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**DOES COGNITIVE REFLECTION PREDICT
COOPERATION BEHAVIOR AFTER A SEVEN-MONTH
PERIOD?**

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COOPERATION BEHAVIOR AFTER A SEVEN-MONTH
PERIOD?**

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APPROVAL

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In addition, I acknowledge that any claim of irregularity that may arise in relation to this work will result in a disciplinary action in accordance with the university legislation.

Ensar Acem

Date: 08/08/2023



To Stillness...

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DOES COGNITIVE REFLECTION PREDICT COOPERATION BEHAVIOR AFTER A SEVEN-MONTH PERIOD?

ABSTRACT

This study aimed to test whether cognitive reflection (as measured by standard measures of cognitive style and cognitive ability) predicts cooperative behavior against in-group, out-group, and anonymous partners after a seven-month period among Christian believers and non-believers (atheists and agnostics). To address potential confounding effects of measurement tools such as demand effect, pre- and post-test phases were employed, unlinking cognitive measures (pre-test) with assessments of cooperative behavior (post-test). Multiple components of cognitive reflection were measured using various assessment tools, including the Cognitive Performance Test for cognitive style and Raven's Progressive Matrices for cognitive ability. Cooperative behavior was assessed through a two-stage Prisoner's Dilemma (PD) Game whereby they initially played the game with anonymous partners, and in the second stage, they played with an in-group, out-group, or again an anonymous partner. The group identity manipulation was based on participants' actual religious identities. Money Allocation Game (MAG) was also utilized to measure fairness concerns. Confirmatory analyses were conducted to test the hypotheses that higher cognitive reflection would predict (1) higher anonymous cooperation, (2) lower in-group bias in MAG, and (3) lower out-group bias in PD. However, the results did not provide support for any of these hypotheses. Nevertheless, exploratory analyses revealed that actively open-minded thinking negatively predicts in-group bias, and fluid intelligence interacts with zero-sum beliefs in predicting in-group bias. For those with higher zero-sum game beliefs, fluid intelligence positively predicted in-group bias. Moreover, analytic cognitive style and total cognitive reflection scores positively predicted one-shot anonymous cooperation only among non-believers (vs. believers), indicating variations in epistemic norms. These findings suggest that the effect of cognitive reflection on cooperative behavior depends on contextual and individual factors.

Keywords: Cognitive reflection, cognitive performance, analytic thinking, intelligence, cooperation, in-group bias, out-group bias, fairness, epistemic norm differences

BİLİŞSEL DERİN DÜŞÜNME, YEDİ AYLIK BİR SÜRE SONRASI İŞBİRLİĞİ DAVRANIŞINI YORDUYOR MU?

ÖZET

Bu çalışma, Hristiyan inananlar ve inanmayanlar (ateist ve agnostikler) arasında yedi aylık bir sürenin ardından (bilişsel stil ve bilişsel yeteneğin standart ölçümleriyle ölçülen) bilişsel derin düşünmenin grup içi, grup dışı ve anonim ortaklara karşı işbirliği davranışını yordayıp yordamayacağını test etmeyi amaçladı. Talep etkisi (*demand effect*) gibi ölçüm araçlarının potansiyel karıştırıcı etkilerini önlemek için, bilişsel ölçümlerin (ön test) işbirliği davranışı ölçümleriyle (son test) bağlantısını kesen ön- ve son-test evreleri kullanıldı. Bilişsel derin düşünmenin birden çok bileşeni, bilişsel stil için Bilişsel Performans Testi ve bilişsel yetenek için Raven Progresif Matrisleri dahil olmak üzere çeşitli değerlendirme araçları kullanılarak ölçüldü. İşbirlikçi davranış, iki aşamalı Mahkum İkilemi (Mİ) aracılığıyla ölçüldü; katılımcılar oyunu başlangıçta anonim ortaklarla ve ikinci aşamada iç-grup, dış-grup veya yine anonim bir ortakla oynadılar. Grup kimliği manipülasyonu, katılımcıların gerçek dini kimliklerine dayanıyordu. Adillik hassasiyetlerini ölçmek için Para Tahsis Oyunu (PTO) da kullanıldı. Daha yüksek bilişsel derin düşünmenin (1) daha yüksek anonim işbirliği, (2) PTO'da daha düşük iç-grup yanlılığı ve (3) Mİ'de daha düşük dış-grup ayrımcılığı yordayacağını bekleyen hipotezleri test etmek için doğrulayıcı analizler yapıldı. Ancak sonuçlar hiçbir hipotezi desteklemedi. Bununla birlikte, keşifsel analizler, aktif olarak açık fikirli düşünmenin iç-grup yanlılığını negatif olarak yordadığını ve akıcı zekanın, iç-grup yanlılığını yordamada sıfır toplamlı inançlarla etkileşime girdiğini ortaya koydu. Daha yüksek sıfır toplamlı oyun inançlarına sahip olanlar için; akıcı zeka, iç-grup yanlılığını pozitif olarak yordadı. Ayrıca, analitik bilişsel stil ve toplam derin düşünme skorları, yalnızca inanmayanlar arasında (inananlara kıyasla) tek seferlik anonim işbirliğini pozitif olarak yordadı ve bu, gruplararası epistemik norm farklılıklarına işaret ediyor. Bu bulgular, bilişsel derin düşünmenin işbirlikçi davranış üzerindeki etkisinin bağlamsal ve bireysel faktörlere bağlı olduğunu göstermektedir.

Anahtar Sözcükler: Bilişsel derin düşünme, bilişsel performans, analitik düşünme, zeka, işbirliği, iç-grup yanlılığı, dış-grup yanlılığı, adillik, epistemik norm farklılıkları

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LIST OF SYMBOLS

- Δ The delta PD (Δ PD) score represents the disparity between cooperative decisions made in the Stage 1 anonymous Prisoner's Dilemma and those made in the Stage 2 out-group Prisoner's Dilemma, serving as a measure of out-group bias.



LIST OF ACRONYMS AND ABBREVIATIONS

BZSG: Belief In Zero-sum Games

CI: Confidence Interval

CPT: Cognitive Performance Test

CRT: Cognitive Reflection Test

CTSQ: Comprehensive Thinking Styles Questionnaire

CTSQ AOT: CTSQ – Actively Open-minded Thinking

CTSQ CMT: CTSQ – Close-minded Thinking

CTSQ PET: CTSQ – Preference for Effortful Thinking

CTSQ PIT: CTSQ – Preference for Intuitive Thinking

H: Hypothesis

IBH: Intuitive Belief Hypothesis

MAG: Money Allocation Game

PD: Prisoner's Dilemma

RPM: Raven's Progressive Matrices

SD: Standard Deviation

1. INTRODUCTION

Humans have a long history of social evolution. Cooperation is widely regarded as the driving force behind the development and advancement of human civilization. According to numerous scientists, it is large-scale cooperation that distinguishes humans from other animals (Bowles & Gintis, 2011). This thesis will primarily focus on cooperation, delving into its evolutionary origins in Section 1.1. Subsequently, I will shift the attention to intergroup cooperation and the cognitive foundations that underlie it.

On the other hand, religion is widely recognized as exerting a significant impact on cooperation. While some researchers argue that religion promotes cooperation, others contend that its negative effects overshadow the positive ones. What remains clear is that religion has both positive and negative effects on cooperative behavior (Norenzayan, 2013), although the specific conditions under which these effects manifest are still not fully understood. One such condition relates to the distinctions between in-group and out-group interactions (Isler et al., 2021b). This study employs religious identity as a natural means of manipulating groups, facilitating interactions between in-groups, out-groups, and anonymous individuals. Therefore, Section 1.2 will provide further details regarding the influence of religion on cooperation within a group context.

Examining the cognitive foundations of cooperation and its impact on religious parochialism and altruism requires a deep exploration of the dual-process model of cognition. Since its first usage by Wason and Evans (1974) and its popularization by Daniel Kahneman (Kahneman, 2011), the metaphorical notion of dual systems of thinking—intuitive and reflective thinking—has been widely employed in the field of cognitive sciences. In Section 1.3, a brief explanation of the dual-process approach to the human mind and its potential effects on other cognitive processes and behaviors will be provided. Notably, it is not surprising that intuitive and reflective thinking styles influence cooperative behavior and intergroup interactions, particularly when

considering the Contextualized Strong Reciprocity Model of one-shot cooperation (Isler et al., 2021a), which will be presented in detail in this section.

Subsequently, in Section 1.4, the various methodological approaches for measuring cognitive style and ability will be discussed, along with their relationships to other measures. This section will also address the effectiveness and criticisms of the techniques used to assess cognitive reflection, as well as differentiate between conceptualizations of cognitive style and cognitive ability.

Finally, in Section 1.5, the present research will be presented, highlighting its potential methodological and theoretical contributions to the existing literature. In essence, this study aims to investigate the effects of cognitive reflection on cooperation and explore the predictive abilities of different cognitive measures on different aspects of cooperative behavior (against anonymous partners, in-group and out-group members as operationalized based on religious identity).

1.1 Cooperation

Cooperation, in essence, can be defined as the act of helping others, even at a potential cost to oneself (Wilson, 2007). It is widely believed that cooperation is not only a fundamental element in the evolution of humans but also extends to other animals and even microorganisms (Foster & Bell, 2012; West et al., 2006). Even microbes engage in cooperative interactions, such as resource-sharing or free-riding. However, humans are deemed distinct from other animals due to the remarkable extent of their cooperative behaviors (Bowles & Gintis, 2011). Humans exhibit exceptionally large-scale cooperation, driven by evolved psychological mechanisms that motivate them to cooperate despite facing significant costs and without any direct reward (Fehr et al., 2002; Fehr & Fischbacher, 2003; Gintis, 2000, 2005; Isler et al., 2021a).

Researchers have explored the scale of cooperation by differentiating between kin-related and non-kin cooperation, as well as direct and indirect reciprocity. Initially, the focus was on smaller scales of cooperation, with W. D. Hamilton (1964) pioneering the study of kin-related altruism and formulating the theory of kin selection, also known as

inclusive fitness theory. Hamilton's formula, known as Hamilton's rule ($rB > C$), predicts that individuals exhibit greater altruism toward genetically close relatives. The variables in the formula represent the genetic relatedness (r) between the altruist and the recipient, the benefit (B) to the recipient, and the cost (C) to the altruist. Essentially, if genetic relatedness and/or the benefit to the recipient increase while the cost to the altruist remains stable or does not increase to the same extent, the likelihood of altruistic behavior increases. Although Hamilton's rule was a milestone in understanding the evolution of altruism, later, it became evident that a more comprehensive perspective on human social interactions in terms of cooperation was necessary (see Nowak et al., 2017 for recent critical perspectives). Thus, Robert Trivers (1971) proposed the theory of reciprocal altruism to explain cooperation beyond kin selection, focusing on individuals' expectations of others. The theory of reciprocal altruism attempts to elucidate how non-kin animals cooperate with each other in social interactions, particularly when one individual helps another in times of need, even at the expense of its own fitness. The underlying reason for such behavior has been attributed to indirect reciprocity (Boyd & Richerson, 1989), taking into account the benefits of reputation and the expectation that others will reciprocate in future situations of need.

In recent years, evolutionary social scientists across various disciplines, including economics, social psychology, and anthropology, have devoted their attention to the topic of large-scale strong reciprocity in humans, which pertain to cooperation even in the absence of indirect benefits such as reputation or the possibility of repeated interactions (Henrich & Muthukrishna, 2021; Rand & Nowak, 2013). At first glance, this phenomenon presented a puzzling challenge because evolutionary processes should not have favored non-beneficial and costly prosocial acts (Bowles & Gintis, 2011; Henrich, 2016; Henrich & Muthukrishna, 2021; Rand & Nowak, 2013; Sober & Wilson, 1998), as traditionally represented with the perspective of the selfish gene (Dawkins, 2016). At that time, one-shot anonymous cooperation posed a mystery for scientists (Bowles & Gintis, 2011; Henrich & Henrich, 2007; Sober & Wilson, 1998). Yet, humans demonstrate a propensity for engaging in altruistic and cooperative behaviors even when there is no external observation. To highlight the human tendency to cooperate even in anonymous interactions, Fehr and Fischbacher (2003) referred to

humans as "selflessly prosocial," leading Bowles and Gintis (2011) to describe humans as "exceptionally cooperative."

Subsequently, researchers introduced the distinction between weak and strong reciprocity. Weak reciprocity implies cooperation only in the presence of direct or indirect benefits (Gintis, 2000). In contrast, strong reciprocity refers to cooperation without such benefits, as can be exemplified by an anonymous one-shot interaction where no one is monitoring. Strong reciprocity can be more accurately defined as altruistic behavior based on the expectation that others will reciprocate, known as conditional cooperation (Fischbacher et al., 2001; Kocher et al., 2008). Conditional cooperators are individuals who cooperate to the extent they believe others will do the same (Isler et al., 2021a). Psychological mechanisms such as inequality aversion (Bolton & Ockenfels, 2000; Fehr & Schmidt, 1999), concerns for social efficiency (Charness & Rabin, 2002), perceived intentions of others (Dufwenberg & Kirchsteiger, 2004; Falk & Fischbacher, 2006), and expectations about others' behavior (Fehr & Fischbacher, 2003; Isler, Gächter, et al., 2021; Weber et al., 2018) have been proposed to explain conditional cooperation. Whatever the underlying mechanisms are, humans exhibit costly non-beneficial cooperation, providing evidence for the existence of strong reciprocity (Fehr et al., 2002).

When examining cooperation and altruism within a society or a group composed of relatives, friends, and acquaintances with whom we have interacted, spoken, and shared experiences, it is easier to anticipate the positive outcomes of cooperative interactions. In a place we consider as home, our city, or our nation, even anonymous interactions may often be perceived as interactions within the in-group, leading individuals to be inclined to cooperate and help others. However, interactions are not always so straightforward. There are instances where we encounter out-groups with competition, such as rival football fans and, even more profoundly, ideological and political partisans. Moreover, there are historical contexts where groups have been enemies, such as nations and religions. How do individuals from different groups interact, particularly when there is expected animosity between them? Given the inherent difficulty in discerning between cooperators and free-riders (Henrich & Henrich, 2007), people

would naturally tend to cooperate more readily with in-group members rather than out-groups, based on trustworthiness and the expected reciprocity (Simpson, 2007). Indeed, experimental studies have demonstrated that individuals discriminate out-groups in cooperative economic games based on political (Balliet et al., 2014, 2018) and religious identity (Isler et al., 2021b). Here, in this thesis, one of the main focuses will be the effects of between-group interactions on cooperative decision-making.

1.2 The Effect of Religion on Cooperation: Parochial or Altruistic?

In the previous section, I provided a brief overview of the evolution of cooperation and the current views on human cooperative interactions. Recent literature suggests that humans are strong reciprocators or conditional cooperators, relying their cooperation on the belief that others would also cooperate (Isler et al., 2021a). What does religion say about this? Does religion embrace conditional cooperation that is already in our nature? The resounding answer is "Yes!" Indeed, major world religions often teach the principle of "do as you would be done by," also known as the golden rule (Neusner & Chilton, 2008). Religion probably acts as a catalyst for cooperation, with its evolutionary history rooted in enhancing large-scale cooperation. Scholars studying the evolution of religion, such as Norenzayan (2013) and Whitehouse et al. (2019), have also discussed similar ideas, highlighting religion's significant role in creating and shaping civilization through fostering cooperation on a large scale (for a summary, see Yilmaz et al., 2019).

However, as I discussed in the previous section on cooperation, cooperative interactions extend beyond in-group or anonymous settings. In fact, there are instances where we perceive others as out-groups, viewing them as adversaries seeking to harm or exploit us. Some groups are known competitors, as seen in the political context, while historical wars have been fought against certain out-groups, such as in national and religious contexts. Recent research has focused on these intergroup differences in cooperative behavior. Considering that religion plays a significant role in shaping people's identity (Davie, 2013), religious identity becomes a valuable tool to investigate the causal effects of religious beliefs and identity on cooperation.

By utilizing religious identity in group manipulations, researchers investigate the effects of religious beliefs and religious identity on cooperation. For instance, some findings indicate that higher levels of religiosity predict a higher degree of cooperation with partners of the same religious affiliation in trust games (Tan & Vogel, 2008). Other findings suggest that religious beliefs promote generalized cooperation, even towards out-groups (Everett et al., 2016; Stagnaro et al., 2019), while some others propose that it primarily enhances parochial cooperation with only in-groups (e.g., Ben-Ner et al., 2009; Isler, Yilmaz, et al., 2021; Lang et al., 2019).

The notion of generalized cooperation between religious groups is unlikely to hold true, considering that nearly half of the global population moralizes their religions and deities (Tamir et al., 2020). For example, discrimination based on religion is widespread, particularly towards atheists (Chuah et al., 2016; Gervais et al., 2011, 2017). Atheists are one of the most distrusted groups in society and are often perceived as immoral (Gervais, 2011; Gervais et al., 2011). Consequently, it is not surprising that believers, in general, do not tend to cooperate with atheists. Throughout history, there has even been hostility towards atheists (Jacoby, 2005), and this continues to persist in modern times (Norris & Inglehart, 2004).

