0.77)	0.00029 (0.941)	-0.00668 (0.90)
	Model Parameter		
Adjusted R^2	0.804	0.988	0.394
Deviance Explained	81.4%	98.9%	42.1%
GCV	0.10128	0.0010184	0.20267
Observation	292	292	292

 # The smooth terms of the GAM model do not directly give coefficients; instead, they give EDF (Effective Degrees of Freedom) values. The coefficients of the smooth terms are non-parametric; hence, they have multiple values.

** Assuming significance level p = 0.05.*

Table 32: Generalized Additive Models (GAM) Regression

Key Insights:

Smooth-termed variables such as receiver trust are highly significant compared to the fear index, where the initial endowment and sender trust variables are not. Parametric variables Reputation Dummy and Role Reversal Dummy are not statistically significant predictors.

Similarly, smooth-termed variables such as sender and receiver trust are highly significant in the greed index, whereas initial endowment is not. Reputation Dummies are a statistically significant predictor, while Role Reversal Dummies are not.

Similarly, smooth-termed variables such as sender and receiver trust are highly significant in the cooperation index, whereas initial endowment is not. Parametric variables Reputation Dummy and Role Reversal Dummy are not statistically significant predictors.

Relevant graphs, such as the partial effect graph (given below), observed vs. fitted plot, and residual plot (Exhibits 19 and 20), can help us understand further.

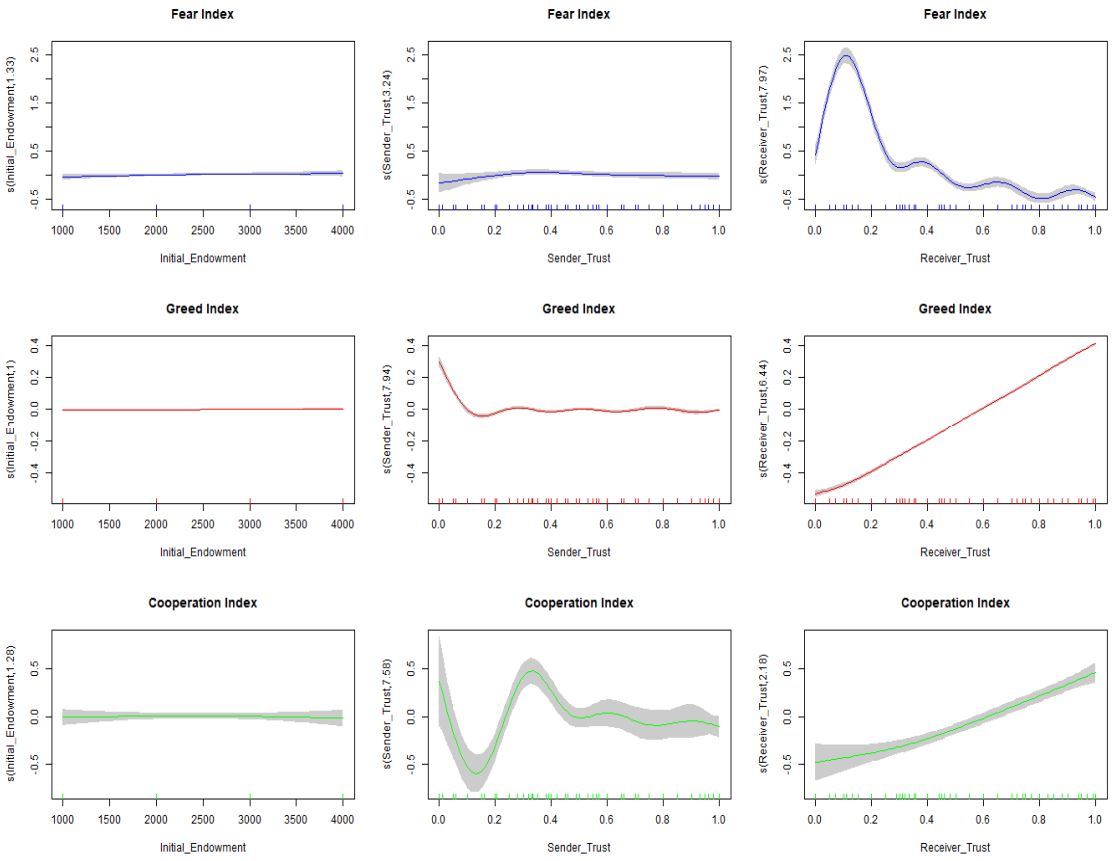

Figure 12: Partial Effect Plot of Smooth Terms of the GAM model

5.7.4. Comparative Analysis of Matrices of GEE and GAM model

We have analyzed the data for a practical model by running Generalized Estimating Equations (GEE) Regression (for repeated measures) and Generalized additive model (GAM) regression (for non-linear relationships). We have also compared the models on their various matrices to determine which model has better explanatory power and predictive accuracy in determining the better-fit model.

Matric	*Fear Index*		*Greed Index*		*Cooperation Index*	
	GEE	GAM	GEE	GAM	GEE	GAM
AIC (GAM)/QIC (GEE)	91.9	161	12.7	-1182	80.6	364
MSE	0.297	0.238	0.00242	0.0021	0.247	0.237
R^2	0.438	0.804	0.971	0.988	0.259	0.394
Adj. R^2	0.426	0.795	0.971	0.987	0.243	0.370

Table 33: Comparative Analysis of Matrices of GEE and GAM model

Key Insights:

The GAM model is better as it has better explanatory power and predictive accuracy than the GEE model, despite sometimes having lower QIC values than the GAM's AIC values. The relevant graphs, Figure 13 and Exhibits 21 and 22, can provide further insights into their comparative analysis.

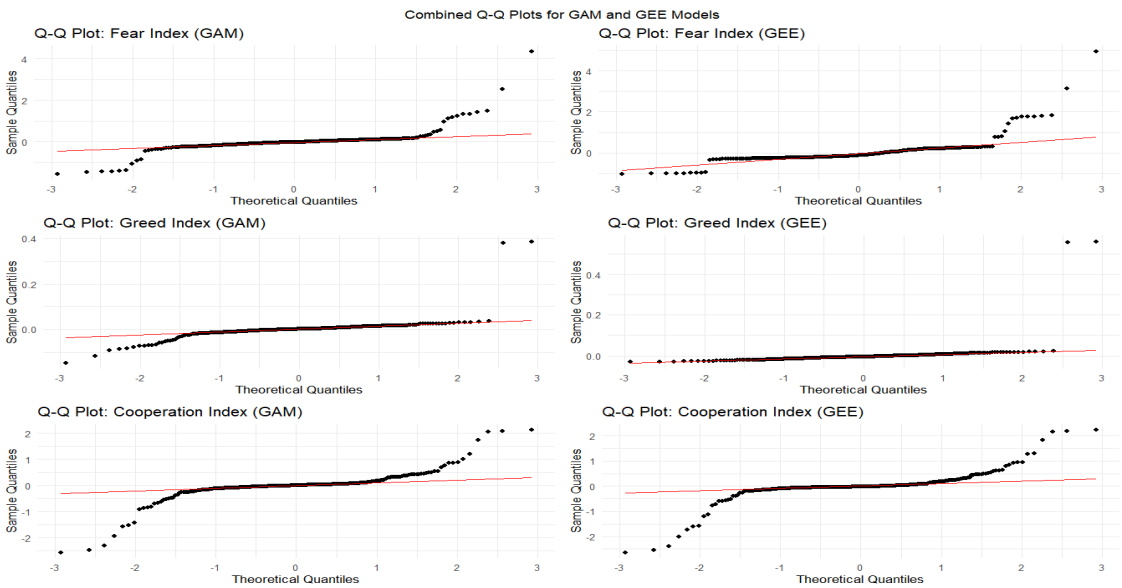

Figure 13: Q-Q Plot: GAM vs. GEE

5.7.5. Covariance-Based Structural Equation Modeling (CB-SEM)

Since the data is non-normal with significant Heteroskedasticity, and we aim to test our Prisoner's dilemma theoretical concept by testing the hypothesized model, Covariance-Based Structural Equation Modeling (CB-SEM) regression was used to test causal relationships between latent variables. It is particularly effective for testing the validity of a model based on theory. Our mediation analysis shows that Receiver Trust significantly mediated relationships between the Reputation dummy and the dependent variables, whereas Sender Trust's mediation was insignificant; however, we will consider them both as mediators.

Formula:

Mediation Formula:

1. $Receiver\ Trust_i = \beta_1 \text{Initial endowment}_i + \beta_2 \text{Reputation Dummy}_i + \beta_3 \text{Role Reversal Dummy}_i + \varepsilon_1$
2. $Sender\ Trust_i = \delta_1 \text{Initial endowment}_i + \delta_2 \text{Reputation Dummy}_i + \delta_3 \text{Role Reversal Dummy}_i + \varepsilon_2$

Outcome Formula (Y= Fear Index, Greed Index, and Cooperation Index):

1. $Y_i = \beta_0 + \beta_1 \text{Initial endowment}_i + \beta_2 \text{Sender trust}_i + \beta_3 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i + \varepsilon_3$

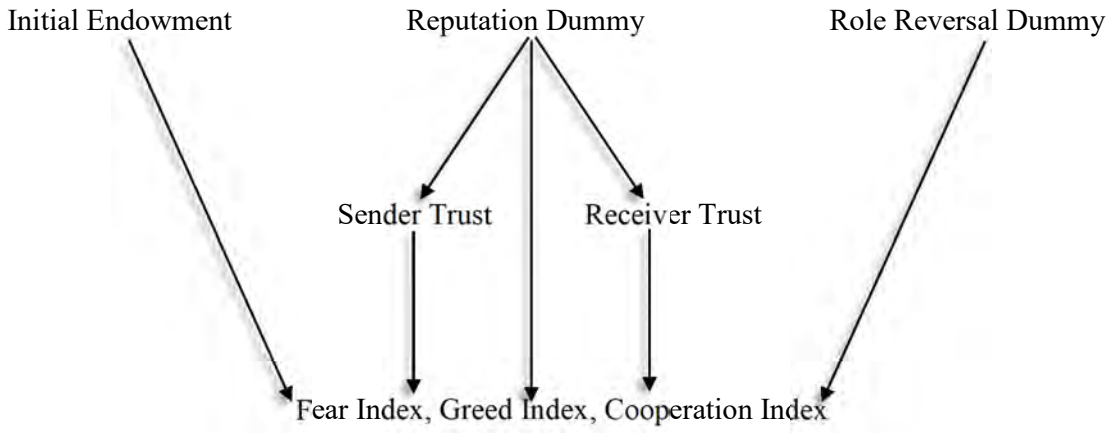

Figure 14: SEM Model Path Representation

Variables	*Estimate*	*Standardized Coefficient*	*z-value*	*p-value*	*Significance*
		Dependent Variable = Sender Trust			
Initial Endowment	0.000	0.085	1.481	0.139	Not Significant
Reputation Dummy	0.145***	0.255***	4.559	0.000	Significant
Role Reversal Dummy	-0.078*	-0.137*	-2.380	0.017	Significant
		Dependent Variable = Receiver Trust			
Initial Endowment	0.000	0.092	1.636	0.102	Not Significant
Reputation Dummy	0.112**	0.197**	3.46	0.001	Significant
Role Reversal Dummy	0.024	0.042	0.713	0.476	Not Significant
		Dependent Variable = Fear Index			
Initial Endowment	0.000	0.033	0.819	0.413	Not Significant
Sender Trust	-0.053	-0.022	-0.474	0.636	Not Significant
Receiver Trust	-1.635***	-0.668***	-7.925	0.000	Significant
Reputation Dummy	0.067	0.048	0.905	0.366	Not Significant
Role Reversal Dummy	0.031	0.023	0.472	0.637	Not Significant
		Dependent Variable = Greed Index			
Initial Endowment	0.000	0.009	0.758	0.448	Not Significant
Sender Trust	-0.019	-0.019	-1.473	0.141	Not Significant
Receiver Trust	0.976***	0.986***	60.506	0.000	Significant
Reputation Dummy	-0.003	-0.005	-1.166	0.243	Not Significant
Role Reversal Dummy	0.007	0.012	1.416	0.157	Not Significant
		Dependent Variable = Cooperation Index			
Initial Endowment	0.000	0.000	0.001	1.000	Not Significant
Sender Trust	-0.118	-0.059	-0.717	0.473	Not Significant
Receiver Trust	1.053***	0.527***	6.128	0.000	Significant
Reputation Dummy	-0.041	-0.036	-0.646	0.518	Not Significant
Role Reversal Dummy	-0.022	-0.019	-0.431	0.667	Not Significant

Fit Matrices

Fit Index	*Value*	*Interpretation*
Chi-square (χ^2)(standard)	27.177	*The model does not fit the data perfectly, though it is expected in larger samples. p-value = 0.000*
Chi-square (χ^2) (scaled/robust)	20.503	
Comparative Fit Index CFI (Standard)	0.985	*The model is an excellent fit (CFI>0.95)*
Comparative Fit Index CFI (Robust)	0.984	
Tucker-Lewis Index: TLI (Standard)	0.624	*The model is a poor fit and needs improvement*
Tucker-Lewis Index: TLI (Robust)	0.612	
Root Mean Square Error of Approximation RMSEA (Standard)	0.299	*High RMSEA values suggest the model fits poorly.*
Root Mean Square Error of Approximation RMSEA (Robust)	0.258	
Standardized Root Mean Square Residual SRMR	0.076	*The model is a reasonable fit SRMR <0.08*
Goodness-of-Fit Index (GFI)	0.965	*The model is a good fit but needs improvement.*
Adjusted Goodness-of-Fit Index (AGFI)	-0.247	*Indicates a poor fit (complex model).*
Akaike Information Criterion (AIC)	101.070	
Bayesian Information Criterion (BIC)	207.696	

Table 34: Covariance-Based Structural Equation Modeling (CB-SEM) Regression

Key Insights:

Reputation Dummy significantly and positively affects Sender Trust and Receiver Trust, suggesting reputation enhances trust behavior between the sender and receiver; however, it does not significantly affect the fear, greed, and cooperation indexes. Role Reversal dummy has a marginal negative effect on sender trust but is insignificant to receiver trust and the dependent variables, the fear, greed, and cooperation indexes. Receiver trust is the critical mediator of the fear, greed, and cooperation indexes; the rest of the variables are statistically insignificant. The overall fit matrices suggest that the model is poorly fit and needs improvement. The graphs (Exhibit 23-25) can provide further insights into the model.

The overall analysis suggests that the model based on the Prisoner's Dilemma paradigm concept is not a good fit and needs reformatting. The payoff matrix and experiment rules of the binary trust game are expected to be different from those of continuous trust games, as the participants have an infinite number of choices rather than binary decisions in the binary trust games. So, the function of the fear/ risk index, greed/ temptation index, and cooperation index must be adjusted accordingly. Next, we tested our proposed theoretical model and checked if it performed better than the Prisoner's Dilemma paradigm. We also tested the model based on the proposed theoretical concept with Generalized Estimating Equations (GEE) Regression (for repeated measures) and Generalized additive model (GAM) regression (for non-linear relationships) for better fit and compared their matrices as we did on the prisoner's dilemma paradigm theoretical concept analysis.

B Analysis of the model based on proposed Theoretical Model Concept

In the second part of the analysis, we analyzed our model derived from our simplified proposed theoretical concept.

5.8. Normality Analysis

5.8.1. Histogram

We plotted a histogram (Figure 15) and Q-Q plot (Exhibit 26) to visualize the distribution pattern of the newly formulated dependent variables (fear, greed, and cooperation index) derived from the proposed theoretical concept.

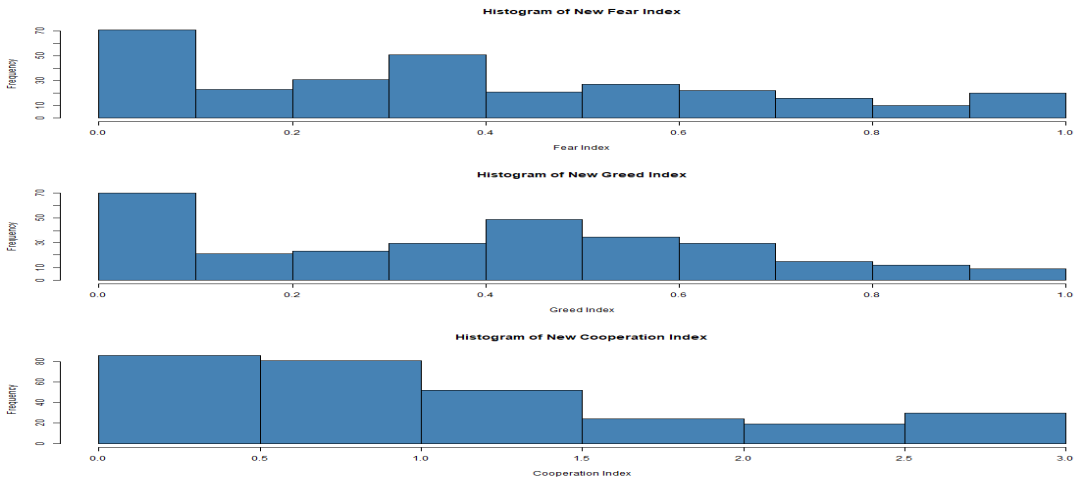

Figure 15: Histogram: Dependent Variables for the proposed formula

5.8.2. Normality Test

The number of Observations is 292. Since all the indexes are slightly positively skewed, we opted to employ the Anderson-Darling test, in addition to the Shapiro-Wilk, Kolmogorov-Smirnov, and Lilliefors correction test, to check the normality distribution.

Variables	*p-value*			*Skewness*	*Kurtosis*	*Remark*
	Shapiro-Wilk	KS Lilliefors	Anderson -Darling			
Fear Index	5.52e-10	7.85e-08	5.98e-11	0.454	-0.778	Not normally distributed
Greed Index	1.28e-08	2.03e-10	3.64e-10	0.075	-0.958	Not normally distributed
Cooperation Index	6.27e-13	5.61e-18	4.27e-22	0.873	-0.220	Not normally distributed

Table 35: Normality test of the dependent variables of the proposed formula

Key Insights:

The normality tests (Shapiro-Wilk, KS Lilliefors, and Anderson-Darling) for the dependent variables reveal distributions that are not normally distributed. Positive Skewness and negative kurtosis values further indicate deviations from normality. All the dependent variables show significant outliers with right skewness and distributions that are flatter than normal. None of the variables follow a normal distribution, suggesting that non-parametric methods and regressions are more appropriate for further analysis.

5.9. Correlation Analysis

We checked the correlations between the independent variables and behavioral indices derived from the proposed model.

5.9.1. Correlation Test

We have used non-parametric correlation tests like Kendall's Tau and Spearman's Rank Correlation tests since our variables do not follow a normal distribution.

5.9.1.1. Kendall's Tau Correlation Test

We have used Kendall's Tau correlation test to capture the non-linear relationships between the variables in the proposed model.

Kendall's Tau Correlation Test

(H0: There is no association between the variables)

Independent Variables	Fear Index		Greed Index		Cooperation Index	
	τ	p-value	τ	p-value	τ	p-value
Initial Endowment	-0.0583	0.20	-0.0781	0.08	0.0805	0.07
Sender Trust	-0.821	<2e-16***	-0.224	1e-07***	0.634	<2e-16***
Receiver Trust	-0.438	<2e-16***	-0.986	<2e-16***	0.636	<2e-16***
Reputation Dummy	-0.207	<2e-16***	-0.168	7e-04***	0.221	5e-06***
Role Reversal Dummy	0.0845	0.08	-0.0754	0.10	-0.0416	0.40

Table 36: Kendall's Tau Correlation Test of the variables

Key Insights:

Kendall's Tau Correlation test reveals significant relationships between trust-related variables and behavioral indices. The Sender and Receiver Trust are strongly associated with all the indexes, indicating trust plays a crucial role in shaping behavioral outcomes. The Reputation

Dummy also has significant but weaker associations with the index, suggesting reputation significantly affects the behavioral indices. However, the Initial Endowment and Role Reversal Dummy do not have significant associations with the indexes.

5.9.1.2. Spearman's Rank Correlation Test

We have used Spearman's Rank Correlation test since our variables are non-parametric.

Spearman's Rank Correlation test

(H0: There is no monotonic association between the variables)

Independent Variables	Fear Index		Greed Index		Cooperation Index	
	ρ	p-value	ρ	p-value	ρ	p-value
Initial Endowment	-0.0753	0.2	-0.103	0.08	0.104	0.08
Sender Trust	-0.923	<2e-16***	-0.3	2e-07***	0.782	<2e-16***
Receiver Trust	-0.568	<2e-16***	-0.99	<2e-16***	0.788	<2e-16***
Reputation Dummy	-0.25	2e-05***	-0.199	6e-04***	0.268	4e-06***
Role Reversal Dummy	0.102	0.08	-0.0894	0.10	-0.0504	0.40

Table 37: Spearman's Rank Correlation test of the variables

Key Insights:

Spearman's Rank Correlation test reveals strong and highly significant monotonic relationships between trust-related variables and behavioral indices. The Sender and Receiver Trust are strongly associated with all three indexes, indicating that trust is critical in influencing behavioral outcomes. The reputation dummy also has significant but less pronounced associations with the indices, suggesting its small but significant role in affecting the behavioral indexes. However, the Initial Endowment and Role Reversal Dummy do not have significant associations with the indexes.

5.9.2. Correlation Matrix

The correlation matrixes in the tables below show the relationship between the dependent and the independent variables and provide critical insights into their correlation. These variables are from the theoretical proposal of the proposed concept.

5.9.2.1. Fear Index

	Fear Index	*Initial Endowment*	*Sender Trust*	*Receiver Trust*	*Reputation Dummy*	*Role Reversal Dummy*
Fear Index	**1.000**	-0.075	-0.923	-0.568	-0.250	0.102
Initial Endowment	-0.075	**1.000**	0.048	0.096	-0.029	0.147
Sender Trust	-0.923	0.048	**1.000**	0.318	0.253	-0.126
Receiver Trust	-0.568	0.096	0.318	**1.000**	0.208	0.077
Reputation Dummy	-0.250	-0.029	0.253	0.208	**1.000**	0.000
Role Reversal Dummy	-0.102	0.147	-0.126	0.077	0.000	**1.000**

Table 38: Correlation Matrix of the Fear Index

Key Insights:

The Fear Index shows a strong negative correlation with Sender Trust (-0.923), indicating that higher sender trust is associated with lower fear levels. There is also a moderate negative correlation between the Fear Index and Receiver Trust (-0.568), suggesting that receiver trust also reduces fear, though to a lesser extent. The reputation dummy also shows a moderate negative correlation, suggesting that a higher reputation induces lesser fear among participants. Initial Endowment and Role Reversal Dummy have weak correlations with all other variables, indicating it may have a limited impact on trust or fear. The Correlation matrix Plot and Heat map (Exhibits 27 and 28) further clarify their relationships.

5.9.2.2 Greed Index

	Greed Index	*Initial Endowment*	*Sender Trust*	*Receiver Trust*	*Reputation Dummy*	*Role Reversal Dummy*
Greed Index	**1.000**	-0.103	-0.300	-0.990	-0.199	-0.089
Initial Endowment	-0.103	**1.000**	0.048	0.096	-0.029	0.147
Sender Trust	-0.300	0.048	**1.000**	0.318	0.253	-0.126
Receiver Trust	-0.990	0.096	0.318	**1.000**	0.208	0.077
Reputation Dummy	-0.199	-0.029	0.253	0.208	**1.000**	0.000
Role Reversal Dummy	-0.089	0.147	-0.126	0.077	0.000	**1.000**

Table 39: Correlation Matrix of the Greed Index

Key Insights:

Interestingly, the correlation matrix is the same as the one from the prisoner's dilemma concept; the signs are the opposite. After honoring the trust back, the nominator is expected to be now the trustee's payoff function instead of the trustee's retained amount. So, like before, Receiver Trust (-0.990) has a very strong negative correlation with the Greed index, suggesting that higher receiver trust is strongly linked to lesser levels of greed. Additionally, there is a moderate negative correlation between the Greed Index and Sender Trust (-0.300), indicating that sender trust also contributes to reducing greed. Initial Endowment, Reputation Dummy, and Role Reversal Dummy have weak negative correlations with the Greed Index, suggesting a minimal influence on trust and greed behavior. The Correlation matrix Plot and Heat map (Exhibits 29 and 30) provide further insights into their relationships.

5.9.2.3. Cooperation Index

	Cooperation Index	*Initial Endowment*	*Sender Trust*	*Receiver Trust*	*Reputation Dummy*	*Role Reversal Dummy*
Cooperation Index	**1.000**	0.104	0.782	0.788	0.268	-0.050
Initial Endowment	0.104	**1.000**	0.048	0.096	-0.029	0.147
Sender Trust	0.782	0.048	**1.000**	0.318	0.253	-0.126
Receiver Trust	0.788	0.096	0.318	**1.000**	0.208	0.077
Reputation Dummy	0.268	-0.029	0.253	0.208	**1.000**	0.000
Role Reversal Dummy	-0.050	0.147	-0.126	0.077	0.000	**1.000**

Table 40: Correlation Matrix of the Cooperation Index

Key Insights:

The correlation matrix shows strong positive correlations with Sender Trust (0.782) and Receiver Trust (0.737) with the correlation index, suggesting that higher sender and receiver trust significantly promotes cooperation. Reputation Dummy exhibits moderate correlations with the Cooperation Index (0.269), suggesting reputation enhances collaboration. The Initial endowment and Role Reversal Dummy show weak correlations (0.104 and -0.05, respectively), implying little influence on cooperative behavior. The Correlation matrix Plot and Heat map (Exhibits 31 and 32) provide further insights into their relationships.

