Masters thesis

The effects of reputation on collaboration

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Abstract

This study explored how direct and indirect reputations impacted collaboration in an online dictator game. Previous research shows that human participants in dictator games are more generous towards players with a positive reputation. In our study (n = 260), the participant played a multi-round trivia game with three "agents" (presented as real players, but they were not): one "key agent" and two regular agents. The agents' predetermined behaviours allowed us to isolate their influence on the participant's decision-making process. In certain rounds, an agent was guaranteed to win and received 100 tokens. They then “decided” whether to share the tokens with the participant, imitating an online player's decision. In other rounds, the participant was guaranteed to win and received 100 tokens. They then decided whether to share the tokens with the other player (an agent). After each round, the results of the other matchup and the tokens shared by the victor were displayed in a results section. This allowed the participant to see how the key agent interacted with the regular agents. We measured participant collaboration using the key agent's behaviour in four conditions: generous, selfish, exclusive (generous to the participant, selfish to regular agents), and excluded (selfish to the participant, generous to regular agents). The dependent variable was the mean number of tokens sent to the key agent in the final round. The statistical analysis focused on the difference in the mean number of tokens sent to the key agent across the four conditions. We found that reputation significantly influenced collaboration; participants gave more tokens to the key agent in the generous condition than in the selfish condition. Also, “reputation discounting” occurred between the selfish-exclusive and generous-excluded conditions, but not between the selfish-excluded and generous-exclusive conditions. The results indicate that the participants primarily based their collaborative behaviour on direct reputation, with indirect reputation being less influential on decision-making.

Keywords: reputation, reputation discounting, dictator game, collaboration

Introduction

Reputation refers to the perception and general opinion that others hold about an individual or organisation based on their actions and behaviour over time (Russell, 2022). A positive reputation is an intangible asset that can have significant implications in various aspects of one's life, career, or business (Milinski, 2016). In Proverbs 22:1 (New King James Version Bible, 1982, Prov. 22:1), King Solomon states that "A good name is to be chosen rather than great riches, loving favour rather than silver and gold." This suggests that a good reputation, one based on virtue and integrity, is more valuable than great riches, as it earns love, admiration, and honour from others, qualities that money cannot buy. It takes many years to develop an excellent reputation or a positive image, but the conduct of a single moment can mar that reputation and change public perception forever. For example, professional athletes with positive reputations are more likely to be recognized for their successes (Castañer et al., 2017) and attract partnerships with businesses and brands (Williams & Williams, 2016; Nguyen, 2019; Rach, 2023). Conversely, a bad reputation can negatively impact how athletes are viewed by colleagues, coaches, and fans, affecting their legacy (Salter, 2010; Adams, 2014; McNees, 2015). Our thesis aimed to delve deeper into the concept of reputation and contribute insights into the role of reputation in shaping social interactions and collaborative behaviour, using an experimental approach grounded in the dictator game framework.

The History, Basic Setup and Gameplay of the Dictator Game

Behavioural economics is a field of study that combines insights from psychology and economics to understand how individuals make decisions (Baddeley, 2017). The Dictator Game stands as a fundamental experimental paradigm in behavioural economics, providing insights into human decision-making and social preferences. Developed in the early 1980s by

Daniel Kahneman, Jack Knetsch, and Richard Thaler, the Dictator Game offers a simple yet powerful framework for studying a wide spectrum of human behaviours (Engel, 2011). The Dictator Game involves two players: the dictator (or allocator) and the receiver (or recipient). The dictator receives a sum of money or resources and freely distributes this endowment as they deem appropriate, without any input or negotiation from the receiver (Leder & Schütz, 2018).

Various research studies have delved deeper into understanding the intricacies of human behaviour by building upon the original framework of the Dictator game (Engel, 2011). A notable study by Forsythe et al. (1994) utilised the basic setup of the game to explore the motivations behind allocators' decisions. Their findings shed light on the complex interplay between self-interest and altruistic tendencies. In their exploration, they discovered that a significant portion of allocators willingly shared resources with receivers, even in the absence of external pressure or incentives. This revelation provided a nuanced understanding of human nature, wherein individuals demonstrated altruistic behaviours that extended beyond mere self-interest, thereby laying the groundwork for further examination of distributive justice and social preferences. In another study by Forsythe et al. (1994), the researchers investigated the impact of gender on allocation decisions in the Dictator Game. They found that male allocators tended to exhibit more selfish behaviour compared to their female counterparts. Andreoni and Vesterlund (2001) explored the influence of social distance between allocators and receivers on resource allocation, revealing that individuals are more generous towards close acquaintances than towards strangers. Moreover, studies by Engelmann and Strobel (2004) and Engelmann and Fischbacher (2009) examined cultural variations in altruistic behaviour using the Dictator Game across different societies, highlighting the role of cultural norms and values in shaping economic decision-making. By adhering to the original rules of the game, these studies offer valuable insights into the

inherent tendencies of individuals in resource allocation, shedding light on the role of factors such as gender, social distance, and cultural context in shaping altruistic behaviours, thus showing the immense effectiveness of the Dictator game's simple framework in studying human behaviours and social interactions.

The Different Variations of the Dictator Game

The simplicity of the Dictator Game's setup allows for easy manipulation of variables and conditions to explore different aspects of human behaviour. Konow (2000) leveraged the simplicity of the original Dictator Game to explore how individuals' allocation choices might change in response to changes in wealth distribution. He found that, by altering the amount of the endowment, the dictators tended to exhibit a preference for equal distribution, especially when the endowment was larger. This suggests that individuals may possess intrinsic motivations for fairness (Hoffman et al., 2008) and egalitarianism, even in contexts where self-interest might dictate otherwise. Several studies have supported Konow's (2000) findings regarding the influence of fairness considerations in the dictator game (Hoffman et al., 2008). For instance, research by Forsythe et al. (1994) demonstrated that a significant proportion of allocators choose to share resources with receivers, even when there is no external pressure or incentive to do so. Similarly, studies by Engelmann and Fischbacher (2009), Hoffman et al. (2008), and Bolton and Ockenfels (2000) have shown that individuals often behave more generously than predicted by standard economic models, indicating the presence of social preferences such as reciprocity and fairness (Hoffman et al., 2008). These studies collectively support the notion that fairness considerations play a significant role in dictators' allocation decisions, aligning with Konow's findings and highlighting the importance of social preferences in economic behaviour.

Dreber et al. (2013) also capitalised on the simplicity of the original dictator game. They aimed to investigate how the identity of the receiver influenced allocation decisions. In their study, they systematically varied the identity of the recipient, manipulating factors such as social proximity and group membership. Their findings revealed that the identity of the recipient significantly influenced dictators' allocation decisions. Specifically, dictators were more generous towards recipients with whom they shared social ties or group membership, indicating a preference for fairness and cooperation within their social circles (Rand & Nowak, 2013; Nowak & Highfield, 2011). However, when the recipient was anonymous or perceived as an outgroup member, dictators tended to allocate fewer resources, suggesting the presence of ingroup favouritism or a lack of concern for fairness towards outgroup members. Studies by Fehr and Schmidt (1999) and Bolton et al. (2004) have demonstrated that individuals often exhibit a preference for fairness and reciprocity, particularly towards individuals with whom they share social ties or group membership. Furthermore, research on ingroup favouritism and outgroup derogation, such as Tajfel and Turner's (1979) social identity theory and Brewer's (1979) minimal group paradigm, suggests that individuals tend to show greater generosity and cooperation towards ingroup members compared to outgroup members. Additionally, experimental work by Charness and Haruvy (2002) and Chen et al. (2006) has shown that social proximity and group membership significantly influence economic decision-making, with individuals displaying more generous behaviour towards ingroup members. These studies support the research of Dreber et al. (2013) and highlight the nuanced nature of human decision-making in the context of resource allocation and underscore the importance of social factors in shaping economic behaviour.

These research studies have showcased the versatility of the Dictator Game’s basic setup in examining various aspects of economic decision-making. However, the simple setup of the Dictator Game has also allowed for it to be adapted and modified into different

variants, which can explore different dimensions of human behaviour and decision-making. One notable variant is the Ultimatum Game, which allows both the allocator and the receiver to make decisions regarding resource allocation. The dictator decides how to divide a sum of money with the recipient, who can either accept the offer or reject it, resulting in neither player receiving anything. Güth and his colleagues (1982) created the Ultimatum Game to investigate the effects of inequity aversion and reciprocity on allocation decisions. They found that the dictators tended to make more equitable proposals, anticipating that the recipients might reciprocate their fairness in subsequent interactions. Similarly, the recipients often reciprocated fair proposals with more equitable allocations, reflecting a desire to maintain fairness and reciprocity within the interaction. This was supported in subsequent research studies by Bolton and Zwick (1995) and Camerer and Thaler (1995), who demonstrated that individuals often exhibit a preference for fairness and reciprocity in economic decision-making, particularly in situations involving bilateral interactions. These pieces of empirical evidence support the notion that fairness and reciprocity are fundamental principles underlying allocation decisions in economic games like the Ultimatum Game. Another notable variant is the Modified Dictator Game which introduces additional conditions or constraints to the traditional Dictator Game setup. The dictator decides how to allocate a sum of money between themselves and the recipient, who has no choice but to accept the offer, as rejection does not affect the outcome. Cherry et al. (2002) employed a modified version of the dictator game to investigate the influence of social distance on altruistic behaviour. In their study, they manipulated the degree of social distance between allocators and receivers by varying the level of anonymity and information available about the recipients. They found that the dictators were more likely to exhibit altruistic behaviour towards recipients with whom they shared closer social ties or had more information. Conversely, when the recipients were anonymous or perceived as distant others, the dictators

were less generous in their allocations. This echoes the findings of Batson et al. (1981) and Dovidio et al. (2017), who also demonstrated that individuals are more likely to exhibit prosocial behaviour towards individuals with whom they share social ties or have a perceived similarity. Additionally, research on the bystander effect by Darley and Latané (1968) and diffusion of responsibility by Latané and Darley (1970) suggests that the presence of social distance or anonymity can reduce individuals' likelihood of helping or behaving altruistically towards others. These findings collectively suggest that social distance plays a significant role in shaping altruistic behaviour, with individuals exhibiting greater generosity towards those with whom they share closer social ties or perceived similarity.