The everyday consequences of religious discrimination and prejudice towards atheists is an ever-lengthening topic. Briefly, a significant portion of the population expresses disapproval of their children marrying atheists (Edgell et al., 2006) and that they may not choose to support an atheist candidate in a presidential election (Jones, 2007). Interestingly, the belief that religious beliefs promote cooperation implicitly leads individuals to be more skeptical regarding the perceived moral standing of atheists, which is comparable to the level of distrust typically associated with rapists, in contrast to Christians or other religious groups like Muslims and Jews (Gervais et al., 2011). Gervais et al. (2017) argued that discrimination against atheists is an intuitive tendency of human nature because they are perceived as untrustworthy individuals by believers due to atheists' lack of personal belief in God. Since God is also perceived as the author of moral truths (Piazza & Landy, 2013; Simpson et al., 2016), believers implicitly perceive atheists as untrustworthy. However, recent findings suggest that atheists also

exhibit a parochial tendency in cooperative situations, similar to that of believers (Isler et al., 2021b), supporting the notion that in-group favoritism is a universal human tendency (Clark et al., 2019).

In summary, religious identity plays a crucial role in cooperative situations much like other social identities (Romano et al., 2021). Existing research in this field, however, has not yielded conclusive findings regarding whether religion's prosocial effect is limited to ingroups (*religious parochialism hypothesis*) or extends to outgroups (*generalized prosociality hypothesis*). Consequently, this study aims to address this question by manipulating religious identity (anonymous, believer vs. non-believer) within a preselected sample.

1.3 Cognitive Reflection and Cooperation

In addition to utilizing a religion-based group manipulation in cooperative decision-making, this research also focuses on the moderating roles of premeasured individual differences in the relationship between cognitive reflection and cooperation. Within the scope of this study, the term "cognitive reflection" encompasses two key aspects: analytic cognitive style (i.e., analytical thinking) and cognitive ability (i.e., fluid intelligence) based on the dual-process model of mind (Yilmaz, 2021). In the subsequent Subsection 1.3.1, I will provide the conceptual distinction between cognitive style and ability, and in Subsection 1.3.2, I will discuss the relationship between these cognitive variables and cooperative behavior.

1.3.1 Dual-Process Model of Cognition

The dual-process model of mind is an old theory of cognition positing two distinct thinking styles: intuitive and reflective (Evans, 2003; Evans & Stanovich, 2013). Firstly, it is important to dispel any misconceptions about this widely recognized theory. The terms Type 1 and Type 2 were initially used to describe the two thinking modes in the paper by Wason and Evans (1974). Subsequently, Stanovich (1999) introduced the terms System 1 and System 2, highlighting the evolutionary advancement of System 2 in the human mind, differentiating humans from other

animals. However, in recent years, Evans and Stanovich together (Evans, 2019; Evans & Stanovich, 2013) cautioned researchers against using the term "system" as it can mistakenly imply complexity comprising multiple mechanisms. Furthermore, in response to criticisms of his theory, Evans (2012, 2018, 2019) argued that the critics often misunderstood the dual-process model and attacked "the falsely received view of the dual-process model." These misconceptions primarily involve the ideas that: (1) Type 1 thinking is responsible for cognitive biases, while Type 2 thinking leads to correct answers in all situations; (2) Type 1 is associated with concrete and conceptual thinking, while Type 2 is linked to abstract thinking; and (3) Type 1 thinking must be fast, while Type 2 thinking must be slow. Evans and Stanovich (2013) clearly stated that attributing normativity or rationality to the dual processes, such as claiming "Type 1 is bad or irrational while Type 2 is good or rational," is incorrect, and these ideas should be abandoned. According to Evans (2012, 2018, 2019), the correlational features between these two thinking styles are not mandatory or defining characteristics; they do not have to align (see Neys, 2017 for further discussions).

A more accurate conceptualization of the dual-process model suggests that Type 1 thinking operates autonomously and does not require working memory, while Type 2 thinking is associated with cognitive decoupling or mental simulations (i.e., hypothetical thinking), requiring working memory or fluid intelligence (Evans & Stanovich, 2013). To highlight their correlated features without mistaking them as defining characteristics, we can say that Type 1, defined as the intuitive process, is *generally* fast, high capacity, biased¹, non-conscious, automatic, experience-based, contextualized, and independent of cognitive ability. Type 2, defined as reflective thinking, is *likely* to be slow, serial, conscious, abstract, controlled, rule-based, limited in capacity, and correlated with cognitive ability (Evans & Stanovich, 2013).

¹ To further emphasize the distinction between the correlative aspects of dual processes and their defining features, it is pertinent to reference a recent publication by Stanovich (2021) entitled "The Bias that Divides US." In this book, Stanovich argues that my-side bias, characterized by a tendency to favor, interpret, or seek out information that supports one's in-group, stands out as a unique bias among many others. As such, intelligence and reflective thinking style not only fail to hinder my-side bias but may even exacerbate it. This example serves to illustrate that the interplay among these cognitive processes is nuanced and should not be misconstrued as defining features. Similar discussions have been raised by other scholars in the realm of motivated numeracy, literacy, and reasoning, particularly as they relate to self-serving political discourse (e.g., Kahan, 2013, 2017; Kahan et al., 2012; Mercier, 2016; Sarathchandra et al., 2018).

These two thinking styles also have implications for our everyday lives, as discussed by Pennycook et al. (2015). They summarized studies examining the correlations between thinking processes and other psychological and behavioral features such as creativeness (Barr et al., 2015), paranormal beliefs (Bouvet & Bonnefon, 2015; Cheyne & Pennycook, 2013), religiosity (Pennycook, 2014; Shenhav et al., 2012; see Saribay et al., 2020 for a failed replication and see Yilmaz, 2021 for a discussion), moral values (Pennycook et al., 2014) and judgments (Paxton et al., 2012), and cooperative behavior (Rand et al., 2012, 2014; see also Isler et al., 2021a, 2021b for the recent mixed findings). These thinking styles have also been found to be related to cognitive biases. For instance, some studies have shown that individuals prone to faster responses are more susceptible to belief bias (Evans & Curtis-Holmes, 2005), meaning that they are more likely to accept invalid syllogisms and make errors. Similarly, Pennycook et al. (2013) found that religious skeptics (i.e., non-theists) took more time for reflective thinking compared to believers, and this difference led to greater belief bias among believers than skeptics.

In summary, the dual-process model of the mind, with its two distinct thinking processes, provides explanatory power across various psychological and behavioral measures, ranging from everyday practices to religious beliefs and cooperative decision-making. Consequently, numerous researchers exploring topics such as beliefs, morality, cooperation, and other intriguing phenomena, utilize the dual-process model of the mind, as we do within the context of this thesis.

1.3.2 Intuitive versus Reflective Cooperation

As discussed in the previous section, numerous researchers have investigated the dual-process model of mind to gain insights into social decision-making. Similarly, in this thesis, we examine the dual-process model's predictive power on cooperative decision-making within an intergroup context.

The exploration of the dual-process model's application to cooperative decision-making began with the studies conducted by Rand et al. (2012), which led to the formulation of

the Social Heuristics Hypothesis (SHH). According to the SHH, individuals rely on intuitive prosocial heuristics during social dilemma situations, making them more inclined to engage in cooperative behavior under an intuitive mindset. The proponents of this hypothesis argue that intuitive prosociality has evolutionary roots, which must have been selected throughout social evolution (Rand et al., 2014). While this evolutionary perspective provides a clear understanding, an alternative viewpoint offers an entirely different narrative. The Self-Control Account (SCA; Isler et al., 2021b; Martinsson et al., 2014) proposes that individuals tend to behave intuitively selfish but reflectively prosocial, driven by intuitive selfish visceral defense mechanisms under different circumstances. Both perspectives have empirical support, although recent years have witnessed an increase in failed replications through high-powered (Bouwmeester et al., 2017; Isler et al., 2021a, 2021b) and meta-analytical (Kvarven et al., 2020) studies, primarily favoring the SCA over the SHH.

Despite recent findings supporting the SCA, it is premature and oversimplified to dismiss the SHH as falsified. The literature remains mixed for several reasons. Firstly, methodological issues regarding the manipulation of thinking processes have only come to light recently. Many of the techniques used to activate Type 1 and Type 2 processes were found ineffective, as revealed in recent high-powered experimental studies (Isler et al., 2020; Isler & Yilmaz, 2022). For instance, commonly used techniques like brief time-limit methods involving time pressure and time delay were employed without appropriate control groups in past studies. What a surprise that it was discovered that brief time-delay methods failed to activate reflection and merely acted as active control conditions. Since some researchers argued that time-delay enhances cooperation in their experiments (e.g., Everett et al., 2017; Isler, Yilmaz, et al., 2021), this effect must be attributed to confounding factors such as zero-sum beliefs (Rózycka-Tran et al., 2015, 2018) or socially desirable responding (Hart et al., 2015), both of which were measured in this study. For instance, decisions made under time-delay might have higher desirable responding (but see Protzko et al., 2019), or faster answers might be more likely to be associated with zero-sum thinking from the perspective of SCA. Consequently, studies employing brief time-delay methods as reflection manipulations lack reliability in their hypothesis testing. Past studies supporting either the SHH or

SCA using time-delay methods are not immune to this problem. To highlight the methodological limitations in the previous literature, it is worth noting that the following manipulation techniques proved ineffective and did not differ significantly from active and passive control conditions: 20-second time-delay, 10-second time-delay, reason prime, and reason recall as ineffective reflection manipulations and intuition recall as an ineffective intuition manipulation (Isler & Yilmaz, 2022). As suggested by Kvarven et al. (2020) in their meta-analyses, the only small effect observed for intuitive cooperation was found exclusively under emotion priming rather than time delay and cognitive load, which all were actually founded reliable methods for manipulating intuition (Isler & Yilmaz, 2022).

Another factor contributing to the mixed results is the lack of focus on the boundary conditions that influence intuitive and reflective cooperation effects. Recently, the Contextualized Strong Reciprocity Model (CSRМ; Isler et al., 2021a) proposed a means of reconciling the conflicting accounts of the SHH and SCA by examining different contextual factors. This model suggests that both effects can be observed under varying conditions and emphasizes the effects of contextual moderators in the domain of cooperation. In detail, the CSRМ presents a four-step causal chain that leads to cooperative behavior (Figure 1). In the first step, the contextual factors of a dilemma shape individuals' intuitions as either prosocial or selfish. These intuitions, combined with other cognitive processes such as reflection tendency, subsequently influence individuals' expectations and preferences regarding the interacted person in this social context. Ultimately, cooperative decision-making is determined by the expectations individuals hold for others and their own cooperative preferences. Thus, the CSRМ offers a systematic perspective on the ongoing discussion surrounding intuitive versus reflective cooperation effects. For instance, research indicates that provision dilemmas elicit more prosocial intuitions compared to maintenance dilemmas, leading individuals to expect greater prosociality from others, resulting in more prosocial decisions (Gächter et al., 2022). Similarly, one can hypothesize that individuals exhibit prosocial intuitions when interacting with in-group members but selfish impulses when encountering out-groups. Briefly, within the context of CSRМ, it is posited that

analyzing interaction effects should be prioritized over main effects when studying one-shot cooperation decisions.

All these theoretical discussions still require accurate empirical investigations as they remain untested predictions because the existing literature on one-shot cooperation primarily relies on ineffective manipulation techniques and has yet to incorporate better-established techniques. Furthermore, the predictive abilities of contextual cues in cooperative situations, including individuals' cognitive characteristics, are still poorly understood. Therefore, it is necessary to conduct the robustness test of the relationship between cognitive reflection and cooperative decision-making. As a robustness test of this relationship in various group contexts and utilizing several cognitive measures, this thesis aims to contribute valuable insights to these discussions on the complexity of one-shot cooperative decision-making. Also, this thesis explores the moderation effects of individual factors, such as religious affiliation, zero-sum beliefs, socio-economic status, and self-reported cognitive styles, on the relationship between cognitive reflection and cooperative decisions.

Causal Chain of the Contextualized Strong Reciprocity Model of One-shot Cooperation

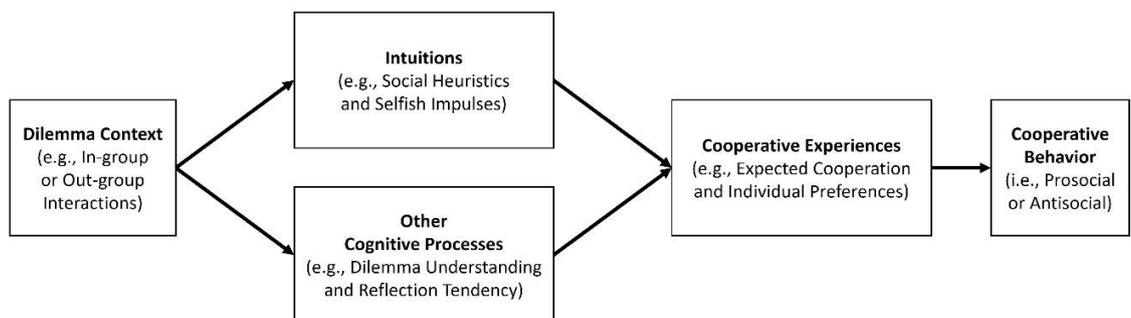


Figure 1. The four-step causal chain of the Contextualized Strong Reciprocity Model of one-shot cooperation.

1.4 Measurement of Cognitive Reflection

The previous section extensively covered the theoretical discussions and the problematic methods the previous literature relied on. Since these problems are primarily about the use of ineffective cognitive style manipulations and about the unknown nature of the predictive ability of cognitive reflection on cooperation behavior, this section now turns the attention to the individual differences in cognitive reflection (i.e., analytic thinking tendency and fluid intelligence) and their assessment, especially focusing on the potential of differential predictions of several assessments techniques (e.g., cognitive ability vs. style) on psychological traits.

There are several methods available for measuring cognitive reflection, each based on different conceptualizations. Given that this study is grounded in the dual-process model of mind, the primary focus in this thesis will be on the analytic thinking tendency, typically assessed using the Cognitive Reflection Test (CRT; Frederick, 2005). As defined by Evans and Stanovich (2013), in their dual-process theory, Type 2 thinking requires fluid intelligence for cognitive decoupling and hypothetical thinking. Therefore, a second focus of this thesis will be on fluid intelligence, as another subdomain of cognitive reflection, generally measured by Raven's Progressive Matrices (RPM; Raven, 2000).

Although analytic thinking and fluid intelligence are both components of cognitive reflection, they have distinct characteristics (Białek & Domurat, 2018; Saribay & Yilmaz, 2017; Yilmaz, 2021). Analytic thinking represents a cognitive style, whereas fluid intelligence represents cognitive ability, as used in previous discussions (Białek & Domurat, 2018; Yilmaz, 2021). These two components predict different psychological traits. It has been suggested that both analytic thinking and intelligence have a negative relationship with religiosity and political conservatism. Some studies have provided evidence for the negative relationship between intelligence and political conservatism (Hodson & Busseri, 2012) and a weak negative relationship between intelligence and religiosity (Dürlinger & Pietschnig, 2022; Zuckerman et al., 2013, 2020). However, the findings regarding the negative relationship between analytic thinking and political

conservatism (e.g., Deppe et al., 2015; Iyer et al., 2012) have sparked discussions due to mixed results (e.g., Kahan, 2013; Piazza & Sousa, 2014).

A detailed investigation revealed that analytical cognitive style was related to religiosity, whereas cognitive ability was related to social but not economic conservatism (Saribay & Yilmaz, 2017). These findings suggest that cognitive ability measures, such as intelligence, may not be as strongly related to religiosity as analytic thinking is and that intelligence may have different associations with different subdomains of conservatism. These relationships remained constant even when controlling for demographics. Subsequently, Yilmaz and Saribay (2018) discussed and provided evidence supporting the idea that the mixed results regarding the relationship between analytic thinking and political conservatism may be due to overlooking different facets of conservatism, such as resistance to change and opposition to equality, as defined by Jost et al. (2003). They found that analytic thinking relates to resistance to change but not to opposition to equality in three non-Western samples. This result was also replicated in the US (Acem et al., unpublished manuscript). All these findings demonstrate that different components of cognitive reflection may be differently related to various psychological outcomes. This might also be true in the domain of cooperative behavior.

Another factor contributing to mixed results in this literature is that different measures of cognitive style may vary in their predictive ability of different psychological traits. Yilmaz and Saribay (2017b) demonstrated that a combined measure of analytic thinking, including CRT (Frederick, 2005), CRT-2 (Thomson & Oppenheimer, 2016), and base-rate conflict problems (Kahneman & Tversky, 1973), was negatively related to social conservatism but not economic conservatism. However, they did not find a significant relationship between the CRT measure alone and political conservatism. Surprisingly, CRT-2 and base-rate problems were again significantly and negatively related to social conservatism. Furthermore, their measure of Actively Open-minded Thinking (AOT; Haran et al., 2013) was negatively related to all measures of political conservatism, including general, social, and economic conservatism. These results suggest that although CRT is the most commonly used method for measuring reflective

thinking, it may not be a reliable predictor of political orientation and other psychological traits. Combined measures of reflective thinking may be a better predictor of political, religious, and other psychological and behavioral outcomes, including cooperative decision-making.

Another concern regarding CRT is its overuse as the primary method for assessing reflective thinking. It has been found that approximately 41% to 51% of research participants are exposed to CRT questions, leading to a potential issue of familiarity. Research has shown that CRT-exposed participants outperform naïve participants (Haigh, 2016; Stieger & Reips, 2016). However, Meyer et al. (2018) argued that exposure to CRT does not significantly increase reflection scores and that only a small increase of 0.024 additional correct answers can be explained by the moderation of the time spent reflecting on the questions. Subsequent studies have also supported the notion that CRT is immune to the familiarity problem. For instance, Stagnaro et al. (2018), in their analysis of previous datasets ($N = 3,302$ MTurkers), found a high correlation ($r = .806$) between participants' first and last answers, which remained consistent over a two-year time span. They also found a stable negative correlation of CRT with beliefs in God and social conservatism, measured at different time points. Bialek and Pennycook (2018) demonstrated that multiple exposures to CRT questions did not undermine its predictive power on 17 variables, including religious belief and susceptibility to cognitive biases.