5.10. Multicollinearity, Heteroskedasticity, and Mediation Analysis

5.10.1. Multicollinearity

Before proceeding with regression analysis, we calculated VIF (Variance Inflation Factor) to check for multicollinearity issues.

Variables	*Fear Index*	*Greed Index*	*Cooperation Index*	*Remark*
	Variance Inflation Factor (VIF)			
Initial Endowment	1.08	1.08	1.08	No Multicollinearity Observed
Sender Trust	1.20	1.20	1.20	No Multicollinearity Observed
Receiver Trust	1.19	1.19	1.19	No Multicollinearity Observed
Reputation Dummy	1.09	1.09	1.09	No Multicollinearity Observed
Role Reversal Dummy	1.06	1.06	1.06	No Multicollinearity Observed

Table 41: VIF table for Multicollinearity

Key Insights:

No significant multicollinearity is observed in any of the models for the new indices. The VIF plot (Exhibit 35) provides a graphical representation of multicollinearity.

5.10.2. Brown-Forsythe test for Homogeneity

We have conducted the Brown-Forsythe test for homogeneity in our non-parametric data by measuring the variance of the dependable variables against the independent variables.

Brown-Forsythe Test

(H0: The variance of the dependent variable is equal across all levels of the independent variable					
p-values (At 5% Significance)	Initial Endowment	Sender Trust	Receiver Trust	Reputation Dummy	Role Reversal Dummy
Fear Index	0.24	0.025*	0.0016**	0.55	0.29
Greed Index	0.46	0.11	1.5e-05***	0.0039**	0.016*
Cooperation Index	0.40	7.4e-10***	< 2e-16***	3.9e-07***	0.54

Table 42: Brown-Forsythe test for Homogeneity

Key Insights:

The Brown-Forsythe test for the Fear Index revealed significant Heteroskedasticity for the sender and receiver trust. In contrast, no significant variance exists for the Initial Endowment, Reputation Dummy, and Role Reversal Dummy, indicating their stable influence. For the

Greed Index, significant Heteroskedasticity was observed for the Receiver Trust, Reputation Endowment, and Role Reversal Dummy; in contrast, Initial Endowment and Sender Trust are homoscedastic. The Cooperation Index has shown significant Heteroskedasticity for the sender trust, receiver trust, and reputation dummy. However, the initial dummy and the role reversal dummy show homoscedasticity. We can gain further insights from the exhibits 36-38.

5.10.3. Mediation Analysis

We have also checked whether the Reputation Dummy and Initial Endowment can influence the Sender and Receiver Trust and the new dependent variables for the proposed concept. For this, we conducted a mediation analysis on the indices.

5.10.3.1. Fear Index

This mediation analysis used the Sender's Trust and the Receiver's Trust to mediate the relationship between the Reputation Dummy/ Initial Endowment and the Fear Index. We calculated the indirect effects using non-parametric bootstrapping.

Effect	*Estimate*	*95% CI (BCa)/ p-value*	*Remark*
		Reputation Dummy	
		Indirect Effect	
Sender Trust	-0.1162	(-0.1667, -0.0633)	Significant
Receiver Trust	-0.0411	(-0.0681, -0.0175)	Significant
Total Indirect Effect	-0.1573		
		Direct Effect	
Direct Effect	0.02776**	0.00845<0.05	Significant
		Total Effect	
Total verified Effect	-0.12955		
Total Effect	-0.12955***	0.00013<0.05	Significant
		Initial Endowment	
		Indirect Effect	
Sender Trust	-1.28e-05	(0.0000, 0.0000)	Not Significant
Receiver Trust	-9.41e-06	(0.0000, 0.0000)	Not Significant
Total Indirect Effect	-2.22e-05		
		Direct Effect	
Direct Effect	1.49e-06	0.760 > 0.05	Not Significant
		Total Effect	
Total Verified Effect	-2.07e-05		
Total Effect	-2.07e-05	0.215 > 0.05	Not Significant

Table 43: Effects of Fear Index

Key Insights:

The indirect effects of the Reputation Dummy through Sender and Receiver trust are significant to the fear index, indicating that reputation influences the sender's and receiver's trust in reducing fear. The direct and total effect of the Reputation Dummy are also significant. The indirect, direct, and total effects of Initial Endowment are insignificant on the fear index.

5.10.3.2. Greed Index

Similarly, this mediation analysis used the Sender's Trust and the Receiver's Trust as mediators in the relationship between the Reputation Dummy/ Initial Endowment and Greed Index. The non-parametric bootstrapping method also computed the indirect effects on the greed index.

Effect	*Estimate*	*95% CI (BCa)/ p-value*	*Remark*
		Reputation Dummy	
		Indirect Effect	
Sender Trust	0.0029	(0.0000, 0.0125)	Not Significant
Receiver Trust	-0.1083	(-0.1700, -0.0443)	Significant
Total Indirect Effect	-0.1054		
		Direct Effect	
Direct Effect	0.0028	0.639>0.05	Not Significant
		Total Effect	
Total verified Effect	-0.1026		
Total Effect	-0.1026**	0.0017<0.05	Significant
		Initial Endowment	
		Indirect Effect	
Sender Trust	3.49e-07	(0.0000, 0.0000)	Not Significant
Receiver Trust	-2.51e-05	(-0.0001, 0.0000)	Not Significant
Total Indirect Effect	-2.47e-05		
		Direct Effect	
Direct Effect	-2.95e-06	0.283 > 0.05	Not Significant
		Total Effect	
Total Verified Effect	-2.77e-05		
Total Effect	-2.77e-05	0.083 > 0.05	Not Significant

Table 44: Effects of Greed Index

Key Insights:

The Reputation Dummy has a significant total effect on the Greed index, but the direct effect is insignificant. However, receiver trust significantly mediates the relationship between the reputation dummy and the greed index, indicating that reputation influences the receiver's trust in greed behavior; however, the indirect effect through the sender's trust is insignificant. The indirect, direct, and total effects of Initial Endowment are insignificant on the greed index.

5.10.3.3. Cooperation Index

This mediation analysis used the Sender's Trust and the Receiver's Trust to mediate the relationship between the Reputation Dummy/ Initial Endowment and the cooperation Index by non-parametric bootstrapping.

Effect	*Estimate*	*95% CI (BCa)/ p-value*	*Remark*
		Reputation Dummy	
		Indirect Effect	
Sender Trust	0.2504	(0.1320, 0.3670)	Significant
Receiver Trust	0.1858	(0.0823, 0.2968)	Significant
Total Indirect Effect	0.4362		
		Direct Effect	
Direct Effect	0.0741*	0.0228 < 0.05	Significant
		Total Effect	
Total verified Effect	0.5102		
Total Effect	0.5102***	1.45e-07 < 0.05	Significant
		Initial Endowment	
		Indirect Effect	
Sender Trust	2.84e-05	(0.0000, 0.0001)	Not Significant
Receiver Trust	4.34e-05	(0.0000, 0.0001)	Not Significant
Total Indirect Effect	7.18e-05		
		Direct Effect	
Direct Effect	1.86e-05	0.23 > 0.05	Not Significant
		Total Effect	
Total Verified Effect	9.04e-05		
Total Effect	9.04e-05	0.061 > 0.05	Not Significant

Table 45: Effects of Cooperation Index

Key Insights:

The indirect effects of the Reputation Dummy through Sender and Receiver trust are significant to the cooperation index, indicating that reputation influences the sender's and receiver's trust in promoting cooperation. The direct and total effect of the Reputation Dummy on the cooperation index is also significant. The indirect, direct, and total effects of Initial Endowment are insignificant on the greed index.

5.11. Regression Model Analysis

Our data show a non-normal distribution with significant Heteroskedasticity. Hence, the regression analysis requires a non-parametric approach accounting for the significant indirect effect of the reputation dummy on the sender's and receiver's trust for all the indices.

5.11.1. Quantile Regression

Similarly to the Prisoner's Dilemma paradigm, we start our regression analysis with Quantile regression to see how the variables for the proposed model behave in different percentiles.

Quantile Regression

Variable	Quantile	Fear Index	Cooperation Index
Intercept	25th	0.99467*** (0.95489, 1.03445)	-0.92183*** (-1.09984, -0.74382)
	50th	1.02581*** (0.98315, 1.06847)	-0.96379*** (-1.12929, -0.79829)
	75th	1.04132*** (0.99918, 1.08345)	-0.95753*** (-1.13713, -0.77793)
Initial Endowment	25th	0 (0, 0)	1e-05 (-1e-05, 3e-05)
	50th	0 (-1e-05, -1e-05)	2e-05 (-1e-05, 4e-05)
	75th	1e-05 (-1e-05, 3e-05)	2e-05 (-4e-05, 7e-05)
Sender Trust	25th	-0.87005*** (-0.90752, -0.83258)	1.63871 (1.4428, 1.83462)
	50th	-0.85194*** (-0.90009, -0.80378)	1.73189*** (1.51116, 1.95262)
	75th	-0.77856*** (-0.82604, -0.73109)	1.83228*** (1.59708, 2.06748)
Receiver Trust	25th	-0.31929*** (-0.34862, -0.28996)	1.54731*** (1.36011, 1.73451)
	50th	-0.34409*** (-0.39402, -0.29416)	1.6082*** (1.39383, 1.82256)
	75th	-0.38928*** (-0.43508, -0.34348)	1.67089*** (1.43741, 1.90436)
Reputation Dummy	25th	0.00018 (-0.00924, 0.0096)	0.04097 (-0.00779, 0.08973)
	50th	0.02401* (0.00068, 0.04734)	0.05946* (0.00382, 0.11511)
	75th	0.04487*** (0.02162, 0.06812)	0.18114*** (0.09298, 0.26929)
Role Reversal Dummy	25th	0.00533 (0.00456, 0.01522)	-0.01075 (-0.0612, 0.03969)
	50th	0.01404 (-0.00926, 0.03733)	-5e-05 (-0.05763, 0.05753)
	75th	0.02489 (-0.00141, 0.05119)	0.05677 (-0.01029, 0.12383)

** Assuming significance level p = 0.05*

Table 46: Quantile Regression

Key Insights:

Sender Trust and Receiver Trust significantly negatively affect the Fear Index, suggesting that higher sender and receiver trust reduces fear. Reputation also gains significance in higher percentiles of the fear index. On the other hand, Receiver trust strongly influences the cooperation index. The Sender Trust and Reputation dummy gained significance in higher percentiles, suggesting that higher sender trust and reputation enhance cooperation. Initial Endowment and Role Reversal Dummy is statistically insignificant in all the indexes. The greed index provides null coefficients; hence, it is not shown in the table. The coefficient plot of the index (Exhibit 39) can provide further insights.

5.11.2. Generalized Estimating Equations (GEE) Regression

Like the Prisoner's Dilemma paradigm, we run the Generalized Estimating Equations (GEE) regression of the proposed Fear, Greed, and Cooperation indexes.

Variable	*Fear Index*	*Greed Index*	*Cooperation Index*
	Co-efficient	Co-efficient	Co-efficient
Initial Endowment	5.906e-07	-2.40e-06	2.05e-05
	(0.89222)	(0.45)	(0.184)
Sender Trust	-0.803***	0.0188	1.74***
	(< 2e-16)	(0.14)	(< 2e-16)
Receiver Trust	-0.376***	-0.976***	1.67***
	(< 2e-16)	(<2e-16)	(< 2e-16)
Reputation Dummy	0.0274**	2.62e-03	0.0764*
	(0.00719)	(0.24)	(0.015)
Role Reversal Dummy	0.022	-6.80e-03	-3.52e-04
	(0.05777)	(0.16)	(0.991)

 # The GEE model does not give R^2 and adjusted R^2 value directly, Observation = 292

** Assuming significance level p = 0.05.*

Table 47: Generalized Estimating Equations (GEE) Regression

Key Insights:

The trust levels (sender and receiver's trust) are significantly negatively and positively associated with the fear and cooperation index, respectively, indicating that fear decreases and cooperation increases as trust increases. Reputation Dummy has a small but significant positive effect on the fear and cooperation index. Initial Endowment and Role Reversal Dummy are statistically insignificant. Initial Endowment and Role Reversal Dummy are statistically insignificant for all indexes. Only Receiver Trust is a significant predictor and is negatively associated with the greed index. This indicates that Greed only decreases when the receiver trusts more. Other variables are statistically insignificant. We can get further information from the relevant graphs such as residual plot, predicted vs. observed plot (Figures 16 and 17), and effect plot (Exhibit 40-42).

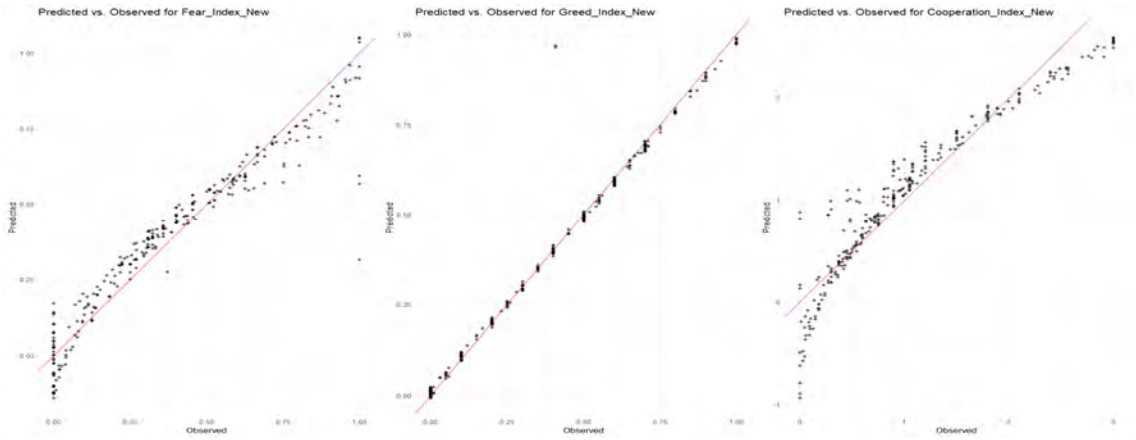

Figure 16: Predicted vs. Observed Graph for the GEE Model for the indices

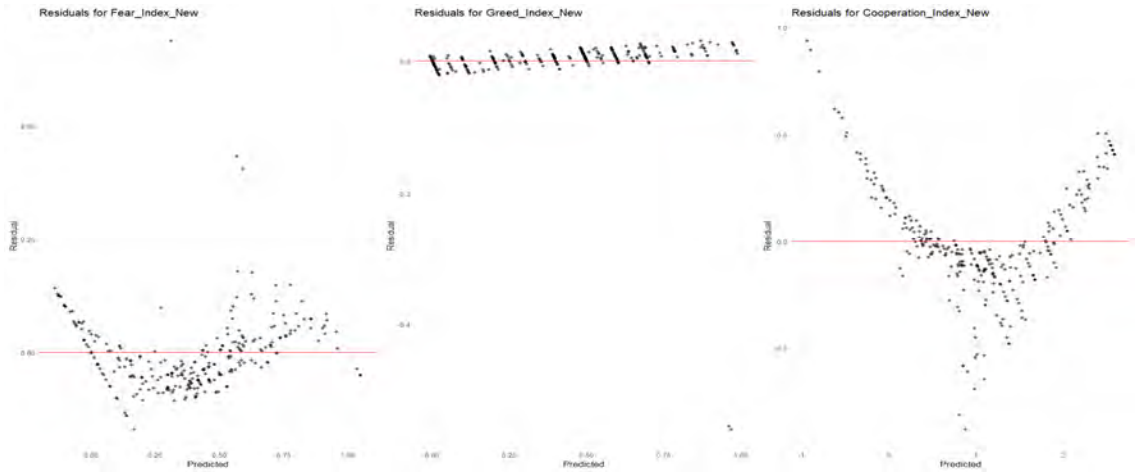

Figure 17: Residual for the GEE Model for the indices

5.11.3. Generalized Additive Model (GAM) Regression

Next, we run the Generalized Additive Model (GAM) regression similar to the Prisoner's Dilemma paradigm for our proposed model on the Fear, Greed, and Cooperation Indexes.

Variable	*Fear Index*	*Greed Index*	*Cooperation Index*
	Smooth Terms		
Initial Endowment	3.02e-10, 0.00161 (0.67)	1.27e-12, -0.00198 (0.29)	-9.98e-11, 0.019 (0.19)
Sender Trust	0.0795,0.408, -0.00297,-0.243, 0.103,-0.226, 0.669,0.00593 (<2e-16***)	0.0673, 0.863, 0.0523, -0.553, 0.123, 1.52, -0.487, 0.49 (<2e-16***)	0.00172,-1.32, -0.208,0.873, -0.265,0.724, -2.39,-0.0581 (<2e-16***)
Receiver Trust	0.0212, -0.213, 0.00216, 0.137, 0.0774, 0.118, -0.468,-0.218 (<2e-16***)	-0.0241, -0.0759, -0.0136, 0.0411, 0.00614, 0.0367, -0.1520, 0.201 (<2e-16***)	0.0311,-0.0116, 0.0105,0.0217, 0.0187,0.0251, -0.123,0.484 (<2e-16***)
	Parametric Variables		
Reputation Dummy	0.00995 (0.19)	0.01201** (0.002)	0.0422 (0.15)
Role Reversal Dummy	-0.00252 (0.74)	-0.00029 (0.941)	-0.0263 (0.37)
	Model Parameter		
Adjusted R^2	0.956	0.988	0.921
Deviance Explained	95.8%	98.9%	92.4%
GCV	0.0040108	0.0010184	0.059539
Observation	292	292	292

 # The smooth terms of the GAM model do not directly give coefficients; instead, they give EDF (Effective Degrees of Freedom) values. The coefficients of the smooth terms are non-parametric; hence, they have multiple values.

** Assuming significance level p = 0.05.*

Table 48: Generalized Additive Model (GAM) regression

Key Insights:

Smooth-termed variables such as the sender and receiver's trust are highly significant for all the indexes, whereas the initial endowment is not. Parametric variables, such as the reputation dummy and role reversal dummy, are not statistically significant predictors for the fear and cooperation index; however, the reputation dummy has a small but significant effect on the greed index. Relevant graphs, such as the partial effect graph (Figure 18), observed vs. fitted plot, and residual plot (Exhibits 43 and 44), can help us understand further.

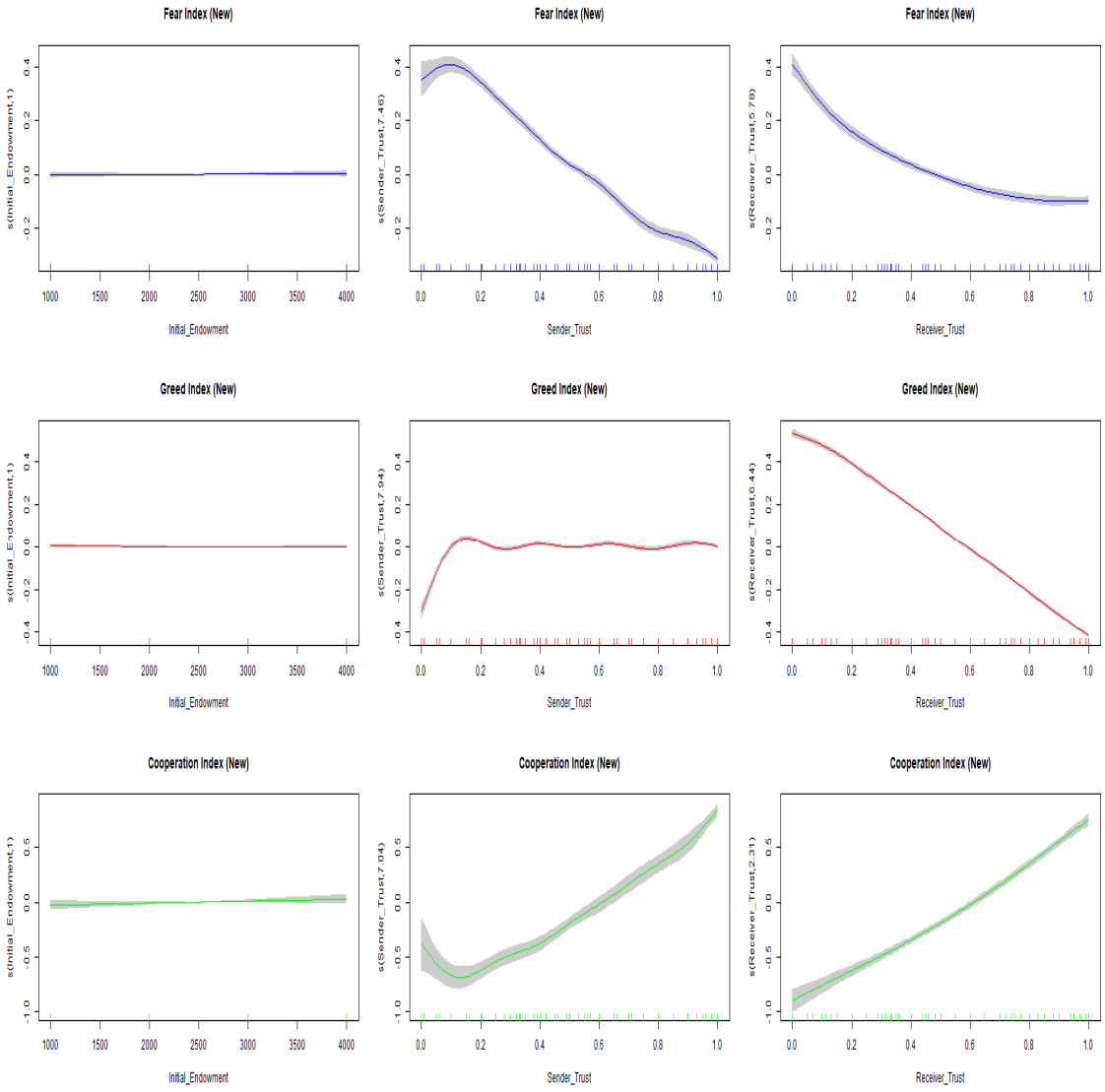

Figure 18: Partial Effect Plot of Smooth Terms of the GAM model

5.11.4. Comparative Analysis of Matrices of GEE and GAM model

We have analyzed the new variables derived from the proposed theoretical concept for a practical model by running Generalized Estimating Equations (GEE) Regression (for repeated measures) and Generalized additive model (GAM) regression (for non-linear relationships). We have also compared the models on their various matrices to determine which model has better explanatory power and predictive accuracy in determining the better-fit model.

Matric	*Fear Index*		*Greed Index*		*Cooperation Index*	
	GEE	GAM	GEE	GAM	GEE	GAM
AIC (GAM)/QIC (GEE)	14.1	-782	12.7	-1182	32.2	6.26
MSE	0.00733	0.00433	0.00242	0.0021	0.0733	0.0622
R^2	0.916	0.956	0.971	0.988	0.903	0.921
Adj. R^2	0.914	0.954	0.971	0.987	0.901	0.918

Table 49: Comparative Analysis of Matrices of GEE and GAM model

Key Insights:

The models' explanatory power and predictive accuracy are very similar. Since the Generalized additive model (GAM) can capture the non-linear relationships of variables such as sender and receiver trust, it has slightly better metrics. The relevant graphs, Figure 19 and Exhibits 45 and 46, can provide further insights into their comparative analysis.

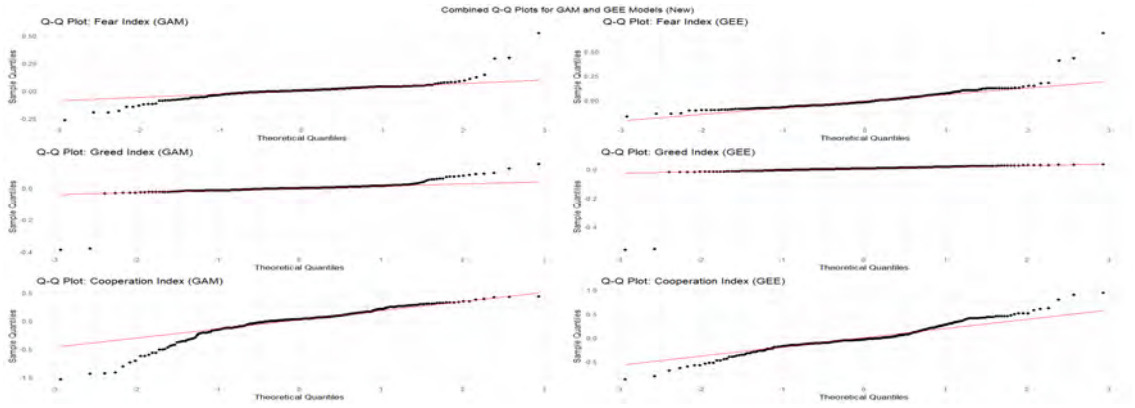

Figure 19: Q-Q Plot: GAM vs. GEE

When we compare this with the comparative analysis of the previous GEE and GAM models based on the prisoner's dilemma paradigm concept, the matrices or the greed index remain the same. However, the accuracy and explanatory power of the Fear and the Greed index improved significantly.