The Sequential Dictator Game (Cason & Mui, 1998; Bahr & Requate, 2007) adds a temporal dimension to the traditional Dictator Game, allowing for sequential decision-making by the dictator and receiver. One person starts as the initial dictator and decides how to allocate the endowment between themselves and the recipient. At the end of each round, the players switch roles, allowing the previous recipient to become the dictator. It allows researchers to observe how decisions change when individuals can switch roles, providing insights into reciprocity and fairness in repeated economic interactions. This was investigated by Bellemare and Kroger (2007), who used the Sequential Dictator Game and found that dictators tended to allocate more resources to receivers when they knew the roles would later switch. Moreover, the receivers would reciprocate the generosity of the dictators in the subsequent round. These findings support the research of Charness and Rabin (2002) and Falk and Fischbacher (2006), who showed that individuals are more likely to exhibit prosocial behaviour towards others when they anticipate future interactions or expect reciprocity. In addition, Bolton et al. (1998) conducted experiments where participants played multi-round dictator games that included role reversals. They found that individuals adjusted their allocation decisions based on their anticipation of future reciprocity, leading to

increased levels of generosity and cooperation over successive rounds. These studies demonstrate the robustness of the role reversal effect on allocation decisions and reciprocity in various economic games. They also highlight the importance of considering temporal dynamics in understanding social behaviour. Another notable variant is the Trust-Dictator Game, which combines elements of the Dictator Game and the Trust Game. It involves two players: the Trustor and the Trustee. The trustor receives money from the experimenter and decides whether to share it with the trustee. If the trustor decides to share the money, the experimenter multiplies the amount that goes to the trustee. Then, the trustee can decide how much, if any, of the total amount to give back to the trustor. When the trustor shares with the trustee, it signals a level of trust and an expectation for reciprocal sharing. When the trustee reciprocates by sharing back, it illustrates cooperation and reciprocity. Conversely, if the trustor chooses not to share, it suggests a lack of trust, and if the trustee fails to reciprocate, it signifies a lack of cooperation. Bohnet and Zeckhauser (2004) utilised the Trust-Dictator Game and found that the trustors who showed greater trustworthiness in the trustees, by transferring more resources, were rewarded with greater levels of reciprocity. Additionally, when trustees thought that the behaviours of the trustors were cooperative and fair, they tended to return the favour more generously. The findings suggest that trust and reciprocity are intricately linked in social interactions, with trust serving as a catalyst for cooperation and reciprocity. Several research studies support their results. Cox (2004) and Charness and Dufwenberg (2006) conducted experiments in trust games where participants could choose to betray or trust their counterparts by transferring resources. They found that there was a positive correlation between the resources transferred by the trustors and their expectations of reciprocity from trustees. Additionally, Kosfeld et al. (2005) investigated trust and reciprocity in a sequential prisoner's dilemma game, where participants could choose between cooperation and defection in each round. They discovered that participants chose to cooperate

when they trusted their counterpart and believed that they would reciprocate the favour in the future. Overall, the empirical evidence underscores the importance of trust in fostering cooperation and reciprocity in social and economic interactions.

Reputation and its Importance within Social Interactions

The evolution of the Dictator Game has led to the development of various adaptations and modifications that provide valuable insights into human behaviour and decision-making in economic exchanges. Each variant offers unique opportunities to study different aspects of altruism, reciprocity, fairness, and trust, contributing to a richer understanding of human behaviour in social and economic contexts. However, reputation is a crucial aspect of human behaviour that profoundly influences social interactions, cooperation, and decision-making. It refers to how others perceive and evaluate an individual's behaviour based on past actions (Russell, 2022). Understanding reputation is vital because it serves as a social currency, shaping how individuals are perceived, trusted, and treated within their social networks and broader communities. In studies by Milinski et al. (2002) and Efferson et al. (2008), conducted different experiments to investigate the role of reputation in the development of cooperation within communities. They discovered a positive relationship between reputation and social status, as those with high reputational scores were more likely to be chosen as cooperative partners and/or leaders within the community. These findings highlight the importance of reputation in shaping social perceptions and interactions, underscoring its significance as a determinant of social status, trust, and cooperation within communities. Research by Nowak and Sigmund (2005) and Yamagishi et al. (2013) provide additional support for the importance of reputation in shaping social perceptions and interactions. Nowak and Sigmund (2005) conducted experiments in which individuals could choose between cooperation and defection in repeated prisoner's dilemma games. They found that individuals with a reputation for cooperation were more likely to receive cooperation from

others, leading to the emergence of cooperation as a stable strategy within the population. The study by Yamagishi et al. (2013) investigated the role of reputation in the development of trust and cooperation by using different economic games. They observed that individuals with high reputation scores were perceived as more trustworthy and thus received more cooperation from others. These studies demonstrate that reputation serves as a powerful mechanism for promoting cooperation, trust, and social cohesion within communities, highlighting its importance as a social currency in shaping social perceptions and interactions.

There are two forms of reputation: direct and indirect (Russell, 2022). A direct reputation refers to how an individual is perceived based on personal interactions. It serves as a marker of trustworthiness, reliability, and moral character within social networks. Research by Baumeister and Leary (2017) highlighted the importance of interpersonal relationships and the need for belongingness in human behaviour, suggesting that individuals strive to maintain positive direct reputations to fulfil their social needs and achieve acceptance within their social circles. This was supported by the research of Fehr and Gächter (2000), who conducted experiments in economic games and observed that individuals with higher reputational scores received more cooperation and support from others, leading to increased social and economic benefits. These findings emphasize the significance of direct reputation as they show that individuals with a positive direct reputation are more likely to be trusted, respected, and included in social groups, leading to increased social status and influence. Multiple research studies on the influence of direct reputation on cooperation in social dilemmas emphasise its significance in shaping behaviour further. For instance, Charness and Dufwenberg (2006) and Dal Bó et al. (2010) utilised experimental frameworks akin to the Dictator Game to shed light on the influence of “direct reputation concerns”. These are worries about how one's actions may impact their perceived credibility, trustworthiness, and

standing in the eyes of others. The participants engaged in repeated interactions where their allocation decisions were observable by others, and the researchers saw a significant increase in cooperative behaviour over time, suggesting that the presence of direct reputation concerns fosters cooperative behaviour. These studies support the research of Milinski et al. (2001), who also highlighted the significance of direct reputation in promoting cooperation and altruism. Their study demonstrated that individuals are more likely to behave altruistically when their actions are observable and subject to reputational consequences. Furthermore, research by Carpenter (2007) explored the effects of direct reputation on trust and reciprocity in economic exchanges. By manipulating the visibility of participants' actions in a trust game scenario, the study revealed that individuals were more inclined to trust and reciprocate with those whose actions were directly observable, highlighting the pivotal role of direct reputation in fostering trust and cooperation. Collectively, the findings provide empirical support for the notion that direct reputation concerns significantly shape behaviour and decision-making in social interactions, emphasising the importance of direct reputation in promoting cooperation and altruism in various contexts.

The concept of *indirect* reputation adds another layer of complexity to understanding social interactions and decision-making processes. An indirect reputation refers to how an individual is perceived based on the experiences of others. It serves as a powerful social cue within social networks and communities. Research by Wedekind and Milinski (2000) has demonstrated the importance of indirect reputation in promoting cooperation and altruism. Their results showed that the participants tended to cooperate with individuals who had a positive reputation for cooperation, even if they had not directly interacted with them previously. This is supported by the research of Rand et al. (2009), who explored the impact of indirect reputation on trust and cooperation in economic games. They found that participants were more likely to trust and cooperate with individuals who had a positive

indirect reputation, suggesting that indirect reputation also influences decision-making and behaviour in social interactions. Building on the research of Rand et al. (2009), studies investigating the role of indirect reputation have provided further insights into its impact on trust and cooperation. For instance, research by Mujcic and Leibbrandt (2018) examined the effects of indirect reputation in a trust game setting, where participants received information about the trustworthiness of their counterparts from third-party observers. Results revealed that individuals were more inclined to trust and cooperate with partners who had a positive indirect reputation, highlighting the influential role of indirect reputation in decision-making. These findings collectively underscore the pivotal role of indirect reputation in shaping behaviour and promoting cooperation in social interactions, highlighting its importance as a mechanism for social influence and coordination. In addition, research studies by Sommerfeld et al. (2007) and Feinberg et al. (2014) have investigated the role of indirect reputation in cooperation and social exchange. They found that individuals with high reputational scores received more cooperation and support from others, leading to increased social status and influence. These research studies and their results add to the notion that indirect reputation is important within social interactions, as they demonstrate that individuals with a positive indirect reputation are more likely to be trusted, respected, and included in social groups, even by individuals who have not directly interacted with them. Moreover, Panchanathan and Boyd (2004) conducted experimental research into the role reputation plays in sustaining cooperation among unrelated individuals in large-scale societies. Through computational models and simulations, they discovered that indirect reputation mechanisms played a crucial role in promoting cooperation and mitigating free-riding behaviours within large groups. Their findings also highlighted how indirect reputation mechanisms could serve as a social enforcement mechanism, deterring defection and promoting adherence to cooperative norms even in the absence of direct monitoring or punishment. These findings

corroborate those of McElreath et al. (2003), who investigated the role of reputation-based partner choice in promoting cooperation in large-scale societies. By using agent-based models and empirical data from real-world populations, they demonstrated that indirect reputation mechanisms played a crucial role in sustaining cooperation among unrelated individuals by enabling the spread of cooperative norms and the identification of trustworthy partners. These studies highlight the importance of indirect reputation in maintaining social order and cooperation within large groups, providing insights into the mechanisms underlying the evolution of cooperation in human societies.

Investigating Reputation Effects using the Round-Robin Dictator Game

The multifaceted nature of reputation stresses its significance as a complex and dynamic social phenomenon that influences various aspects of human behaviour and interactions. Reputation not only encompasses observable actions and behaviours but also perceived trustworthiness, competence, and moral character, which are all evaluated and interpreted by those within social networks and communities. Moreover, reputation is shaped by direct observations and indirect information, such as word-of-mouth communication and third-party evaluations, further complicating its nature (Russell, 2022). Therefore, having the tools to investigate the effects of both direct and indirect reputation allows researchers to unravel the complexities of human behaviour and societal dynamics, contributing to our understanding of the intricate workings of human societies.

The Round-Robin Dictator Game is a variant of the classic Dictator Game (Engel. 2011), which has emerged as a valuable tool for investigating the effects of both direct and indirect reputation on collaboration and altruistic behaviour (Bardsley, 2008; Bolton et al, 1998). In this modified version, each player gets the chance to become the dictator and determine the division of the endowment with another player. This process continues until

each player has had the opportunity to be the dictator against all the other players. As with the classic Dictator Game (Engel, 2011), the personal interactions between the dictator and recipient facilitate the development of a direct reputation. However, the dictators are aware that they are being observed by other players who will act as subsequent allocators, thus introducing the element of indirect reputation to the game. Peysakhovich and Rand (2016) employed the round-robin dictator game to explore the dynamics of direct reputation and its influence on resource allocation decisions. In their study, participants engaged in multiple rounds of the variant, which allowed the researchers to examine how both types of reputation influenced allocation choices. Their findings revealed that when participants observed a dictator consistently behaving altruistically in direct interactions, they were more likely to reciprocate and cooperate with that individual in subsequent interactions. The dictator also gained a positive indirect reputation among the other players, and the researchers found that the other players consistently reciprocated the generosity they had observed indirectly in subsequent direct interactions. The synergistic effect of positive reputations fosters increased levels of cooperation and reciprocity among participants (McNamara & Doodson, 2015), as individuals are inclined to cooperate with those perceived as trustworthy by both direct observation and indirect information. These results are consistent with the findings of Nowak and Roch (2007) and Panchanathan and Boyd (2004). Their studies found that participants felt compelled to reciprocate the generosity shown through direct acts or through information that they had received from other players, thus creating a positive feedback loop of cooperation within the group. Similarly, Capraro and Rand (2018) investigated how both types of reputation impact resource allocation in such settings. The study revealed that the combination of negative direct and indirect reputation led to decreased levels of cooperation and reciprocity among participants, as individuals were disinclined to cooperate with those perceived as untrustworthy by both direct observation and indirect information. Overall, these

studies collectively underscore the importance of both forms of reputation in shaping altruistic behaviour and cooperation. They also emphasize the utility of the Robin-Round Dictator Game in explaining the dynamics of reputation in social decision-making contexts.