Even though evidence suggests that the familiarity issue is not a significant problem in CRT measures, alternative versions of CRT have been developed to address other criticisms, such that CRT is only based on numeracy and that the predictive ability of combined measures is better than CRT alone (e.g., Primi et al., 2016; Thomson & Oppenheimer, 2016; Toplak et al., 2014). In this study, the Cognitive Performance Test (CPT; Isler & Yilmaz, 2022) is utilized as a measure of reflective thinking. The CPT combines three multiple-choice CRT questions (Sirota & Juanchich, 2018), one standard base-rate problem (Kahneman & Tversky, 1973), and one syllogistic reasoning task with belief bias (Baron et al., 2015). This combination makes the CPT a comprehensive performance-based measure of cognitive styles.

In addition to the performance-based CPT, the Comprehensive Thinking Styles Questionnaire (CTSQ; Newton et al., 2021) is used as a self-reported measure of cognitive styles, taking into account the differences in the predictive abilities of performance-based and self-reported measures. The CTSQ consists of four subscales, including Actively Open-minded Thinking (AOT), Preference for Effortful Thinking (PET), Close-minded Thinking (CMT), and Preference for Intuitive Thinking (PIT). As its name suggests, the CTSQ comprehensively assesses different domains of thinking styles. The developers of this questionnaire found that the CTSQ had better predictive power than CRT in distinguishing between fake and true news in the domains of vaccination and COVID-19 (Newton et al., 2021).

Regarding the measurement of fluid intelligence, which is crucial for Type 2 thinking (Evans & Stanovich, 2013), Raven's Progressive Matrices (RPM; Raven, 2000) is employed, as it is widely recognized as a leading technique in this field (Kaplan & Saccuzzo, 2009). RPM is considered a non-verbal estimate of fluid intelligence (Bilker et al., 2012), assessing reasoning ability (Kaplan & Saccuzzo, 2009) by requiring participants to determine the missing piece of a visual geometric pattern (Domino & Domino, 2006). This study utilized three questions from a 3x3 matrix format of RPM, following Mani et al. (2013, Study 2).

In summary, this study employs the CPT and RPM as different measures of cognitive reflection, with the CPT assessing cognitive styles and RPM measuring fluid intelligence. Additionally, the CTSQ is used as a self-reported measure of cognitive styles, which will be explored in this study.

1.5 The Present Research

Until this section, we have delved into the intricate nature of cooperative decision-making. Understanding cooperative decision-making requires a comprehensive analysis of various factors, including dilemma-specific situations, group dynamics, cognitive heuristics, individual differences, and cooperative expectations and preferences (Isler et al., 2021a). However, previous studies investigating this subject have employed

manipulation and measurement methods that raise concerns about their validity (Isler & Yilmaz, 2022; Yilmaz & Saribay, 2017a). These studies also lacked a comprehensive toolset for measuring cognitive reflection, which should be considered (Yilmaz & Saribay, 2017b). Additionally, the cross-sectional design of these studies may have activated confounding factors. For example, Yilmaz and Saribay (2017a) found that utilization of the CRT, by itself, can activate reflective thinking, which could confound the results when CRT is used before other measures (see also Finley et al., 2015). Moreover, using CRT in a cross-sectional design may also elicit other cognitive processes such as demand characteristics (Mummolo & Peterson, 2019), socially desirable responding (Hart et al., 2015), and zero-sum beliefs (Różycka-Tran et al., 2015, 2018), leading to biased cooperative decision-making. Furthermore, hypothetical tasks employed in cooperation studies may not accurately reflect real-world behavior (Bostyn et al., 2018; Camerer et al., 2018; FeldmanHall et al., 2012; Sheeran & Webb, 2016). Considering these issues, it is necessary to question the presumed relationship between cognitive reflection and one-shot cooperation. Therefore, a study that addresses these concerns by utilizing comprehensive cognitive measures, employing real dilemmas with monetary incentives, manipulating group identity, and incorporating a pre- and post-test phases to mitigate confounding effects is needed. Pre- and post-test phases that separate cognitive measures from cooperation tasks would resolve the confounding effects highlighted in this paragraph.

To address the concerns mentioned in the previous paragraph, this study utilized two cognitive reflection measures, the CPT and RPM, as well as the CTSQ, as a self-reported measure of cognitive styles. Also, by conducting pre- and post-test phases, this study aimed to eliminate the confounding effects of cognitive measures on cooperative decision-making. In the pre-test phase, participants were administered the cognitive measures in random order. Seven months later, during the post-test phase, the participants engaged in a two-stage Prisoner's Dilemma (PD) game. In Stage 1, they played with an anonymous participant. In Stage 2, the participants were randomly assigned to play the PD game with an in-group member, an out-group member, or another anonymous participant based on religious identity (believer vs. non-believer). This two-stage PD procedure allowed for the examination of out-group bias by

comparing cooperative decisions in Stage 1 (anonymous) and Stage 2 (out-group) interactions.

In addition to cooperative decisions in the PD game, participants also took part in a Money Allocation Game (Yilmaz et al., 2021), where they allocated money between an in-group and an out-group member, again based on religious identities (believer vs. non-believer). This method was employed to assess participants' fairness and in-group bias behavior.

Participants were informed that the other players and their identities were real and that the decisions made in the games would impact their additional payment. For this monetary incentive, a lottery-based method was employed, where it was clearly stated that one of the games would be selected randomly to determine the actual calculation of the additional payment. This method of utilizing a lottery-based payment in economic games has been employed for a considerable period of time (Cubitt et al., 1998) and is recognized as a reliable and recommended approach for economically allocating research funding (Charness et al., 2016).

In summary, this study aims to examine the validity of several measures of cognitive reflection, including CPT, standard CRT (the first three questions of CPT), RPM, and CTSQ, in relation to cooperative decision-making. The use of pre- and post-test phases address the concerns about the potential confounding factors, such as demand effects, social desirability bias, reflection prime, and zero-sum beliefs that may arise from exposing to cognitive measures before the outcome variables. Furthermore, the use of real monetary incentives in economic games distinguishes this study from those employing hypothetical scenarios. Ultimately, this study seeks to investigate the relationship between cognitive reflection and cooperative decisions, considering the methodological issues present in the existing literature. Thus, the study aims to fill methodological and theoretical gaps in the field.

To achieve these goals, three confirmatory hypotheses were preregistered:

H1: Higher levels of analytic cognitive style (CPT: H1a) and cognitive ability (fluid intelligence: H1b) will predict higher cooperation scores in the one-shot anonymous PD.

H2: Higher levels of analytic cognitive style (CPT: H2a) and cognitive ability (fluid intelligence: H2b) will predict lower in-group bias as measured by the Money Allocation Game.

H3: Higher levels of analytic cognitive style (CPT: H3a) and cognitive ability (fluid intelligence: H3b) will predict lower out-group bias, as measured by the inconsistency scores between anonymous (Stage 1) and out-group (Stage 2) conditions in the PD.

2. METHODS

2.1 Open Science Statement

This study is part of a comprehensive project funded by the Templeton Religion Trust. The methodology was devised, taking into account all sub-projects, and prior to data collection, all projects were preregistered on the Open Science Framework. The preregistration for this particular study can be accessed at <https://osf.io/vs8fe>. All data and analysis code are available on the project page, ensuring transparency and accessibility.

2.2 Participants

This study employs pre- and post-test phases. Each phase involved a 20-minute study, offering a flat payment of \$2 to participants, with additional payments available through tasks. The recruitment was conducted on Prolific, targeting US residents who are fluent in English and above 18 years of age. Pre-screening information, including gender, socio-economic status (SES), and religious beliefs or disbeliefs, was provided by Prolific. Further details are provided in the following paragraphs.

In the pre-test phase, a total of 1200 participants were recruited between June 16, 2022, and July 6, 2022, seven months prior to the post-test. The participants were equally distributed based on gender (male, female), religious beliefs and disbeliefs (believer and non-believer), and perceived socio-economic status (low SES, high SES). Thus, there were 600 males and 600 females, 600 participants from low SES and 600 participants from high SES backgrounds, and 600 believers and 600 non-believers among the 1200 participants. The non-believers were further divided equally between atheists and agnostics, resulting in 300 atheists and 300 agnostics. Since the primary criterion for pre-selection was the participants' religious affiliation, the gender and SES categories

were equally represented within each religious group (Christians, Atheists, Agnostics). The participants' mobile access to the survey was restricted during the pre-test phase. However, in the post-test phase, no such restrictions were imposed to prevent attrition, allowing participants to access the survey using their mobile devices.

In the post-test phase, all 1200 participants were reinvited between January 24, 2023, and February 21, 2023, with 596 participants choosing to participate. To ensure consistency, participants who provided different answers from Christian, Atheist, or Agnostic in the demographics form of the study's post-test were excluded, considering their most updated responses regarding religious beliefs. The inconsistency rate between the pre-screening demographics on Prolific and the post-test responses was found to be 3.2%. As a result, 19 participants were excluded from the post-test analysis, leaving a final sample of 577 participants. Among these participants, 305 were believers (Christians), and 272 were non-believers (141 Atheists and 131 Agnostics; see Tables 2.4, 2.5, and 2.6). Regarding gender, there were 305 males, 256 females, 14 participants identifying as non-binary/third gender, and 3 participants who preferred not to disclose their gender (see Table 2.3). The mean age of the 577 participants was 43.4, with the youngest participant being 18 years old and the oldest being 84 (see Tables 2.1 and 2.2).

Table 2.1. Demographics

	Age	Ladder	Belief in God (Continuous)
N	577	577	577
Mean	43.4	5.71	5.02
Std. error mean	0.602	0.0727	0.183
Median	41.0	6	5.00
Standard deviation	14.5	1.75	4.39
Minimum	18.0	1	0.00
Maximum	85.0	10	10.0
Skewness	0.388	0.215	-0.00166
Std. error skewness	0.102	0.102	0.102
Kurtosis	-0.779	-0.607	-1.80
Std. error kurtosis	0.203	0.203	0.203

Table 2.1. Demographics

	Age	Ladder	Belief in God (Continuous)
Note. Both the belief in God continuous question and the socioeconomic status ladder question were asked on a scale ranging from 0 (lowest level) to 10 (highest level).			

Table 2.2. Demographics split by religious affiliation (believer vs. non-believer)

	Religious Affiliation	Age	Ladder	Belief in God (continuous)
N	believer	305	305	305
	non-believer	272	272	272
Mean	believer	46.4	5.58	8.65
	non-believer	40.0	5.85	0.949
Standard deviation	believer	14.5	1.73	2.36
	non-believer	13.7	1.76	1.81
Minimum	believer	18.0	1	0.00
	non-believer	19.0	2	0.00
Maximum	believer	85.0	10	10.0
	non-believer	81.0	10	10.0
Skewness	believer	0.136	0.276	-1.93
	non-believer	0.710	0.146	2.36
Std. error skewness	believer	0.140	0.140	0.140
	non-believer	0.148	0.148	0.148
Kurtosis	believer	-0.886	-0.464	2.94
	non-believer	-0.273	-0.725	5.58
Std. error kurtosis	believer	0.278	0.278	0.278
	non-believer	0.294	0.294	0.294

Note. Both the belief in God continuous question and the socioeconomic status ladder question were asked on a scale ranging from 0 (lowest level) to 10 (highest level).

Table 2.3. Frequencies of gender

Levels	N	% of Total	Cumulative %
Male	304	52.7 %	52.7 %
Female	256	44.4 %	97.1 %
Non-binary / third gender	14	2.4 %	99.5 %
Prefer not to say	3	0.5 %	100.0 %

Table 2.4. Frequencies of religious affiliation

Levels	N	% of Total	Cumulative %
believer	305	52.9 %	52.9 %
atheist	141	24.4 %	77.3 %
agnostic	131	22.7 %	100.0 %

Table 2.5. Frequencies of religion affiliation (Binary)

Levels	N	% of Total	Cumulative %
believer	305	52.9 %	52.9 %
non-believer	272	47.1 %	100.0 %

Table 2.6. Frequencies of religious denomination

Levels	N	% of Total	Cumulative %
Christian, Anglican	2	0.3 %	0.3 %
Christian, Baptist	42	7.3 %	7.6 %
Christian, Catholic	113	19.6 %	27.2 %
Christian, Evangelical	27	4.7 %	31.9 %
Christian, Mormon	3	0.5 %	32.4 %
Christian, Orthodox	4	0.7 %	33.1 %
Christian, Protestant	73	12.7 %	45.8 %
Christian, Unitarian	1	0.2 %	45.9 %
Christian, Other	40	6.9 %	52.9 %
Atheist	141	24.4 %	77.3 %
Agnostic	131	22.7 %	100.0 %

All 577 participants played a two-stage procedure one-shot PD game in the post-test. For the second stage of the game, the participants were assigned randomly to one of the three groups: in-group, out-group, or anonymous interactions (see details in the Procedure section). 184 individuals interacted with an out-group in PD. Among them, 97 identified as believers, while 87 identified as non-believers. 203 individuals interacted with an in-group in PD. Among them, 110 identified as believers, while 93 identified as non-believers. The remaining 190 interactions were occurred anonymously, and the players in the Stage 2 anonymous interactions were 98 believers and 92 non-believers.

2.3 Materials

2.3.1 Cognitive Performance Test (CPT)

The CPT (Isler & Yilmaz, 2022) is utilized to assess participants' scores in analytic and intuitive thinking (see Appendix D). This test encompasses various types of questions. Firstly, it includes three multiple-choice versions (Sirota & Juanchich, 2018) of the classical CRT (Frederick, 2005), where each question presents four options. Secondly, it incorporates a syllogistic reasoning task with belief bias (Baron et al., 2015), where

participants are required to choose one of two options. Lastly, it features a standard base-rate neglect question (Kahneman & Tversky, 1973) with two options. Each question has one answer that is deemed "analytic and correct" and another that is considered "intuitive and incorrect."

For three of the CPT questions, there are also two additional answer options that are "non-intuitive and incorrect." Selecting these options will be considered as an error. Analytic thinking performance is calculated by summing the number of "analytic and correct" answers, while intuition scores are calculated by summing the number of "intuitive and incorrect" answers. In this study, the internal consistency of the CPT was assessed using Cronbach's alpha, yielding a coefficient of .701. The internal consistency of CRT, the first three questions of CPT, had a coefficient of .771 Cronbach's alpha.

2.3.2 Raven's Progressive Matrices (RPM)

To evaluate participants' fluid intelligence, RPM (Raven, 2000) was utilized, following the procedure employed in Study 2 of Mani et al. (2013; see Appendix E). Participants were presented with a series of 3x3 matrices, each containing eight figures. Their objective was to identify the correct figure that best aligns with the provided pattern. It is crucial to note that this task does not involve any form of training phase. In this study, the internal consistency of the RPM was assessed using Cronbach's alpha, yielding a coefficient of .593.

2.3.3 Comprehensive Thinking Styles Questionnaire (CTSQ)

The participants in this study underwent an assessment of their cognitive styles, also using a self-reported measure known as the CTSQ, developed by Newton et al. (2021; see Appendix C). This questionnaire is specifically designed to capture participants' personal perceptions of their thinking styles. It encompasses four distinct subscales: Actively Open-minded Thinking (AOT), Preference for Effortful Thinking (PET), Close-minded Thinking (CMT), and Preference for Intuitive Thinking (PIT). Participants were requested to express their agreement level for each item using a scale that spanned from 1 (Strongly Disagree) to 6 (Strongly Agree). In this study, the

internal consistency of the CTSQ sub-scales were assessed using Cronbach's alpha, yielding a coefficient of .923 for AOT, .873 for CMT, .958 for PET, and .906 for PIT.

2.3.4 Belief in a Zero-Sum Game Scale (BZSG)

The tendency of zero-sum thinking is assessed using an 8-item BZSG Scale developed by Różycka-Tran et al. (2015; see Appendix F). This scale has demonstrated reliability across different cultures, as evidenced by a cross-cultural study involving 43 countries, where the Cronbach's alpha coefficients of the scale ranged from .69 to .95 (Różycka-Tran et al., 2018). In this study, the internal consistency of the BZSG was assessed using Cronb'ch's alpha, yielding a coefficient of .886.

2.3.5 Balanced Inventory of Desirable Responding Short Form (BIDR-16)

Participants' socially desirable responding was assessed using a 16-item scale developed by Hart et al. (2015; see Appendix G). This scale measures participants' tendency to respond in a socially desirable manner and utilizes a response scale ranging from 0 (not true) to 7 (very true). It has two sub-scales, self-deceptive enhancement and impression management. In this study, the overall internal consistency of the BIDR-16 was assessed using Cronbach's alpha, yielding a coefficient of .863. Self-deceptive enhancement sub-scale had a coefficient of .789, and impression management sub-scale had a coefficient of .822.

2.3.6 Prisoner's Dilemma (PD) Game

The PD Game was utilized in this study to measure participants' cooperative decisions (see Appendix A). The game began with each player having 100 tokens in their personal wallets. Participants had the option to allocate any number of tokens, ranging from 0 to 100, to the other player simultaneously. The amount given by each participant was doubled before being received by the other player.

Participants engaged in two rounds of PD Game. The first round, conducted in Stage 1, had no specific conditions. Participants received instructions for the game and answered

comprehension questions. Afterward, they made their decision regarding the allocation of tokens. Measures of expectation, social distance, and cooperative preferences were administered following the game.