5.11.5. Covariance-Based Structural Equation Modeling (CB-SEM)

Similar to the Prisoner's dilemma theoretical concept, we have also conducted Covariance-Based Structural Equation Modeling (CB-SEM) on the hypothesized model derived from the proposed theoretical concept for the continuous trust game to test the validity of a model based on the theory. Covariance-based Structural Equation Modeling (CB-SEM) regression was used to test causal relationships between latent variables, determining their direct and indirect effects on the model. Our mediation analysis shows that the Sender's and Receiver's Trust significantly mediated relationships between the Reputation dummy and the dependent variables.

Formula:

Mediation Formula:

3. $Receiver\ Trust_i = \beta_1 \text{Initial endowment}_i + \beta_2 \text{Reputation Dummy}_i + \beta_3 \text{Role Reversal Dummy}_i + \varepsilon_1$
4. $Sender\ Trust_i = \delta_1 \text{Initial endowment}_i + \delta_2 \text{Reputation Dummy}_i + \delta_3 \text{Role Reversal Dummy}_i + \varepsilon_2$

Outcome Formula (Y= Fear Index New, Greed Index New, and Cooperation Index New):

2. $Y_i = \beta_0 + \beta_1 \text{Initial endowment}_i + \beta_2 \text{Sender trust}_i + \beta_3 \text{Receiver Trust}_i + \beta_4 \text{Reputation Dummy}_i + \beta_5 \text{Role Reversal Dummy}_i + \varepsilon_3$

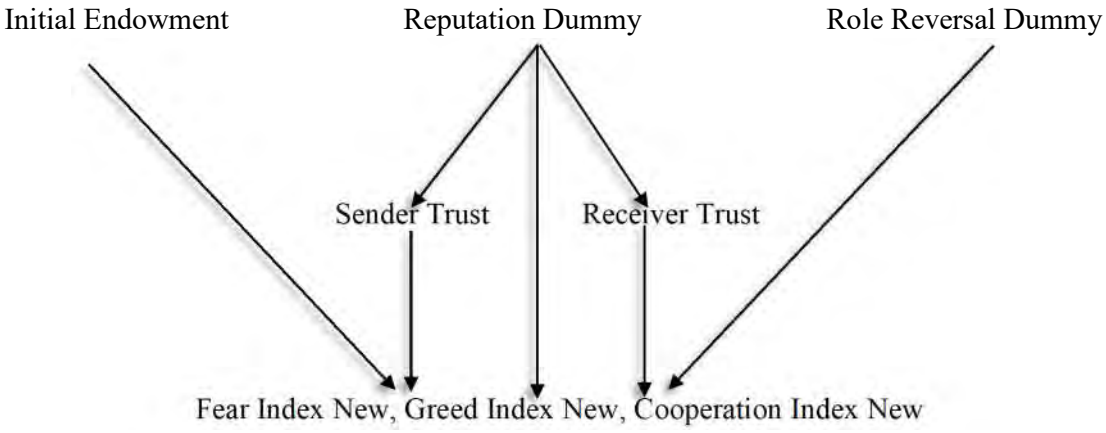

Figure 20: SEM Model Path Representation

Variables	*Estimate*	*Standardized Coefficient*	*z-value*	*p-value*	*Significance*
		Dependent Variable = Sender Trust			
Initial Endowment	0.000	0.085	1.481	0.139	Not Significant
Reputation Dummy	0.145	0.255	4.559	0.000	Significant
Role Reversal Dummy	-0.078	-0.137	-2.38	0.017	Significant
		Dependent Variable = Receiver Trust			
Initial Endowment	0.000	0.092	1.636	0.102	Not Significant
Reputation Dummy	0.112	0.197	3.46	0.001	Significant
Role Reversal Dummy	0.024	0.042	0.713	0.476	Not Significant
		Dependent Variable = Fear Index			
Initial Endowment	0.000	0.002	0.135	0.892	Not Significant
Sender Trust	-0.803	-0.852	-30.797	0.000	Significant
Receiver Trust	-0.376	-0.399	-10.539	0.000	Significant
Reputation Dummy	0.027	0.051	2.688	0.007	Significant
Role Reversal Dummy	0.022	0.041	1.897	0.058	Not Significant
		Dependent Variable = Greed Index			
Initial Endowment	0.000	-0.009	-0.758	0.448	Not Significant
Sender Trust	0.019	0.019	1.473	0.141	Not Significant
Receiver Trust	-0.976	-0.986	-60.506	0.000	Significant
Reputation Dummy	0.003	0.005	1.166	0.243	Not Significant
Role Reversal Dummy	-0.007	-0.012	-1.416	0.157	Not Significant
		Dependent Variable = Cooperation Index			
Initial Endowment	0.000	0.027	1.328	0.184	Not Significant
Sender Trust	1.74	0.647	20.814	0.000	Significant
Receiver Trust	1.671	0.621	18.404	0.000	Significant
Reputation Dummy	0.076	0.05	2.431	0.015	Significant
Role Reversal Dummy	0.000	0.000	-0.011	0.991	Not Significant

Fit Matrices

Fit Index	*Value*	*Interpretation*
Chi-square (χ^2)(standard)	27.177	*The model does not fit the data perfectly, though it is expected, p-value = 0.000*
Chi-square (χ^2) (scaled/robust)	20.503	
Comparative Fit Index CFI (Standard)	0.991	*The model is an excellent fit (CFI>0.95)*
Comparative Fit Index CFI (Robust)	0.991	
Tucker-Lewis Index: TLI (Standard)	0.778	*The model is a poor fit and needs improvement.*
Tucker-Lewis Index: TLI (Robust)	0.774	
Root Mean Square Error of Approximation RMSEA (Standard)	0.299	*High RMSEA values suggest the model fits poorly.*
Root Mean Square Error of Approximation RMSEA (Robust)	0.258	
Standardized Root Mean Square Residual SRMR	0.108	*The model is a reasonable fit SRMR <0.08*
Goodness-of-Fit Index (GFI)	0.965	*The model is a good fit but needs improvement (Complex model)*
Adjusted Goodness-of-Fit Index (AGFI)	-0.247	
Akaike Information Criterion (AIC)	-1376.501	
Bayesian Information Criterion (BIC)	-1269.876	

Table 50: Covariance-Based Structural Equation Modeling (CB-SEM) Regression

Key Insights:

The reputation dummy influences trust-based behaviors such as fear, greed, and cooperation through the mediator variable sender's and receiver's trust. It also significantly affects the Fear and cooperation but not the greed indexes. On the other hand, the Initial Endowment is insignificant to both mediator and outcome variables, suggesting it does not have any indirect, direct, or total effect on the outcome variables. The Sender's and the receiver's trust are significant variables in fear, greed, and cooperation. We can gain further knowledge from the exhibits 47-49.

C Additional Analysis

5.12. Gender Analysis on Reciprocity

5.12.1. Gender-wise Comparison of Trust and Expectation

The experiment involved 78 Males and 40 Females, and the remaining 28 people did not reveal their gender. We have analyzed their behavior on reciprocity as Sender and Receiver roles in the experiment for each round, each stage (pre and post-reputation rounds), and all rounds.

Mean Values

Variables	Gender	Round 1	Round 2	Round 3	Round 4	Round 1&2	Round 3&4	All Rounds
Initial Endowment	Male	2523.81	2805.56	2333.33	2527.78	2653.85	2423.08	2538.46
	Female	1941.18	2652.17	2470.59	2521.74	2350.00	2500.00	2425.00
Sender Trust	Male	0.54	0.46	0.69	0.58	0.50	0.64	0.57
	Female	0.48	0.46	0.76	0.54	0.47	0.63	0.55
Sender Expectation	Male	0.51	0.47	0.65	0.60	0.49	0.63	0.56
	Female	0.48	0.49	0.66	0.55	0.48	0.60	0.54
Receiver Trust	Male	0.48	0.54	0.65	0.60	0.50	0.63	0.57
	Female	0.46	0.65	0.66	0.66	0.57	0.66	0.62
Receiver Expectation	Male	0.43	0.55	0.61	0.57	0.49	0.59	0.54
	Female	0.46	0.58	0.63	0.72	0.53	0.68	0.61

Table 51: Round-wise mean values of the independent variables for male and female

Key Insights:

The data reveals some gender differences in trust-related variables across rounds. Males generally display a more consistent pattern in Sender Trust, Sender Expectation, and Receiver Trust across rounds, with moderate increases in later rounds. Females show more variation, particularly with higher trust and expectation values in later rounds. Both genders demonstrate an increase in Receiver Trust and Expectation as the rounds progress, but females consistently exhibit slightly higher values overall. We can get further insights from the box-whisker plots on the gender-wise reciprocity behavior (Sender and Receiver Trust) (Exhibit 50 and 51).

5.12.2. Wilcoxon Rank Sum Test (Mann-Whitney U Test) and Two-sample Kolmogorov-Smirnov test

The Wilcoxon Rank Sum Test (Mann-Whitney U Test) compared male and female groups' central tendencies (medians) of the Sender's and Receiver's Trust, whereas the Two-sample Kolmogorov-Smirnov test compares the distributions for their given observations.

Round	*Wilcoxon Rank Sum Test (H0: The distributions of the two independent samples are identical.)*				*2S K-S Test (H0: The two samples come from the same continuous distribution)*				*Remark*
	Sender Trust		Receiver Trust		Sender Trust		Receiver Trust		
	p-value	Statistic	p-value	Statistic	p-value	Statistic	p-value	Statistic	
Round 1	0.86	346	0.95	418.5	0.52	0.190476	0.81	0.141304	Not Significant
Round 2	0.96	418	0.28	292.5	0.40	0.199275	0.32	0.238095	Not Significant
Round 3	0.62	386.5	1.00	413.5	0.33	0.238095	0.99	0.073672	Not Significant
Round 4	0.66	385.5	0.34	414.5	0.21	0.252416	0.27	0.253501	Not Significant
Round 1&2	0.70	1492	0.39	1408.5	0.39	0.146154	0.48	0.141026	Not Significant
Round 3&4	0.97	1567.5	0.42	1702.5	0.83	0.096795	0.57	0.128205	Not Significant
All Round	0.69	6041.5	0.99	6235.5	0.99	0.061859	0.90	0.078846	Not Significant

Table 52: Gender-wise Wilcoxon Rank Sum and Two-sample Kolmogorov-Smirnov test on trust

Key Insights:

The tests revealed no significant difference (location and distribution) across the rounds between male and female trust behavior as Sender and Receiver. These findings indicated that gender did not play a significant role in the experiment in their trust behaviors.

5.13. Expectation vs. Reality Analysis on Cooperation

We have analyzed participants' cooperative behavior regarding what they expect from their counterparts and what they get. Since the model from the proposed theoretical concept is a better fit than that of the Prisoner's Dilemma, we have used the new cooperation Index and expected/ perceived cooperation index to compare their levels of difference by conducting a Wilcoxon signed-rank test to test their difference in location and a Two-sample Kolmogorov-Smirnov test to test their differences in distributions.

Specification	*Wilcoxon signed-rank test (H0: The median of the differences between the paired observations is zero)*			*Two-sample KS test (H0: The two samples come from the same continuous distribution)*		
Paired Variables (Observation = 292)	Test Statistics V	p-value	Significance	Test Statistics D	p-value	Significance
Cooperation Index Expected Cooperation Index	18656	5.497e-05	Significant	0.09589	0.1364	Not Significant

Table 53: Wilcoxon Rank Sum and Two-sample KS test on cooperation (Expectation vs. Reality)

Key Insights:

The tests suggest that the locations of the indexes differ significantly but not in distribution. The participants' perceptions/expectations of Cooperation significantly differ from their actual Cooperation; reality does not match the expectation. However, they share a similar distribution, as shown in the CDF plot (Figure 20). We can get further information from additional graphs (Exhibits 52-54).

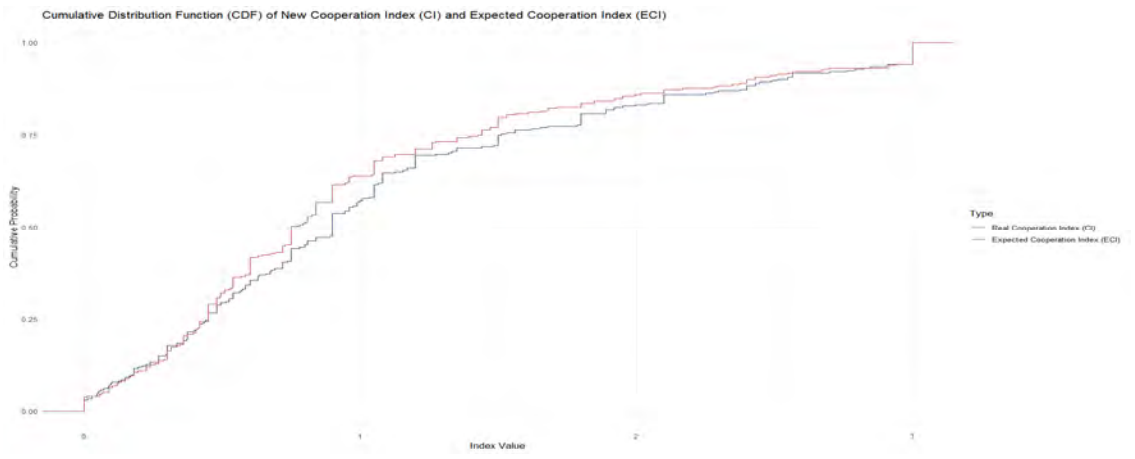

Figure 21: Cumulative distribution function Plot Cooperation (Expectation vs. Reality

CHAPTER 6: DISCUSSION

6.1. Model Discussion

We have initiated a theoretical approach based on the Prisoner's Dilemma/ Binary Trust game paradigm to compute the FTC Index (Fear, Temptation, and Cooperation). Fear, Temptation, and Greed are complex social and psychological phenomena that are hard to grasp in traditional economics. So, with the help of game theory, particularly continuous trust games, we tried to break through their inherent mysteries. We then analyzed how endowment and reputation affect the trust dynamics of the FTC index. Then, we proposed a new, simplified theoretical approach to computing and analyzing the FTC index and compared these two theoretical concepts. The Prisoner's Dilemma's payoff matrix differs from the continuous trust game conducted in the experiment based on the original BDM game; the PD (Prisoner's Dilemma) concept cannot capture the whole dynamics of the continuous trust game. As mentioned in the literature, PD models assume an all-or-nothing approach that fails to comprehend the subtleties of Fear, Greed, and Cooperation based on real-world reactions, which have infinite choices. Our proposal tries to incorporate continuous trust games based on the respective payoff functions instead of the payoff used in binary trust games. So rather than fear or no fear, cooperation or no cooperation, we chose to view them as a spectrum and try to capture them accordingly. When we tested the Wilcoxon Signed Rank and Two-sample Kolmogorov-Smirnov (K-S) Test on the similar groups of participants to their respective dependent variables to see how they differed in their location and distributions, we found that the differences were significant in both cases.

Variables	*Wilcoxon Signed Rank Test (H0: The median of the differences between the paired observations is zero)*			*Two-sample (K-S) test (H0: The two samples come from the same continuous distribution)*		
	Statistic	p-value	Significance	Statistic	p-value	Significance
Fear	38255	< 2e-16	Significant	0.5	< 2e-16	Significant
Greed	21539	1e-07	Significant	0.2	3e-07	Significant
Cooperation	3169	< 2e-16	Significant	0.5	< 2e-16	Significant

Table 54: Wilcoxon Sign Ranked and Two-sample (K-S) Test between Models from Prisoner's Dilemma and Proposed Concepts, respectively

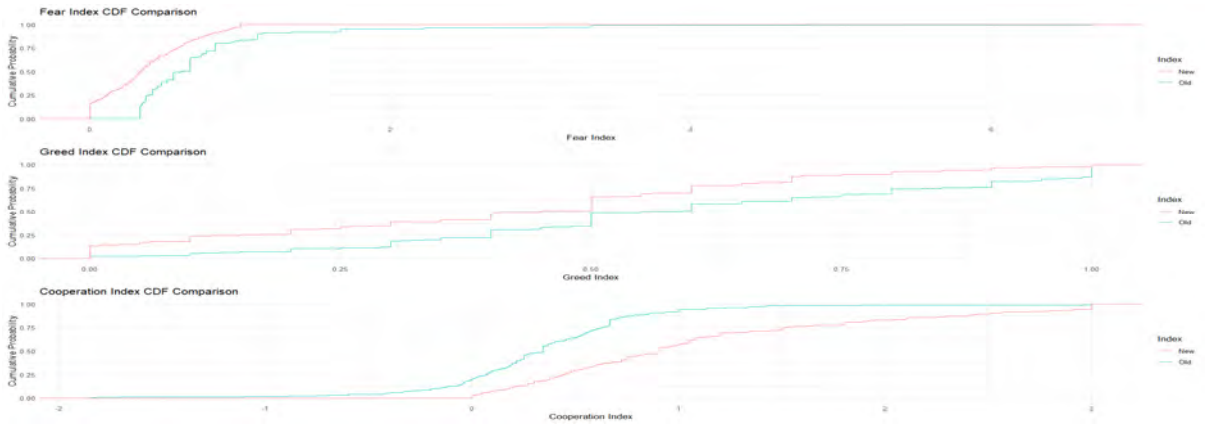

Figure 22: Cumulative distribution function of the dependent variables (PD Model vs. Proposed Model)

The Cumulative distribution function Plot (Figure 16) of the dependent variables shows that the locations and distributions differ between the PD and proposed models. This highlights the proposed model's potential conceptual and structural shifts from the Prisoner's dilemma concept for fear, greed, and cooperation. However, it does not answer whether the proposed model fared better than the PD model construct. So, we compared their respective regressed models, such as Generalized Estimating Equations (GEE), Generalized Additive Models (GAM), and Covariance-Based Structural Equation Modeling (CB-SEM) Models, to their respective metrics.

Matric	*Fear Index*		*Greed Index*		*Cooperation Index*	
	Generalized Estimating Equations (GEE)					
	PD Model	Proposed Model	PD Model	Proposed Model	PD Model	Proposed Model
QIC	91.9	14.1	12.7	12.7	80.6	32.2
MSE	0.297	0.00733	0.00242	0.00242	0.247	0.0733
R^2	0.438	0.916	0.971	0.971	0.259	0.903
Adj. R^2	0.426	0.914	0.971	0.971	0.243	0.901
	Generalized Additive Models (GAM)					
AIC	161	-782	-1182	-1182	364	6.26
MSE	0.238	0.00433	0.0021	0.0021	0.237	0.0622
R^2	0.804	0.956	0.988	0.988	0.394	0.921
Adj. R^2	0.795	0.954	0.987	0.987	0.370	0.918
GCV	0.10128	0.0040108	0.0010184	0.0010184	0.20267	0.059539

Table 55: Comparative Analysis of the Generalized Estimating Equations (GEE) and *Generalized Additive Models (GAM) from Prisoner's Dilemma and Proposed Concepts, respectively*

The proposed model outperformed in terms of predictive accuracy and explanatory power the PD model in Generalized Estimation Equations (GEE) and Generalized Additive Models (GAM), especially in the Fear and Cooperation Indexes. The nominator of the Greed index in the PD model is the Trustee's retained amount, which is replaced by the Trustee's Payoff function in the proposed model. So the models are identical, just opposite, and that is why the metrics of the greed index remained the same, which already has a good predictive accuracy and explanatory power. We have used the Generalized Estimation Equations (GEE) models as they are helpful for correlated data in our experiment as round-based group interactions between the Sender and the Receiver; however, they cannot account for the latent variables or measurement errors which are evident in the mediation analysis. Similarly, Generalized Additive Models (GAM) are powerful tools for exploring non-linear relationships such as in Sender's and Receiver's trust. However, they are less suitable for testing or measuring the indirect effect of the latent variables through their mediators on the outcome variables. We have also conducted Quantile regressions to understand how the predictors influence different Quantiles (25^{th}, $50^{th,}$ and 75^{th}) of the outcome distribution. It cannot also capture the simultaneous direct, indirect, and mediating effects between trust and other variables in this continuous trust game. So, we have implemented Covariance-Based Structural Equation Modeling (CB-SEM) Models to investigate the whole structure's direct, indirect, and total effect among the latent (Reputation Dummy and Initial Endowment) and outcome variables (Fear, Greed, and Cooperation Index). CB-SEM (Covariance-Based Structural Equation Modeling) is ideal for this study because it tests complex theoretical models with multiple latent and observed variables while considering measurement errors. The framework of CB-SEM provides a more detailed and theoretically grounded approach to investigating relationships, particularly in situations involving latent constructs like trust, cooperation, and fear. One key aspect of CB-SEM is its ability to simultaneously test the relationships between variables (direct and indirect effects) and validate the entire model structure. CB-SEM is advantageous as it is designed to explicitly incorporate theoretical assumptions and pathways, making it more appropriate for validating theoretical concepts related to continuous trust game experiments. So, we conducted CB-SEM analyses on the PD and proposed a model to explore their latent relationships. The comparison of fit metrics of the respective CB-SEM Models also resulted in the proposed model being more parsimonious and a better fit over the PD model, highlighting the difference between the binary and continuous trust games.

Fit Index	*PD Model*	*Proposed Model*
Chi-square (χ^2)(standard)	27.177	27.177
Chi-square (χ^2) (scaled/robust)	20.503	20.503
Comparative Fit Index CFI (Standard)	0.985	0.991
Comparative Fit Index CFI (Robust)	0.984	0.991
Tucker-Lewis Index TLI (Standard)	0.624	0.778
Tucker-Lewis Index TLI (Robust)	0.612	0.774
Root Mean Square Error of Approximation RMSEA (Standard)	0.299	0.299
Root Mean Square Error of Approximation RMSEA (Robust)	0.258	0.258
Standardized Root Mean Square Residual SRMR	0.076	0.108
Goodness-of-Fit Index (GFI)	0.965	0.965
Adjusted Goodness-of-Fit Index (AGFI)	-0.247	-0.247
Akaike Information Criterion (AIC)	101.070	-1376.501
Bayesian Information Criterion (BIC)	207.696	-1269.876

Table 56: Comparative Analysis of the Covariance-Based Structural Equation Modeling (CB-SEM) Models from Prisoner's Dilemma and Proposed Concepts, respectively

Though the models have similar Chi-square (χ^2) (Standard and Robust), Root Mean Square Error of Approximation (RMSEA) (Standard and Robust), Goodness-of-Fit Index (GFI), and Adjusted Goodness-of-Fit Index (AGFI) values, Model B has better Comparative Fit Index (CFI) (Standard and Robust), Tucker-Lewis Index (TLI) (Standard and Robust) values where Model A has slightly better Standardized Root Mean Square Residual (SRMR). The significantly lower Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values suggest that the model from the proposed theoretical concept for the continuous trust game is a more parsimonious and better fit over the Prisoner's Dilemma, emphasizing the distinction between the binary and continuous trust games.

From the mediation analysis, we could deduce how reputation influences trust-based behaviors such as fear, greed, and cooperation in the experiment by controlling the Sender's and Receiver's trust decisions. The CB-SEM analysis confirmed its significance as a latent variable; however, the initial endowment has shown the opposing to be insignificant in those analyses. The findings of the CB-SEM analysis have been crucial as they help us validate our proposed theoretical concept over the PD concept, which was used as a stepping stone to this journey.

6.2. The Endowment Effect

In our experiment, we have considered the endowment effect from the random numbered initial endowment given to the Trustor/ Sender at the beginning of each round, not the Trustee's endowment, which they received from the Trustor when they decided to put trust in the Trustee. The endowment represents the financial condition of the experiment. We have assumed intuitively that trust enhances cooperation by reducing the fear of betrayal and the temptation to betray. We also wanted to test our hypothesis that the endowment positively affects trust, improving cooperation and reducing fear and greed. So, we hypothesized the endowment effect on fear, greed, and cooperation as follows:

H1: *Higher endowment is negatively associated with Fear/ Risk*

H2: *Higher endowment is negatively associated with Greed/Temptation*

H3: *Higher endowment is positively associated with Cooperation*

However, the various works of the previous literature have mixed results on how Endowment affects trust and trust-based behaviors. Carpenter, Verhoogen, and Burks (2005) showed that people tend to behave selfishly when the size of stakes (Endowment) increases, resulting in lesser trust between the group of people and everyone becoming more reserved in cooperation because of the fear of betrayal. On the other hand, Ho and Weigelt (2001) and Kuroda, Kamijo, and Kameda (2020) concluded that a higher endowment could enhance trust among individuals as higher endowments bring higher rewards.