Conflicting reputational cues occur when a person shows different behaviours to different people, leading to uncertainty and ambiguity in evaluating their trustworthiness and cooperation. However, this provides an opportunity to examine the phenomenon of "reputation discounting" (List, 2007; Dreber et al, 2013). This occurs when an individual downplays the significance of one form of reputation in favour of the other during social interactions. This might involve dismissing others' perceptions of an individual in favour of personal observations and direct interactions. Conversely, it could entail overlooking any behaviours observed in personal interactions in favour of the consensus. The study of reputation discounting can have profound implications for cooperation, trust, and social interactions. Research on the topic has produced conflicting results. Research studies by Milinski et al. (2001) and Barclay (2004) have demonstrated that individuals often discount the influence of indirect reputation in favour of their own direct observations of behaviour. Additionally, Fehr and Fischbacher (2004) found that individuals are more likely to trust and cooperate with those who have demonstrated consistent positive behaviour in direct interactions, even if their indirect reputation suggests otherwise. These studies suggest that individuals prioritise their immediate observations over indirect information when forming judgements and making decisions in social contexts. On the other hand, research studies by Panchanathan and Boyd (2004) and Nowak and Roch (2007) have shown that individuals are willing to overlook isolated instances of negative behaviour when confronted with a positive indirect reputation for cooperation and fairness, suggesting that individuals prioritise reputation information from others over their own direct observations when forming judgements and making decisions in social contexts. A notable study that may have identified

a common thread in reputation discounting research is the experimental work of Reuben and van Winden (2010). They investigated how individuals would respond to both positive and negative reputational cues when making allocation decisions. Their findings revealed that the participants would prioritise positive reputational information over negative reputational information that signalled disloyalty, dishonesty, or unreliability. Reuben and van Winden (2010) linked this tendency to the desire to avoid social and emotional costs, such as the discomfort of confrontation or the potential for social exclusion. Research by Milinski et al. (2001) provides further support for the tendency of individuals to discount negative reputations. They found that individuals were more likely to cooperate with partners who had positive reputations for trustworthiness and reliability, even if they had previously behaved uncooperatively. This suggests that positive reputational cues are generally given more weight in decision-making processes, possibly due to the desire to maintain cooperative relationships and the social benefits associated with positive interactions.

This thesis aimed to investigate the effects of reputation on collaboration. By using the Round-Robin Dictator Game, this study sought to examine the influence direct and indirect reputation had on decision-making behaviour within social interactions. Based on research by Nowak and Roch (2007), Peysakhovich and Rand (2016), and Capraro and Rand (2018), we hypothesised that there would be a positive relationship between reputation and collaboration. Specifically, we predicted that players with positive reputations (direct and indirect) would benefit from significantly higher levels of cooperation than players with negative reputations. Another aim of this thesis was to investigate the effects of reputation discounting on collaboration. Using the round-robin dictator game, this study also sought to examine the influence conflicting reputational cues had on decision-making within social interactions. Based on research by Milinski et al. (2001) and Reuben and van Winden (2010), our hypothesis posited that participants would prioritise one form of reputation when

confronted with conflicting reputational cues during the online round-robin dictator game. Specifically, we predicted that participants would discount negative reputational information (either direct or indirect) in favour of positive reputational information (either direct or indirect). Quantitative analysis was used to test both hypotheses, and by addressing the effects reputation and reputation discounting have on collaboration, this research aimed to contribute to the existing body of knowledge in social psychology and behavioural economics. It will provide valuable insights into economic behaviour and strategies for fostering positive social dynamics and reducing social dilemmas. It will also shed light on how people weigh different types of reputational cues and the possible implications for social interactions and cooperation.

Methods

Research Design

This study utilised a between-subjects experimental design to investigate the effects of reputation on collaboration. This study adopts a quantitative experimental approach. The choice of a between-subjects experimental design allowed for the manipulation of reputation information while controlling for other variables, thus enabling the isolation of the effect of reputation on collaborative behaviour. The round-robin dictator game was an appropriate tool for assessing collaborative tendencies in a controlled laboratory setting because collaborative behaviour can easily be measured by the size of the endowment allocated to the recipient. The study consisted of four conditions that are mentioned in the “Variables” section of the thesis.

Participants

Participants from the undergraduate student population at Middlesex University were recruited using the convenience sampling method. Additionally, some participants shared the

link to this study with family and friends who were willing to participate. We also recruited participants using SurveyCircle (www.surveycircle.com), an online platform where individuals interested in contributing to research can volunteer and receive points for their participation. 62 of the initial 322 participants completed the online round-robin dictator game in under 4 minutes and consistently selected the same answer throughout the entire game. We believed that the acquiescence bias would significantly skew the data. Therefore, we decided to deem the data from those participants invalid, thus leaving us with 260 valid participants, which was still above our target sample size. The primary aim of our study was to investigate the effects of reputation on collaboration behaviour. By not collecting demographic information, we maintained a focused and streamlined approach, concentrating on the main variables of interest without introducing potential confounding factors. In addition, the collection of demographic information would increase the length and complexity of the study, potentially causing participant fatigue and reducing the quality of responses. By simplifying the data collection process, we aimed to keep participants engaged and gather more accurate data on collaborative behaviour. Also, participant anonymity and privacy were key considerations. Not collecting demographic data allowed us to assure participants that their responses were entirely anonymous, potentially leading to more honest and uninfluenced responses, particularly in an online setting where concerns about data privacy are prominent.

Variables

This was a controlled experiment in which the behaviours of the other three players within the group were predetermined, so we referred to these players as “agents”. These agents were not real; they were programmed to behave differently in each condition. The participant was the only real player in the game. This setup allowed us to isolate the influence of different types of behaviour on the participant’s decision-making process. One player was

the "key agent" because their actions across the different conditions helped reveal important insights into human behaviour and decision-making. The two other players were “regular agents," whose role was to exhibit contrasting behaviours that would place greater emphasis on the behaviour of the key agent. Overall, this allowed us to evaluate the impact of the key agent's actions on the decision-making processes of the participants. To safeguard against potential demand characteristics and maintain the validity of the study, participants were not informed that they would be competing against agents with predetermined actions.

The independent variables of this study were the reputation conditions (generous, selfish, exclusive, excluded). The dependent variable of this study was the collaborative behaviour of the participants, which was measured as resource allocation to a specific player (the key agent) within the online round-robin dictator game. We chose to conduct the study online because it was a cost-effective method that allowed for efficient data collection and a seamless execution of experimental protocols.

Participants were randomly assigned to one of four conditions: Generous, Selfish, Exclusive, or Excluded.

Generous condition: participants interacted with a key agent who shared a substantial portion of their endowment with them and the other agents. This agent cultivated a positive direct and indirect reputation.

Selfish condition: participants interacted with a key agent who did not share any of their endowment with them or the other agents. This agent cultivated a negative direct and indirect reputation.

Exclusive condition: participants interacted with a key agent who allocated a significant portion of the endowment to them but allocated nothing to the other agents. This agent cultivated both a positive direct reputation and a negative indirect reputation.

Excluded condition: participants interacted with a key agent who allocated nothing to them but allocated a significant portion of the endowment to the other agents. This agent cultivated both a negative direct reputation and a positive indirect reputation.

Table 1 provides an illustration of our use of the key agent to gain insight into the decision-making process of the participants. It outlines the behaviour of the key agent (highlighted in red), whether the interaction was with the participants or regular agents (depicted in black), and the different study conditions (highlighted in blue).

Table 1.

		To Regular Agents	
		Generous	**Selfish**
To Participant	**Generous**	**Generous**	**Exclusive**
	Selfish	**Excluded**	**Selfish**

Note. The key agent behaves in a different manner in each of the conditions (shown in blue)

Procedure

To start, participants were directed to review the information sheet (shown in Appendix A), outlining that the study aimed to evaluate their general knowledge and capacity to recognise and articulate visual objects when presented. They were notified that they would engage in an online trivia game, competing against other players, with their performance assessed based on the speed of information processing and accuracy in selecting answers. Participants were also briefed that participation in the research project was entirely voluntary and that their completion of the experiment would signify their agreement to take part. Additionally, it was clarified that all data collected from the study would be kept completely

anonymous, and participants would retain the option to withdraw their consent up until the commencement of data analysis on June 1st, 2023.

We then placed the participants in an online game with three other players and assigned each of them a username (e.g., Player 1, 2, 3, or 4) to provide a way for players to identify themselves and others. This showed the participants that their actions were completely anonymous throughout the game and remained anonymous during the data analysis process. We informed them that the game consisted of nine rounds, as they would play each player in their group three times. However, the participants were only made to participate in eight rounds instead of nine. One reason for this is because we believed that this length of study was sufficient for the agents within the study to develop a direct and indirect reputation. Another reason was to prevent boredom from affecting the results. Research by Hill et al. (2013) investigated the effects of prolonged cognitive testing on participant fatigue and its impact on task performance. They found that participants exhibited signs of fatigue, such as decreased alertness and increased distractibility, as the duration of cognitive testing sessions extended beyond a certain threshold. This showed that longer controlled experiments and laboratory studies can indeed lead to increased participant fatigue, potentially compromising the validity of research findings. An additional reason for shortening the study from nine rounds to eight rounds was to prevent the end-of-experiment effect from affecting the validity of the results. The end-of-experiment effect occurs when the responses or behaviours of the participants are influenced by the impending conclusion of an experiment (Baron and Kenny, 1986; Baumeister and Showers, 1986). Participants may rush through tasks, provide hasty responses, or disengage from the experimental procedure altogether, compromising the reliability and validity of the collected data. Therefore, we decided to implement this strategy to prevent participant disengagement, hasty responses, and demand characteristics (Orne, 2002) from compromising the validity of the study's findings.

The matchups were displayed to the players at the start of each round. The participants could see the opponent they were facing as well as the other matchup. Each round consisted of three stages. In phase one, the participant was paired with an agent and given a question to answer. In phase two, the player who chose the correct answer first received 100 virtual tokens from the researcher. In phase three, the victor decided how many tokens they were willing to give to their opponent before entering the next round. After each round, the participants were shown the result of the other matchup between the other agents. To familiarise themselves with the timing, layout, and structure of the game, participants took part in a practice run. In this trial run, the participants faced off against three different computer-controlled opponents (CPU 1, 2, and 3), and once they had finished this trial run, the real experiment began.

In the Generous condition, participants were assigned to an online group with three agents, identified by the usernames Player 1, Player 3, and Player 4. Players 1 and 4 were the regular agents, and Player 3 was the key agent. The use of agents within the study provided an element of control. We could determine the rounds in which participants would win or lose, thus managing how key agents developed their direct and indirect reputations over the course of the eight rounds. For example, the participants lost to Player 3 in rounds 3 and 5, and they were told that Player 3 would decide how to divide the endowment of 100 tokens. In this condition, Player 3 behaved in a very altruistic manner, giving the participants 80–100 tokens and thus developing a positive direct reputation. The participants could also see the results of the other matchups at the end of each round. So, throughout the round-robin dictator game, the participants saw different instances in which the key agent (Player 3) won and gave a significant amount of the allotted endowment to the regular agents. This led to the development of a positive indirect reputation in the eyes of the participants. In the final round of the study (Round 8), the participants would always win the round by defeating the key

agent. This was their only victory against the key agent throughout the study. With this victory coming at the end, it allowed the participants to recall the behaviours of the key agent, both directly and indirectly. They would then decide how they wanted to split the endowment. We believed that the participants in the generous condition would be more likely to reciprocate the levels of generosity shown to them by the key agent. After this round, the participants were then fully debriefed. They were told about the true aim of the study, what their data would be used for, and their right to withdraw their data.