In Stage 2, there were three between-subjects conditions. Participants were randomly assigned to the anonymous, believer, or non-believer conditions. In the anonymous condition, they played the PD Game with an anonymous player, serving as a control condition. In the believer and non-believer conditions, participants played the game with a player identified as a believer or non-believer, respectively. The religious identity of the players was indicated through both text (e.g., "N1 is a believer") and symbols, with a Cross representing believers and an Atheism symbol representing atheists as in the previous research (e.g., Everett et al., 2017; Isler et al., 2021b).

The number of tokens allocated to the other players served as a measure of cooperation, which is the main focus of H1. Participants' personal earnings were calculated by summing the tokens in their personal wallets and multiplying the amount received from the other participant by two. Also, the difference score between the Stage 1 (anonymous) and Stage 2 (out-group) phases of PD was counted as the participant's out-group bias, a measure under the focus of H3.

2.3.7 Understanding Questions

During the initial presentation of the PD Game instructions, participants were presented with three understanding questions. The first two questions were randomly selected and asked: "How many tokens should you give to Participant D1 so that you personally earn as much money as possible? (answer range: 0-100; the correct answer is 0)" and "How many tokens should you give to Participant D1 so that you and Participant D1 earn as much money as possible in total? (answer range: 0-100; the correct answer is 100)." The third question, which appeared at the end, was: "How many cents would you earn personally if Participant D1 gives you 50 tokens and if you give D1 50 tokens? (answer range: 0-300; the correct answer is 150)." After providing their answers and proceeding to the next page, participants received an answer sheet that displayed both their answers

and the correct answers to the understanding questions. Throughout the Cooperation Protocol, participants had the opportunity to review the instructions on each page.

2.3.8 Expected Partner Cooperation

In order to evaluate the level of expectation participants had from their partners, they were requested to make predictions regarding the amount their partners would contribute, as in Hayashi et al. (1999).

2.3.9 Inclusion of the Other in the Self Scale

The participants' emotional bond with other participants was assessed using the "Inclusion of the Other in the Self Scale (Gächter et al., 2015). This scale utilized a visual representation consisting of two circles, with one representing the self and the other representing the other players. Participants were asked to describe the relationship between themselves and the other players by providing ratings on a scale.

2.3.10 Money Allocation Game

The assessment of participants' group bias and fairness was conducted utilizing the Money Allocation Game, employing the approach elucidated in the study by Yilmaz et al. (2021; see Appendix B). Two distinct metrics were computed: in-group bias, representing the proportion of the allocation designated for the in-group, and fairness, quantified as an equal division. The in-group bias score is the main focus of H2.

2.3.11 Demographic Form

In this study, participants completed a demographics form in both the pre-test and post-test phases. However, for the purposes of this study, the demographics form from the post-test phase was utilized. The post-test demographics form included various factors such as age, gender, socioeconomic status, income status, belief in evolution, belief in karma, belief in witchcraft, belief in alternative medicine, belief in God (categorical: yes or no), belief in God (continuous: rated from 0 to 10), religious affiliation

(denomination), general happiness level, recent life satisfaction, the feeling of meaning in life, and a feedback section about the study (see Appendix H).

In addition to the post-test demographics form, the data also included additional measures collected during the pre-test phase. These measures consisted of education level, religiosity, the level of commitment to the selected religious affiliation, political affiliation, political views, social conservatism, and economic conservatism.

To ensure the validity of the pre-screening information obtained from Prolific and to analyze the data with updated responses, the answers to the religious affiliation question in the demographics form were examined. The incoherency rate, indicating inconsistencies in the responses, was found to be only 3.2%, demonstrating the reliability of the pre-screening information.

2.4 Procedure

Both the pre-test and post-test phases of this study were conducted using Qualtrics, and participants were recruited through Prolific. On Prolific, participants were provided with a brief description of the study and the details regarding participation payment. They accepted the offer of \$2 for both the pre-test and post-test phases (with an exchange rate of 100 cents = 80 pence) upon selecting the study through their web browsers. After confirming their consent on the first page, participants proceeded to the Prolific ID page, which allowed us to match participants' Prolific IDs between pre- and post-tests. In the post-test phase, an overview page was presented to participants, providing specific details about the study and additional payment. In the overview, participants were informed that the additional payments they could earn through their decisions in the games would be randomly selected from one of the games. This lottery method of additional payments in monetarily incentivized games was employed to avoid deception while still benefiting from monetary incentives, as suggested by Cubitt et al. (1998) and Charness et al. (2016).

In the pre-test phase, participants' psychological and cognitive measures, including self-reported thinking styles, performance-based thinking styles, fluid intelligence, zero-sum beliefs, socially desirable responding, and other measures that are outside the scope of this study², were collected. Finally, participants completed a demographics form. The survey was fully randomized in terms of scale and question order.

In the post-test phase, participants engaged in a two-stage one-shot PD game. In Stage 1, all participants played the game with an anonymous player without any randomization. They first received instructions and then answered three understanding questions. Participants who did not understand the task were not excluded as a standard practice (Rand, 2016); however, a feedback sheet on the next page displayed the correct answers alongside the participants' own answers. Following the feedback sheet, participants provided their decisions in the PD game, their expectation of the other player's decision, and their perception of a close relationship with the other player. All these questions were presented with the option to review the instructions. Lastly, in Stage 1, participants' cooperation preferences were measured using two strategy questions.

In Stage 2, participants played the same game again, but this time the religious identity of their partners was introduced as either a believer, non-believer, or anonymous. The religious identity in Stage 2 was represented by a Cross symbol for Christians and an Atheism symbol for Atheists as in the previous research (e.g., Everett et al., 2017; Isler et al., 2021b), while no symbol was presented for the anonymous group. Each page included an invisible timer allowing researchers to track response times. Similar to Stage 1, participants also answered questions regarding their expectations and social distance (i.e., relationship closeness). Following the PD games, a money allocation task

² This study was preregistered based on the decisions made during the PD Game. However, there were additional tasks included in the post-test phase of this project that fell outside the specific scope of this study. These tasks encompassed the Donation Task (Brown et al., 2017), Deception Game, Trust Game (Berg et al., 1995), Third-Party Punishment Game (Fehr & Fischbacher, 2004), Moral Courage Game (Balafoutas et al., 2014), Rule-following Task (Kimbrough & Vostroknutov, 2018), and Dictator Game (Engel, 2011). It is important to mention that none of these additional tasks involved group manipulation. Only the PD Game was conducted in two stages, with group manipulation occurring in Stage 2. Prior to the second stage of the PD Game, participants were exposed to all tasks in a randomized order. Therefore, it should be noted that between the two stages of the PD Game, all participants also completed these additional tasks.

was presented to measure participants' in-group bias and fairness, as in Yilmaz et al. (2021). Before concluding, participants completed a demographic form. In the end, they were directed to the Prolific survey completion page.

2.5 Analyses

The study involved both confirmatory and exploratory analyses conducted on SPSS 25 (IBM Corp., 2017). Additionally, power analyses were performed using G*Power 3.1 (Faul et al., 2007).

2.5.1 Confirmatory Analyses

In accordance with the preregistered plan, the scores obtained from the PD Game were converted into the percentage of the maximum possible score (POMP), following the methodology proposed by Cohen et al. (1999). Subsequent analyses were conducted using these POMP scores.

All confirmatory hypotheses (H1a, H1b, H2a, H2b, H3a, and H3b) were tested using bootstrapped multiple regression models. Due to the non-normal distribution of some variables, bootstrapped models were employed in contrast to preregistration. In these models, predictors included cognitive style and cognitive ability, while the outcome variables were one-shot anonymous cooperation, in-group bias in Money Allocation Game, and out-group bias in PD.

2.5.2 Exploratory Analyses

In addition to the CPT and RPM scores, the three main hypotheses were exploratorily tested by including (1) CRT score (i.e., the first three questions in CPT) as predictor, (2) CTSQ sub-scale scores as predictors, and (3) the total cognitive reflection score (i.e., the total score of CPT and RPM) as predictor in relation to cooperation decisions.

Furthermore, for testing H3, the standard deviation was utilized instead of the difference score between anonymous interactions and out-group interactions, as another measure of out-group bias.

Additionally, correlations between variables were also examined to establish zero-order relationships both in the overall sample and the split samples, among only believers and only non-believers. For group comparison on cognitive measures and social behavior, bootstrapped independent samples t-tests were conducted.

Also, the moderation effects of religious identity, zero-sum beliefs, socio-economic status, and CTSQ subscales on the specified relationships in three confirmatory hypotheses were tested. These moderation analyses were conducted on the predictor variables of the centered CPT and the centered fluid intelligence. The dependent variables in these tests encompass (1) the anonymous one-shot cooperation in Stage 1 PD, (2) in-group bias in the Money Allocation Game, and (3) out-group bias in PD. The same moderation analyses were also replicated, adding CRT instead of CPT.

To test the expectations of CSR, a bootstrapped linear regression was conducted to examine the marginal effect of expected cooperation from the anonymous partner on the decision to cooperate in PD Stage 1.

Lastly, to examine the quality of data, we also tested whether cognitive reflection could predict religious disbelief negatively. This relationship was observed in the US in several correlational studies (but please note that correlational studies in non-Western countries and the results related to the causal relationship were mixed, Gervais et al., 2018; Gervais & Norenzayan, 2018; Yilmaz, 2021). We compared believers and non-believers in terms of various cognitive measures, including the total cognitive reflection score, fluid intelligence, CPT, CRT, and CTSQ subscales, using bootstrapped independent t-tests. Additionally, these cognitive measures were included in bootstrapped simple linear regressions to predict the belief in God continuous measure.

2.5.2 Power Analyses

Sensitivity power analyses were conducted for confirmatory hypothesis tests and exploratory findings using G*Power 3.1 (Faul et al., 2007). Power and effect sizes were reported together with other analysis results.

3. RESULTS

3.1 Zero-order Correlations

3.1.1 Zero-order correlations in the general sample

Pearson correlation analyses were employed to examine the relationships among the key variables in the present study. The results revealed significant associations between all measures of cognitive reflection and self-reported cognitive styles (see Table 3.1) in the expected directions. This means that all cognitive reflection scores predict each other and that higher reflection scores are related to higher self-reported analytic/open-minded thinking styles but lower intuitive/close-minded thinking styles. Specifically, fluid intelligence was significantly correlated with CPT ($r = .398, p < .001$), CRT ($r = .335, p < .001$), CTSQ AOT ($r = .199, p < .001$), CTSQ CMT ($r = -.129, p = .002$), CTSQ PIT ($r = -.206, p < .001$), and CTSQ PET ($r = .127, p = .002$).

Likewise, CPT and CRT scores also predict the same significant directions in these relationships. While CPT was significantly related to CRT ($r = .903, p < .001$), CTSQ AOT ($r = .324, p < .001$), CTSQ CMT ($r = -.227, p < .001$), CTSQ PIT ($r = -.333, p < .001$), and CTSQ PET ($r = .200, p < .001$), CRT was also significantly related to CTSQ AOT ($r = .266, p < .001$), CTSQ CMT ($r = -.172, p < .001$), CTSQ PIT ($r = -.266, p < .001$), and CTSQ PET ($r = .179, p < .001$).

Regarding the correlations among self-reported measures of cognitive style, once again, the observed trends aligned with the inherent nature of the measures (Newton et al., 2021). CTSQ AOT was significantly related to CTSQ CMT ($r = -.430, p < .001$), CTSQ PIT ($r = -.517, p < .001$), CTSQ PET ($r = .286, p < .001$). CTSQ CMT was significantly related to CTSQ PIT ($r = .252, p < .001$), CTSQ PET ($r = -.208, p < .001$). CTSQ PIT was significantly related to CTSQ PET ($r = -.165, p < .001$).

In terms of the association between cognitive reflection and BZSG, significant negative correlations were observed between BZSG and CPT ($r = -.124, p = .003$), CRT ($r = -.115, p = .006$), CTSQ CMT ($r = -.094, p = .025$), and CTSQ PET ($r = -.165, p < .001$) scores. The correlation between BZSG and CTSQ PIT was significantly positive ($r = .083, p = .047$). These findings indicate a potential negative relationship between cognitive reflection and BZSG.

Significant relationships between cognitive reflection and game scores were only observed in self-reported measures. Specifically, a negative relationship was found between CTSQ AOT and in-group bias ($r = -.116, p = .005$), between CTSQ CMT and fairness ($r = -.102, p = .014$), and between CTSQ PIT and fairness ($r = -.094, p = .023$). However, performance-based measures did not show significant relationships with the scores obtained from the Money Allocation Game. It is worth noting that both one-shot anonymous cooperation and general out-group bias in PD were found to be non-significant in relation to both cognitive reflection and self-reported thinking style measures.

3.1.2 Zero-order correlations by splitting the sample into believers and non-believers

When analyzing the data by splitting it into believers and non-believers (see Table 3.2 and Table 3.3), the correlations of out-group bias score with cognitive measures were again insignificant, both in believers and non-believers. However, in-group bias and fairness scores in Money Allocation Game showed different patterns in split data. The fairness score of believers was significantly and negatively related to CTSQ CMT ($r = -.215, p < .001$) and CTSQ PIT ($r = -.136, p < .05$) and negatively related to CTSQ AOT ($r = .207, p < .001$). The fairness score of non-believers was related to fluid intelligence positively ($r = .157, p < .01$) and was not related to any of the self-reported thinking style measures. These findings indicate that fairness may be related to higher cognitive reflection and that self-report and performance-based measures might differently

predict the fairness of believers and non-believers. The in-group bias score of each subsample had no significant relationship with cognitive reflection measures.

When it comes to cognitive reflection and cooperation decisions, one-shot anonymous cooperation in PD Stage 1 was significantly correlated with both CPT ($r = .166, p = .006$) and CRT ($r = .123, p = .020$) scores of non-believers. However, the same relationships, CPT-cooperation ($r = -.036, p = .535$) and CRT-cooperation ($r = -.028, p = .626$), were not significant for believers. These findings indicate that the null finding in the overall sample might be driven by believers' indifference to CRT and CPT scores in the context of one-shot anonymous cooperation. Also, analytic cognitive style might predict one-shot anonymous cooperative decisions only in non-believers.

Table 3.1. Correlation matrix for the overall sample

	FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
FLIQ	—											
CPT	0.398***	—										
CRT	0.335***	0.903***	—									
CTSQ AOT	0.199***	0.324***	0.266***	—								
CTSQ CMT	-0.129**	-0.227***	-0.172***	-0.430***	—							
CTSQ PIT	-0.206***	-0.333***	-0.266***	-0.517***	0.252***	—						
CTSQ PET	0.127**	0.200***	0.179***	0.286***	-0.208***	-0.184***	—					
BZSG	0.010	-0.124**	-0.115**	0.060	-0.094*	0.083*	-0.165***	—				
PD Stage 1	0.060	0.057	0.046	0.054	-0.070	-0.046	0.027	-0.015	—			
ΔPD	-0.053	-0.074	-0.061	-0.061	0.024	0.009	-0.028	0.064	0.471***	—		
Ingroup bias	0.002	-0.067	-0.069	-0.116**	0.068	0.030	-0.058	-0.043	-0.040	0.023	—	
Fairness	0.077	0.062	0.068	0.034	-0.102*	-0.094*	-0.008	-0.076	0.157***	-0.218**	0.159***	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. CIs were reported in the detailed Table I.1 in Appendix I

Table 3.2. Correlation matrix for believers

	FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup Bias	Fairness
FLIQ	—											
CPT	0.364 ***	—										
CRT	0.292 ***	0.916 ***	—									
CTSQ AOT	0.140 *	0.320 ***	0.271 ***	—								
CTSQ CMT	-0.090	-0.204 ***	-0.151 **	-0.387 ***	—							
CTSQ PIT	-0.202 ***	-0.293 ***	-0.230 ***	-0.482 ***	0.198 ***	—						
CTSQ PET	0.132 *	0.212 ***	0.179 **	0.229 ***	-0.151 **	-0.170 **	—					
BZSG	0.039	-0.156 **	-0.134 *	-0.084	-0.027	0.133 *	-0.209 ***	—				
PD Stage 1	0.015	-0.036	-0.028	0.056	-0.048	-0.030	-0.019	-0.023	—			
ΔPD	-0.024	-0.084	-0.023	-0.016	0.067	-0.039	0.062	0.031	0.492 ***	—		
Ingroup bias	-0.029	-0.060	-0.065	-0.073	0.003	-0.001	-0.030	0.076	0.032	0.206 *	—	
Fairness	0.016	0.054	0.059	0.207 ***	-0.215 ***	-0.136 *	0.014	0.048	0.162 **	-0.211 *	0.030	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. CIs were reported in the detailed Table I.2 in Appendix I

Table 3.3. Correlation matrix for non-believers

	FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
FLIQ	—											
CPT	0.397***	—										
CRT	0.354***	0.885***	—									
CTSQ_AOT	0.162**	0.164**	0.125*	—								
CTSQ_CMT	-0.082	-0.119*	-0.087	-0.207***	—							
CTSQ_PIT	-0.150*	-0.298***	-0.243***	-0.458***	0.170**	—						
CTSQ_PET	0.087	0.139*	0.138*	0.309***	-0.219***	-0.145*	—					
BZSG	-0.097	-0.209***	-0.189**	-0.020	-0.016	0.161**	-0.187**	—				
PD Stage 1	0.111	0.166**	0.141*	0.082	-0.117	-0.069	0.081	-0.003	—			
ΔPD	-0.064	-0.042	-0.101	-0.015	-0.140	0.030	-0.103	0.182	0.456***	—		
Ingroup bias	0.056	-0.041	-0.048	-0.105	0.095	0.019	-0.066	-0.131*	-0.110	-0.217*	—	
Fairness	0.157**	0.105	0.104	-0.084	-0.033	-0.095	-0.013	-0.181**	0.153*	-0.218*	-0.263***	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. CIs were reported in the detailed Table I.3 in Appendix I

3.2 Confirmatory Hypothesis Tests

Three confirmatory hypotheses were tested using bootstrapped simple linear regression models with the same two predictors (CPT and RPM) on different outcomes (one-shot cooperation, in-group bias, out-group bias). For these tests, a sensitivity power analysis was tailored for a multiple linear regression model with two predictors. It was found that the post-test sample of 577 participants is able to detect an effect size f^2 bigger than 0.0269 with a power of 0.95 when alpha is equal to 0.05. The effect size f^2 of 0.0269 can be categorized as the small effect size, according to Cohen (2013).