In our experiment, the Kruskal-Wallis Rank Sum test and Dunn's Post-Hoc analysis on initial endowment on the Fear, Greed, and Cooperation Index have shown that a change in Initial endowment from 1000 to 2000 and 4000, respectively, significantly affects the fear and greed index; however, for the cooperation index, the difference has been insignificant in all pairs. The initial endowment was negligible for all dependent variables in the PD and proposed model regression analyses. The mediation analyses also found no indirect, direct, or total effect of initial endowment on the outcome variables, as confirmed by the CB-SEM models. So, as per our analysis of the experiment on the dependent variables, the results contradict our hypotheses.

Observations for Contradiction:

First, fear, greed, and cooperation – these trust-based behaviors in the experiment are not dictated purely by economic decisions but rather by complex psychological and social interference, cultural and religious bias, moral values, etc. To encompass all these complex dynamics to compute the endowment effect in laboratory settings may be challenging and rigorous. The design of the experiment may be simplistic in comprehending overall trust dynamics.

Second, the participants may be motivated by the prospect of higher reward/ gain and have an aversion to loss due to fear of betrayal over the size of the initial endowment. People are not happy in their status quo situations, and instead, they want to change them, if possible, in a reliable society or environment. To some extent, human nature has an insatiable thirst to own more without losing what they already own, and they are more concerned with the change of the state than the totality of it. The risk perceptions of loss aversion may dull the significance of the endowment effect.

Third, the experimental design, variations in endowment, ownership sense of endowment, etc., can downplay the significance of endowment. As the endowments in the experiments were given randomly without asking the participants to perform any task, the participants may not have possessed a sense of ownership, reflected in their trust-based decisions. Also, variance in endowment levels may influence the effectiveness of the experiment.

Overall, comprehending the complexity of humans' trust dynamics in the various aspects of the experiment poses challenges to capturing the endowment effect on the fear, greed, and cooperation spectrum.

6.3. Reputation Effect

Similar to the endowment effect, we have analyzed how reputation may influence trust-based behaviors like fear, greed, and cooperation. We incorporated reputation as a dummy variable in the experiment as participants continued the same game procedure. We still know the level of trust the participants have between them in their respective groups. This Reputation Dummy acts as a Social condition of the experiment. Intuitively, similar to the initial endowment, we have assumed higher reputation enhances the trust between the participants, and they will be willing to reciprocate more over hogging the payoffs, raising cooperation among them and reducing fear and greed. So, we hypothesized the reputation effect on fear, greed, and cooperation as follows:

H4: *Higher reputation is negatively associated with Fear/ Risk*

H5: *Higher reputation is negatively associated with Greed/ Temptation*

H6: *Higher reputation is positively associated with Cooperation*

Numerous works on previous literature support similar notions. Andreas Diekmann and Wojtek Przepiorka (2005), Nowak and Sigmund (1998), Teck-Hua Ho (2005), Dirk Engelmann and Urs Fischbacher (2009), Bolton, Katok, and Ockenfels (2004), etc., have deduced in both computer-simulated and practical laboratory settings that higher reputation builds greater trust among individuals, and higher trust lessens the fear of betrayals and temptation to betray, raising cooperation among them.

Our analysis of dummy variables showed that the introduction of reputation before round 3 significantly shifted the location of the distribution of the dependent variable, i.e., post-reputation rounds significantly differ from pre-reputation rounds. The mediation analysis showed that the reputation dummy influences the fear, greed, and cooperation index via the Sender's and Receiver's trust. The Quantile regression, Generalized Estimation Equations, and Generalized Additive Models resulted in mixed results; however, they failed to capture the latent effect of the reputation on the dependent variables via mediators. The Covariance-Based Structural Equation Modeling (CB-SEM) model discovered that reputation directly and indirectly affects fear and cooperation. Reputation, however, does not affect Greed directly, as its total effect on the greed index is insignificant. However, reputation still significantly impacts the receiver's trust, the only significant predictor of the Greed index. So, our hypotheses align with observed analyses.

6.4. Gender Role

The initial observation of the gender-wise trust and reciprocity reveals some variations in the pattern of trust and expectation between the male and female participants. The males showed a more consistent pattern of trust and expectation in both Sender and Receiver roles throughout the rounds. In contrast, the females displayed more variations, especially in the later rounds. Receiver Trust and expectations have increased for males and females with the game's progression. However, females showed marginally higher trust and expectation values as Receivers, whereas males showed approximately higher trust and expectation values as Senders.

However, the Wilcoxon Rank Sum Test (Mann-Whitney U Test) and the Two-sample Kolmogorov-Smirnov test revealed that statistically, there are no significant differences in the central tendencies or distributions of the trust-related variables between the males and females. This finding suggests that gender roles did not influence trust behaviors in the experiment.

6.5. Expectation Versus Reality for Cooperation

The initial observation implies that the genuine cooperation is approximately less than the participants' expectations across the rounds. The comparison between the Expected Cooperation Index and the actual cooperation index has revealed significant differences in participant's perceptions versus reality. The Wilcoxon signed-rank test showed a significant difference between perception and reality regarding cooperation in their central tendencies. However, the Two-sample Kolmogorov-Smirnov test found no significant differences in their distributions between the cooperation indices. This suggests that the pattern of actual cooperation is similar to what they perceive but consistently overestimates their level of cooperation to their expectations. Though the participants had a similar trend of cooperation between expectation and reality, their optimistic cooperation was often not met in reality. In fear of betrayal, participants took a cautious approach to their strategic trust decisions, diminishing their hopeful expectations of cooperation. This analysis mirrors the real-world scenario where the difference between expectation and reality stems from the tension between optimism and self-preservation. Though we hope for mutual cooperation, past experience, social norms, fear of exploitation, etc., make us act more cautiously in business, teamwork, or even personal relationships than we initially intended.

CHAPTER 7: LIMITATIONS

7.1. Limitations

The study sheds light on the significance of initial endowments and reputation in continuous trust game experiments in laboratory settings, which examine trust-based behaviors such as fear, temptation, and cooperation. However, it's imperative to point out that the results from these experiments, while valuable, are with their respective limitations. These limitations could impact the interpretation and application of the research in this field.

Sample Limitations:

The study participants are predominantly drawn from a specific demographic group, such as students, which can limit the generalizability of the outcomes. The homogeneity of the sample may not represent broader populations or individuals with different socioeconomic backgrounds, which can affect trust behavior in real-world settings.

Demographic Bias:

Participants' cultural, social, or religious values may affect trust-based behaviors in experiments, which are difficult to control. These biases could lead to variation in trust, fear, and cooperation indices, making standardizing results across different groups hard.

Experimental Design Limit and External Validity:

The use of controlled laboratory settings may oversimplify real-world complexity. For instance, trust dynamics in experiments are often influenced by economic incentives or predefined choices that do not fully capture emotional, social, or cultural factors driving trust behavior. The simplified Fear, Greed, and Cooperation index cannot capture the complexity of human emotions leading to fear, greed, and cooperation in real-world situations.

Omitted Variable Bias:

The experiment did not consider personality traits, cultural background, prior social interactions, emotional state, experience, etc., which can lead to a potential omitted variable bias, resulting in overestimation or underestimation of the model.

CHAPTER 8: CONCLUSION

8. 1. Conclusion

In this research, we explored the dynamics of trust and cooperation through an experimental design that tested a Prisoner's Dilemma-based (PD) model and a proposed continuous trust game model. Our findings consistently demonstrated that social factors, particularly reputation, played a far more significant role in influencing trust and trust-based behaviors such as fear, greed, and cooperation than financial conditions, like initial endowment. Reputation strongly predicted trust between senders and receivers, highlighting that social perception heavily governs decision-making in trust-based interactions. Interestingly, despite being hypothesized to reduce fear and greed and boost cooperation, initial endowment proved insignificant across different regression models. This suggests that participants may have prioritized relational and reputational cues over financial stakes, downplaying the role of wealth in shaping their trust decisions. The participants' trust behavior demonstrated that it is not financial conditions but rather a healthy, trust-rich environment that motivated them to foster cooperation. The proposed continuous trust game model outperformed the PD model regarding fit, accuracy, and explanatory power, capturing the complexity of trust dynamics in fear, greed, and cooperation, aligning more with real-world behaviors, where trust often unfolds in a fluid, non-binary fashion.

Our controlled, bias-free experiment found that males and females exhibit similar trust behaviors. This suggests that the disparities in trust and cooperation in the real world may not be due to inherent gender-wise behavioral traits but rather to unequal access to opportunities, leadership roles, or societal barriers. This underscores the importance of creating more equal and inclusive environments, as it is not the gender role that downplays trust and cooperation but rather the societal barriers leading to gender discrimination.

In the real world, cooperation differs from expectations due to unequal opportunities, social biases, discriminations, etc., leading to a cautious approach to trust and cooperation. However, if the opportunities are more equitable and fair, society will be more transparent and inclusive; trust and cooperation may improve and align with our expectations in a trust-rich environment.

8. 2. Implications of The Research

Social and Relational Factors

This research underscores the pivotal role of reputation in nurturing trust and cooperation in society. It suggests that interpersonal relationships and social cues are influential and critical in shaping trust dynamics. People are more inclined to participate in collective philanthropic endeavors in a society where harmony and benevolence are valued. This results in Pareto superior outcomes for all members, as people prioritize humane qualities and reputations.

Policy and Organizational Trust

The research findings suggest that policies in organizations and financial settings should emphasize building trust through interpersonal relationships and social cues rather than solely relying on monetary incentives. This implies that fostering a positive and supportive work environment, promoting open communication, and encouraging ethical behavior are essential for cultivating trust among employees and stakeholders. By focusing on relational elements, organizations can create a more collaborative and productive atmosphere where employees are more willing to trust and cooperate.

Financial Insignificance in Trust Decisions

The research findings contradict the conventional wisdom that financial incentives are the primary drivers of trust. The study challenges the assumption that economic conditions alone can foster trustful relationships. This implies that financial factors may play a role in specific contexts but cannot establish enduring trust. Instead, individuals are more likely to trust those who have demonstrated reliability, honesty, and integrity, regardless of their financial standing.

Model Applicability

The research findings suggest that the proposed continuous trust model offers a more accurate and comprehensive understanding of trust dynamics than existing frameworks. This implies that the model can be an essential resource for potential future research in economic games and social trust analysis, providing a more insightful perspective on how trust is formed, maintained, and eroded. The model can help researchers understand and predict trust-related behaviors in various contexts.

8. 3. Future Recommendations

Incorporate Diverse Demographics

The study's findings could be further enriched by incorporating a more diverse participant base. While the laboratory setting provided a controlled environment for isolating variables, future research should consider integrating field experiments to enhance external validity. By incorporating real-world scenarios, researchers can explore how demographic factors such as cultural background, socioeconomic status, and age influence trust dynamics. This would help to generalize the findings and better understand the applicability of the continuous trust model in various contexts.

Longitudinal Studies

A longitudinal approach may offer a valuable understanding of how trust evolves in this research. For example, researchers could track how individuals' confidence in a particular person or institution changes as they interact with them over time. They could also examine how trust is affected by various events or circumstances, such as economic downturns, natural disasters, or political scandals. By following participants over time, researchers can identify patterns and trends that might be absent in short-term experimental studies.

Real-World Applications

We recommend that future researchers extend the experimental setup to real-world environments where trust is critical, such as business, community interactions, or online platforms. By integrating the experiment with real-world software or app applications, researchers can gather diverse data from users across various contexts, enhancing the external validity of the models. Such applications could collect valuable insights into trust dynamics and provide feedback to users, helping them build healthier, more cooperative relationships based on trust. This approach would allow researchers to bridge the discrepancies between controlled experiments and real-world scenarios, offering actionable insights to improve user experiences in critical domains of trust, cooperation, and social behavior.

Explore Psychological Mechanisms and Cognitive Bias

Further research could explore the psychological mechanisms behind why reputation has a powerful influence on trust and cooperation. One area to investigate could be social identity theory, where individuals may be more likely to trust those they perceive as part of their in-group. Cognitive biases, such as the halo effect, could also play a role, where positive impressions in one area (like reputation) spill over to influence trust in unrelated aspects of behavior.

Enhance Financial Context

Future research could make the initial endowment more salient or explore how different financial stakes, such as losses versus gains, impact trust decisions. Rather than focusing solely on the endowment, investigating how the prospect of higher returns or fear of betrayal shapes the whole endowment effect could offer a deeper understanding of its role in trust dynamics.

Introduce dynamic variables

To capture social and emotional biases, variables such as personality traits (risk averse or risk takers), social interactions, emotional states (stressed or optimistic), etc., can be explored in the experiment's context. The inclusion of such dynamic variables can provide a more comprehensive view, mimicking real-world scenarios, and help understand the drivers behind trust and cooperation.

CHAPTER 9: BIBLIOGRAPHY

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CHAPTER 10: APPENDIX

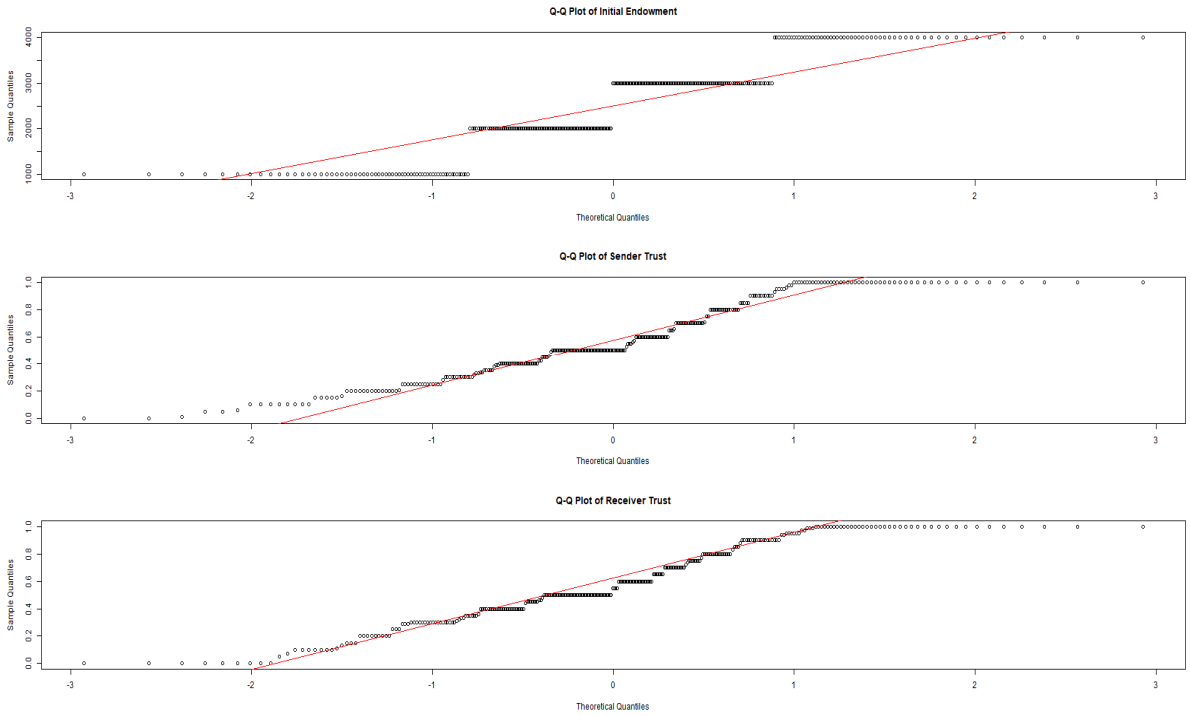

Exhibit 1: Q-Q Plot of the independent variables

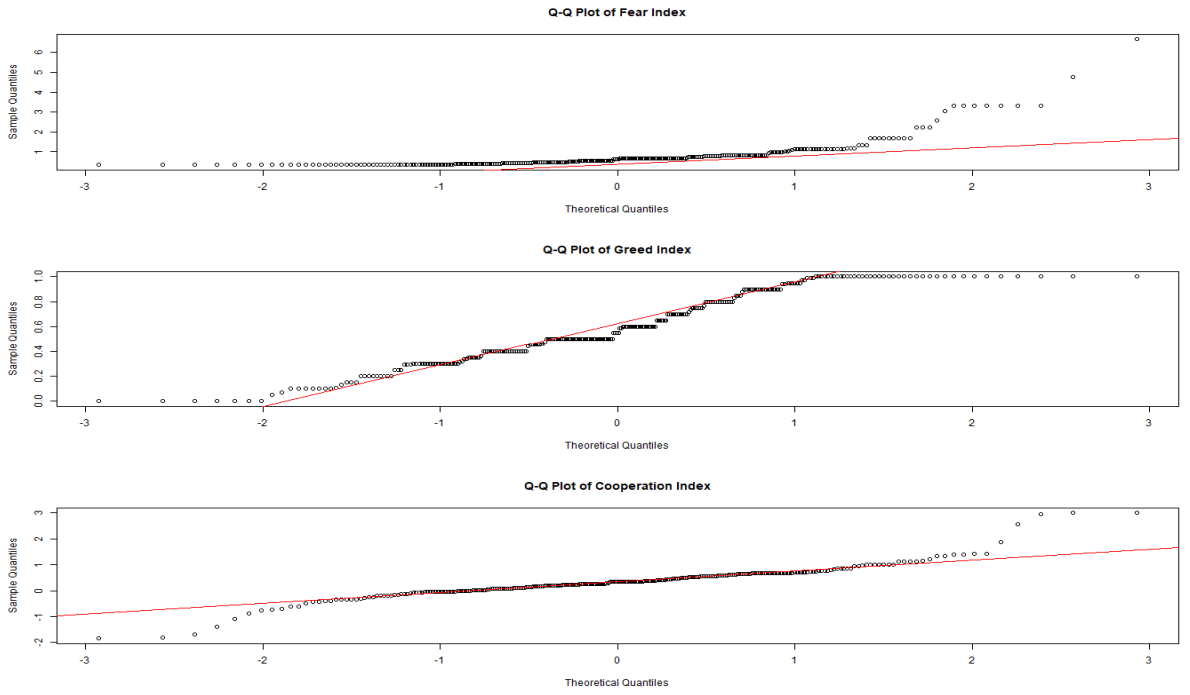

Exhibit 2: Q-Q Plot of the dependent variables (Prisoner's Dilemma Concept)

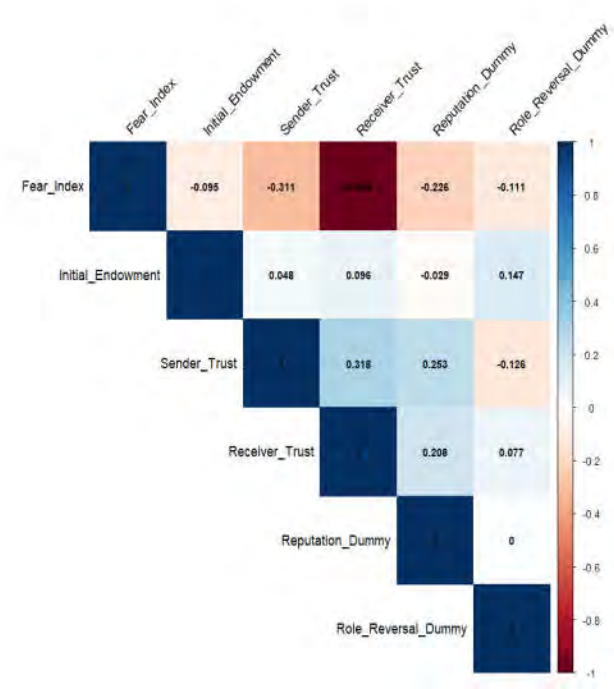

Exhibit 3: Correlation Matrix Plot for the Fear Index (Prisoner's Dilemma Concept)

Exhibit 4: Heat Map for the Fear Index (Prisoner's Dilemma Concept)

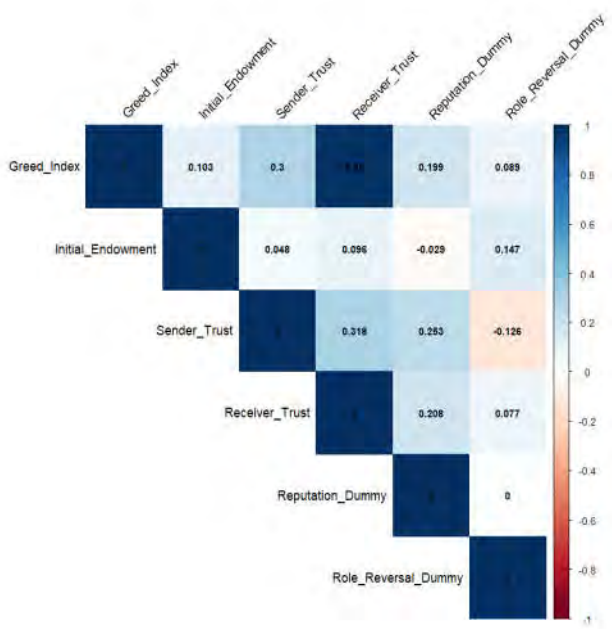

Exhibit 5: Correlation Matrix Plot for the Greed Index (Prisoner's Dilemma Concept)

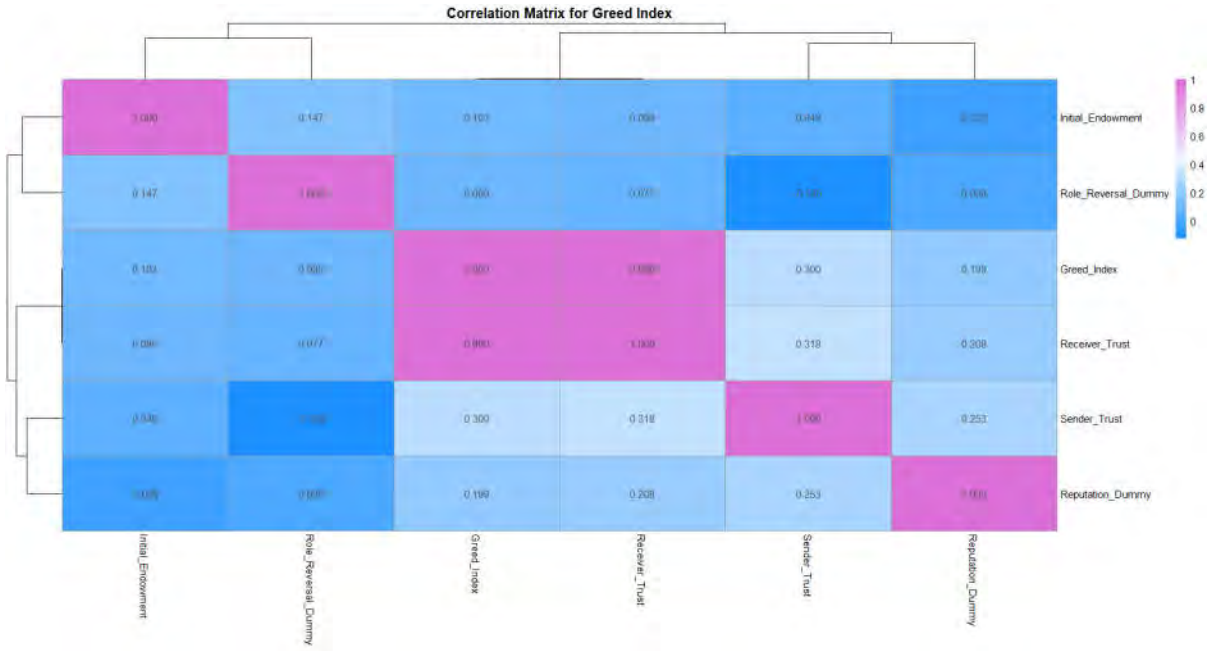

Exhibit 6: Heat Map for the Greed Index (Prisoner's Dilemma Concept)

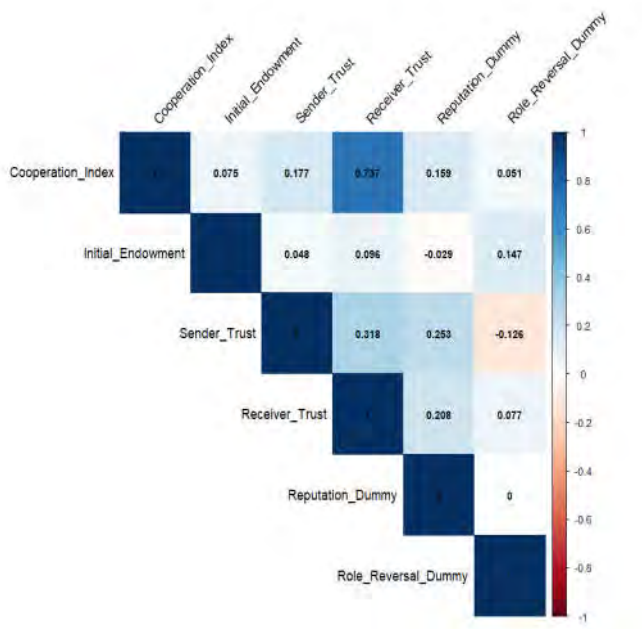

Exhibit 7: Correlation Matrix Plot for the Cooperation Index (Prisoner's Dilemma Concept)