Materials

The round-robin dictator game was conducted using a web-based platform, called Gorilla (https://gorilla.sc/; Anwyl-Irvine et al. 2020), specifically designed for experimental games and surveys. Participants remained anonymous when they interacted with the other players in their assigned condition and made allocation decisions regarding the virtual endowment. The participants were provided with a virtual currency of 100 tokens to allocate to their interaction partners during each round of the game. The virtual currency within the round-robin dictator game could not be exchanged for any real currency after the experiment. Instructions were provided beforehand to ensure that all the participants understood the rules of the game, including information on the allocation of tokens and any constraints, such as the maximum allocation of 100 tokens per round.

In Appendix A, screenshots of the round-robin dictator game tailored for participants in the Generous condition are presented. Under this condition, the key agent (Player 3) emerged victorious over the participant (Player 2) in two out of three matches, thereby assuming the role of dictator in their interaction. After receiving the 100 tokens from the researcher, the key agent would generously give the participant 80 or more tokens each time. The key agent also emerged victorious against the regular agents. This information was

displayed on the "Other Results" slide that participants would view after completing their round. The key agent behaved in a generous manner towards the regular agents, giving them 70 tokens or more each time. When the regular agents emerged victorious, they exhibited extremely selfish behaviour, abstaining from sending any tokens to either the participant (Player 2) or the key agent (Player 3). This was intended to underscore the generosity of the key agent and further emphasise its positive direct and indirect reputation. We also created a second version of the Generous condition. This version was identical to the first version. The structure remained consistent: both the key agent and the regular agents behaved identically, allocating the same number of tokens to the recipient. We only changed the usernames of the players within the group because we felt the game would appear more realistic if the participants were not always “Player 2” when they took part in the online round-robin dictator game. In this second version, the key agent was Player 4, while the participant was Player 1.

Appendix B outlines the structure of the round-robin dictator game, providing an overview of the format in each of the four conditions. Referencing the table for the generous condition, the "Round" column indicates that there were eight rounds in the study. The “Matchup 1” column lists all the matchups involving the participant, with P2 representing Player 2 and P1 representing Player 1, and so forth. The “Matchup 2” column displays the other matchups that occurred in the same round. The “Victor” column displayed the players who emerged victorious in each matchup. For example, in the Round 1 matchup between Player 1 and Player 2 (the participant), Player 1 was the victor. Therefore, Player 1 became the dictator, while Player 2 was the recipient. The “Tokens Given” column denotes the number of tokens transferred from the victor to the recipient in each matchup. Using the previous example, Player 1 was the dictator, and Player 2 (the participant) was the recipient. The “Tokens Given” column shows that, after they had received 100 tokens from the

researcher, Player 1 did not send any tokens to the participant (Player 2). We use the abbreviation TBD (To Be Determined) in certain rounds because these are the rounds in which the participant will emerge victorious and decide how to allocate the endowment. All the matchups in bold (red or black) involve Player 2 (the participant). The matchups highlighted in red are between Player 3 (the key agent) and Player 2 (the participant). These are the key matches within the online round-robin dictator game. As shown in Appendix B, Player 2 loses the first two games against Player 3. This is important as it allows the key agent to develop a reputation before they face off again in round 8. Player 2 will win the final round and decide how to split the endowment with Player 3 based on their previous interactions.

Ethical Considerations

At the start, we informed the participants that they were taking part in an online trivia game against three other individuals. We intentionally kept the true nature of the study undisclosed to maintain its integrity and reduce the potential impact of demand characteristics on the validity of the results. The participants were informed of the investigation's main objectives at the end. We also informed them about how we intended to use their data and that they had the right to withhold it if they wished.

We obtained informed consent from the participants before commencing the study by showing each participant a copy of the information sheet.

Throughout this study, we preserved participant anonymity and confidentiality by not collecting or storing identifiable information in the data file. The online platform, Gorilla, replaced personal details with a unique ID, which added a layer of privacy while still allowing for effective data analysis.

The research protocol has also been reviewed and approved by the relevant research ethics committee in the Psychology Department at Middlesex University (application 23193).

Data Analysis

Data from the online round-robin dictator game was analysed using the appropriate statistical techniques to examine the differences in collaboration levels across the reputation conditions.

Statistical Software: The data analysis was performed using the statistical software package SPSS version 28.

Significance Level: Statistical tests will be conducted at the conventional significance level of $\alpha = 0.05$, with p-values less than 0.05 considered statistically significant.

Reporting of Results: The results of the data analysis were presented in a clear and concise manner, using tables, figures, and narrative descriptions to communicate key findings and interpretations.

Results

The initial examination of the descriptive statistics for collaborative behaviour across the four reputation conditions—generous, selfish, exclusive, and excluded—revealed that the data were not normally distributed. Measures of skewness and kurtosis indicated significant deviations from normality for each condition. Specifically, skewness values ranged from -0.33 (SE = 0.30) to 1.68 (SE = 0.28) and kurtosis values ranged from -1.31 (SE = 0.59) and 1.77 (SE = 0.56), indicating a departure from the normal distribution.

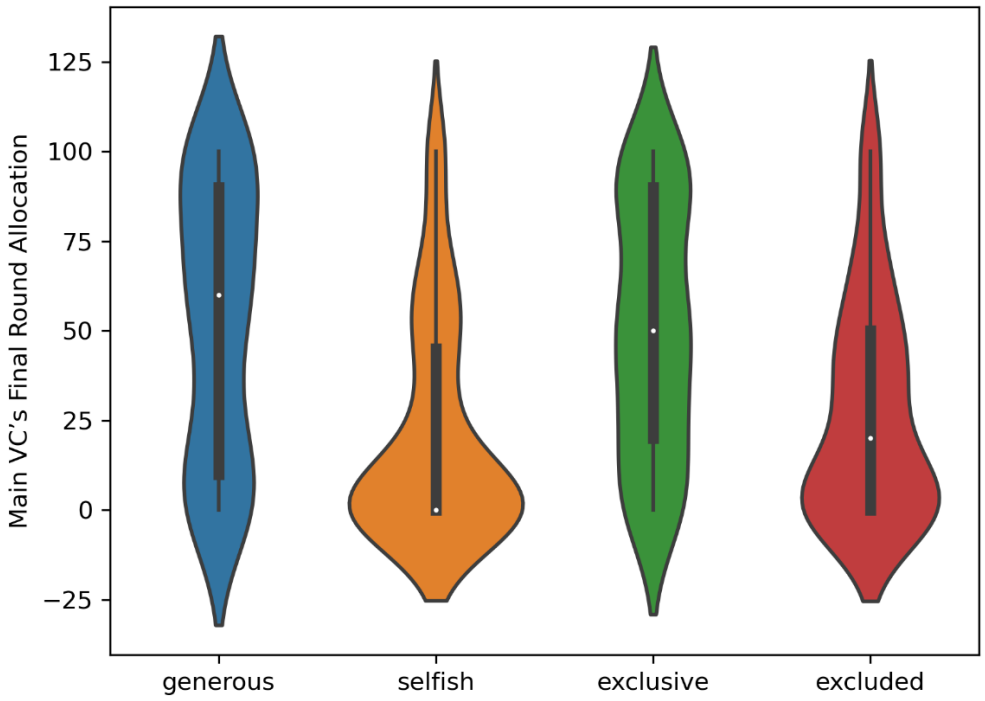
To statistically confirm the non-normality, the Shapiro-Wilk test for normality was conducted for each group. The results of the Shapiro-Wilk test were as follows: Generous condition ($W = 0.89$, $p < .001$), Selfish condition ($W = 0.67$, $p < .001$), Exclusive condition

(W = 0.91, p < .001), and Excluded condition (W = 0.83, p < .001). All conditions produced significant p-values (p < 0.05), indicating that the assumption of normality was violated. Given these findings, non-parametric statistical tests were deemed appropriate for subsequent analyses to accurately assess differences in collaboration behaviour among the reputation conditions.

Due to the non-normal distribution of the data, non-parametric statistical tests were employed. The Kruskal-Wallis H Test was used to compare the participants' collaborative behaviour across the four different reputation conditions: Generous, Selfish, Exclusive, and Excluded. This test was chosen as it does not assume normality and is suitable for comparing multiple independent groups.

Figure 1

Violin plot showing the distribution of tokens sent by the participants across all four reputation conditions.



This violin plot illustrates the distribution of tokens sent by participants in the Generous, Selfish, Exclusive, and Excluded reputation conditions. The width of each violin represents the density of the data, with wider sections indicating higher concentrations of token amounts. The central white dot shows the median, the thick black bar represents the interquartile range (IQR), and the thin black lines (whiskers) extend to the minimum and maximum values, excluding outliers. This visualisation highlights the differences in the participants' collaborative behaviour across the four conditions. influenced by the direct and indirect reputation of the key agent.

The Kruskal-Wallis test indicated a significant difference in collaborative behaviour among the four reputation conditions, H (3, n = 260) = 60.88, p < .001. This result suggests that at least one group differs significantly from the others in terms of collaborative behaviour.

To determine which specific groups differed, pairwise comparisons were conducted using the Mann-Whitney U test with a Bonferroni correction applied to adjust for multiple comparisons. The results of these pairwise comparisons can be seen in Table 2.

Table 2

Pairwise Comparisons of the Reputation Conditions

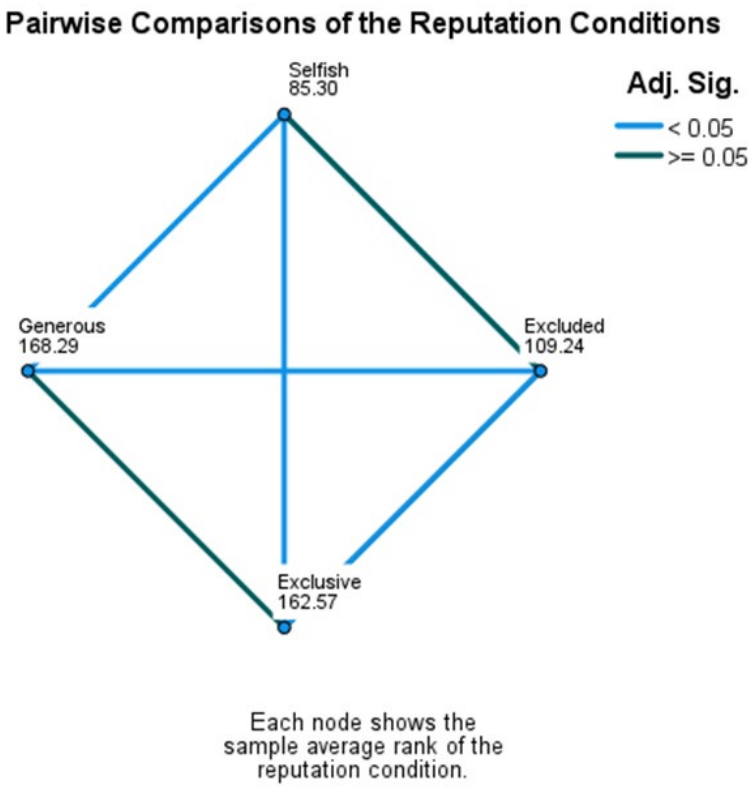
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Selfish-Excluded	-23.939	12.977	-1.845	.065	.390
Selfish-Exclusive	-77.272	12.695	-6.087	<.001	.000
Selfish-Generous	82.994	12.643	6.564	<.001	.000
Excluded-Exclusive	53.333	13.337	3.999	<.001	.000
Excluded-Generous	59.055	13.288	4.444	<.001	.000
Exclusive-Generous	5.722	13.013	.440	.660	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Figure 2

A pairwise comparison plot for each of the four reputation conditions: generous, selfish, exclusive, and excluded.