3.2.1 The predictive ability of cognitive style and cognitive ability on one-shot anonymous cooperation

To test H1a and H1b, a bootstrapped multiple linear regression analysis was conducted to examine the predictive abilities of analytic cognitive style, measured by CPT, and fluid intelligence, measured by RPM, on the cooperative decisions in the PD game. Both predictor variables (IVs) were included in the initial and only step of the regression model. The results revealed that the overall model did not reach statistical significance ($F(2,574) = 1.42, p = .243$). Both analytic cognitive style and fluid intelligence were found to be non-significant predictors of cooperative decision-making in the PD game, against the expectation of H1.

3.2.2 The predictive ability of cognitive style and cognitive ability on in-group bias

To test H2a and H2b, a bootstrapped multiple linear regression analysis was conducted to examine the predictive abilities of analytic cognitive style, measured by CPT, and fluid intelligence, measured by RPM, on the in-group bias scores in the Money Allocation Game. Both predictors were included in the initial and only step of the regression model. The results revealed that the overall model did not reach statistical significance ($F(2,574) = 1.598, p = .203$). Both analytic cognitive style and fluid intelligence were found to be non-significant predictors of in-group bias scores in the Money Allocation Game, against the expectation of H2.

3.2.3 The predictive ability of cognitive style and cognitive ability on out-group bias in PD

To test H3a and H3b, a bootstrapped multiple linear regression analysis was conducted to examine the predictive abilities of analytic cognitive style, measured by CPT, and fluid intelligence, measured by RPM, on out-group bias in the PD game. Both predictors were included in the initial and only step of the regression model. The results revealed that the overall model did not reach statistical significance ($F(2,181) = .544, p = .581$). Both analytic cognitive style and fluid intelligence were found to be non-significant predictors of the out-group bias in the PD game, against the expectation of H3.

3.3 Exploratory Test of H3 Using SD Instead of Difference Scores for Out-group Bias

3.3.1 The predictive ability of cognitive style and cognitive ability on out-group bias in PD using SD

As an exploratory test of H3a and H3b, a bootstrapped multiple linear regression analysis was conducted to examine the predictive abilities of analytic cognitive style, measured by CPT, and fluid intelligence, measured by RPM, on the out-group bias in the PD game. Both predictors were included in the initial and only step of the regression model. The results revealed that the overall model did not reach statistical significance ($F(2,181) = 0.069, p = .933$). Both analytic cognitive style and fluid intelligence were found to be non-significant predictors of out-group bias in PD using SD, against the expectation of H3.

3.4 Exploratory Hypothesis Tests Using CRT Scores Instead of CPT Scores

In addition to the aforementioned regression analyses using CPT scores, we attempted to re-test the same predictions using CRT scores, the first three questions from the CPT. Therefore, we have conducted four bootstrapped multiple linear regression analyses to examine the predictive abilities of analytic cognitive style, measured by CRT, and fluid intelligence, measured by RPM, on (1) the one-shot anonymous cooperation in PD, (2)

in-group bias in Money Allocation Game, (3) out-group bias in PD, and (4) out-group bias in PD using SD. Both predictors were included in the initial and only step of the regression models. None of these models reached statistical significance. Analytic cognitive style and fluid intelligence were found to be non-significant predictors of these four outcomes in separate models.

3.5 Exploratory Hypothesis Tests Using The Total Cognitive Reflection Score Instead of Separate Measures

I have conducted four bootstrapped simple linear regressions to test the predictive ability of cognitive reflection, the total score of CPT and RPM, on outcome variables: (1) one-shot anonymous cooperation in PD, (2) in-group bias in Money Allocation Game, (3) out-group bias in PD, and (4) out-group bias in PD using SD. None of these models reached statistical significance. The cognitive reflection score was found to be a non-significant predictor of these four outcomes in separate models.

3.6 Exploratory Hypothesis Tests Using CTSQ Scores Instead of CPT Scores

I have conducted four bootstrapped multiple linear regressions to test the predictive ability of self-reported thinking styles, measured by CTSQ's subscales, AOT, CMT, PIT, and PET, on outcome variables: (1) one-shot anonymous cooperation in PD, (2) in-group bias in Money Allocation Game, (3) out-group bias in PD, and (4) out-group bias in PD using SD. Predictors were included in the initial and only step of the regression models. None of these models reached statistical significance. However, the second model, which predicted the in-group bias in the Money Allocation Game, was trending toward significance ($F(4,572) = 2.281, p = .059$).

Despite the null finding in omnibus results, since AOT has a significant and unique predictor in this model, we added AOT alone as an additional exploratory model, bootstrapped simple linear regression, to predict in-group bias. This time the model was significant, $F(1,575) = 7.789, p = .005, R^2 = .013$. AOT subscale of CTSQ significantly and negatively predicted in-group bias in the Money Allocation Game ($B_1 = -2.095, p = .019$). This suggests that, on average, for each additional AOT score, in-group bias decreased by 2.095 points. The intercept term (B_0) in the model represents the expected

baseline in-group bias score when the AOT score is zero. In this model, the intercept value was found to be 56.86 ($p < .001$). This implies that when participants have zero AOT score, the expected in-group bias score was 56.86. In summary, the formula used to calculate participants' predicted in-group bias was derived as 56.86 minus 2.095 multiplied by the AOT score, indicating that each one-unit increase in the AOT score corresponded to a reduction of 2.095 points in participants' reported in-group bias. This finding indicates that self-reported AOT may negatively predict in-group bias in Money Allocation Game (see Figure 3.1).

The effect size (f^2) for this result was calculated as 0.149, indicating a moderate effect size. The power analysis revealed that this statistical test had 83% power to detect this effect ($N = 577$, $\alpha = .05$), suggesting a high likelihood of correctly identifying the true effect if it exists.

When we conducted other simple regressions for CMT, PIT, and PET subscales of CTSQ, the models and the predictors were insignificant.

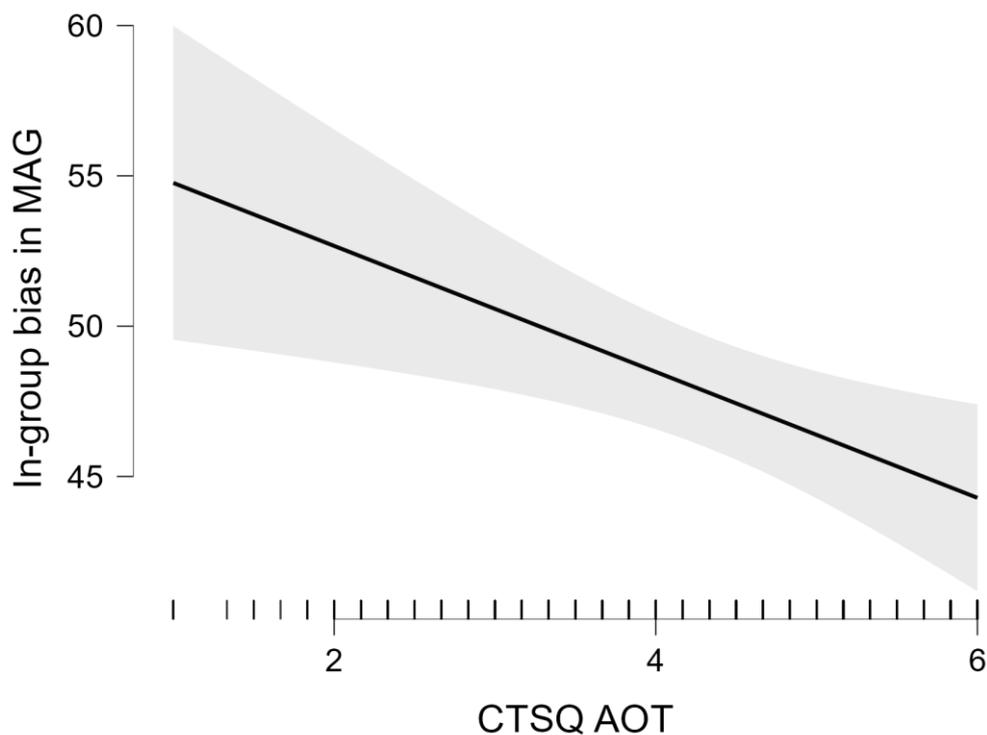


Figure 3.1. Marginal effect of CTSQ AOT on in-group bias in Money Allocation Game

3.7 Exploratory Moderation Analyses

3.7.1 Overview of moderation analyses

The moderation effects of religious identity, zero-sum beliefs, socio-economic status, and CTSQ subscales on the specified relationships in three confirmatory hypotheses were tested. These moderation analyses were conducted on the predictor variables of the centered CPT and the centered fluid intelligence. The outcome variables in these tests encompass (1) the anonymous cooperation decisions in Stage 1 PD, (2) in-group bias in the Money Allocation Game, and (3) the out-group bias in PD decisions. The same moderation analyses were also replicated, adding CRT instead of CPT.

With three outcome variables and four moderator variables, and the additional replications using CRT, 24 moderation analyses was conducted for exploratory purposes. Only two of the models were significant. The significant models were on (1) the moderating role of zero-sum beliefs on the relationship between CPT (predictor) and in-group bias (dependent) and (2) the moderating role of religious identity on the relationship between CRT (predictor) and anonymous PD decision (dependent).

3.7.2 Moderating role of zero-sum beliefs on the relationship between CPT and in-group bias

The moderating role of zero-sum beliefs on the relationship between CPT (predictor) and in-group bias (dependent) was tested by adding centered scores of zero-sum beliefs, fluid intelligence, and CPT scores in the first step and by adding the interaction of fluid intelligence with zero-sum beliefs and the interaction of CPT scores with zero-sum beliefs in the second step. The first step was not significant ($F(3,533) = 1.474, p = .221$); the second step was significant ($\Delta F(2,531) = 3.830, p = .022$) with an adjusted R^2 of .013.

In the second step, the centered CPT scores ($B = -1.471, Bca CI [-3.080, -.177], p = .046$) and the interaction of fluid intelligence with zero-sum beliefs ($B = 2.196, Bca CI$

[.444, 3.760], $p = .012$) demonstrated significant effects (see Figure 3.2, Figure 3.3, and Table 3.4). Other predictors did not show significant effects in this model. Notably, the effects of the centered fluid intelligence scores were not statistically significant ($B = 1.007$, *Bca CI* [-.791, 2.713], $p = .276$).

The effect size (f^2) for the significant results was calculated as 0.149, indicating a moderate effect size. The power analysis revealed that this statistical test had 74.8% power to detect this effect ($N = 577$, $\alpha = .05$), suggesting a moderate likelihood of correctly identifying the true effect if it exists.

These findings suggest two key points. Firstly, the CPT scores of participants may serve as predictors for the in-group bias score in the Money Allocation Game, showing a negative relationship. This provides exploratory evidence supporting H2a. However, it is important to note that fluid intelligence alone does not predict the in-group bias, maintaining the lack of evidence for H2b. Secondly, when fluid intelligence interacts with BZSG, it may predict higher in-group bias scores. Rather than indicating a reverse pattern between CPT and fluid intelligence, this finding highlights the significance of the interactions of individual differences in cooperative situations. It suggests that the interplay between individual characteristics and contextual factors plays a crucial role in shaping cooperative behaviors.

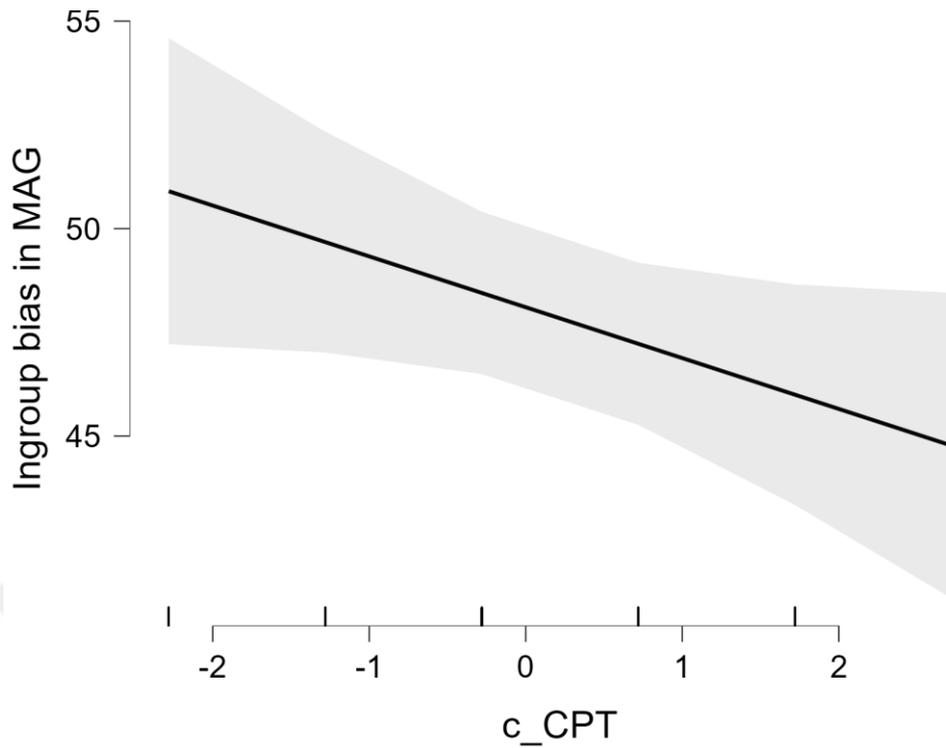


Figure 3.2. Marginal effect of centered CPT on in-group bias in Money Allocation Game (Step 2)

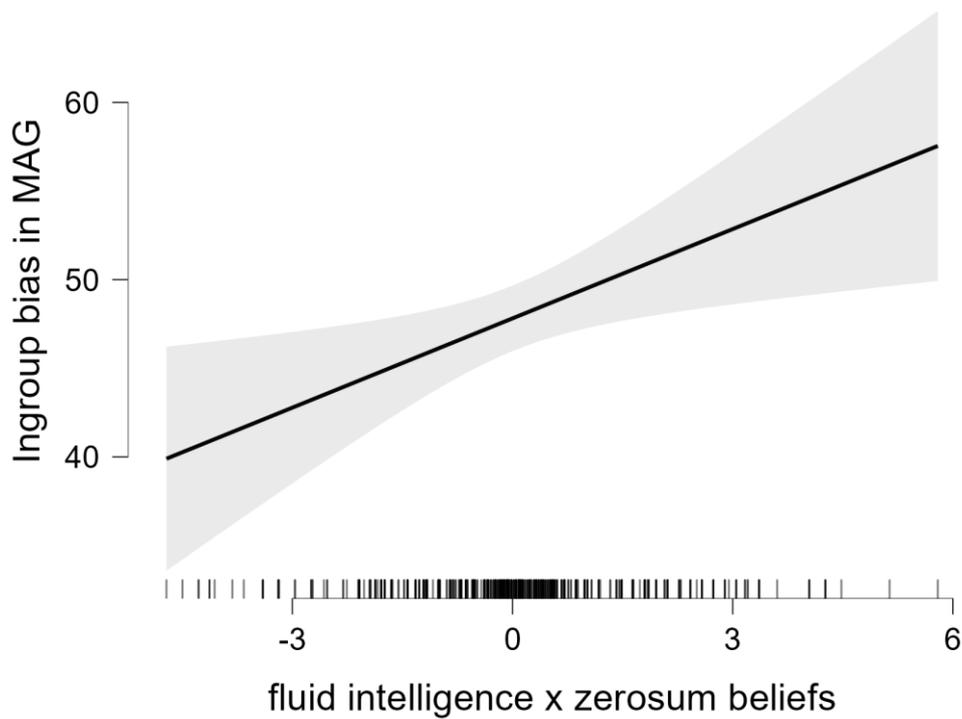


Figure 3.3. Marginal effect of the interaction of fluid intelligence with zero-sum beliefs on in-group bias in Money Allocation Game

Table 3.4. Bootstrapped hierarchical regression predicting in-group bias

	<i>B</i>	Bias	Standardized Error	Lower CI (95%)	Upper CI (95%)	<i>R</i> ²
Step 1						.008
CPT	-.884	-.40	.704	46.184	-.026	
RPM	.636	.018	.920	-2.834	2.468	
BZSG	-1.301	-.049	.904	-1.144	.924	
Step 2						.022*
CPT	-1.471*	-.048	.715	-3.080	-.177	
RPM	1.007	.002	.910	-.791	2.713	
BZSG	-.707	-.059	.891	-2.441	.986	
CPTxBZSG	2.196	-.054	.824	.444	3.760	
RPMxBZSG	-.855	-.004	.593	-1.957	.291	

Note. * $p < .05$

3.7.3 Moderating role of religious belief on the relationship between CRT and one-shot anonymous cooperation

The moderating role of religious affiliation on the relationship between CRT (predictor) and one-shot anonymous cooperation (dependent) was tested by adding the centered score of CRT and categorical religious affiliation (0 = believer, 1 = non-believer) variables in the first step and by adding their interactions in the second step. The first step was not significant ($F(2,574) = .673, p = .511$); the second step was significant ($\Delta F(1,573) = 4.499, p = .034$) with an adjusted R^2 of .010.