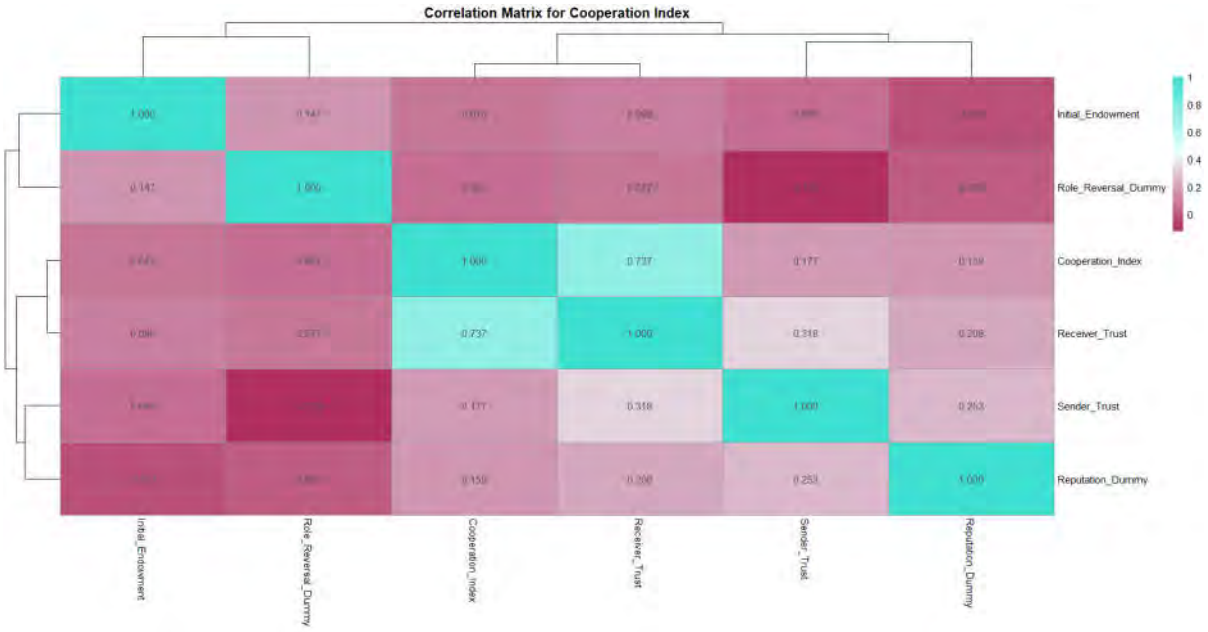

Exhibit 8: Heat Map for the Cooperation Index (Prisoner's Dilemma Concept)

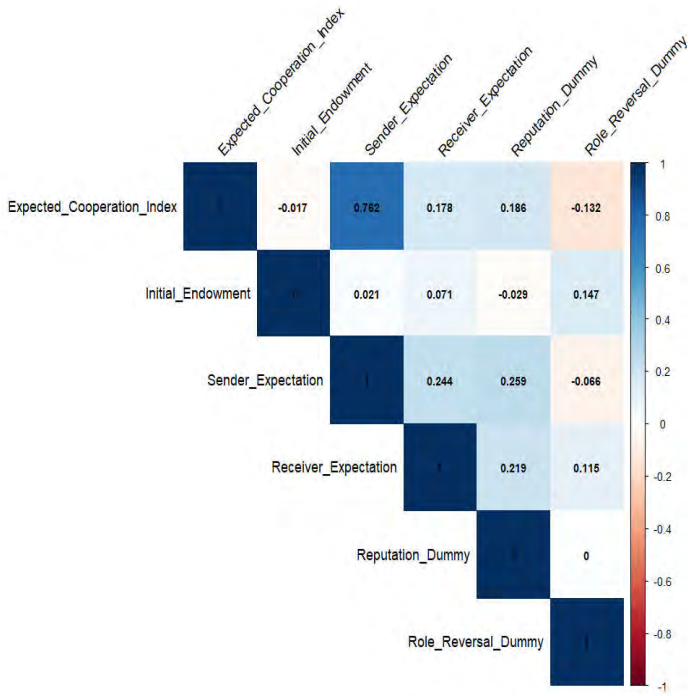

Exhibit 9: Correlation Matrix Plot for the Expected Cooperation Index (Prisoner's Dilemma Concept)

Exhibit 10: Heat Map for the Expected Cooperation Index (Prisoner's Dilemma Concept)

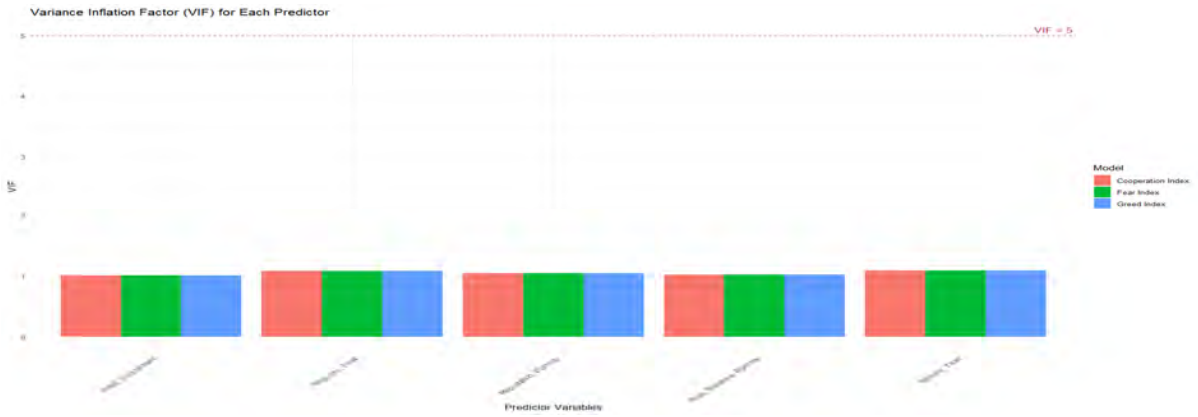

Exhibit 11: VIF Plot (Prisoner's Dilemma Concept)

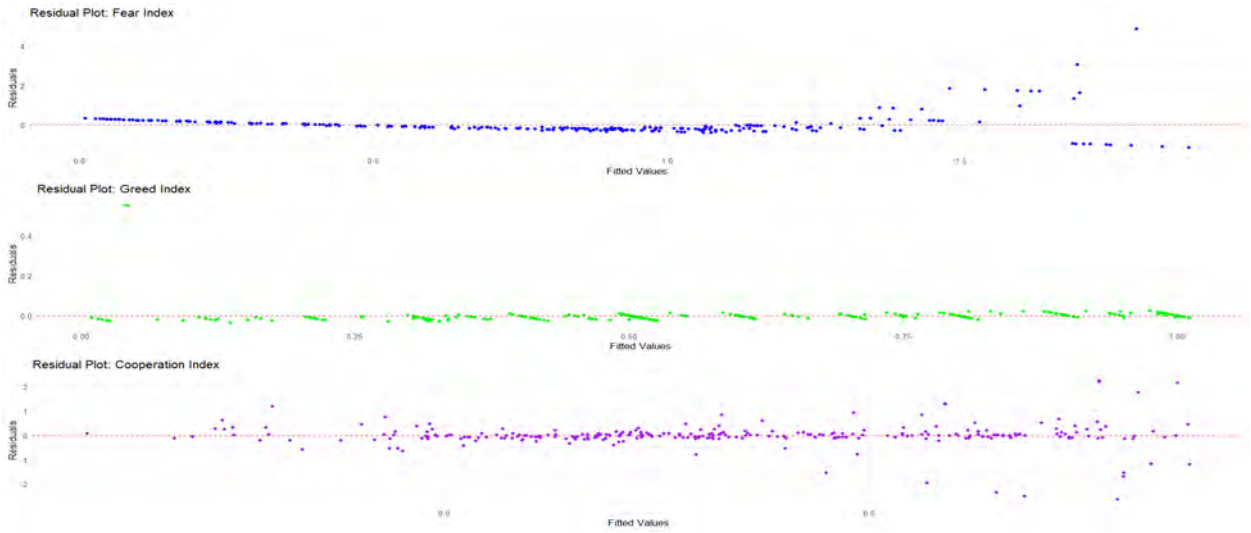

Exhibit 12: Residual Plot for Homogeneity (Prisoner's Dilemma Concept)

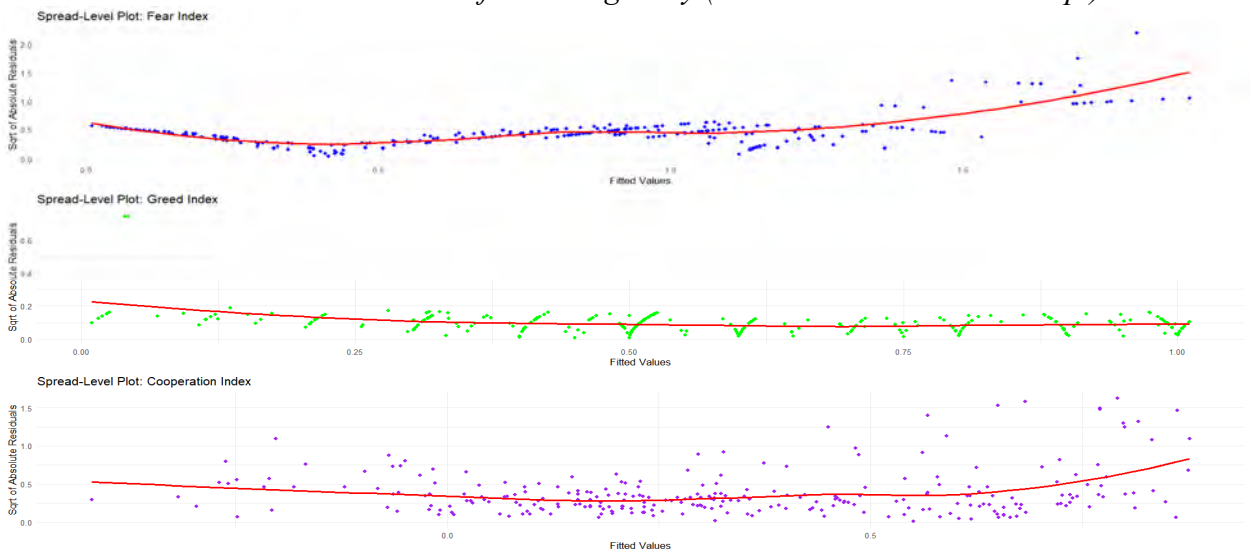

Exhibit 13: Spread-Level Plot (Prisoner's Dilemma Concept)

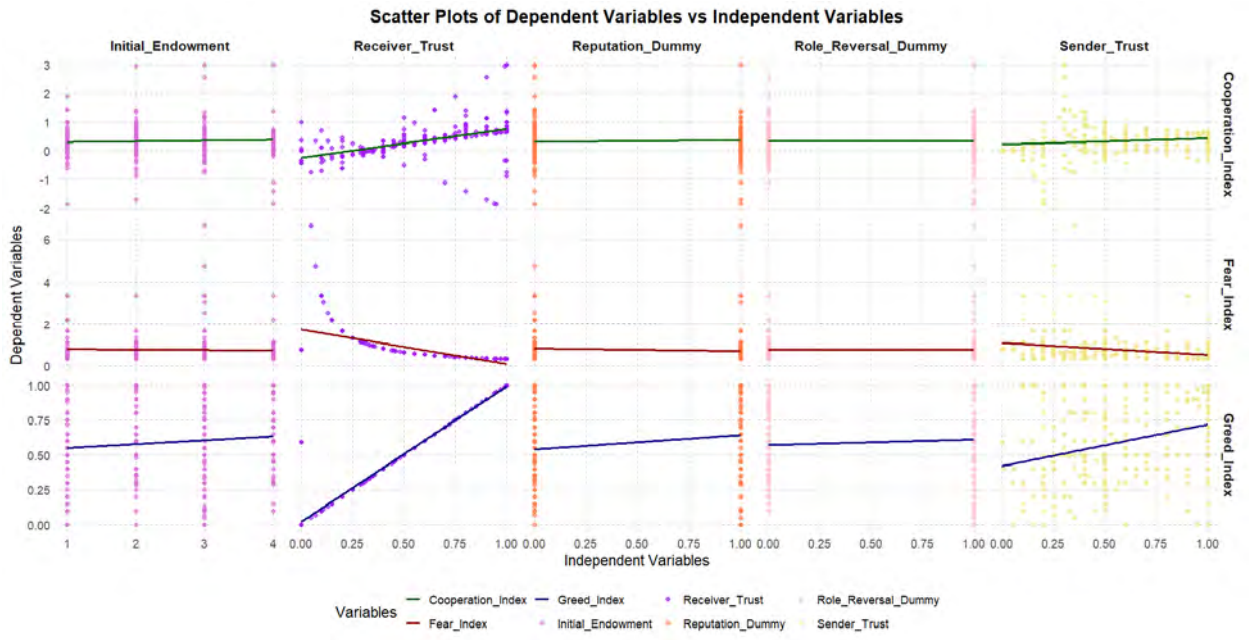

Exhibit 14: Scatter Plot: Dependent Variables versus Independent Variables (Prisoner's Dilemma Concept)