These comparisons revealed significant differences between the Selfish and Generous conditions ($z = 6.56$, $p < .001$), the Selfish and Exclusive conditions ($z = -6.09$, $p < .001$), the Excluded and Exclusive conditions ($z = 4.00$, $p < .001$), and the Excluded and Generous conditions ($z = 4.44$, $p < .001$). There were no significant differences between the Selfish and Excluded conditions ($z = -1.85$, $p = 0.07$) and the Exclusive and Generous conditions ($z = 4.00$, $p = 0.66$).

Discussion

Our study revealed significant insights into how reputation influences collaborative behaviour. Participants demonstrated a clear tendency to behave more generously towards individuals with a positive direct reputation. Specifically, those in the Generous and Exclusive conditions were more willing to send tokens to the key agent when compared to those in the Selfish and Excluded conditions, indicating that positive direct reputations strongly encourage collaborative actions. Additionally, the concept of reputation discounting was observed when the participants were faced with conflicting reputational cues. There was a significant difference in the mean number of tokens sent to the key agents in the Generous-Excluded conditions. This suggests that the participants in the Excluded condition were willing to disregard the positive indirect reputation of the key agent due to its negative direct reputation. There was also a significant difference in the mean number of tokens sent to the key agents in the Selfish-Exclusive conditions. This suggests that the participants in the Exclusive condition were willing to overlook the negative indirect reputation of the key agent due to its positive direct reputation. However, there were no notable differences in behaviour between the Selfish-Excluded conditions nor between the Generous-Exclusive conditions, suggesting that once a direct reputation is established, additional indirect information does not significantly alter behaviour. Overall, these findings underscore the importance of direct reputation in guiding collaborative decisions and highlight the nuanced ways in which people interpret reputation information during social interactions. when deciding how to collaborate.

Critical Analysis

Acquiescence bias: We structured our online round-robin dictator game to mimic a questionnaire, wherein participants answered trivia questions before determining how to divide an endowment with another player. One of the advantages of employing this self-

report technique was its cost-effectiveness. With the progression of technology and the emergence of platforms like Gorilla and SurveyCircle, we were able to create and distribute our research at a minimal cost. Another advantage is the reduced probability of demand characteristics affecting the validity of the research findings. Compared to methods like interviews or laboratory experiments, where the presence of the researcher can influence the participants' behaviour, questionnaires are less susceptible to bias because of the standardised format of data collection. This standardised format ensures consistency in responses across different respondents, reduces the potential for demand characteristics, and increases the internal validity of the findings. However, employing a self-report design for our online round-robin dictator game made our study vulnerable to various biases that could have impacted the internal validity of our research findings. For example, we identified the presence of acquiescence bias in the collected data. Acquiescence bias, a form of response bias, occurs when participants repeatedly select the same answer without fully reading or considering the question's content. Studies by Podsakoff et al. (2003) and Meade and Craig (2012) have highlighted the detrimental effects of acquiescence bias. Podsakoff et al. (2003) demonstrated that acquiescence bias can artificially inflate correlations between constructs, leading to spurious relationships and misleading conclusions. Similarly, Meade and Craig (2012) investigated the impact of acquiescence bias on survey responses and observed that it can lead to measurement errors and invalid inferences, undermining the credibility and utility of research findings. Although we took steps to mitigate the acquiescence bias (e.g., clear instructions and the anonymity of responses), we set a time threshold of 7-10 minutes to filter out the responses of participants who completed the task too quickly. This ensured that only responses from participants who had engaged with the study adequately were included in the analysis. During the data analysis, we found that 62 of the initial 322 participants completed the online round-robin dictator game in under 4 minutes and consistently selected the same

answer throughout the entire game. We believed that the acquiescence bias would significantly skew the data. Therefore, we decided to deem the data from those participants invalid, thus leaving us with 260 valid participants, which was still above our target sample size.

Social Desirability Bias: There is also the possibility that the participants were keen to present themselves in a positive light; this is a demand characteristic known as social desirability bias. Braun et al. (2001) highlighted that social desirability bias can lead to inflated self-reports of positive traits such as honesty, kindness, and intelligence, thereby compromising the validity of personality assessments. Similarly, Fisher (1993) investigated the impact of social desirability bias on survey responses and observed that it can lead to overreporting of socially acceptable behaviours and underreporting of socially undesirable behaviours, distorting research findings and undermining their reliability. These findings demonstrate the detrimental effects of social desirability bias on various measures, including self-reported measures of personality traits, attitudes, and behaviours. In our study, the participants may have behaved in a way that they believed aligned with social norms or expectations rather than their true preferences or intentions. For example, they might have distributed the endowment in a more equitable manner because they perceive this as socially desirable, even if they would have preferred to keep more for themselves. However, we employed strategies that aimed to mitigate the effects of social desirability bias. We assured participants that the data we collected from the study would remain anonymous. This technique reduces the pressure participants feel to provide socially desirable behaviours, encouraging more honest and accurate responses. In addition, we disguised the true purpose of the study and the specific variables of interest. The participants were told that they were taking part in an online trivia game that tested their reaction time and general knowledge. This was done to reduce the participants' inclination to provide socially desirable responses,

as they do not know the desired outcome or the true aims of the study. Through the implementation of these methods, we could confidently attribute the observed effects in the experiment to the manipulation of the independent variables, thereby strengthening the internal validity of our findings.

Sample Representativeness: Another benefit of the study's design was its scalability. By using online platforms such as Gorilla and SurveyCircle, we were able to gather data from a larger number of participants. A relatively large sample size led to narrower confidence intervals around estimates of population parameters. This heightened precision yielded more accurate estimates of the true population values, which enhanced the accuracy and reliability of the study findings and enabled us to draw confident conclusions about the observed effects in the data. Also, our relatively large sample size meant that our study had high statistical power. This reduced the likelihood of Type II errors (false negatives) and further increased the internal validity of the study. However, we used a volunteer sample to gather data for this study. While this is a cost-effective and less time-consuming method of data collection, volunteer samples only consist of individuals who chose to participate and therefore are not representative of the broader population. Sample representativeness is crucial for ensuring the generalisability and external validity of research findings. A representative sample is essential for drawing valid conclusions about the broader population and making reliable inferences from research data. Studies by Groves et al. (2009) and Schouten et al. (2021) have emphasised the importance of sample representativeness in minimising sampling bias and increasing the reliability of research outcomes. Groves et al. (2009) highlighted that a non-representative sample may lead to biassed estimates and erroneous conclusions, limiting the applicability of research findings to a broader population. Similarly, Schouten et al. (2021) examined the effects of sampling bias on survey estimates. They found that non-representative samples yielded inaccurate population estimates and biassed parameter

estimates. These findings highlight the importance of sample representativeness in research methodology and stress the necessity of meticulous sampling procedures. Our round-robin dictator game suffered from selection bias due to a significant portion of the sample being drawn from Middlesex University. This meant that it would be difficult to generalise the results to a wider population, thus reducing their external validity. Our study also suffered from volunteer bias due to our online recruitment method. Online participation was voluntary, so those who chose to participate may have had different traits or interests than those who declined. This may have skewed the sample towards certain demographics or attitudes, making it more difficult to generalise the findings to the broader population. To address these issues in the future, we may use different strategies to mitigate selection bias and volunteer bias. For example, targeted recruitment methods ensure that the sample of participants more accurately represents the population of interest and reduce the likelihood of self-selection in the study. By using these methods, we would be able to actively seek out and include individuals from diverse demographic backgrounds, ensuring that our sample is more representative of the target population, thus helping to mitigate selection bias. Targeted recruitment methods would also allow us to collect data from different groups or individuals who are less likely to volunteer for the study through traditional means. This could involve leveraging social networks or using incentives to appeal to underrepresented groups. This would reduce the likelihood of volunteer bias and ensure that the sample is more representative. We could also combine online recruitment with other recruitment methods to broaden our reach and reduce selection bias. The use of online recruitment methods, such as SurveyCircle, provided access to a vast and diverse pool of participants from different geographic locations, demographic backgrounds, and cultural contexts. However, relying solely on online recruitment inadvertently excluded individuals who were less comfortable with technology and those who did not have access to the internet. By diversifying our

recruitment methods, we would be able to reduce the likelihood of selection bias in future research by ensuring individuals with varying levels of digital literacy and internet access can participate in the study. This helps create a more representative sample that captures a broader range of perspectives and experiences. Overall, by using a multi-faceted approach to participant recruitment in the future, we would be able to improve the generalisability and validity of the study findings by ensuring that the sample more accurately reflects the population of interest.

Highly controlled experiment: Our study was conducted in a highly controlled environment, which provided us with many advantages when it came to the results of our study. Crowther and Lancaster (2012) and Walliman (2022) emphasised that experimental control is important in establishing causal relationships between variables. By conducting a highly controlled experiment, we were able to precisely manipulate the reputation conditions and ensure consistency and accuracy in the presentation of reputational cues to the participants. Also, by systematically varying the reputation information across the experimental conditions, we isolated the specific effects of reputation on collaborative behaviour, minimised potential confounding variables, and enhanced the internal validity of our study further. Burns (2000), Rosenthal and Rosnow (2008), and Howitt and Cramer (2014) provided a comprehensive review and synthesis of existing research methodologies where they discussed various experimental designs, statistical methods, and principles of behavioural research. Their approach involved critically analysing and summarising findings from numerous studies to highlight best practices in research design and methodology. They provided detailed discussions on the importance of experimental control, the dangers of confounding variables, and methods to enhance internal validity. By reviewing various research studies, they highlighted the benefits of rigorous experimental control and demonstrated how well-designed experiments could isolate the effects of independent

variables, thus ensuring the accuracy and validity of research findings. By opting for a highly controlled environment in our study, we were able to control the outcomes of the matches and the number of tokens that the key agent would give to the participant in the different conditions. This gave us the opportunity to create different types of reputation conditions and investigate the relationship between reputation and collaborative behaviour without the influence of extraneous variables. The implementation of standardised experimental procedures aided in isolating the effects of reputation on collaboration, thereby bolstering the reliability and replicability of our findings. Overall, the use of a highly controlled setting enhanced the rigour and robustness of our research, increased the internal validity of our findings, and enabled us to deduce that reputation has a significant effect on collaborative behaviour within social interactions. One potential limitation would be that the experimental setting does not completely capture the complexity and variability of real-world collaborative situations. The absence of the rich contextual cues and interpersonal dynamics present in authentic collaborative environments may have had an impact on the participants' decision-making. Additionally, the context of the round-robin dictator game does not represent the diverse range of collaborative interactions encountered in various organisational or social settings. This may have led to responses that did not reflect the participants' natural inclinations or tendencies and limited the ecological validity of our findings. For example, participants may display "signalling behaviour" where they give larger amounts to signal something about themselves (e.g., generosity or wealth) to the experimenters or other participants, especially if they believe their behaviour is being closely observed. Also, the participants may have provided responses that followed a specific, non-random pattern, such as giving a fixed number of tokens regardless of the recipient, thus indicating that the participants were following a rule rather than making genuine decisions based on the reputation condition or the behaviour of the key agent in previous rounds.