Only the interaction term was significant in this model ($B = 6.223, Bca\ CI [.745, 11.38], p < .05$; see Figure 3.4 and Table 3.5). Other predictors did not show significant effects in this model.

The effect size (f^2) for the significant result was calculated as 0.111, indicating a small to moderate effect size. The power analysis revealed that this statistical test had 71.9% power to detect this effect ($N = 577, \alpha = .05$), suggesting a moderate likelihood of correctly identifying the true effect if it exists.

This finding indicates that the relationship between CRT and one-shot anonymous cooperation is influenced by the moderating role of religious affiliation. For individuals who identify as non-believers, there may be a positive association between cognitive reflection and cooperation. However, it is important to note that without further information about the specific study and the underlying mechanisms at play, this interpretation remains speculative. The relationship between CRT, religious affiliation, and one-shot anonymous cooperation is complex and may be influenced by various factors. Further research is needed to gain a more comprehensive understanding of the role of religious affiliation in moderating the relationship between CRT and one-shot anonymous cooperation.

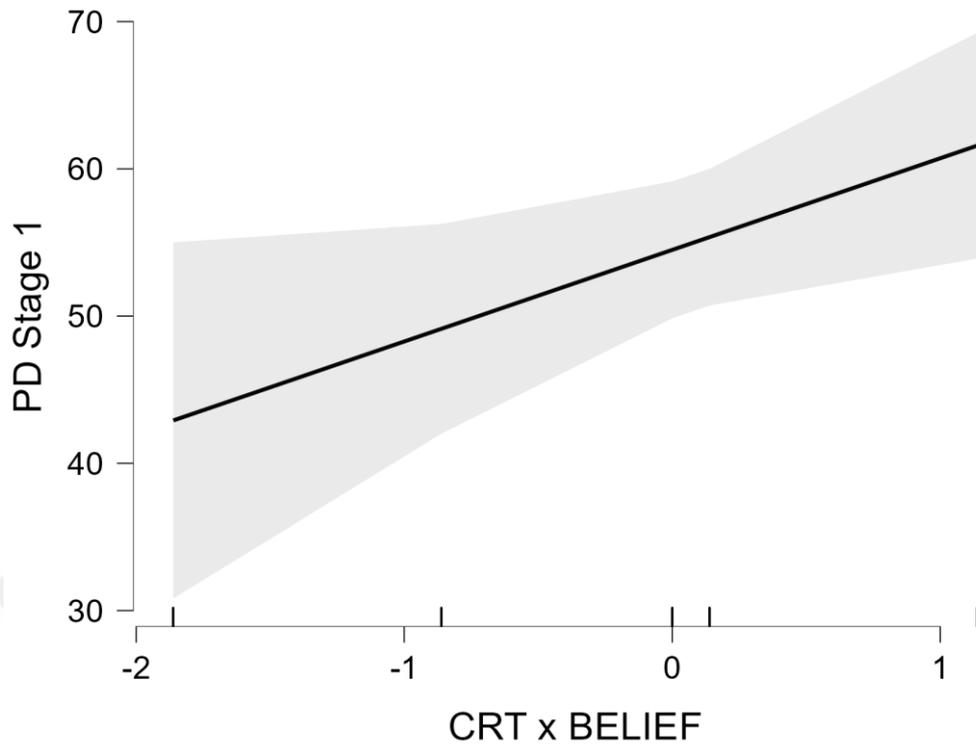


Figure 3.4. Marginal effect of the interaction of CRT and religious affiliation on one-shot anonymous cooperation

Table 3.5. Bootstrapped hierarchical regression predicting one-shot anonymous cooperation

	<i>B</i>	Bias	Standardized Error	Lower CI (95%)	Upper CI (95%)	<i>R</i> ²
Step 1						.002
CRT	1.670	-.056	1.409	-1.06	4.457	
Religious affiliation	-1.137	-.037	3.479	-7.955	5.778	
Step 2						.010*
CRT	-.915	.037	1.818	-4.372	2.486	
Religious affiliation	-1.414	-.016	3.452	-8.150	2.486	
CRTx Religious affiliation	6.223*	.005	2.758	.745	11.380	

Note. * $p < .05$

3.8 Exploratory Hypothesis Tests by Splitting Data into Believers and Non-believers

Since it has been found that religious affiliation has a moderating effect on the relationship between one-shot anonymous cooperation and CRT scores, it is plausible to reconduct all the hypothesis tests, both confirmatory and exploratory, by splitting data into believers and non-believers. The analyses to test the specified hypotheses, utilizing various cognitive measures such as RPM, CPT, CRT, cognitive reflection score, and CTSQ subscales, were conducted on the split data. Among the various bootstrapped regression models, none of the models and predictors showed significant prediction for believers' one-shot anonymous cooperation, in-group bias, or out-group bias. However, three models based on non-believers did yield significant results. These significant models predicted one-shot anonymous cooperation among non-believers using different cognitive reflection measures.

Specifically, when including CPT and RPM scores as predictors in the first and only step of the regression for one-shot anonymous cooperation, the model showed significance, $F(2,269) = 4.149$, $p = .017$, $R^2 = .030$. The CPT scores significantly and positively predicted one-shot anonymous cooperation ($B = 3.899$, $p = .019$) with an intercept coefficient of 40.138 ($p = .001$). This indicates that, on average, for each additional CPT score, one-shot anonymous cooperation among non-believers increased by 3.899 points from the point of intercept, 40.138, among non-believers (see Figure 3.5). However, the RPM score was not a significant predictor in this model ($B = 2.001$, $p = .410$).

When including CRT (instead of CPT) and RPM scores as predictors in the first and only step of the regression for one-shot anonymous cooperation, the model showed statistically significant result, $F(2,269) = 3.323$, $p = .038$, $R^2 = .024$. However, the CRT scores only exhibited a trend toward significance ($B = 4.385$, $p = .064$). Similarly, the RPM score was not a significant predictor in this model ($B = 2.621$, $p = .273$). In comparison to the previous model with CPT scores, the lack of significant predictive

ability for CRT scores may be attributed to its restriction to only three classical CRT questions (Frederick, 2005).

Lastly, a bootstrapped simple linear regression model using generalized cooperation score as the predictor and one-shot anonymous cooperation as the outcome was significant, $F(1,270) = 8.036$, $p = .005$, $R^2 = .030$. The cognitive reflection score significantly and positively predicted one-shot anonymous cooperation ($B = 3.176$, $p = .003$) with an intercept coefficient of 40.526 ($p < .001$). This suggests that, on average, for each additional cognitive reflection score, one-shot anonymous cooperation increased by 3.176 points from the intercept point of 40.526 among non-believers (see Figure 3.6).

The effect size (f^2) was calculated as 0.031 for the relationship between CPT and one-shot anonymous cooperation (from a multiple linear regression) among non-believers, indicating a small effect size. The power analysis revealed that this statistical test had 73.6% power to detect this effect ($N = 577$, $\alpha = .05$), suggesting a moderate likelihood of correctly identifying the true effect if it exists.

The effect size (f^2) was calculated as 0.031 for the relationship between CPT and one-shot anonymous cooperation (from a simple linear regression) among non-believers, indicating a small effect size. The power analysis revealed that this statistical test had 82.4% power to detect this effect ($N = 272$, $\alpha = .05$), suggesting a moderate likelihood of correctly identifying the true effect if it exists.

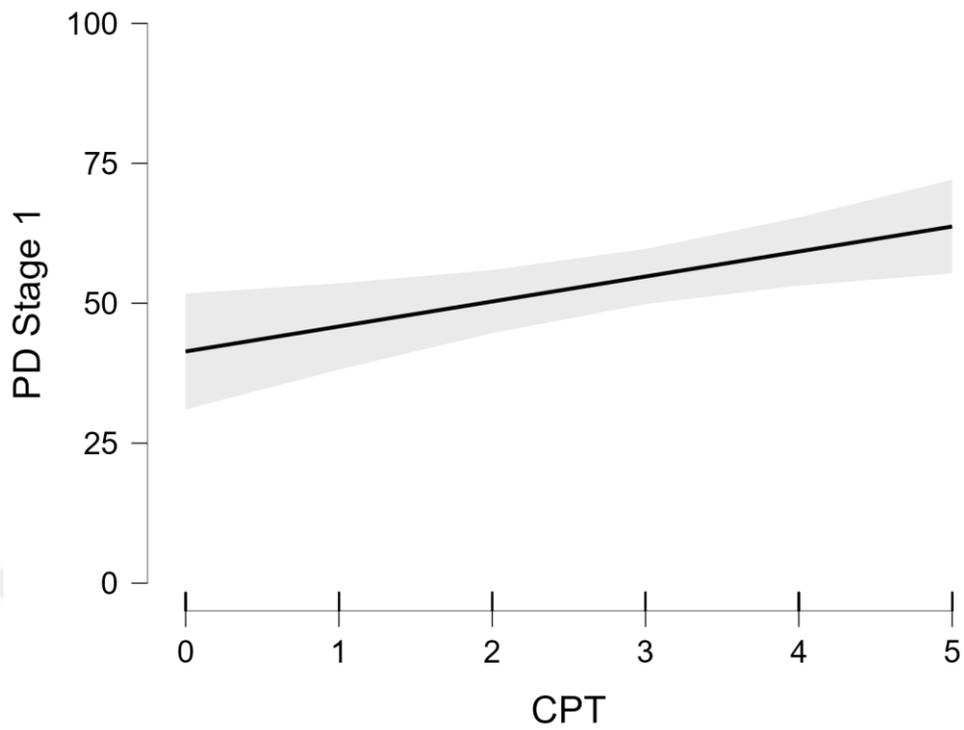


Figure 3.5. Marginal effect of CPT scores on one-shot anonymous cooperation among non-believers ($CI = \%95$)

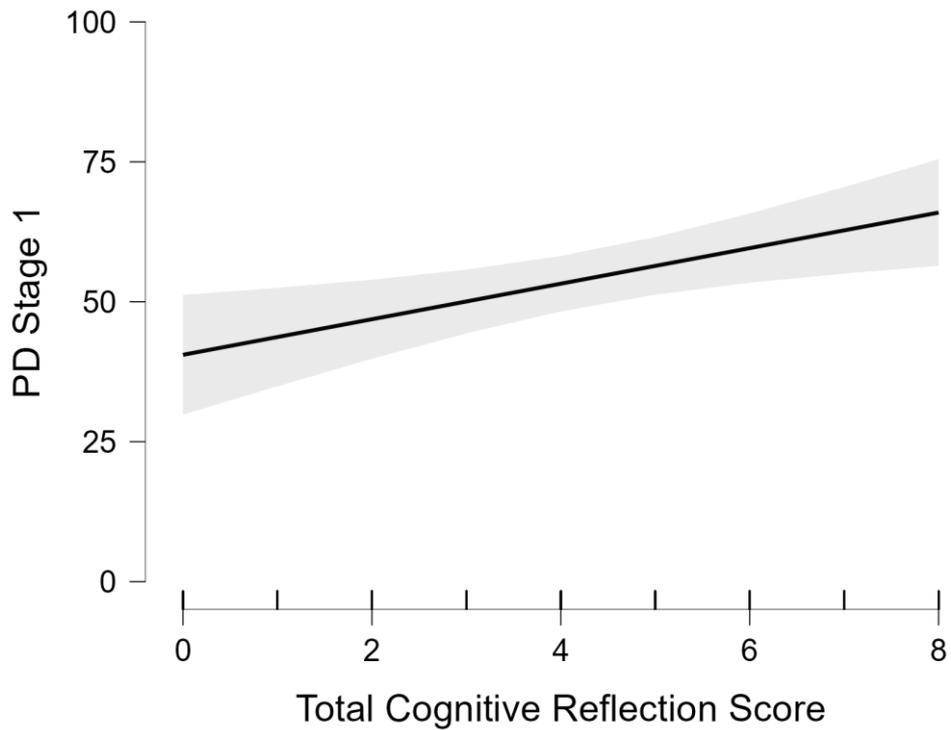


Figure 3.6. Marginal effect of the total cognitive reflection score on one-shot anonymous cooperation among non-believers ($CI = \%95$)

3.9 Additional Exploratory Analyses

3.9.1 Group comparisons

Believers' and non-believers' cognitive measures and social behaviors were compared using bootstrapped ($N = 1000$) independent samples t-tests. The statistical details of these comparisons are reported in Table 3.6.

Regarding cognitive reflection, non-believers consistently obtained higher scores than believers across all measures, including total cognitive reflection score, fluid intelligence, CPT, and CRT. In line with these findings, believers had higher self-reported CSTQ CMT and CTSQ PIT scores and lower CTSQ AOT and CTSQ PET scores, compared to non-believers. Additionally, non-believers exhibited higher levels of zero-sum belief than believers.

In terms of social behavior, no significant differences were found between believers and non-believers in cooperation decisions during anonymous PD games, both in Stage 1 and Stage 2. Their expectations from anonymous partners did not vary significantly either. However, believers reported a greater sense of closeness (reverse coded measure of the feeling of social distance) in relation to anonymous Stage 1 PD interactions compared to non-believers. Furthermore, believers displayed higher levels of cooperation and expected more cooperation from their partners when interacting with other believers, compared to non-believers' cooperation and expectation. These groups exhibited the opposite pattern when interacting with non-believers. These findings suggest that cooperative behavior may be primarily influenced by the expected level of cooperation from the other partner, as proposed by the CSRSM. In the next section, an additional exploratory linear regression will be conducted to investigate the relationship between expectations and cooperation in one-shot anonymous cooperation.

Although there were no differences between believers and non-believers in terms of out-group bias in PD and fairness in the Money Allocation Game scores, believers demonstrated a higher level of in-group bias compared to non-believers.

Table 3.6. Group comparisons, believers vs. non-believers

	Mean (Believers)	Mean (Non-believers)	Result	<i>p</i>-value	Lower CI (95%)	Upper CI (95%)
Total Cognitive Reflection	3.289	4.301	B < NB	.001	-1.33169	-.64011
Fluid IQ	1.111	1.434	B < NB	.001	-.50103	-.14808
CPT	2.177	2.868	B < NB	.001	-.94628	-.44534
CRT	1.675	2.070	B < NB	.001	-.58852	-.20303
CTSQ AOT	3.719	4.969	B < NB	.001	-1.42692	-1.07166
CTSQ CMT	3.243	2.406	B > NB	.001	.65094	1.03909
CTSQ PIT	3.680	3.048	B > NB	.001	.43596	.82632
CTSQ PET	4.511	4.801	B < NB	.003	-.47164	-.10080
BZSG	3.237	3.818	B < NB	.001	-.78980	-.37042

PD Stage 1	54.666	54.188	B = NB	.886	-6.45716	7.34007
PD Stage 1 expectation	54.338	50.849	B = NB	.263	-2.21482	9.49390
PD Stage 1 feeling of close relationship	2.869	2.563	B > NB	.029	.033	.567
PD Stage 2 w/believer	61.627	47.011	B > NB	.014	3.44602	26.20385
PD Stage 2 w/non-believer	39.619	52.441	B < NB	.038	-24.42584	-.95762
PD Stage 2 w/anonymous	55.551	64.870	B = NB	.120	-21.03908	2.12490
PD Stage 2 expectation from believers	64.182	49.483	B > NB	.005	4.73490	24.65148
PD Stage 2 expectation from non-believers	38.268	51.656	B < NB	.016	-23.87221	-1.98204
PD Stage 2 expectation from anon.	53.000	58.511	B = NB	.348	-16.96569	6.13616
ΔPD	13.433	7.230	B = NB	.246	-4.44047	16.63465

Ingroup bias	49.639	45.809	B > NB	.045	.01815	7.48534
Fairness	77.377	72.206	B > NB	.095	-.64446	11.34351

Note. B defines believers; NB defines non-believers.

3.9.2 A simple linear regression between expectation and cooperation

As the group comparisons revealed that believers and non-believers had higher expectations of cooperation from their respective religious in-groups in the PD game, and their cooperative decisions aligned with these expectations, a simple linear regression analysis with a 1000 samples bootstrap was conducted to examine the relationship between expectation and cooperation. This analysis also served as an exploratory test of the CSRМ. To this end, a bootstrapped simple linear regression was performed, with expectation as the predictor and one-shot anonymous cooperation as the outcome. The model yielded significant results, $F(1,575) = 370.51$, $p < .001$, $R^2 = .392$.

The results indicated that expectation significantly and positively predicted one-shot anonymous cooperation in Stage 1 PD ($B = .699$, $p = .001$). This suggests that, on average, for each additional expectation score, the cooperation score (ranging from 0 to 100) increased by .699 points. The intercept value in this model was found to be 17.60 ($p = .001$), indicating that when participants had zero expectations, the expected amount of cooperation was 17.60 (see Figure 3.7).

The effect size (f^2) was calculated as .6447 for the relationship between expectation and one-shot anonymous cooperation, indicating a large effect size. The power analysis revealed that this statistical test had 99.99% power to detect this effect ($N = 577$, $\alpha = .05$), suggesting a very high likelihood of correctly identifying the true effect if it exists.

Consequently, these findings suggest that expected cooperation from the other participant may play a crucial role in influencing one-shot cooperation decisions, lending support to the assertions of the CSRМ (Isler et al., 2021a).