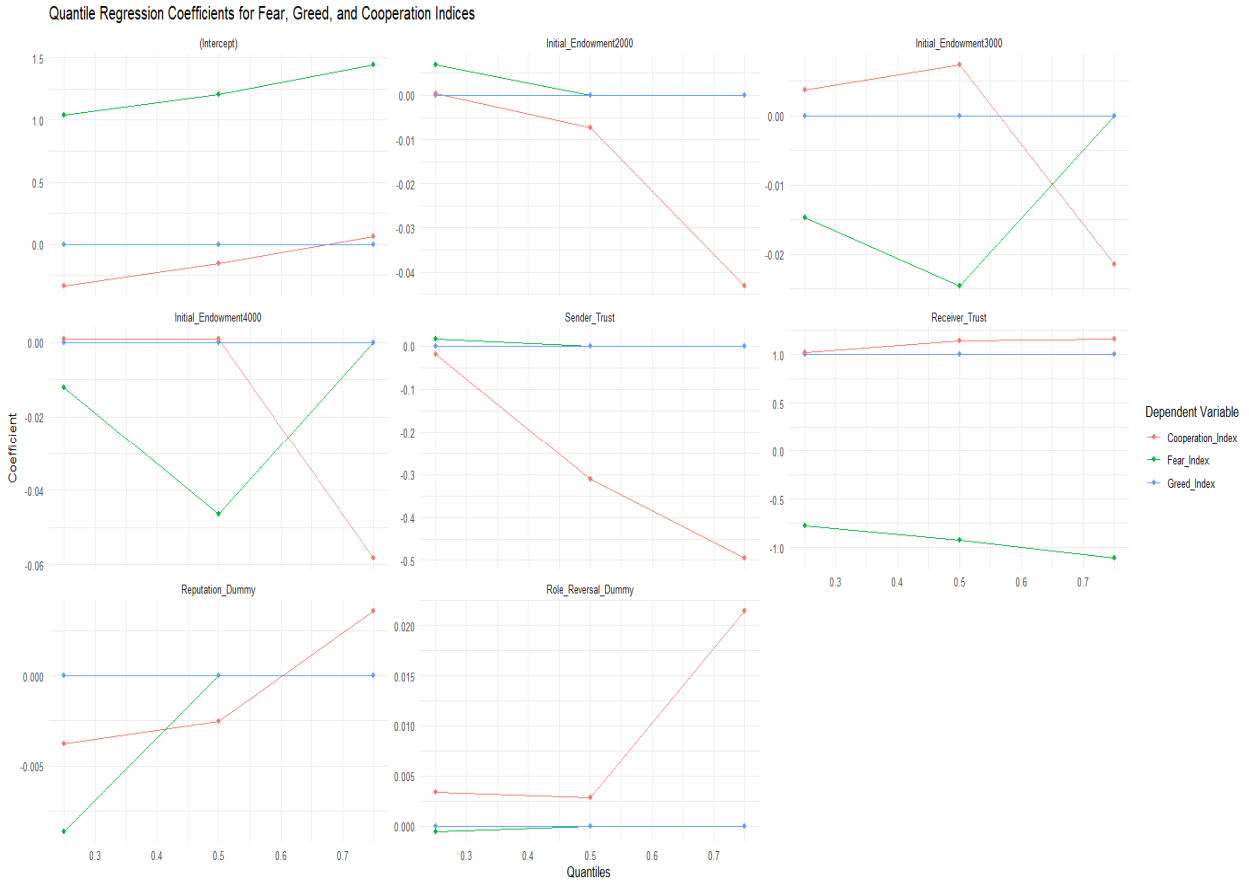

Exhibit 15: Coefficient Plot for the Indices in Quantile Regressions

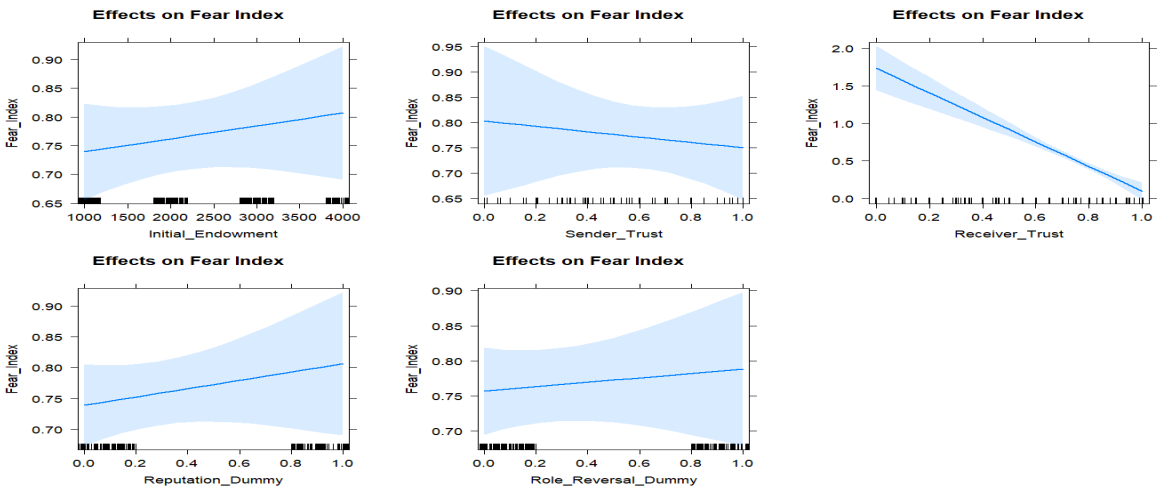

Exhibit 16: Effects Plot for GEE Model for the Fear Index

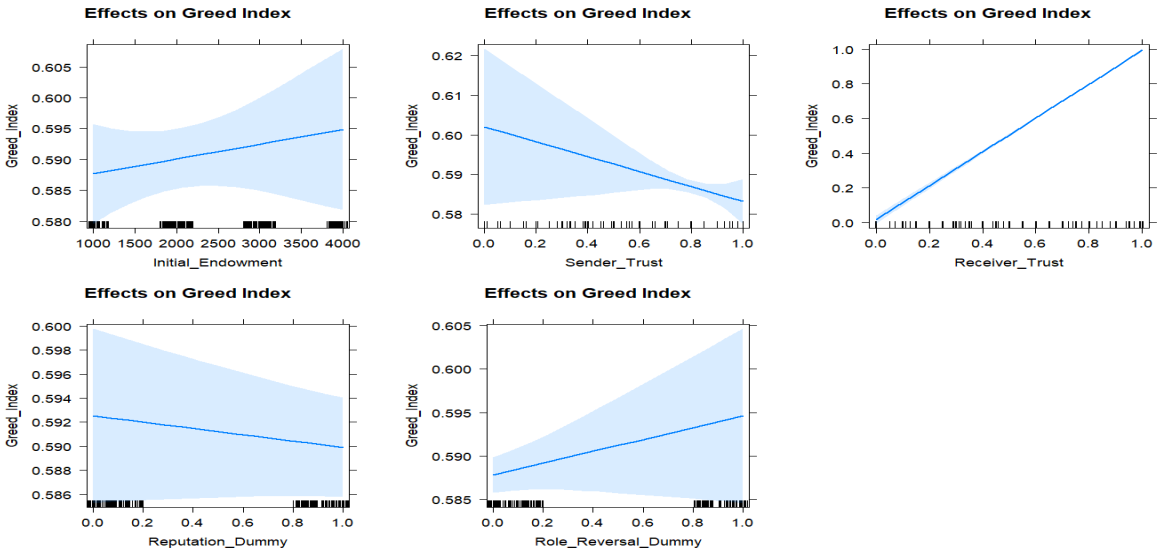

Exhibit 17: Effects Plot for GEE Model for the Greed Index

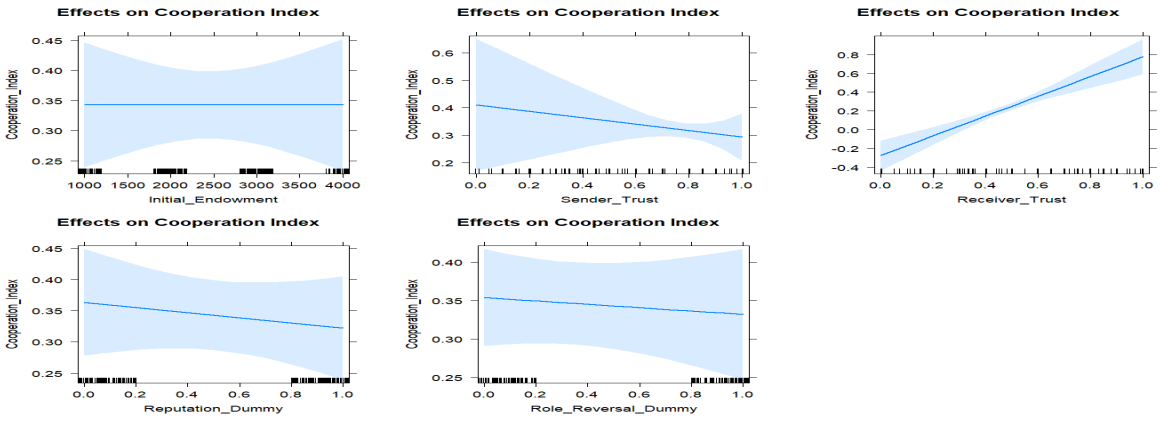

Exhibit 18: Effects Plot for GEE Model for the Cooperation Index

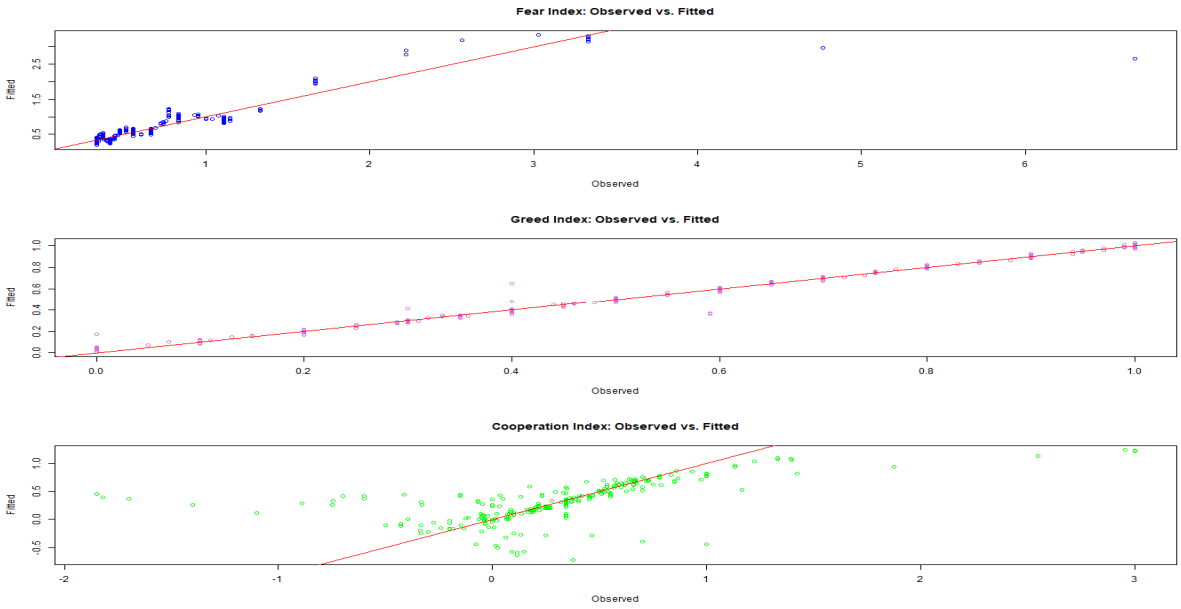

Exhibit 19: Observed vs. Fitted Plot for GAM Model

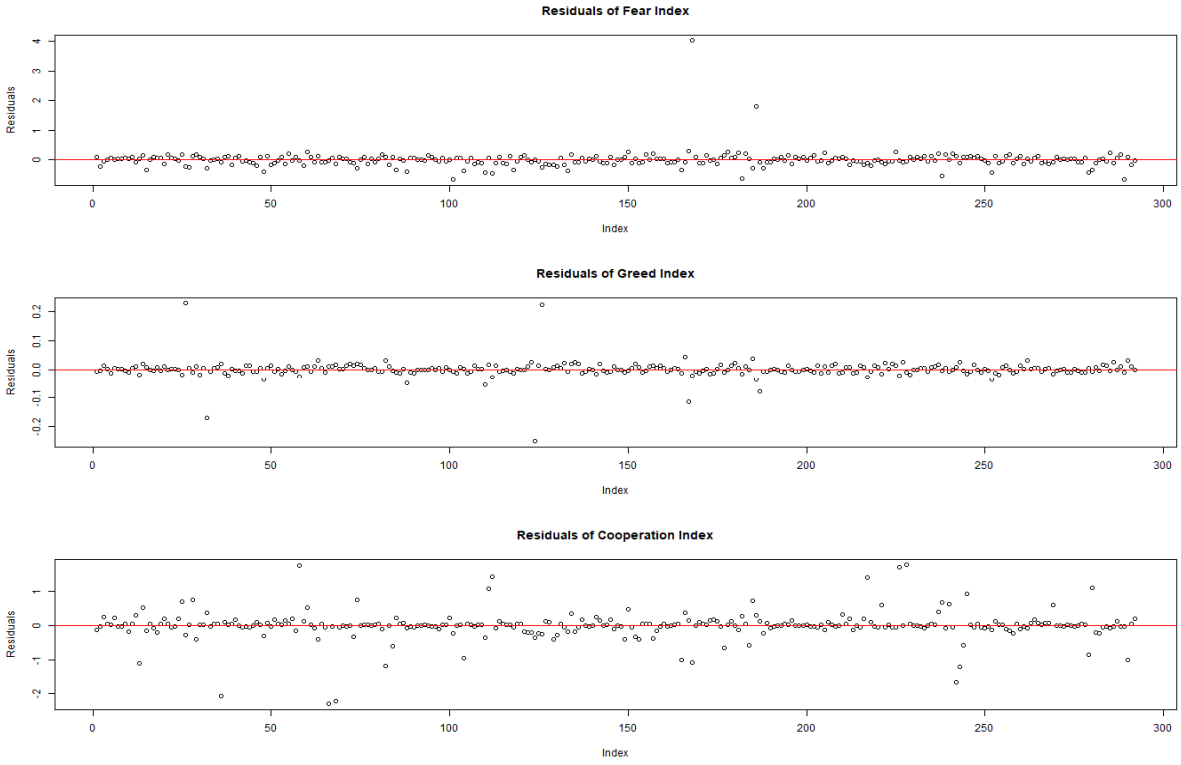

Exhibit 20: Residual Plot for GAM Model

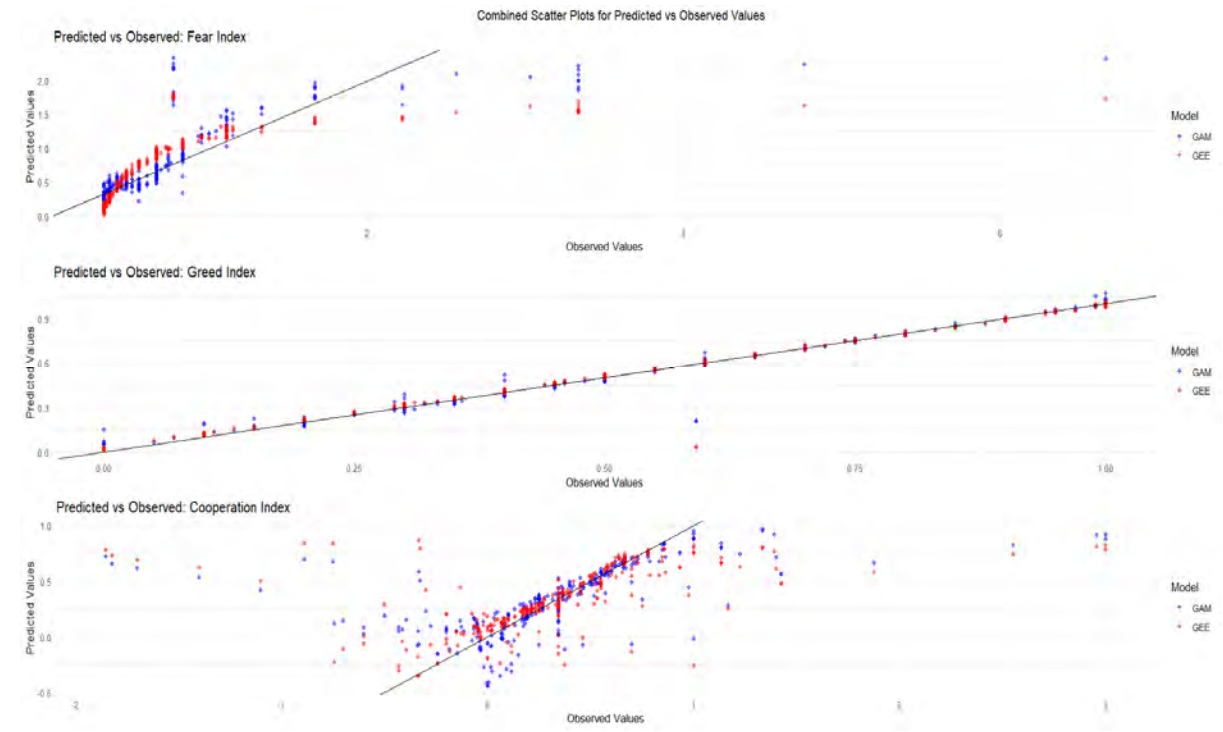

Exhibit 21: Predicted vs. Observed Scatter Plot: GAM vs. GEE

Exhibit 22: Residual Plot: GAM vs. GEE

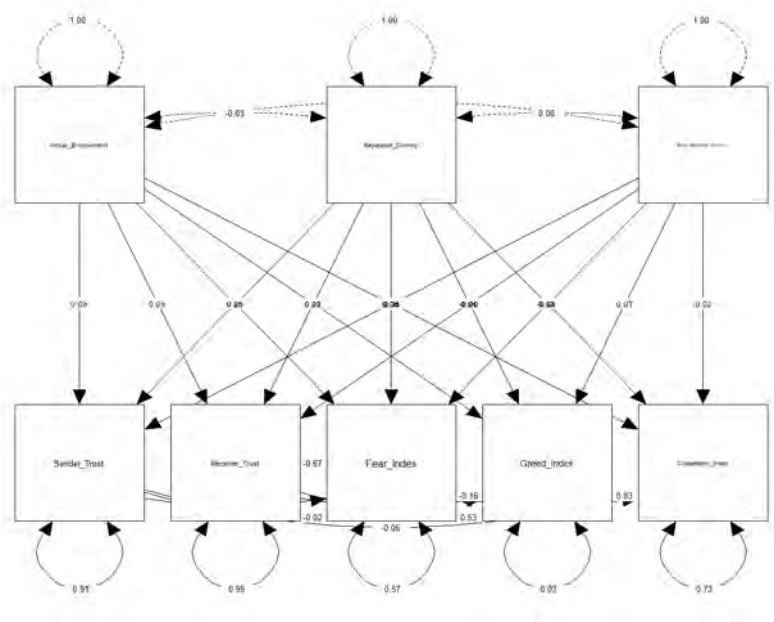

Exhibit 23: Covariance-Based Structural Equation Modeling (CB-SEM) Path Diagram

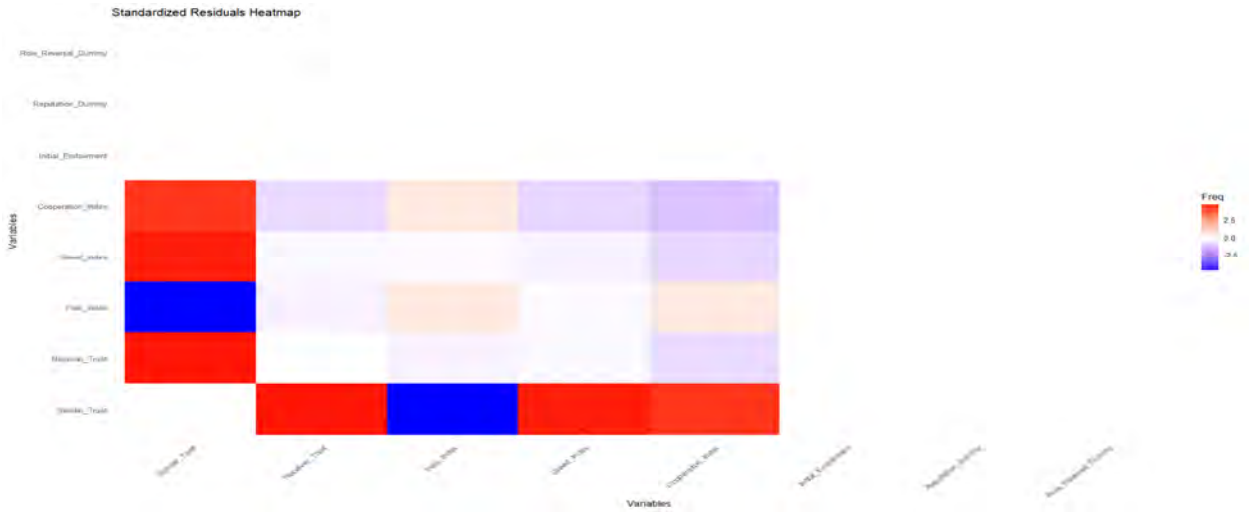

Exhibit 24: Covariance-Based Structural Equation Modeling (CB-SEM) Residual Plot

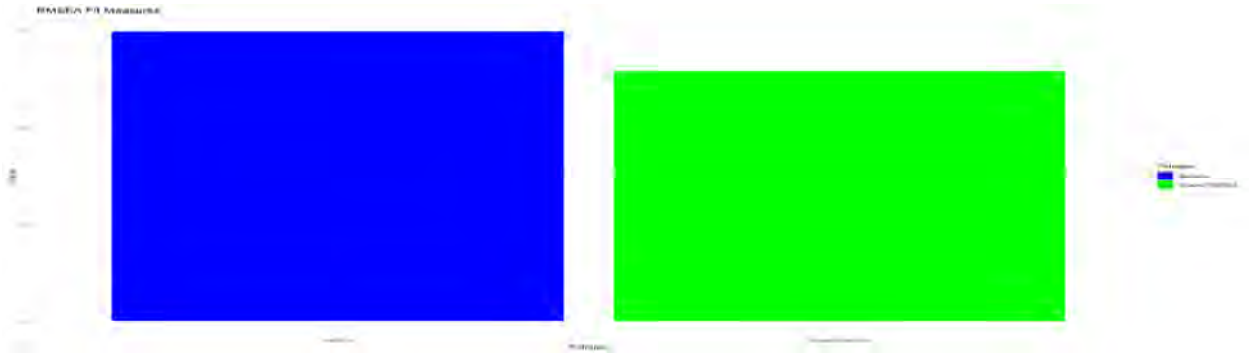

Exhibit 25: Covariance-Based Structural Equation Modeling (CB-SEM) RMSEA Plot

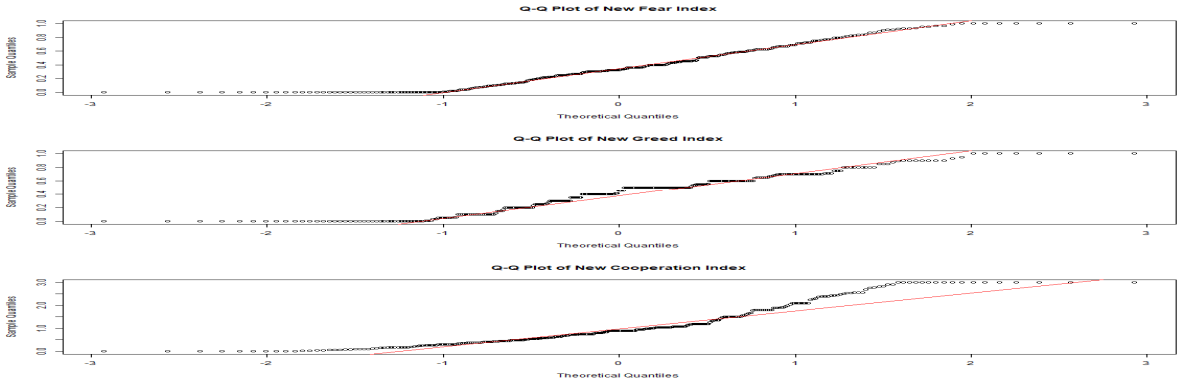

Exhibit 26: Q-Q Plot: Dependent Variables for the proposed formula

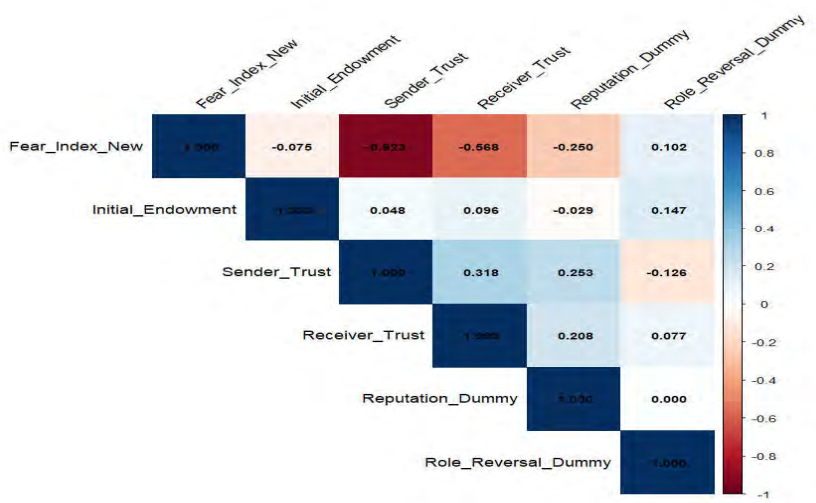

Exhibit 27: Correlation Matrix Plot for the Fear Index (Proposed Concept)

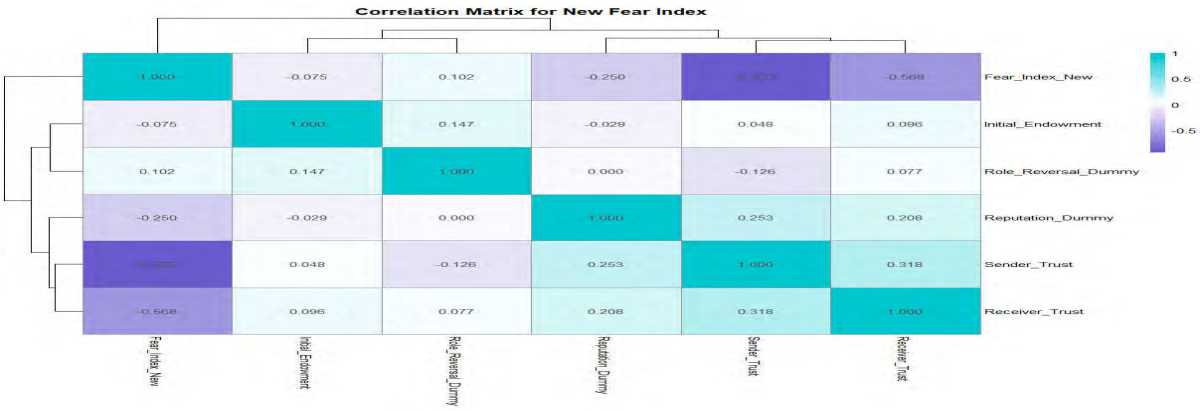

Exhibit 28: Heat Map for the Fear Index (Proposed Concept)

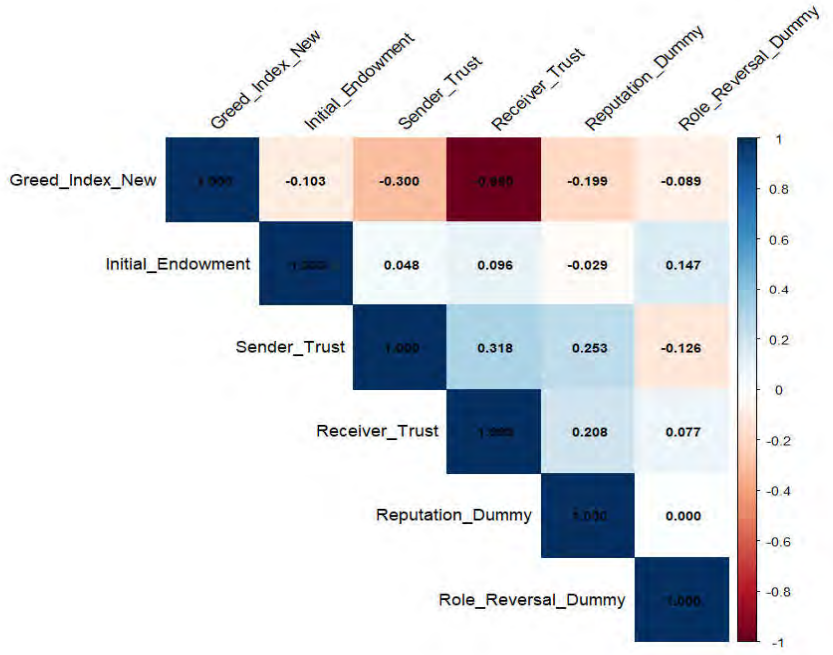

Exhibit 29: Correlation Matrix Plot for the Greed Index (Proposed Concept)

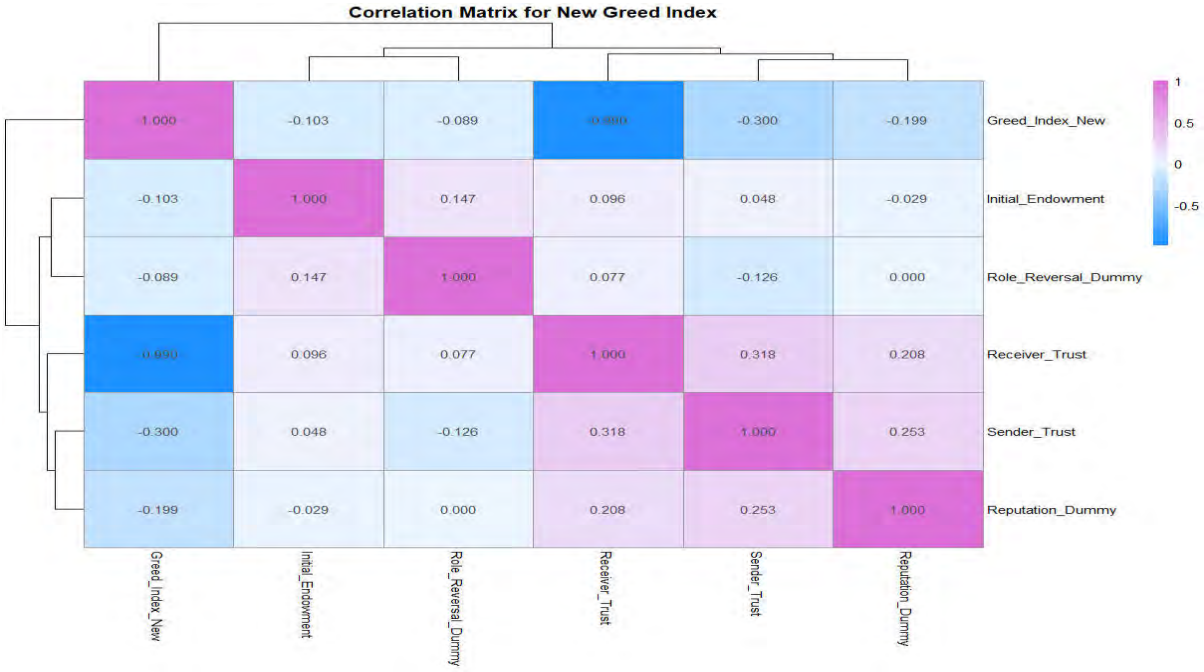

Exhibit 30: Heat Map for the Greed Index (Proposed Concept)

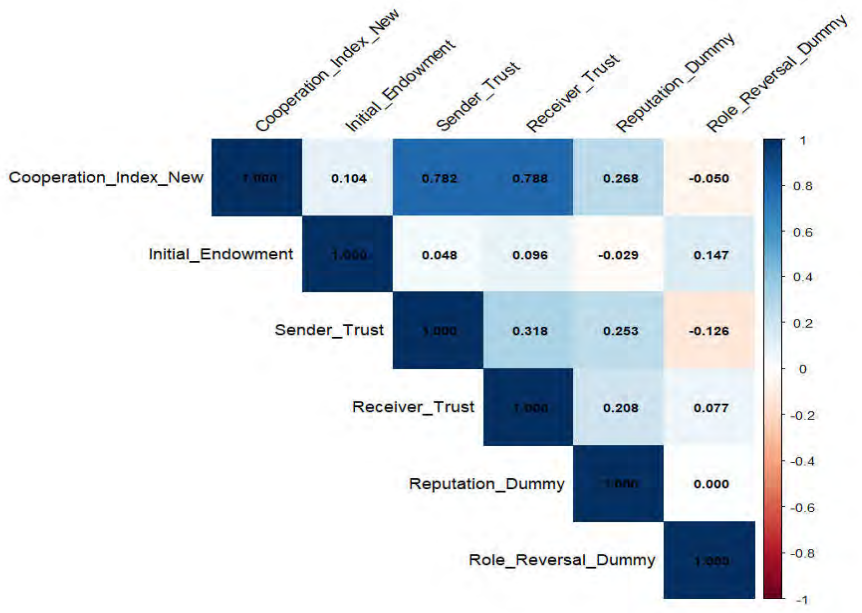

Exhibit 31: Correlation Matrix Plot for the Cooperation Index (Proposed Concept)

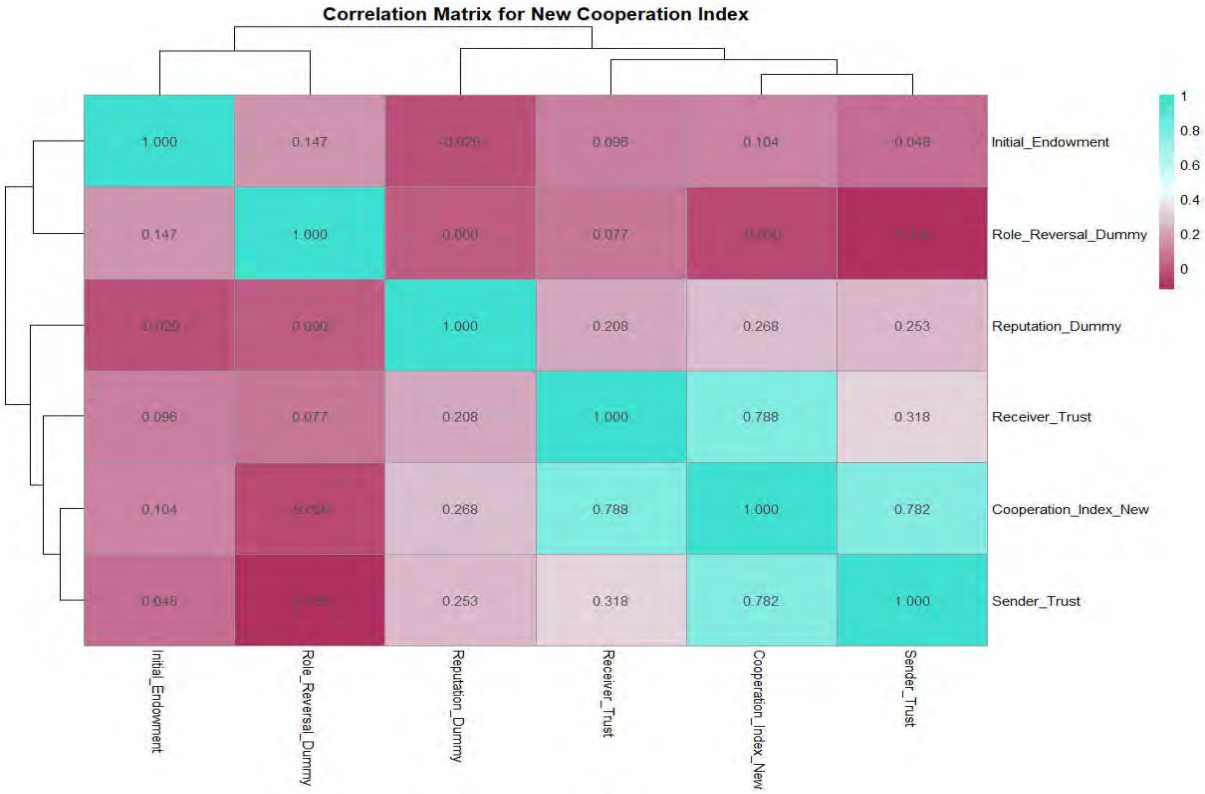

Exhibit 32: Heat Map for the Cooperation Index (Proposed Concept)