The situational context in which research is conducted plays a crucial role in shaping participant behaviour, responses, and the interpretation of results. Milgram (1963), Hofling et al. (1966), Milgram (1974), Burger (2009) all conducted experiments on obedience to authority. They used laboratory experiments to investigate obedience levels in different scenarios or contexts and demonstrated how situational factors, such as the presence of an authority figure and social pressure, can influence individuals' willingness to obey unethical commands. The experimental setups involved a "teacher" (the participant) who was instructed to administer electric shocks to a "learner" (a confederate of the experimenter) whenever the learner made a mistake on a memory task. The shocks ranged from mild to potentially lethal levels, though no actual shocks were delivered. They found that the participants were willing to administer shocks to the learner and obey the authority figure's commands. These studies highlight the importance of considering situational context in research design and interpretation to ensure that study findings accurately reflect human behaviour in real-world settings. Therefore, future research on reputation and collaboration could explore alternative methodologies or field-based approaches to better capture the complexities of collaborative interactions across different situational contexts and settings. Acknowledging and accounting for the situational factors will enhance the ecological validity and applicability of the findings because real-world behaviours are often the result of complex interactions between individual traits and situational factors. Therefore, accounting for these interactions in research designs provides a more comprehensive understanding of the effects of reputation on collaborative behaviour. In addition, the acknowledgement of situational factors can inform the development of interventions and policies that are more effective in real-world settings. For example, understanding how different contexts influence collaboration can help design better teamwork strategies in organisational settings.

Use of a Cross-Sectional Design: By manipulating the reputation conditions, we were able to explore the different reputational cues that influence collaborative behaviour (generous, selfish, exclusive, and excluded) and shed light on the underlying mechanisms of reputation in social interactions. This study contributes to the existing body of research on collaborative behaviour and reputation by employing a novel experimental approach and extending our understanding of the factors that influence collaborative interactions. However, the cross-sectional design limits the temporal stability of our study because there are many confounding variables that may arise over time and make it difficult to establish the true cause-and-effect relationships between reputation and collaborative behaviour in social interactions. For example, cultural norms and values are important (Tomasello, 2010; Whiten et al., 2011; Spencer-Oatey & Franklin, 2012) and can influence both the perception of reputation and collaborative behaviour. Therefore, if social and cultural norms change over time, what constitutes a positive or negative reputation may also shift, meaning that the results seen in our study may become obsolete and no longer applicable to real-world contexts. Temporal stability allows researchers to assess the consistency of results across different time points, populations, and contexts, thereby increasing confidence in the reliability and robustness of study conclusions (Roberts et al., 2006). As our cross-sectional study only collected data from a single point in time, the observed relationships between reputation and collaborative behaviour are only valid for that period. These relationships may not hold true over time, thus limiting the temporal stability and generalisability of the results. If we were to obtain more resources in the future, we could use a longitudinal design to track the changes in collaborative behaviour and reputation over time. This would allow us to assess the consistency of the research findings over time and develop a more comprehensive understanding of the causal relationships.

Individual Differences: Individual differences are another confounding variable that may have had an impact on the results. This is a common confounding variable, particularly in between-subjects research designs where participants across groups differ. This means that the mean differences discovered between the groups could be due to individual differences rather than changes to the independent variable(s). Revelle et al. (2011) underscored how inherent variations among participants can introduce variability into research results, potentially confounding study findings and impacting their internal validity. To address this, we randomly allocated participants to evenly distribute the participant characteristics across the four conditions (generous, selfish, exclusive, and exclusive). However, this study primarily investigated the impact of reputation on collaboration using the round-robin dictator game. We were interested in understanding the general mechanisms through which reputation influences collaboration rather than how these effects might vary among individuals. Although individual characteristics such as gender, personality traits, and cultural backgrounds can influence collaboration, this study did not directly explore them. Conducting research on individual differences often requires larger sample sizes and more resources to account for the variability among participants. We opted for a simpler study design due to limitations in funding and time. Future research in the areas of reputation and collaboration could incorporate measures of individual differences, thus providing a more comprehensive insight into the mechanisms shaping collaborative behaviour within the framework of reputation.

Inferences drawn from the Results

The key agent with a positive reputation (direct and indirect) received a significantly greater portion of the endowment when compared to the key agent with a negative reputation (direct and indirect). Based on these findings, there are a few things we can infer about reputation.

Trustworthiness and Social Influence: Individuals with positive reputations are often perceived to be more trustworthy and reliable. Research by Anderson et al. (2006) has demonstrated the impact of reputation on trustworthiness judgements and interpersonal evaluations. They conducted experiments on social reputation and observed that individuals with positive reputations were more likely to be perceived as trustworthy and reliable, leading to increased trust and cooperation from others. Research by Colquitt et al. (2007) provides support for the perception that individuals with positive reputations are perceived as more trustworthy. In their study on justice and trust in the workplace, they found that supervisors who were perceived as fair gained the trust of their subordinates. These findings align with the research of Dirks and Ferrin (2001), who examined trust in the workplace and showed that supervisors who exhibited behaviours consistent with ethical standards and integrity were perceived as more trustworthy by their subordinates.

This perception of increased trustworthiness may explain why the key agent in the generous condition received a significantly greater portion of the endowment when compared to the key agent in the selfish condition. Individuals with positive reputations are perceived as trustworthy and reliable by others. By investing resources in them, the participants aimed to enhance the quality of the relationship and promote cooperation or collective success. Research studies by Gambetta (1988) and Mayer et al. (1995) have shown that increased trustworthiness often leads to increased resource allocation due to the positive expectations and perceptions associated with trustworthy individuals. Gambetta (1988) investigated the role of trust in social exchange and observed that individuals are more willing to share resources with trustworthy partners, as trust reduces uncertainty and perceived risk in social interactions. This allocation of resources reflects a willingness to invest in relationships with trustworthy individuals based on the expectation of reciprocity and mutual benefit. This was supported by Mayer et al. (1995), who presented an integrative model of organisational trust.

The researchers conducted a thorough review of existing literature across disciplines such as psychology, organisational behaviour, and management. They examined studies that explored various aspects of trust, including its antecedents, dimensions, and consequences in organisational contexts. Mayer et al. (1995) found that individuals who were perceived as high in these dimensions were more likely to be trusted by their peers and colleagues. Specifically, integrity was highlighted as a critical factor, where individuals who consistently demonstrated honesty, fairness, and ethical behaviour earned positive reputations for trustworthiness. Overall, Mayer et al. (1995) were able to develop a model that depicted a positive relationship between a positive reputation and the perception of trustworthiness, highlighting the importance of ethical conduct in fostering trust and cooperation in interpersonal and organisational contexts.

Individuals with positive reputations are often perceived to have greater social influence due to the trust, respect, and admiration associated with their reputation. Fiske and Taylor (1991) conducted studies on social cognition and observed that individuals with positive reputations were perceived as more competent, likeable, and influential, leading to greater deference and compliance with their requests and recommendations. Similarly, Flynn (2005) investigated the role of reputation in social decision-making and found that individuals with positive reputations were more likely to be chosen as leaders and decision-makers in group settings, leading to increased resource allocation and influence. In addition, Casciaro and Lobo (2008) investigated the role of social networks in influence and observed that individuals with positive reputations were more likely to occupy central positions in social networks, facilitating greater influence and access to resources. These research studies suggest that individuals with positive reputations exert a significant social influence, which affects how others interact with them in social situations. Research by Roberts and O'Reilly (1974) offer further support for the idea that positive reputations lead to increased social

influence. In their study on leadership and influence in organisational contexts, they found that leaders with positive reputations for fairness, integrity, and competence were more successful in influencing subordinates' behaviours and attitudes. These findings suggest that positive reputations contribute to increased social influence by fostering trust, credibility, and respect, thereby enhancing leaders' ability to mobilise and motivate others towards shared goals. This is consistent with the research of Van Vugt and Hardy (2010). They examined leadership emergence and effectiveness and found that individuals with positive reputations for competence, fairness, and integrity were more likely to emerge as leaders in group settings and exert greater influence over group decisions.

Our results showed that the key agent in the generous condition received significantly more tokens than the key agent in the selfish condition, and the increased social influence due to the positive reputation (direct and indirect) could be another explanation for this phenomenon. Research studies by Gouldner (1960) and Yamagishi and Cook (1993) have shown that increased social influence, due to a positive reputation, led to the reciprocity of positive actions. Gouldner (1960) introduced the concept of "the norm of reciprocity," which suggests that when individuals perceive someone with a positive reputation as influential, they feel compelled to reciprocate their positive behaviour as a means of maintaining social harmony and preserving the relationship. Yamagishi and Cook (1993) supported this concept as they demonstrated that individuals with positive reputations were perceived as more trustworthy and influential within their social networks. They suggested that their positive reputation elicited cooperative behaviour and positive actions from others because people tend to reciprocate the positive treatment they receive. Additionally, they found that individuals engaged in positive actions to cultivate and maintain their social relationships with these influential individuals, further reinforcing the cycle of reciprocity and cooperation. Overall, these findings suggest that individuals with positive reputations, both

direct and indirect, exert a significant social influence on members within their group, which positively affects how others interact with them and allocate resources to them in social situations.

Social Signal: Reputation plays a vital role in social interactions and decision-making by giving people valuable insights into the trustworthiness, reliability, and past behaviour of others. Yamagishi et al. (1999) found that individuals with positive reputations for fairness and reciprocity were more likely to receive cooperation from others in subsequent interactions. This reputation-based cooperation was facilitated by social signals that communicated individuals' trustworthiness and reliability. The study highlighted that reputation serves as a mechanism for signalling cooperative intentions and adherence to social norms, influencing individuals' decisions to cooperate or defect in social dilemmas. These results coincide with the research of Milinski et al. (2002), who investigated reputation and cooperation in economic games and showed that individuals use others' reputations for fairness and reciprocity to assess the risk of cooperating with them. They also found that positive reputations were signals of trustworthiness and reliability, which led to the development of cooperative interactions and the formation of mutually beneficial partnerships. This provides another explanation for the results of our experiment. Based on these studies, the positive reputation of the key agent in the generous condition serves as a social signal of favourable outcomes in the future, prompting the participants to allocate a greater portion of the endowment to the key agent. Also, the negative reputation of the key agent in the selfish condition signalled a higher risk of betrayal or exploitation, which explains the significantly reduced allocation of tokens.