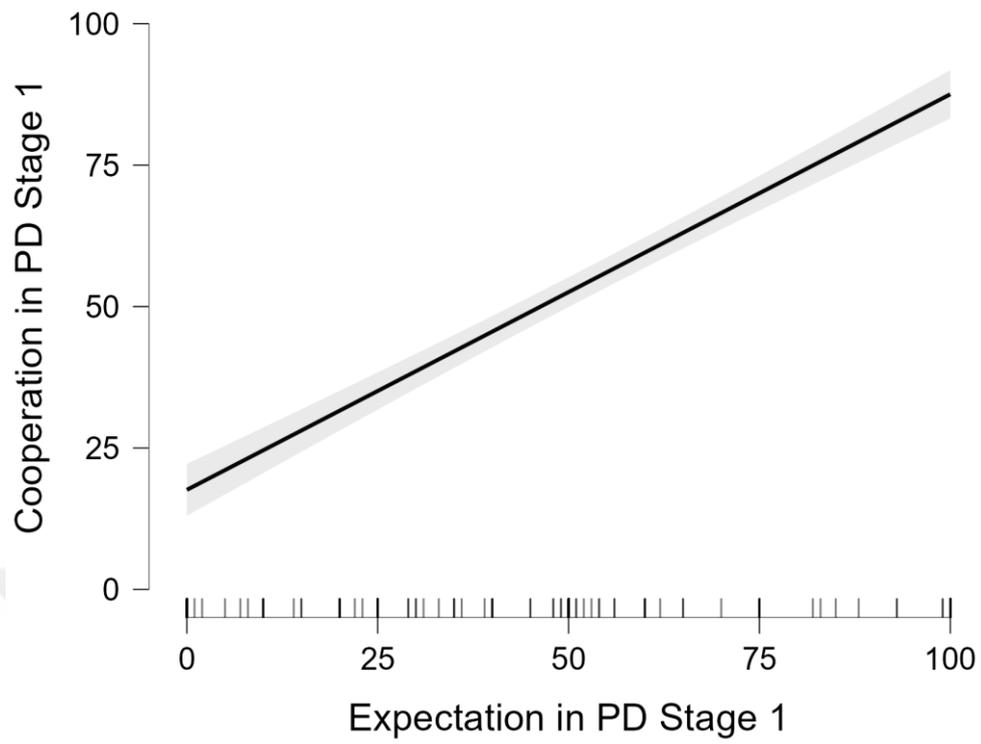


Figure 3.7. Marginal effect of expectation on one-shot anonymous cooperation

3.9.3 Analyses on the relationship between cognitive reflection and religious disbelief

Finally, we conducted tests to examine the potential of cognitive reflection to predict religious disbelief in a negative manner. Using bootstrapped independent t-tests, we found that non-believers scored higher in all cognitive reflection measures, including total cognitive reflection, CRT, CPT, and fluid intelligence (see Table 3.6 in Section 3.9.1).

Additionally, bootstrapped simple linear regressions was employed to utilize these cognitive measures in predicting the continuous measure of belief in God. The data indicates that total cognitive reflection ($B = -.414$, $p = .001$, $f^2 = .048$, power = .999), CPT ($B = -.607$, $p = .001$, $f^2 = .052$, power = .999), CRT ($B = -.623$, $p = .001$, $f^2 = .030$, power = .985), and fluid intelligence ($B = -.484$, $p = .004$, $f^2 = .015$, power = .84) negatively predicted the continuous variable of belief in God after a span of seven months. We also conducted separate simple linear regression models for believers and non-believers. However, when analyzing the split data, the simple linear regressions did not yield any significant effects of cognitive measures (predictors) on belief in God (outcome).

4. DISCUSSION

4.1 Overview of Findings

This thesis examines the predictive ability of cognitive reflection on cooperation within an intergroup context based on religious affiliation, specifically believers and non-believers. To address potential confounding factors such as demand effect, reflection prime, and zero-sum thinking, we implemented pre- and post-test phases with a seven-month gap between cognitive measures (pre-test) and social behavior assessments (post-test).

Building upon previous findings that combined measures were more predictive in terms of attitudes and psychological features (Yilmaz & Saribay, 2017b), we employed two performance-based measures to assess cognitive reflection: analytic thinking (as measured by CPT) and fluid intelligence (as measured by RPM) for confirmatory analyses. Exploratory analyses included a self-reported thinking styles questionnaire (CTSQ), CRT (the first three questions of CPT), and a total cognitive reflection measure (total score of CPT and RPM) to exploratorily examine the hypothesized relationships.

Three main hypotheses were preregistered, expecting that cognitive reflection measures (CPT and RPM) would predict (1) higher cooperation in one-shot anonymous interactions in Stage 1 PD, (2) lower in-group bias in the Money Allocation Game, and (3) a lower out-group bias in PD. However, the confirmatory hypothesis tests, as preregistered, did not yield significant evidence for the expected relationships. Several exploratory analyses examining the same relationships using different measures, including CRT and the total cognitive reflection score, also did not identify any reliable effects. Nevertheless, other exploratory analyses showed significant patterns.

Notably, in the exploratory analyses, the Actively Open-minded Thinking (AOT) subscale of CTSQ significantly and negatively predicted in-group bias in the Money Allocation Game. However, it is important to note that the other three subscales of CTSQ, as well as other exploratory measures such as CRT and the total cognitive reflection scores, were not significant predictors of social behavior in the overall sample.

In the exploratory moderation analyses, it was found that centered CPT scores (but not centered fluid intelligence) significantly and negatively predicted in-group bias in the Money Allocation Game. This finding provides exploratory evidence for H2a. Additionally, the discrepancy in results between the models that included original CPT scores and centered CPT scores can be attributed to the utilization of centered scores in the model, which likely helped address potential collinearity issues and yielded more reliable estimates of the relationship between CPT and in-group bias.

Furthermore, the interaction between fluid intelligence and zero-sum belief positively predicted in-group bias, which can be seen as evidence for the moderating effect of zero-sum belief on the relationship between fluid intelligence and in-group bias. This suggests that the impact of fluid intelligence on in-group bias is dependent on individuals' zero-sum belief. For those who are higher at zero-sum game beliefs, fluid intelligence positively predicted in-group bias, supporting the view that intelligence can serve the motivated reasoning for some individuals (Stanovich, 2021). It seems that zero-sum game belief is one of those missing moderators in this relationship.

Another moderation analysis revealed that the relationship between CRT and one-shot anonymous cooperation was moderated by religious affiliation. The interaction term between CRT score and religious affiliation positively predicted one-shot anonymous cooperation, indicating that being a non-believer and having higher CRT scores together predicted higher cooperation decisions in the one-shot anonymous PD. This finding suggests that religious affiliation moderates the relationship between cognitive reflection measures and social behavior, leading us to conduct the same hypothesis tests by splitting the data into believers and non-believers.

When splitting the data into believers and non-believers, it was found that both CPT and the total cognitive reflection scores positively predicted one-shot anonymous cooperation among non-believers. These findings provide exploratory evidence for H1 in general and specifically H1a. In split data analyses, it was also found that none of the cognitive reflection measures emerged as significant predictors of believers' behaviors in both the PD and the Money Allocation Game. The differential effects of cognitive reflection in predicting the behavior of these distinct groups may be attributed to variances in their respective epistemic norms (Baron, 2020; Metz et al 2018), which will be further discussed in the next section.

Group comparisons between believers and non-believers revealed significant differences in several aspects. Specifically, non-believers exhibited higher cognitive reflection scores across all measures, including the total cognitive reflection, fluid IQ, CPT, and CRT, in comparison to believers. Their CTSQ scores were also in line with this finding. Non-believers had higher AOT and PET scores and lower CMT and PIT scores, than believers. Moreover, non-believers demonstrated a greater belief in zero-sum games, whereas believers displayed a higher degree of in-group bias in the Money Allocation Game. In the PD Game, both religious groups exhibited elevated expectations of cooperation from their respective in-group partners and demonstrated a higher level of cooperation towards their in-groups. These notable findings prompted us to investigate the marginal effect of expectation on cooperative decisions through a simple linear regression analysis. The results revealed a positive association between the level of expected partner cooperation and the level of cooperative decision in accordance with the theoretical framework of the CSRSM and previous findings (Isler et al., 2021a).

4.2 Implications

While the confirmatory analyses did not yield statistically significant findings, the exploratory analyses uncovered meaningful and statistically significant patterns.

4.2.1 Cognitive reflection and cooperation

To begin, the null findings regarding the total cognitive reflection, fluid intelligence, CPT, and CRT scores in the overall sample indicate that the expected relationship between cognitive reflection and cooperation may be a fickle phenomenon after a seven-month period. Attempting to assess the main effect of cognitive reflection on cooperative decision-making in a random sample without any pre-selection may prove futile, as these effects depend on numerous other factors. CSRM suggests that evidence for both intuitive and reflective accounts of cooperation is likely to be found under specific conditions, with a focus on contextual and individual factors (Isler et al., 2021a). Therefore, researchers should explore interaction effects within boundary conditions.

Regarding the examination of interaction effects, this study found two moderating factors between the specified predictors and outcomes. First, the relationship between fluid intelligence and in-group bias was moderated by zero-sum beliefs. The interaction between fluid intelligence and zero-sum beliefs positively predicted in-group bias. This finding suggests that fluid intelligence may sometimes hinder cooperation when interacting with other psychological variables, which is a novel finding that partially contradicts discussions favoring the positive effects of intelligence on cooperation (see Proto et al., 2019; Zhang et al., 2015), while partially aligning with findings that theory of mind, an ability related to higher executive functions, reduces cooperative decisions (DeAngelo & McCannon, 2017). To explain the underlying reason for this effect, intelligence could be a useful tool for people who see the world as a battle between “us and them,” and their advantages in real-life free-riding experiences may come to the experimental games. After all, this finding shows direct evidence for the moderating role of individual factors between cognitive processes and cooperation.

Second, the relationship between CRT and anonymous cooperative decisions was moderated by participants’ religious affiliation. This result indicates that the relationship between cognitive reflection and cooperation may be influenced by religious affiliation, leading us to conduct separate hypothesis tests among believers and non-believers. The subsequent results demonstrated that the total cognitive reflection

and CPT scores were significant predictors of one-shot cooperative decisions only among non-believers. This finding could be considered exploratory evidence for the reflective cooperation account (Isler et al., 2021b; Martinsson et al., 2014), specifically supporting H1 and H1a. However, the effects were observed only in the interactions among non-believers, and no main effects were found in the overall sample.

The pattern, where reflection significantly influences attitudes and behaviors among non-believers but has no effect among believers, has been observed in previous studies with different contexts. For instance, Yilmaz and Isler (2019), when testing the Intuitive Belief Hypothesis (IBH) that posits reflective thinking reduces religious belief (Gervais & Norenzayan, 2012; Shenhav et al., 2012), found that reflection actually increased religious beliefs in the overall sample of believers and non-believers, contradicting the IBH. However, in their detailed analyses in the second study, they observed that this effect was predominantly driven by non-believers, with believers exhibiting no significant change in their level of belief in God. Similarly, Pennycook et al. (2020) found that AOT was a more predictive measure among liberals than conservatives. Hence, the effects of the cognitive reflection on the cooperative behavior of different groups may also vary, as preliminary evidence suggests in the present study.

One possible explanation for the varying predictive abilities of believers' and non-believers' reflection scores on cooperative behavior could lie in their differing epistemic norms. While non-believers tend to prioritize reasoning in their belief systems, believers may rely on values such as intuition, norms, and authority instead of reason (Baron, 2020; Metz et al., 2018). These differences in epistemic norms between the two groups may shed light on their contrasting susceptibility to reason, reflection, and AOT. Consequently, future research should focus on these differences, and intervention techniques targeting belief systems should tailor their approaches to accommodate the specific epistemic norms of each group (Baron, 2020; Metz et al., 2018).

Exploring the differential effects of cognitive processes on groups' cooperative decisions and other factors that influence these relationships should be a focus of future research. CSRM, which emphasizes contextual and individual factors and their

boundary conditions on one-shot cooperation decisions (Isler et al., 2021a), suggests a general framework and some specific interactions; however, it lacks a detailed investigation of various other variables. In this study, we have added a particular contribution to the context of CSRМ by finding moderating effects of zero-sum beliefs and religious affiliation.

Furthermore, our data supported one specific hypothesis of CSRМ on the expectations and cooperative decision-making. CSRМ suggests that one-shot cooperative decisions can be predicted by the level of expectation from others in cooperative interactions. The data provides support for this hypothesis by revealing a positive relationship between expectations and cooperation, consistent with previous findings (Isler et al., 2021a). Moreover, group comparisons showed that both believers and non-believers expected higher levels of cooperation from their in-groups compared to their out-groups, as expected (see Henrich & Henrich, 2007; Simpson, 2007). Their actual levels of cooperation aligned with their expectations from others. These findings emphasize the importance of analyzing strong reciprocity by directing attention toward contextual factors, such as intergroup interactions that influence cooperative dynamics.

Regarding the discussions on religious prosociality, the analyses of cooperation between groups demonstrate that both believers and non-believers exhibit higher cooperation with their in-groups than out-groups in the PD Game. The in-group favoritism observed among both groups in our data aligns with previous findings on religious groups (Isler et al., 2021b) and political groups (Balliet et al., 2014, 2018), as well as the notion that humans display tribal tendencies irrespective of their secondary identities (Clark et al., 2019). Similarly, in the Money Allocation Game, both groups exhibited in-group bias. However, the in-group bias scores were higher among believers compared to non-believers with a small effect size (Cohen's $d = 0.17$). While the heightened in-group bias among believers may be explained by their lower cognitive reflection and AOT scores of believers, all these findings support *the religious parochialism hypothesis* (e.g., Ben-Ner et al., 2009; Isler et al., 2021b; Lang et al., 2019) instead of *the generalized prosociality hypothesis* (Everett et al., 2016; Stagnaro

et al., 2019). Religious affiliation appears to have a parochial effect on cooperation by favoring in-groups, at least in the context of believers versus non-believers.

Lastly, AOT was found to be a negative predictor of in-group bias in the Money Allocation Game in the overall sample. Baron et al. (2023) have discussed how AOT represents a personal and moral value that embraces cosmopolitanism, which opposes parochialism and favoritism. According to their arguments, open-mindedness promotes tolerance and inclusive attitudes toward different groups. They provided evidence for the positive relationship between AOT and cosmopolitan values (measured by the reverse score of parochialism-related items) by analyzing data from the British Election Survey (wave 8, Fieldhouse et al., 2020). Additionally, Bronstein et al.'s (2019) data demonstrated that AOT is negatively associated with religious fundamentalism and dogmatism. It has long been known that fundamentalism strongly correlates with discriminatory attitudes toward various out-groups and minorities (Kirkpatrick, 1993). Moreover, the negative relationship between AOT and my-side bias is evident (Baron, 2019; Baron et al., 2023). All these findings and discussions explain the negative relationship between AOT and in-group bias observed in the Money Allocation Game in this study.

4.2.2 Cognitive reflection and religious disbelief

Regarding the relationship between cognitive reflection and religious beliefs, our data supports the IBH (Gervais & Norenzayan, 2012), indicating that non-believers tend to have higher scores in measures of the total cognitive reflection, CPT, CRT and fluid intelligence. These findings align with previous correlational studies (e.g., Stagnaro et al., 2019). However, in light of an increasing number of failed replications (e.g., Gervais et al., 2018; Sanchez et al., 2017; Sarıbay et al., 2020), Gervais and Norenzayan (2018) have recently highlighted the need for cross-cultural studies with effective experimental cognitive manipulations to examine this relationship more comprehensively (see also Yilmaz, 2021). Although the current study does not incorporate a cross-cultural design or experimentally induce reflective or intuitive mindsets, its pre- and post-test phases, measuring cognitive reflection (pre-test) and the level of belief in God (post-test), provide a robust assessment of this relationship. The

data demonstrates that all cognitive reflection measures, including the total cognitive reflection, CRT, CPT, and fluid intelligence, negatively predict the level of belief in God after a seven-month period. Furthermore, we explored the predictions of the Reflective Doubt Hypothesis by analyzing the data separately for believers and non-believers. However, simple linear regressions conducted on the split data did not reveal any significant effects of cognitive measures (predictors) on belief in God (outcome).

4.3 Limitations and Future Directions

This study aimed to investigate the robustness of the relationship between cognitive reflection and cooperative social behavior within an intergroup context. The results of confirmatory hypothesis tests suggest that this relationship may not hold true when adding a seven-month period between pre- and post-test phases. However, exploratory findings provide insights into its nuanced nature, indicating that contextual and individual cues may influence cooperative decision-making, as noted by Isler et al. (2021a). While these exploratory findings are valuable, it is important to acknowledge the limitations of this study and consider them for future research.

Firstly, the current study employed a seven-month period between pre- and post-test phases to minimize the influence of confounding factors associated with cognitive measures, such as the demand effect and zero-sum thinking. However, the high drop-out rate during the seven-month interval between the pre-test and post-test phases (623 out of 1200 participants) raises concerns about potential sample bias and compromises the random sampling procedure. Particularly in studies investigating social behavior, a biased sample can pose significant issues. Future longitudinal studies should address this problem and implement strategies to minimize drop-outs. One possible reason for the high drop-out rate in this study could be the unforeseen high economic inflation rate, resulting in a participation fee that may have made the study less attractive to the same participants who took part in the pre-test.

Another issue regarding the sample size in this study pertains to the random assignment of 577 participants to the three conditions in Stage 2 of the PD game. This method resulted in approximately 190 participants per group, with only 184 participants playing

against their out-groups. Analyzing group differences in out-group bias with the reduced sample sizes of 97 believers vs. 87 non-believers may pose a challenge. Future studies should explore alternative methods to avoid diminishing the sample size or strive to recruit a larger number of participants for this type of experimentation. However, it is worth noting that a two-stage PD game can provide valuable insights into the investigation of in-group and out-group bias within a cooperative context.