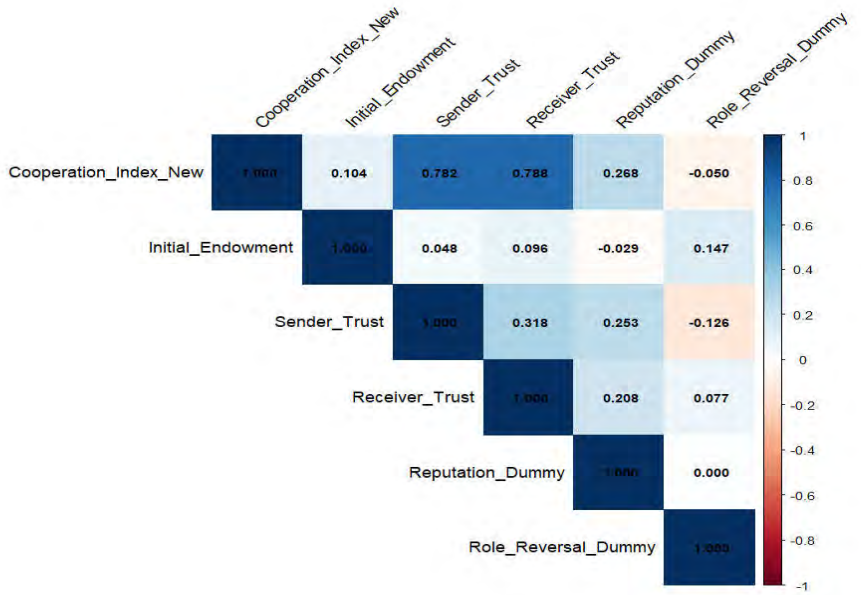

Exhibit 33: Correlation Matrix Plot for the Expected Cooperation Index (Proposed Concept)

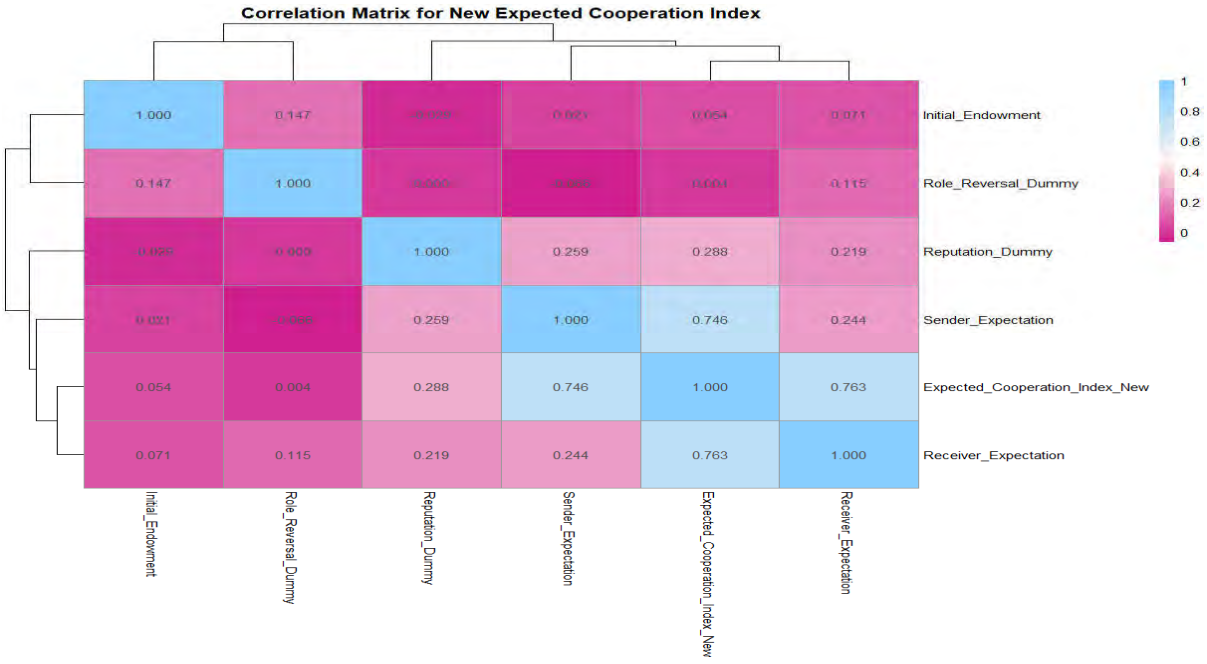

Exhibit 34: Heat Map for the Expected Cooperation Index (Proposed Concept)

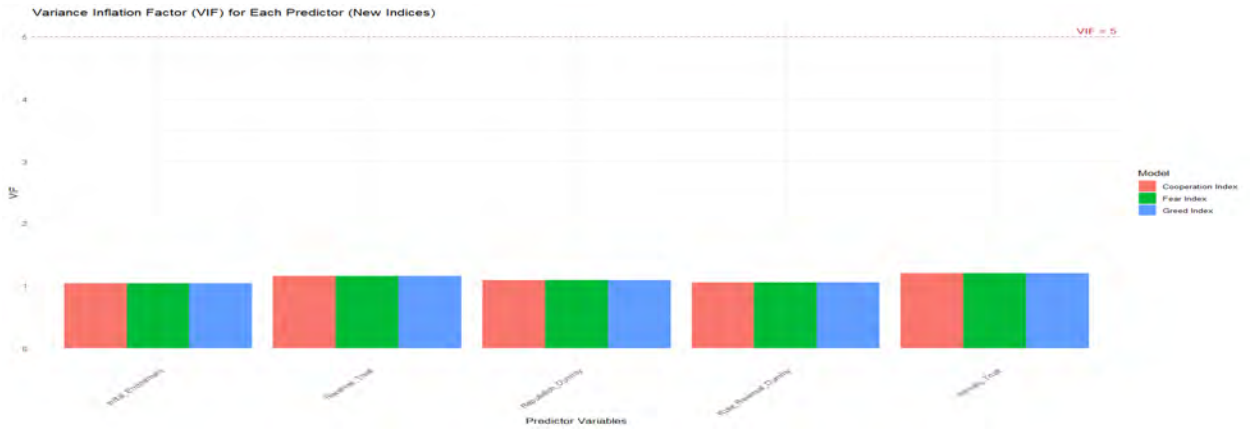

Exhibit 35: VIF Plot (Proposed Concept)

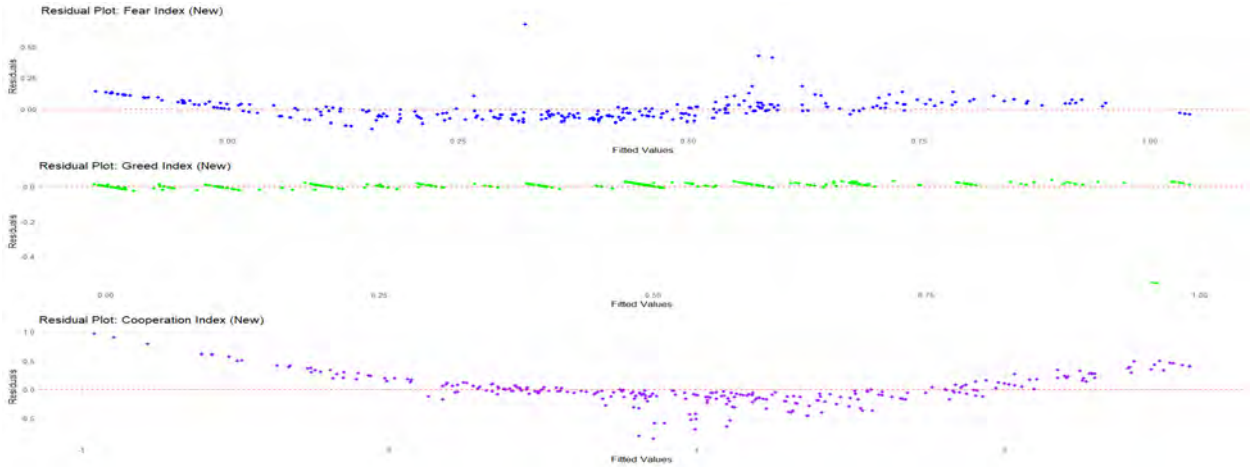

Exhibit 36: Residual Plot for Homogeneity (Proposed Concept)

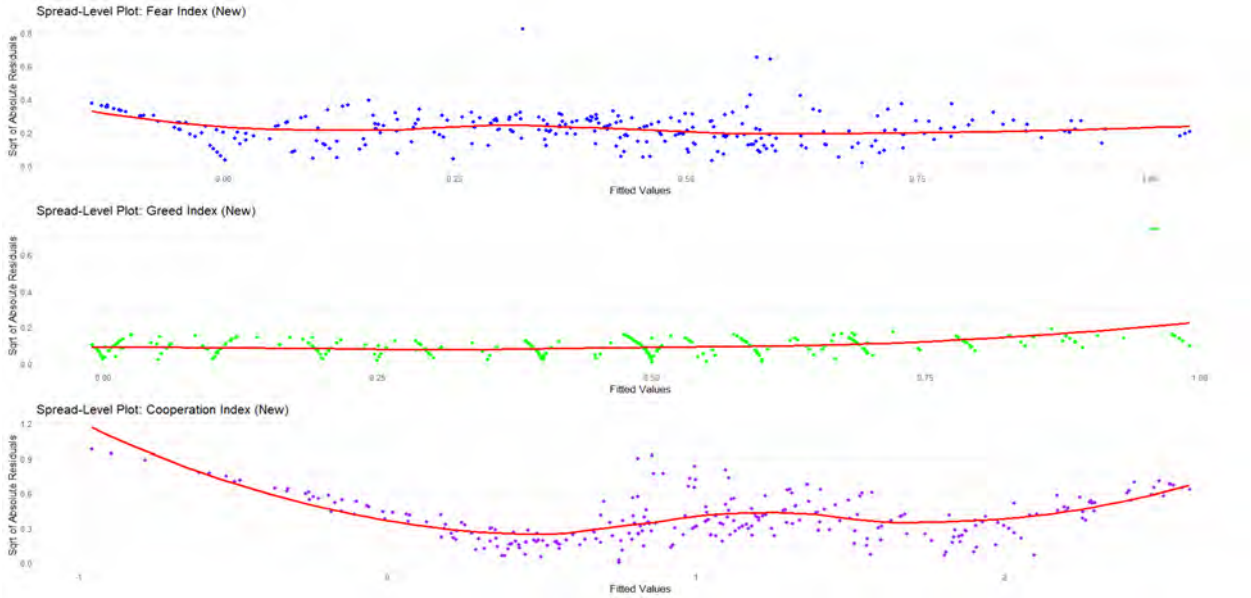

Exhibit 37: Spread-Level Plot (Proposed Concept)

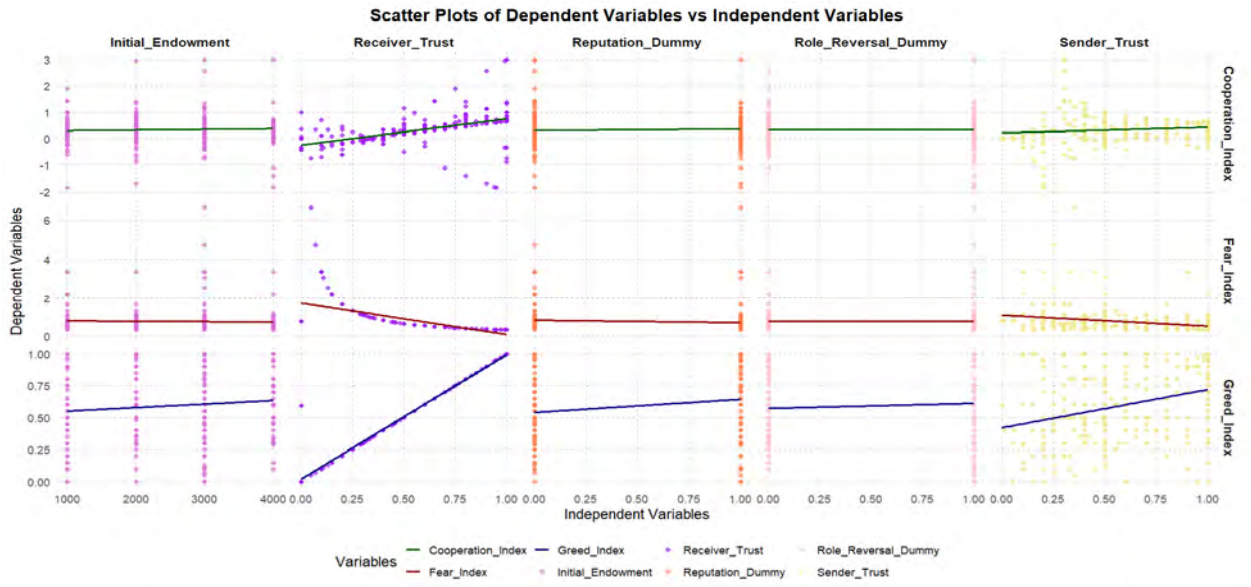

Exhibit 38: Scatter Plot: Dependent Variables versus Independent Variables (Proposed Concept)

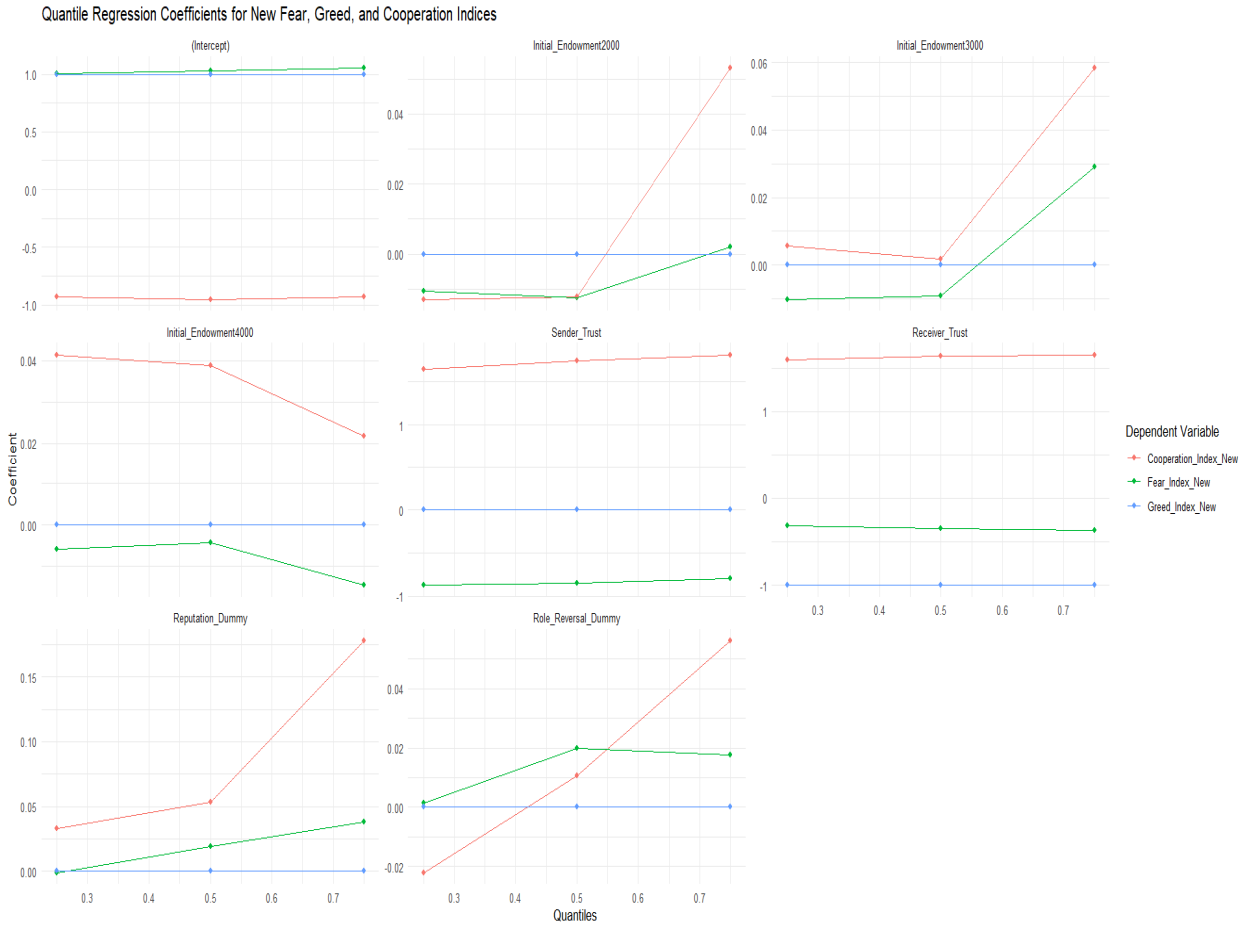

Exhibit 39: Coefficient Plot for the Indices in Quantile Regressions *(Proposed Concept)*

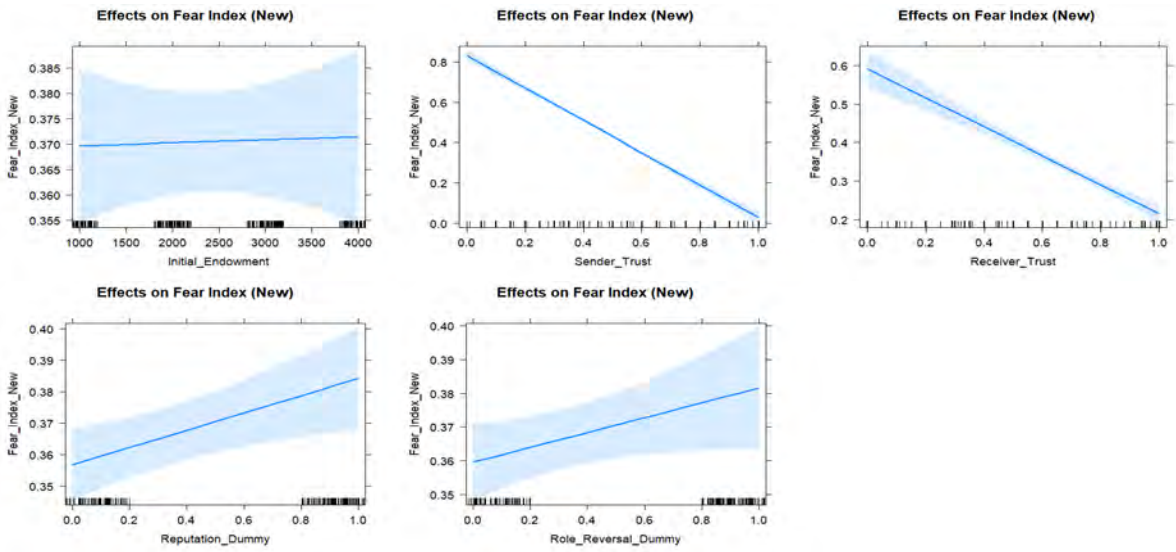

Exhibit 40: Effects Plot for GEE Model for the Fear Index (Proposed Concept)

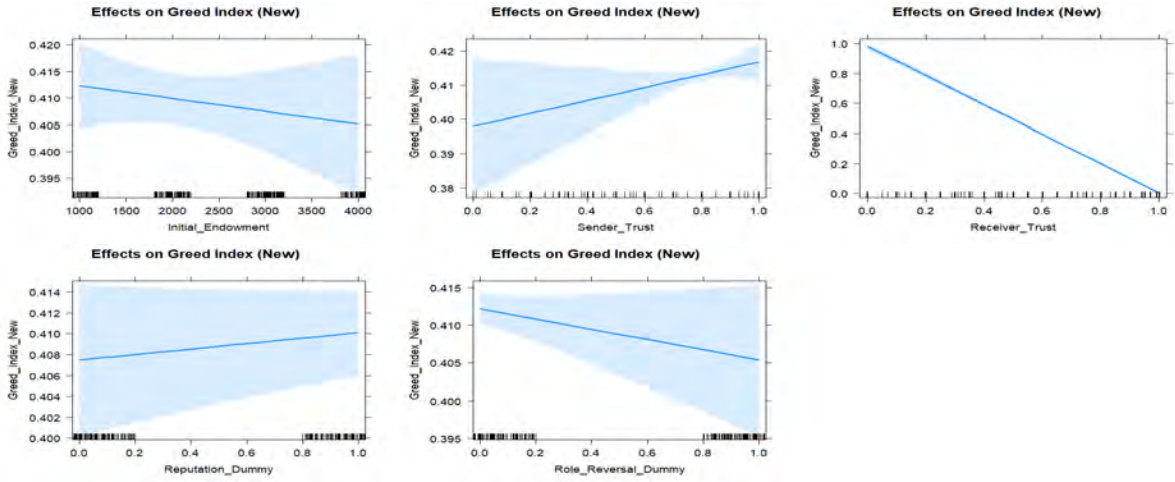

Exhibit 41: Effects Plot for GEE Model for the Greed Index (Proposed Concept)

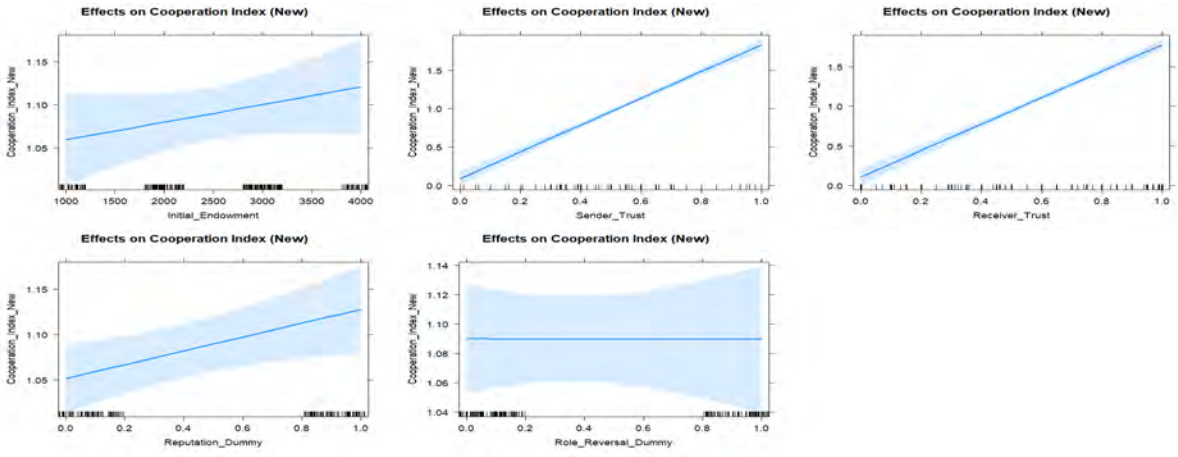

Exhibit 42: Effects Plot for GEE Model for the Cooperation Index (Proposed Concept)

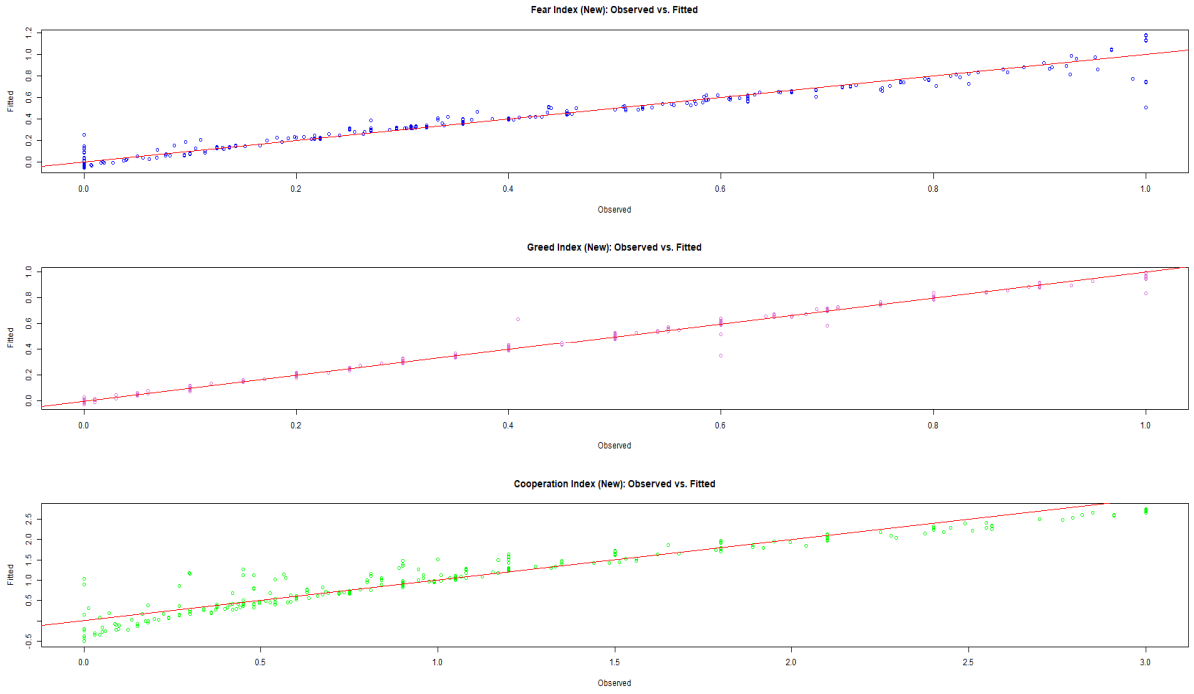

Exhibit 43: Observed vs. Fitted Plot for GAM Model (Proposed Concept)