Research by Bicchieri and Xiao (2009) provides further support for the role of reputation as a form of risk assessment in social interactions and decision-making processes. In their research on social norms and cooperation, Bicchieri and Xiao (2009) used the dictator

game to investigate the role social norms play in decision-making. They discovered that individuals depend on the reputations of others to gauge the risks associated with engaging in social interactions. When participants were matched with someone boasting a positive reputation, they tended to behave in a cooperative manner. Conversely, when paired with someone bearing a negative reputation, participants tended to exercise caution or even avoid the interaction altogether to forestall potential exploitation. In the research study by Haley and Fessler (2005), participants played a version of the public goods game in which they could observe the contributions made by other players and choose whether to punish those who contributed less than their fair share. Participants were also provided with information about the reputations of other players based on their past behaviour in similar games. They found that participants were more inclined to punish individuals who contributed less if they perceived them as having a poor reputation for cooperation or fairness. Conversely, they were less inclined to punish those with positive reputations, even if their contributions were below what was considered fair in the current game. This suggests that individuals use reputation cues to assess the probability of engaging in behaviour warranting punishment; they are more likely to penalise those with negative reputations because they perceive them as posing a greater risk of defection or exploitation in future interactions. Moreover, the research conducted by Seinen and Schram (2006) further bolsters the notion that reputation acts as a mode of risk assessment in social interactions and decision-making processes. In their examination of social status and cooperation, they observed that reputation played a crucial role in evaluating the risk associated with engaging in various social interactions. Moreover, Seinen and Schram (2006) illustrated that individuals were more inclined to cooperate with those possessing positive reputations, as this mitigated the perceived risk of betrayal and defection in social exchanges. These findings indicate that reputation serves as a valuable

heuristic for assessing risk in social interactions, enabling individuals to make informed decisions and navigate intricate social landscapes adeptly.

Preference for Positive Information: We also found that participants prioritised positive reputational information (either direct or indirect) over negative reputational information (either direct or indirect). The preference for positive information refers to individuals assigning greater significance to positive attributes, traits, or experiences when forming judgements or decisions. In our study, this preference was evident in the participants' responses to conflicting reputational cues in the excluded and exclusive conditions. The difference in tokens allocated to the key agents in the excluded and selfish conditions, as well as in the exclusive and selfish conditions, demonstrated that positive information held greater weight than negative information.

Rand et al. (2009) delved into the dynamics of reputation and cooperation, investigating how individuals tend to prioritise positive reputational signals over negative ones, even amidst conflicting cues. Their research involved participants engaging in economic games, where choices of cooperation or defection impacted their reputations based on past behaviour. The results indicated a distinct preference for individuals with positive reputations, a preference that persisted even in the face of conflicting reputational information. This underscores the inclination towards favourable reputation cues in social interactions. Raihani and Bshary (2015) supported these findings in their examination of reputation and indirect reciprocity. Their study illustrated how individuals assess the trustworthiness and cooperation of others based on reputational cues. Participants, faced with scenarios featuring individuals with positive or negative reputations, consistently leaned towards cooperation with those holding positive reputations, reinforcing the tendency to favour positive reputational cues in decision-making regarding social interactions. Collectively, these studies suggest a robust preference for positive reputational information

when determining whom to trust or cooperate with, even amidst ambiguity or conflicting signals. Sylwester and Roberts (2010) conducted a study on indirect reciprocity and reputation management, focusing on how individuals make decisions about whom to cooperate with based on reputational information. In their study, participants engaged in economic games where they could choose to interact and cooperate with others. Each participant had the opportunity to observe the past behaviours and reputations of potential interaction partners. The key aspect of the study was that participants could base their decisions on reputational cues, specifically whether potential partners had positive or negative reputations for cooperation. Sylwester and Roberts (2010) found that participants were more likely to cooperate with individuals who had positive reputations, even if those reputations were based on indirect information. This suggests that even if participants did not directly witness a person's cooperative behaviour but instead received information about it from others, they were still more inclined to cooperate with that individual. This preference for positive information aligns with broader psychological phenomena such as positivity bias or the Pollyanna principle (Matlin, 2016), which suggest that people tend to focus more on positive stimuli and information while downplaying or ignoring negative stimuli. Similarly, the research conducted by Bear and Rand (2016) on reputation and social learning showed that individuals tend to adopt the behaviours of those with positive reputations, even when faced with conflicting information. This bias towards positive reputational information reflects its greater salience and impact on individuals' perceptions and decisions.

Research by Efferson et al. (2015) provides additional evidence supporting the tendency of individuals to prioritise positive reputational information over negative reputational information. Efferson et al. (2015) delved into reputation-based cooperation within large-scale societies, with a particular emphasis on the role of reputation in shaping individuals' choices to cooperate. Efferson and colleagues conducted their research in the

context of female genital cutting (FGC) in Sudan, where there are various factors influencing individuals' decisions regarding this practice. They found that people were more likely to support those who had developed a positive reputation for not practicing FGC because of their stance on the health, well-being, and rights of girls and women. This support persisted even when people received conflicting information about these individuals or the practice of FGC. The findings suggest that the positive reputations developed for non-participation in FGC served as a strong signal of trustworthiness and bravery among individuals in the community. Despite potential uncertainty or conflicting information, people were more inclined to support these individuals, demonstrating a preference for positive reputational information. Moreover, research by Barkow et al. (1992) on the psychology of reputation highlights the evolutionary significance of positive reputational information in social decision-making. They explained that prioritising positive reputational information is a component of adaptive decision-making processes because a positive reputation is associated with heightened social status, improved access to resources, and enhanced reproductive success, rendering it highly esteemed and actively sought after in social interactions. Therefore, the preference for positive reputational information reflects an adaptive strategy that is shaped by evolutionary pressures to maximise social benefits and minimise risks in social interactions. These studies highlight the importance of reputation in influencing social behaviour and decision-making, even in contexts where there may be uncertainty or conflicting information. They illustrate how individuals prioritise positive reputational cues when making decisions about cooperation, underscoring the significance of reputation as a fundamental mechanism for social coordination and cooperation in human societies.

Prioritising Self-Interests: We found no significant difference between the number of tokens given to key agents in the generous condition and the exclusive condition. This suggests that participants were willing to overlook negative reputational cues if they received

personal benefits. A cost-benefit analysis often drives this behaviour because the potential rewards outweigh the social or reputational risks of negative perception. For instance, a study by Fehr and Fischbacher (2004) on social preferences and reciprocity showed that individuals are willing to overlook negative reputations if the partnership offers significant personal or financial gains. Moreover, Bazerman and Moore (2012) emphasised that individuals frequently exhibit bounded ethicality, prioritising practical benefits over ethical considerations, especially in competitive or resource-scarce environments. The concept of strategic partnerships between businesses provides support for this phenomenon. Organisations often collaborate with others, even if they have tarnished reputations, to achieve mutual objectives, access new markets, or leverage unique resources, as discussed by Dyer and Singh (1998). Consequently, the immediate and tangible benefits of such collaborations often motivate individuals to set aside moral or reputational concerns in favour of achieving personal or professional goals. Schweitzer et al. (2005) provide further evidence supporting the notion that individuals may collaborate with those perceived negatively in public for personal gain. In their study on behaviour during negotiations, they observed that people often overlook unethical actions when significant personal gains are at stake. This indicates that the allure of potential benefits from collaboration can outweigh moral or ethical considerations. Similarly, Lount and Pettit (2012) explored how perceived competence can sometimes outweigh reputational concerns. They found that participants were willing to collaborate with those who have negative reputations if they were competent or capable of delivering substantial benefits. This observation also aligns with the concept of "constructive deviance," as coined by Warren (2003), which suggests that the pursuit of desired outcomes can justify associations with negatively perceived individuals. Overall, these findings highlight the pragmatic approach that participants may have adopted within the online round-

robin dictator game: prioritising personal or strategic gains over reputational risks in competitive or high-stakes environments.

Conclusion

To conclude, this study contributes significantly to the growing body of literature on reputation and collaboration, offering empirical evidence of how various types of reputational information influence cooperative behaviour. Beyond the immediate findings, the insights gleaned from this study have practical implications for the design and implementation of reputation systems and policies across diverse social and organisational contexts. By elucidating the nuanced effects of different reputational cues on collaborative behaviour, the research provides valuable guidance for refining existing reputation mechanisms and developing new strategies to foster collaboration. For instance, organisations, online platforms, and communities can leverage these insights to design more effective reputation systems that incentivise cooperation, trustworthiness, and reciprocity while mitigating the risks of exploitation and free riding. The insights drawn from this study can also address pressing societal issues, such as public health crises and social inequality. By elucidating the factors that drive collaborative behaviour and collective action, the research offers potential strategies for mobilising collective efforts to tackle complex global problems. By leveraging reputational incentives and social norms, policymakers, activists, and community organisers can galvanise collective action and drive positive social change. Finally, this research study connects multiple disciplines—psychology, economics, sociology, and organisational behaviour—by integrating insights from reputation theory with experimental methodologies. By promoting interdisciplinary collaboration and knowledge exchange, the study enhances our understanding of human behaviour and social dynamics and paves the way for future interdisciplinary research efforts.

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Appendix A
General Reputation Questionnaire

Information Sheet

This is an online multiplayer trivia game that aims to test the general knowledge of the participants involved, and their ability to identify and describe visual stimuli when presented. We are trying to observe the speed at which individuals can process information that is provided to them, and select the correct responses to each task. This is important as it provides information on how the schematic framework of humans, who are complex adaptive systems, operates in mundane situations.

Your data, along with the data from other players, will be collected, combined, and analysed to find the mean time taken for the tasks to be completed.The resulting data will be kept completely anonymous when being mentioned within a written dissertation, or potentially a subsequent publication in a scientific journal. In addition, this data could be combined with other data sources and analysed as part of a larger study in the future, whilst still remaining fully anonymised.

Your completion of this study will be deemed as your consent. At any point during the research study, you are able to end your participation. You also have the right to withdraw your consent up until the first day of data analysis **(1st June 2023).**

If you have any questions or would like additional information about the study, feel free to contact the researcher or one of the supervisors.

Researcher - Kola Taiwo (KT614@live.mdx.ac.uk)

Supervisor - Yvan Russell (y.russell@mdx.ac.uk)

Supervisor - Rob Spencer (r.spencer@mdx.ac.uk

SEARCH

Searching for other players

1/4 Players

Search Complete

4/4 Players

PLAYER 2

You have been randomly assigned the role of Player 2 for the following game.

Click **NEXT** to read about the format.

NEXT

Online Game

This game will test reaction time, general knowledge, and observational skills.

There are **NINE ROUNDS**, as you will compete against each player three times.

Click **NEXT** to read the Instructions.

NEXT

Instructions

Each round consists of three stages.

Stage 1. You will be paired with another player, and given a question to answer.

Stage 2. The player that answers the question first will receive 100 tokens.

Stage 3. The victor will decide how many tokens they are willing to send to their opponent, before entering the next round.

Click **TRIAL** to undergo a Trial Run.

TRIAL

You will all start with a Trial Run against bots

OK

Trial Run

You vs. CPU 1

CPU 2 vs. CPU 3

Click **START** to begin your match.

START

You against **CPU 1**

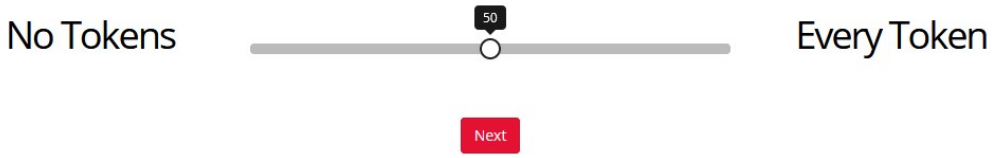
Be ready to answer the question

Red

Brown

You clicked faster than CPU 1, and you have won **100 tokens**

How many tokens are you willing to send to CPU 1?



Other Results (Trial Run)

CPU 2 defeated CPU 3 , and sent them **50 out of 100** tokens

Excellent

Now that you are familiar with the game, we shall begin

Click **READY** to begin the competitive game

READY

Round 1

Player 1 vs. Player 2 (You)

Player 3 vs. Player 4

Click **START** to begin your match.

START

How many weeks are in a year?

42

52

Player 1 clicked faster than you. They are making their decision...

Player 1 sent you **0 out of 100 tokens**

Other Results (Round 1)

Player 3 defeated Player 4, and sent them **70 out of 100** tokens

Round 2

Player 2 (You) vs. Player 4

Player 1 vs. Player 3

Click **START** to begin your match.

START

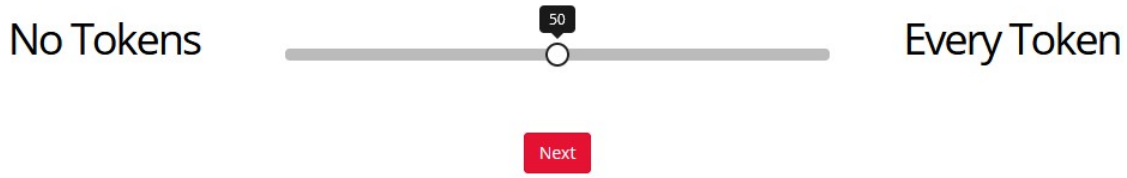
You against **Player 4**

Be ready to answer the question

How many minutes are in an hour?

You clicked faster than Player 4, and you have won **100 tokens**

How many tokens are you willing to send to Player 4?



Other Results (Round 2)

Player 3 defeated Player 1, and sent them **70 out of 100** tokens

Round 3

Player 1 vs. Player 4

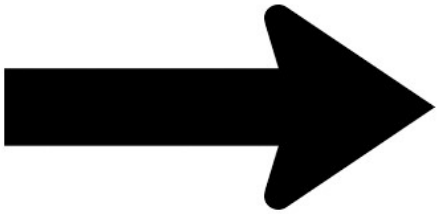
Player 2 (You) vs. Player 3

Click **START** to begin your match.

START

You against **Player 3**

Be ready to answer the question



Left

Right

Player 3 clicked faster than you. They are making their decision...

Player 3 sent you **80 out of 100 tokens**

Other Results (Round 3)

Player 1 defeated Player 4, and sent them **0 out of 100** tokens

Round 4

Player 3 vs. Player 4

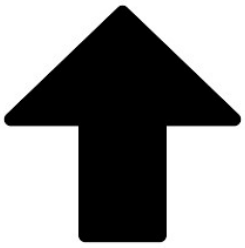
Player 2 (You) vs. Player 1

Click **START** to begin your match.

START

You against **Player 1**

Be ready to answer the question

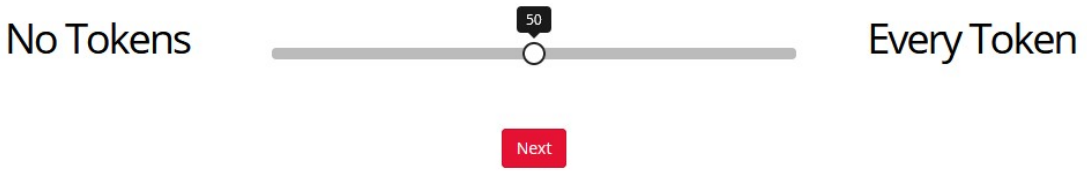


Down

Up

You clicked faster than Player 1, and you have won **100 tokens**

How many tokens are you willing to send to Player 1?



Other Results (Round 4)

Player 4 defeated Player 3, and sent them **0 out of 100** tokens

Round 5

Player 3 vs. Player 2 (You)

Player 4 vs. Player 1

Click **START** to begin your match.

START

You against **Player 3**

Be ready to answer the question

How many days are in a leap year?

366

365

Player 3 clicked faster than you. They are making their decision...

Player 3 sent you **90 out of 100 tokens**

Other Results (Round 5)

Player 1 defeated Player 4, and sent them **0 out of 100** tokens

Round 6

Player 3 vs. Player 1

Player 4 vs. Player 2 (You)

Click **START** to begin your match.

START

You against **Player 4**

Be ready to answer the question

A Triangle has how many sides?

5

3

Player 4 was fastest. They are making their decision...

Player 4 sent you **0 out of 100 tokens**

Other Results (Round 6)

Player 3 defeated Player 1, and sent them **70 out of 100** tokens

Round 7

Player 2 (You) vs. Player 1

Player 4 vs. Player 3

Click **START** to begin your match.

START

You against **Player 1**

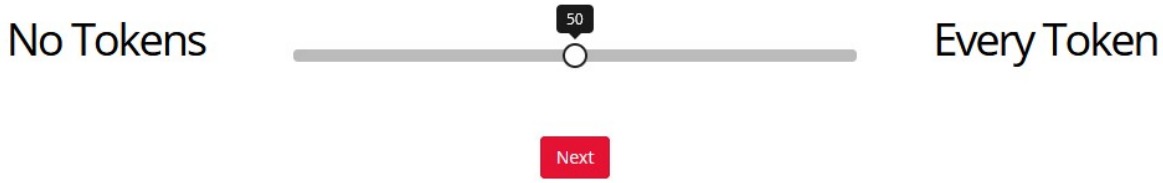
Be ready to answer the question

England

Denmark

You clicked faster than Player 1, and you have won **100 tokens**

How many tokens are you willing to send to Player 1?



Other Results (Round 7)

Player 3 defeated Player 4, and sent them **80 out of 100** tokens

Round 8

Player 2 (You) vs. Player 3

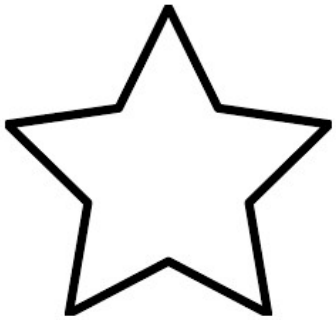
Player 1 vs. Player 4

Click **START** to begin your match.

START

You against **Player 3**

Be ready to answer the question

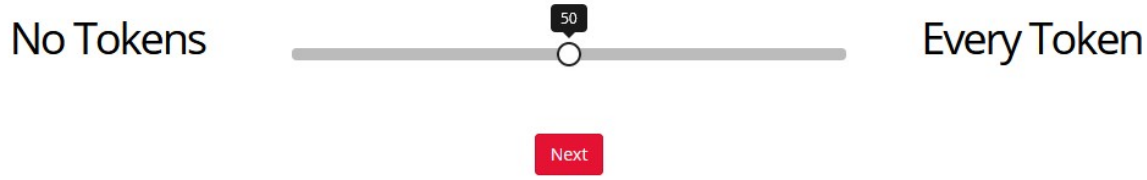


Square

Star

You clicked faster than Player 3, and you have won **100 tokens**

How many tokens are you willing to send to Player 3?



Other Results (Round 8)

Player 4 defeated Player 1, and sent them **0 out of 100** tokens

End of Study - Debrief Section

For SurveyCircle users (www.surveycircle.com), the Survey Code is **86MC-9XZ5-U1X4-6KAF**

Thank you for your participation. Your completion of this study will be deemed as your consent. You have the right to withdraw your consent up until the first day of data analysis **(1st June 2023).**

The original aim of this study is to investigate the effects of reputation on future collaboration, specifically drect and indirect reputation. This was done by disguising a dictator game as a multiplayer trivia game. All three of the other players involved in the study were virtual confederates, and their responses were predetermined.

The effects of direct repuation were measured using your responses during personal encounters with the confederates, and whether there was correlation between how they treated you previously and the amount donated in the future encounters. The effects of indirect reputation were measured using the 'Other Results' section that was displayed after your matches. We wanted to see whether the knowledge of how the confederate treated others would have an affect on how you treated them during a personal encounter.

We expect to find a significant difference between the number of tokens donated to a generous confederate and a selfish confederate.

If you have any questions or would like additional information about the study, feel free to contact the researcher or one of the supervisors.

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DONE

Appendix B

Structure of each Condition

Generous Condition						
Round	Matchup 1	Victor	Tokens Given	Matchup 2	Victor	Tokens Given
1	P2 vs P1	P1	0	**P3 vs P4**	**P3**	**70**
2	P2 vs P4	P2	TBD	**P1 vs P3**	**P3**	**70**
3	**P2 vs P3**	**P3**	**80**	P1 vs P4	P1	0
4	P2 vs P1	P2	TBD	P3 vs P4	P4	0
5	**P2 vs P3**	**P3**	**90**	P1 vs P4	P1	0
6	P2 vs P4	P4	0	**P1 vs P3**	**P3**	**70**
7	P2 vs P1	P2	TBD	**P3 vs P4**	**P3**	**80**
8	**P2 vs P3**	**P2**	**TBD**	P1 vs P4	P4	0

Selfish Condition						
Round	Matchup 1	Victor	Tokens Given	Matchup 2	Victor	Tokens Given
1	P2 vs P1	P1	60	**P3 vs P4**	**P3**	**0**
2	P2 vs P4	P2	TBD	**P1 vs P3**	**P3**	**0**
3	**P2 vs P3**	**P3**	**0**	P1 vs P4	P1	70
4	P2 vs P1	P2	TBD	P3 vs P4	P4	60
5	**P2 vs P3**	**P3**	**0**	P1 vs P4	P1	70
6	P2 vs P4	P4	60	**P1 vs P3**	**P3**	**0**
7	P2 vs P1	P2	TBD	**P3 vs P4**	**P3**	**0**
8	**P2 vs P3**	**P2**	**TBD**	P1 vs P4	P4	70

Exclusive Condition						
Round	Matchup 1	Victor	Tokens Given	Matchup 2	Victor	Tokens Given
1	P2 vs P1	P1	0	**P3 vs P4**	**P3**	**0**
2	P2 vs P4	P2	TBD	**P1 vs P3**	**P3**	**0**
3	**P2 vs P3**	**P3**	**80**	P1 vs P4	P1	0
4	P2 vs P1	P2	TBD	P3 vs P4	P4	0
5	**P2 vs P3**	**P3**	**90**	P1 vs P4	P1	0
6	P2 vs P4	P4	0	**P1 vs P3**	**P3**	**0**
7	P2 vs P1	P2	TBD	**P3 vs P4**	**P3**	**0**
8	**P2 vs P3**	**P2**	**TBD**	P1 vs P4	P4	0

Excluded Condition						
Round	Matchup 1	Victor	Tokens Given	Matchup 2	Victor	Tokens Given
1	P2 vs P1	P1	0	**P3 vs P4**	**P3**	**80**
2	P2 vs P4	P2	TBD	**P1 vs P3**	**P3**	**90**
3	**P2 vs P3**	**P3**	**0**	P1 vs P4	P1	70
4	P2 vs P1	P2	TBD	P3 vs P4	P4	60
5	**P2 vs P3**	**P3**	**0**	P1 vs P4	P1	70
6	P2 vs P4	P4	0	**P1 vs P3**	**P3**	**90**
7	P2 vs P1	P2	TBD	**P3 vs P4**	**P3**	**80**
8	**P2 vs P3**	**P2**	**TBD**	P1 vs P4	P4	70