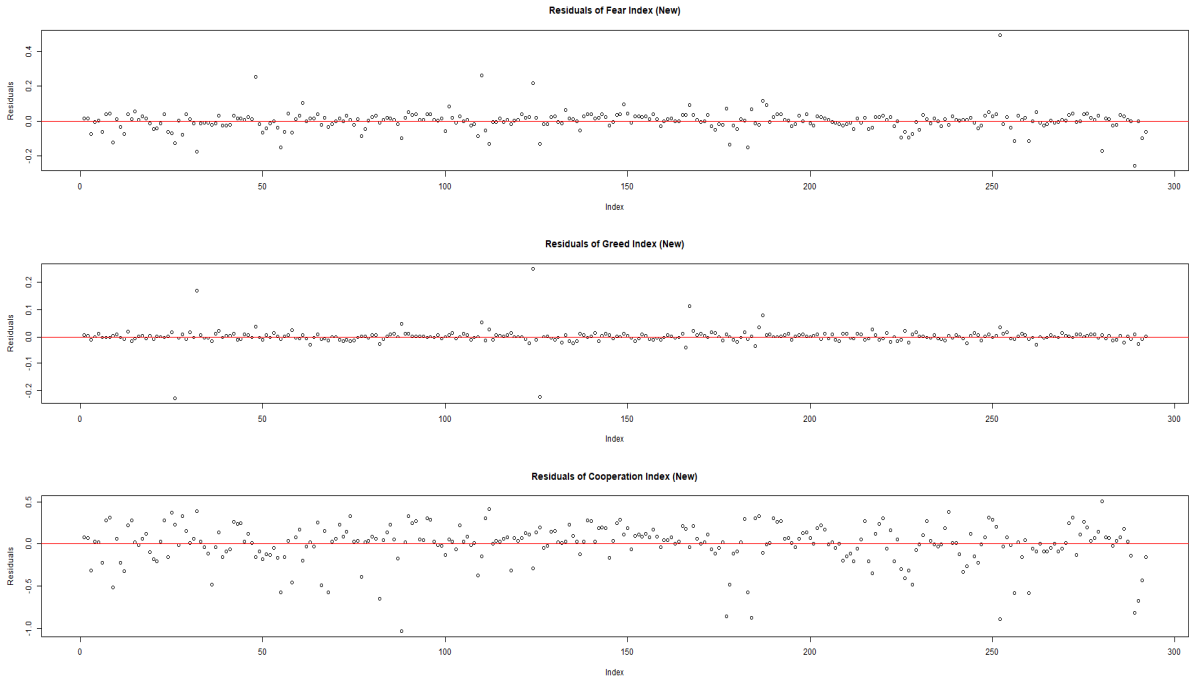

Exhibit 44: Residual Plot for GAM Model (Proposed Concept)

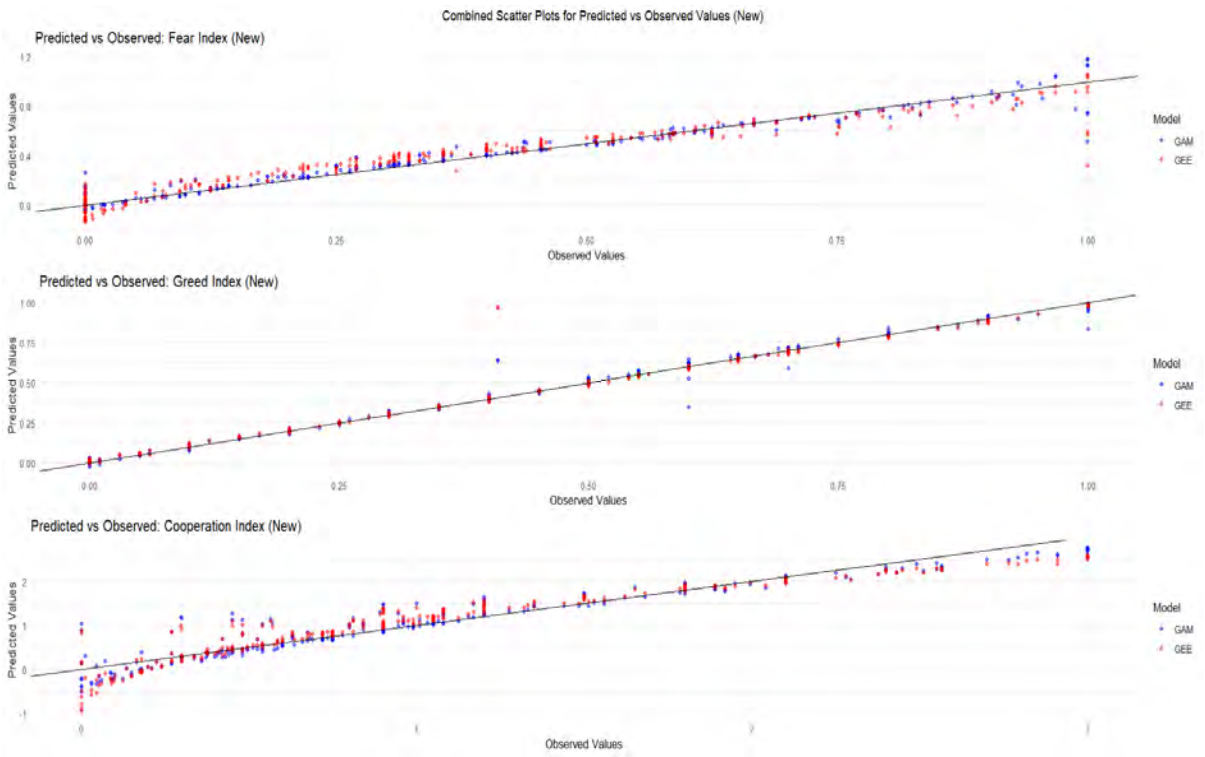

Exhibit 45: Predicted vs. Observed Scatter Plot: GAM vs. GEE (Proposed Concept)

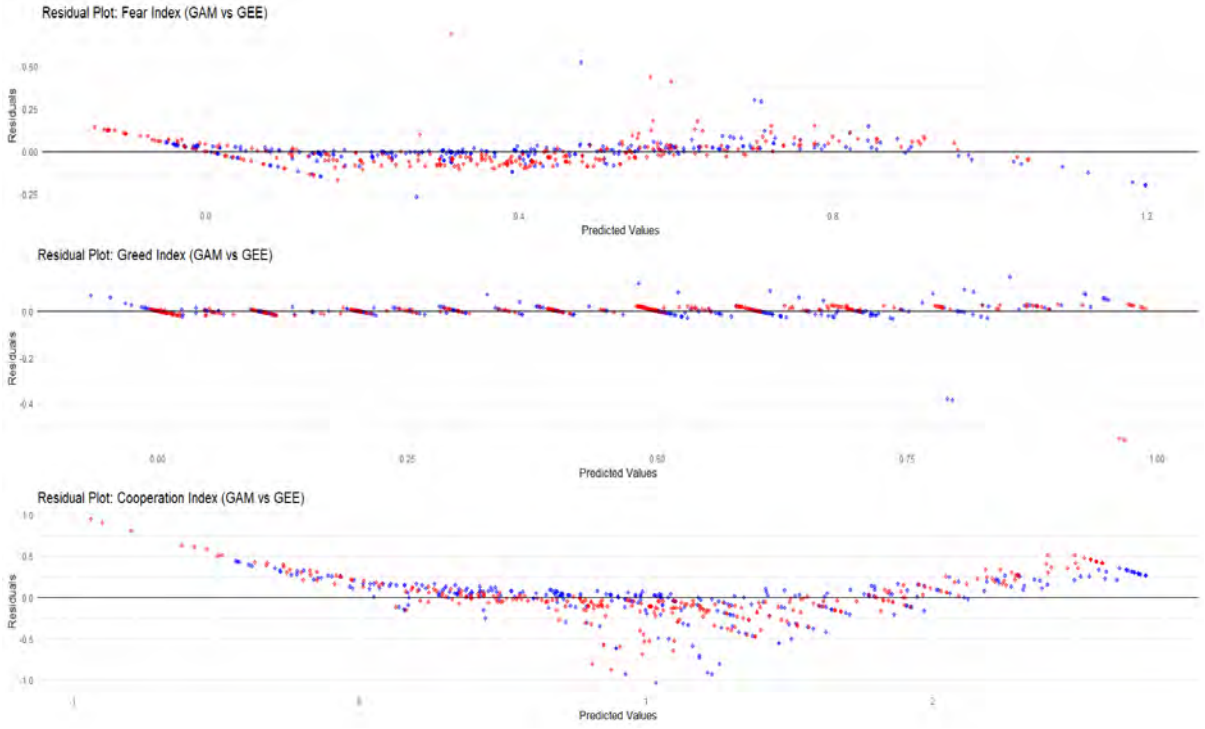

Exhibit 46: Residual Plot: GAM vs. GEE (Proposed Concept)

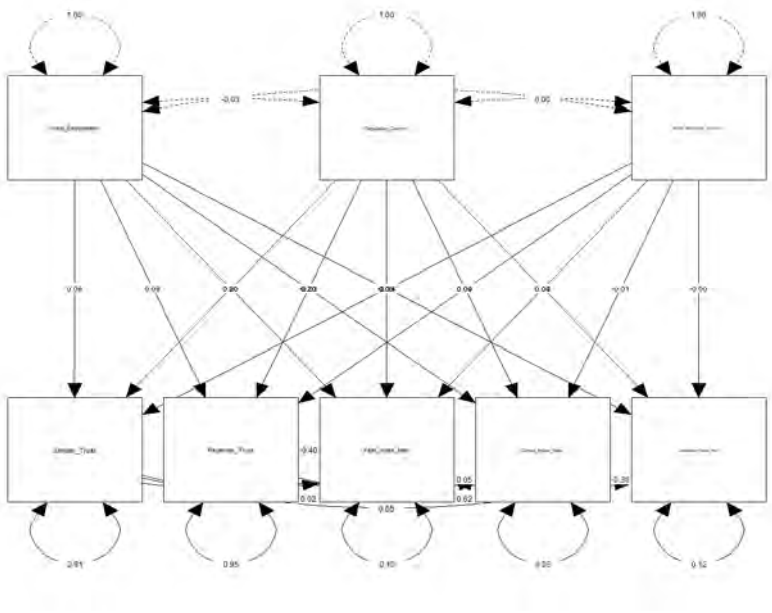

Exhibit 47: CB-SEM Path Diagram (Proposed Concept)

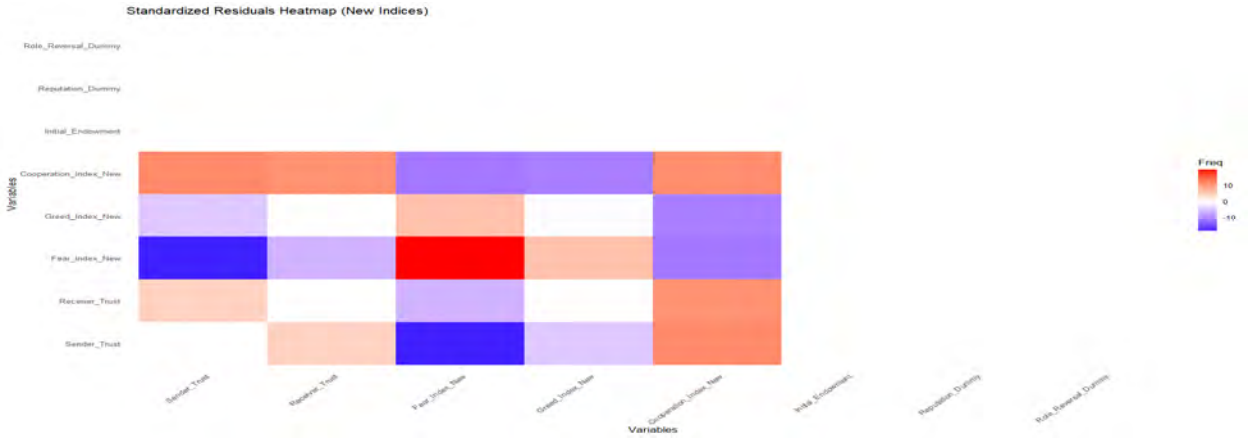

Exhibit 48: CB-SEM Residual Plot (Proposed Concept)

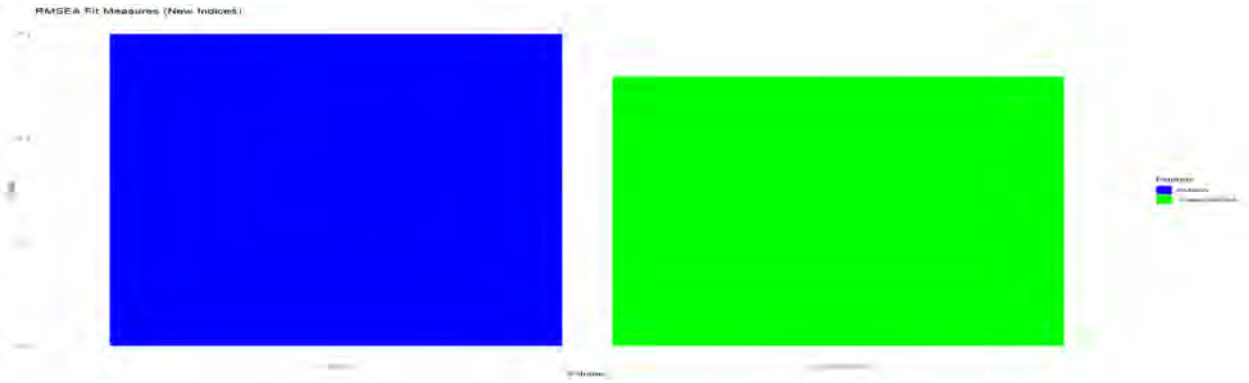

Exhibit 49: CB-SEM RMSE Plot (Proposed Concept)

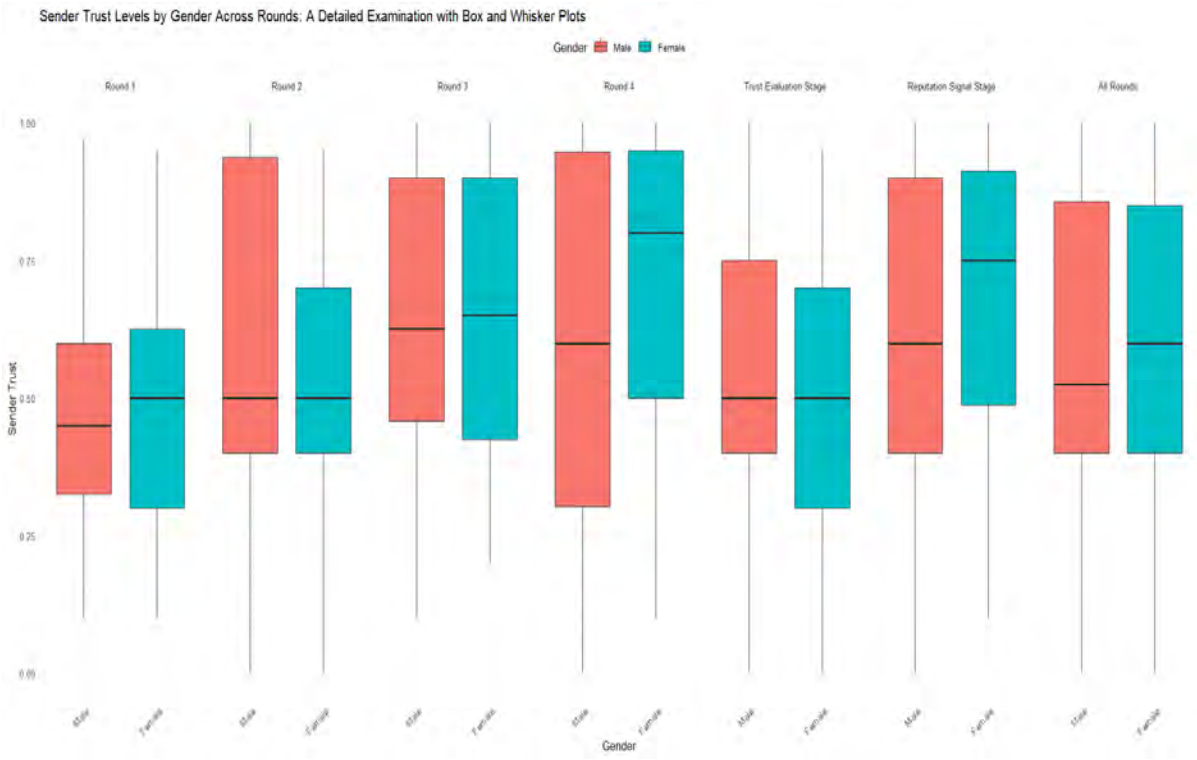

Exhibit 50: Box and Whisker Plot: Sender's Trust Level by Gender across Rounds

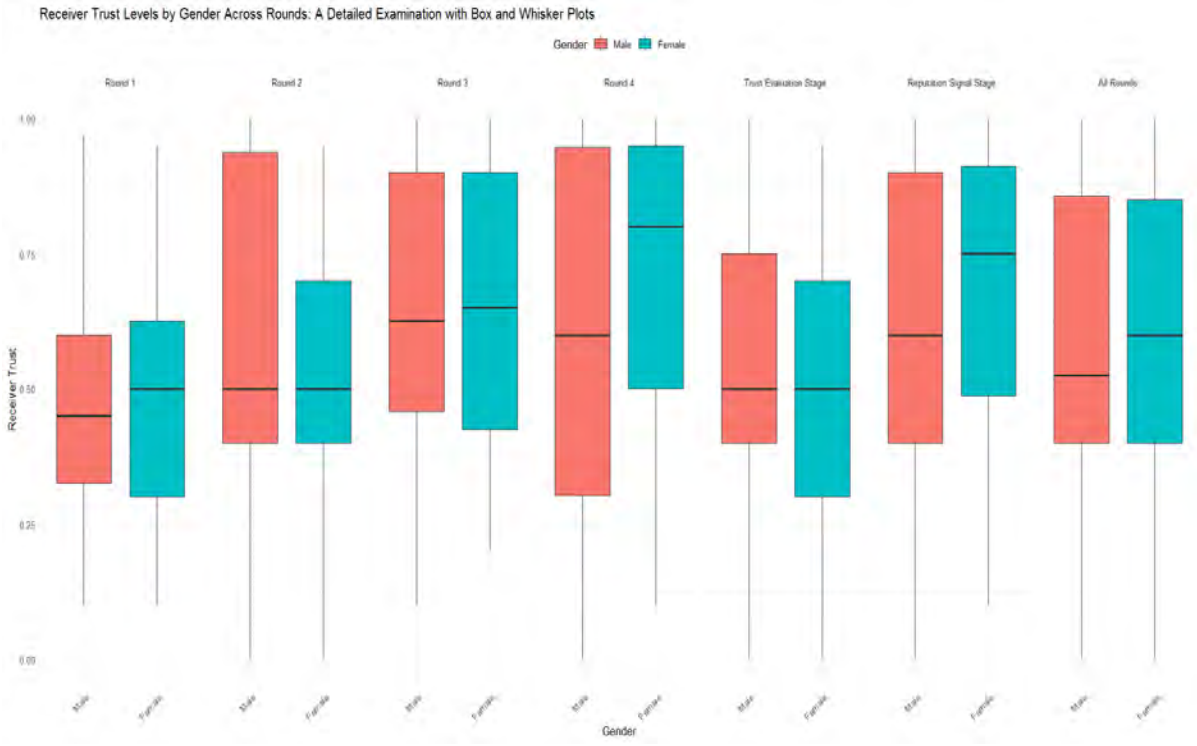

Exhibit 51: Box and Whisker Plot: Receiver's Trust Level by Gender across Rounds

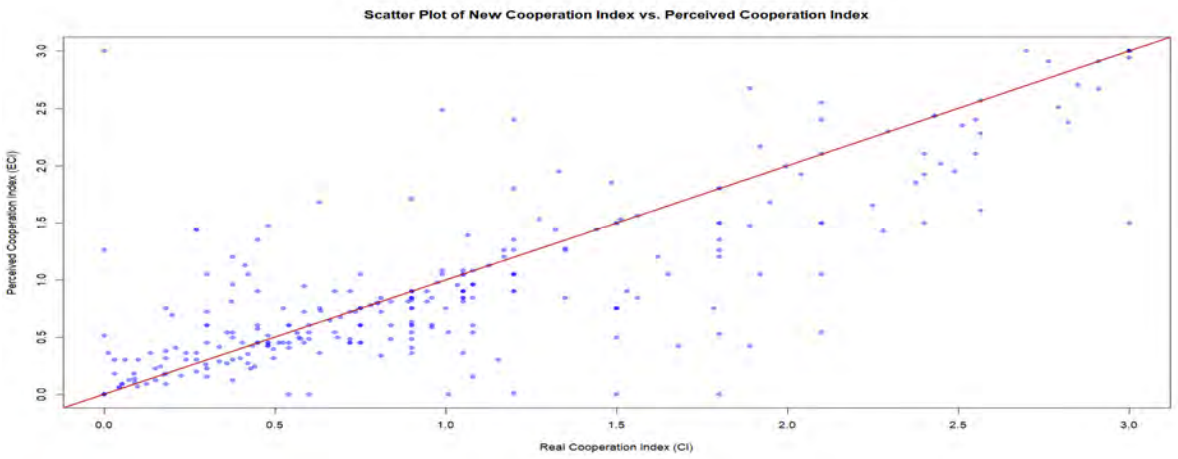

Exhibit 52: Scatter Plot: Expectation vs. Reality on Cooperation

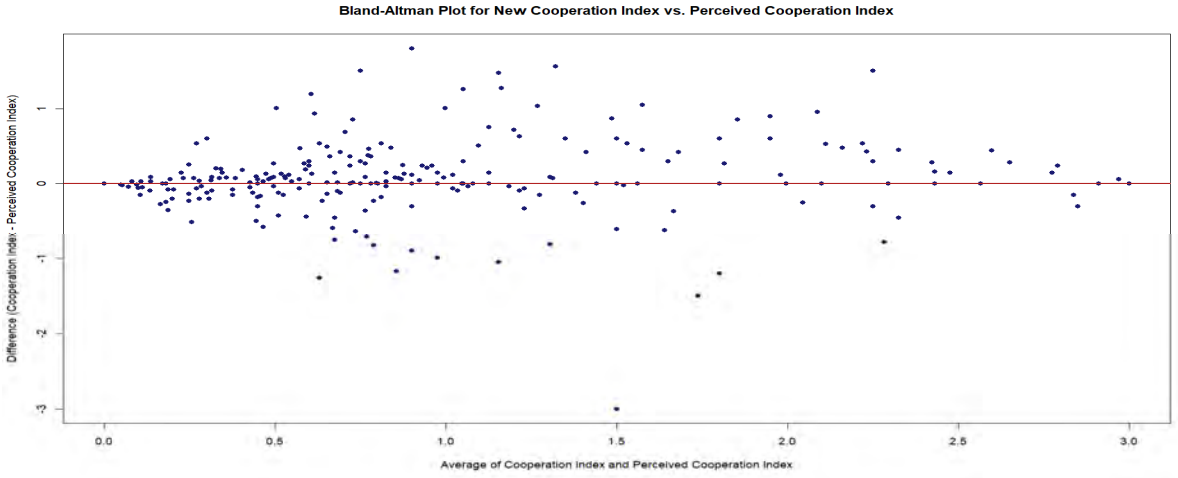

Exhibit 53: Bland-Altman Plot: Expectation vs. Reality on Cooperation

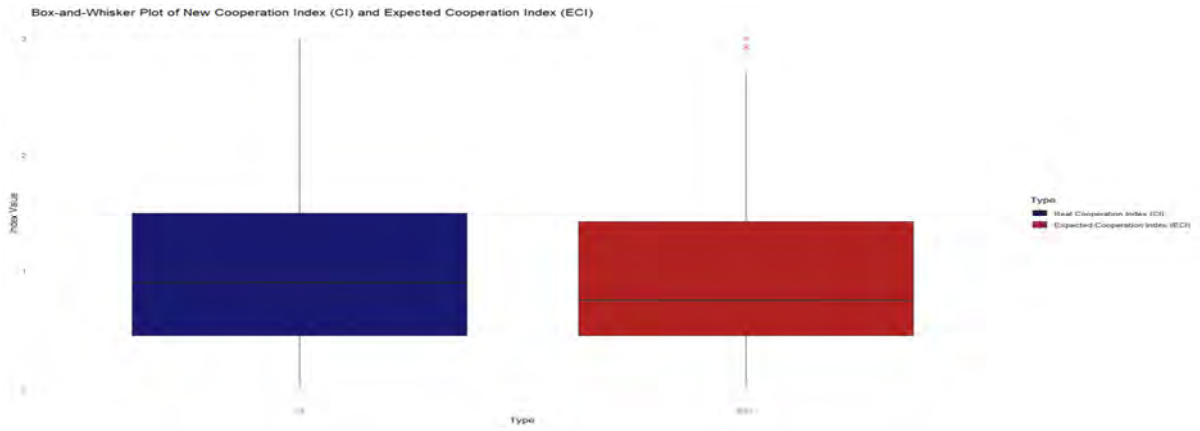

Exhibit 54: Box-Whisker Plot: Expectation vs. Reality on Cooperation