Also, this study included an equal number of believers and non-believers in the pre-test phase. However, the post-test phase had an unequal distribution of participants across the two groups, since we did not utilize a pre-selection method in post-test. Future longitudinal studies should strive to maintain equal group sizes in the post-test to ensure more accurate comparisons.

Furthermore, in the context of group manipulation, the current study sought to enhance internal validity at the expense of external validity. This was achieved by introducing participants' religious identities through a sentence and a symbol during PD Stage 2 (not in Stage 1) and in the Money Allocation Game – the final tasks preceding the demographics form. Given that participants were exclusively exposed to religious identities within these tasks, it is plausible that their decision-making was susceptible to the influence of demand characteristics. However, it is important to acknowledge the inherent trade-off between internal and external validity in studies employing group manipulation. Techniques aimed at bolstering the external validity of intergroup interactions may also inadvertently introduce additional confounding variables. For instance, Isler et al. (2021b), in their religious group manipulation, introduced secondary identities shared by all participants, such as "US resident" for residency, "18 or older" for the age group, "Speaks English" for language, and Prolific membership. While this approach, geared towards bolstering external validity, could potentially mitigate demand characteristics, it runs the risk of introducing unintended biases, as the shared attributes may inadvertently signal in-group membership.

Moreover, since this study is only one part of a comprehensive project, participants received other tasks during the study, such as other economic games like dictator game.

This process made the study longer and might create a fatigue effect on participants. The fatigue effect might be one reason for the null findings.

Lastly, this study conducted a large number of statistical analyses, which could inflate the possibility of Type 1 error. Therefore, we urge caution about the positive findings of this study.

4.4 Conclusion

This study represents an initial exploratory endeavor to address the methodological and theoretical gaps present in the literature concerning the relationship between cognitive reflection and cooperation. The primary findings of this study suggest that the expected association between cognitive reflection and cooperative social behavior may be a nuanced phenomenon. By interpreting the data in this manner, the study lends support the recent findings and innovative theoretical approach proposed by Isler et al. (2021a), emphasizing the need for a comprehensive consideration of multiple factors within the CSRM of one-shot cooperation. This study demonstrated the effects of cognitive measures, including cognitive reflection and zero-sum beliefs, and religious affiliation as individual factors on cooperative decision-making. The experimentation in PD Game created an intergroup context, as a contextual factor. However, it should be noted that the factors effective on cooperative decision-making can be extended. Future research may focus on these individual and contextual factors in a more robust experimental design.

Enhancing our understanding on the complexity of cooperation between groups holds promise for developing interventions that effectively combat discrimination and self-centered behavior in societies. These interventions should address between-group and within-group interactions separately, recognizing the distinct effects they may have on specific groups. For instance, this study revealed that believers' and non-believers' cognitive processes differ in predicting selfish or prosocial behavior in anonymous interactions. Moving forward, if we can grasp the intricacies of cooperative and prosocial behavior, we can design reliable intervention methods tailored to specific

situations, thereby maximizing the positive outcomes of cooperation within and between societies.



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APPENDIX A: COOPERATION PROTOCOL

A.1 Prisoner's Dilemma Instruction

TASK D

In this task, you will interact with Participant D1.

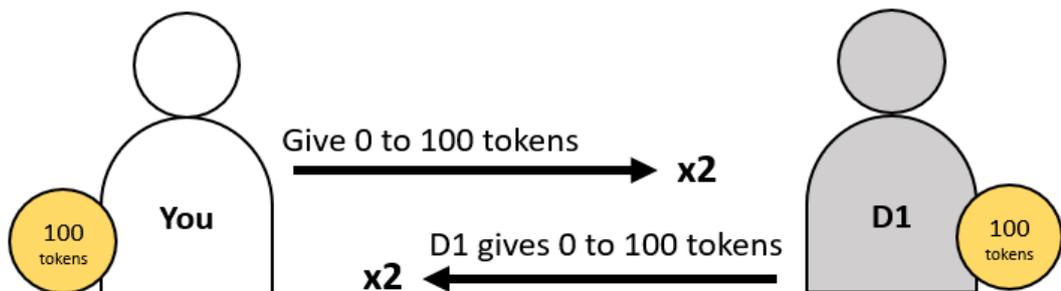
Each of you is given 100 tokens worth \$1 (1 token = 1 cent) for this interaction (in addition to the participation fee).

You will each independently decide how much of your 100 tokens to keep for yourself and how much (if any) to give to the other person.

Any money you give to the other person will be doubled. Thus, for every 1 token you give to the other person, Participant D1 will receive 2 tokens.

Likewise, any money the other person gives you will be doubled. Thus, for every 1 token Participant D1 gives you, you will receive 2 tokens.

The interaction is depicted below.



For example, if both of you choose to keep all of your 100 tokens, then you will each earn 100 tokens.

However, if both of you choose to give all of your 100 tokens, then all of the money will be doubled, and each of you will earn 200 tokens.

But if Participant D1 sends all of his or her 100 tokens to you while you keep all of your 100 tokens for yourself, you will earn \$3 (100 + 200 = 300 tokens), while Participant D1 will not earn any money from this task (100 - 100 + 0 = 0 tokens).

A.2 Prisoner's Dilemma Decision Page with an Anonymous Partner

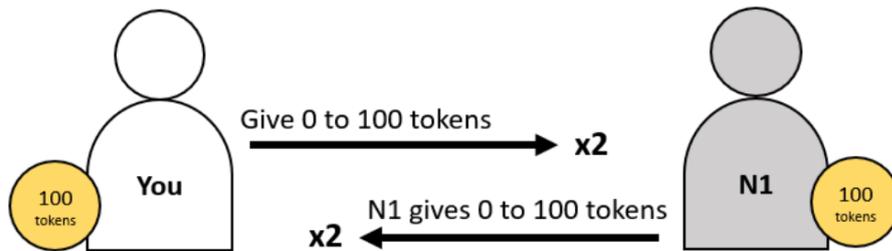
TASK N

How many tokens do you want to give to Participant N1?

0 100

A.3 Prisoner's Dilemma Expectation Page with an Anonymous Partner

TASK N



How many tokens do you think Participant N1 has given you?

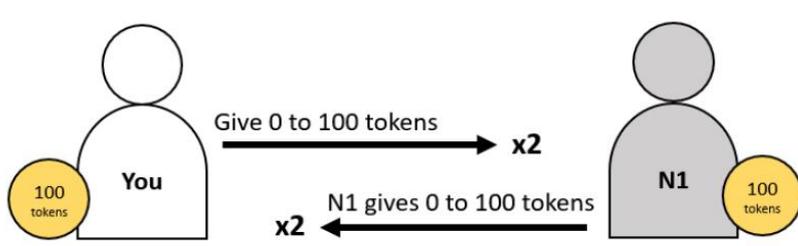
0

100

0

A.4 Prisoner's Dilemma Decision Page with a Believer Partner

TASK N



Participant N1

N1 is a believer

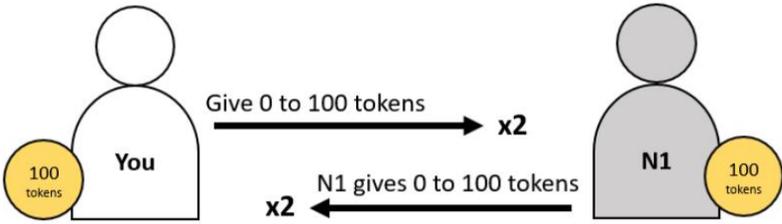
+

How many tokens do you want to give to Participant N1?

0 100

A.5 Prisoner's Dilemma Expectation Page with a Believer Partner

TASK N



Participant N1



N1 is a believer



How many tokens do you think Participant N1 has given you?

0 100

A.6 Prisoner's Dilemma Decision Page with a Non-believer Partner

TASK N

100 tokens **You** Give 0 to 100 tokens → **x2** **N1** 100 tokens

← **x2** N1 gives 0 to 100 tokens

Participant N1

N1 is a non-believer

Ⓐ

How many tokens do you want to give to Participant N1?

0 100

A.7 Prisoner's Dilemma Decision Page with a Non-believer Partner

TASK N

Participant N1
N1 is a non-believer

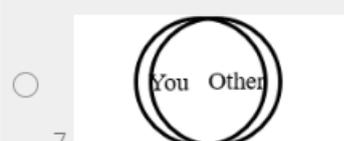
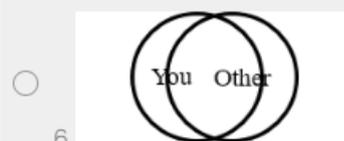
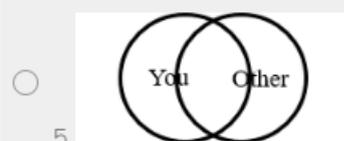
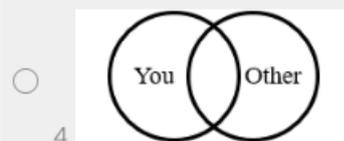
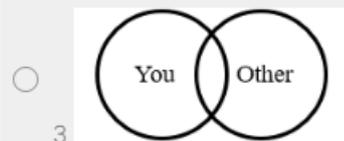
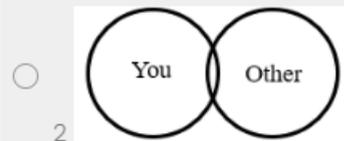
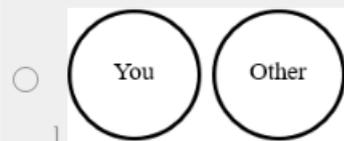
A

How many tokens do you think Participant N1 has given you?

0 100

A.8 Inclusion of the Other in the Self Scale

Please select one of the seven pictures below that best describes the relationship between you and the other participant you interacted with in this task (Participant D1).



APPENDIX B: MONEY ALLOCATION GAME

B.1 Money Allocation Game Decision Page (Identity positions, left and right, were counter-balanced between-subjects.)

Participant O1



Give more to O1 ←

↔

→ Give more to O2

Participant O2



Give more to O2

O1 is a non-believer



O2 is a believer



Please make your allocation decision.

Non-believer:												Non-believer:
100	90	80	70	60	50	40	30	20	10	0	0	0
vs.	vs.	vs.	vs.	vs.	vs.	vs.	vs.	vs.	vs.	vs.	vs.	vs.
Believer:	10	20	30	40	50	60	70	80	90	100	100	100
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX C: COMPREHENSIVE THINKING STYLES QUESTIONNAIRE

Please indicate to what extent you agree or disagree with the following statements.	1 (Strongly Disagree)	2	3	4	5	6 (Strongly Agree)
It is important to be loyal to your beliefs even when evidence is brought to bear against them. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whether something feels true is more important than evidence. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Just because evidence conflicts with my current beliefs does not mean my beliefs are wrong. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There may be evidence that goes against what you believe but that does not mean you have to change your beliefs. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Even if there is concrete evidence against what you believe to be true, it is OK to maintain cherished beliefs. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regardless of the topic, what you believe to be true is more important than evidence against your beliefs. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think there are many wrong ways, but only one right way, to almost anything. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my experience, the truth is often black and white. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Truth is never relative. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The truth does not change. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Either something is true or it is false; there is nothing in-between. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

There is no middle ground between what is true and what is false. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to rely on my intuitive impressions. (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe in trusting my hunches. (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I make decisions, I tend to rely on my intuition. (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using my "gut-feelings" usually works well for me in figuring out problems in my life. (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intuition is the best guide in making decisions. (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often go by my instincts when deciding on a course of action. (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not that good at figuring out complicated problems. (19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thinking is not my idea of an enjoyable activity. (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to avoid situations that require thinking in depth about something. (21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not a very analytical thinker. (22)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reasoning things out carefully is not one of my strong points. (23)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thinking hard and for a long time about something gives me little satisfaction. (24)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This is an attention check question. Please choose 2. (25)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX D: COGNITIVE PERFORMANCE TEST

CRT Please answer the following questions:

1) A bat and a ball cost £1.10 in total. The bat costs £1.00 more than the ball. How much does the ball cost?

- 5 pence
 - 10 pence
 - 9 pence
 - 1 pence
-

2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

- 5 minutes
 - 100 minutes
 - 20 minutes
 - 500 minutes
-

3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

- 47 days
 - 24 days
 - 12 days
 - 36 days
-

4) All living things need water. Roses need water. If these two statements are true, can we conclude from them that roses are living things?

- Yes
 - No
-

5) Claire is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

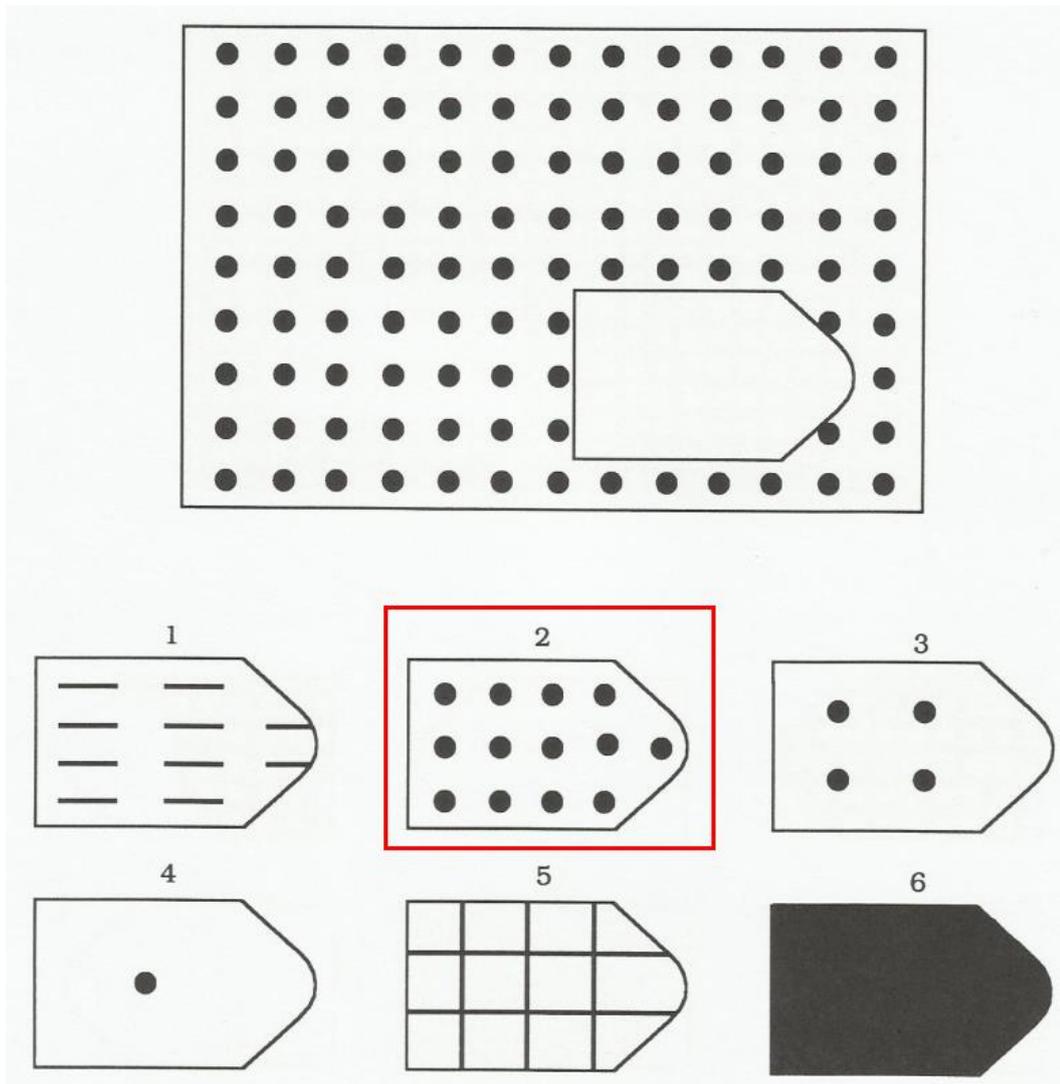
Which is more probable?

- Claire is a bank teller
- Claire is a bank teller and is active in the feminist movement

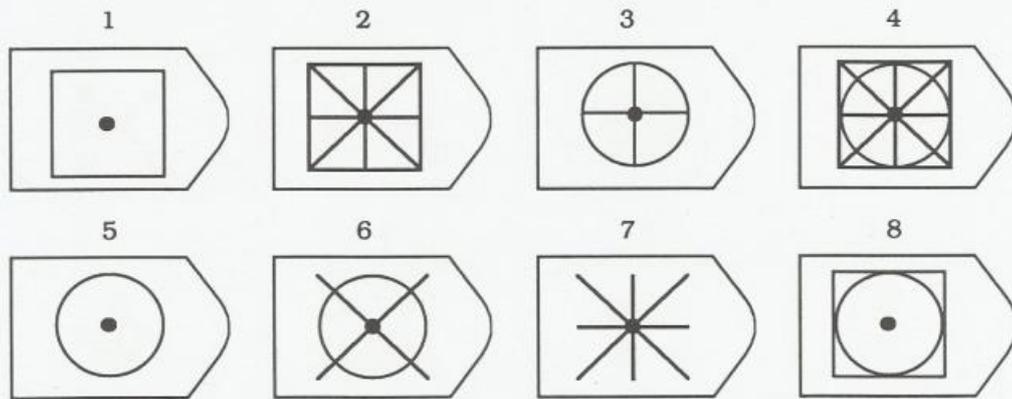
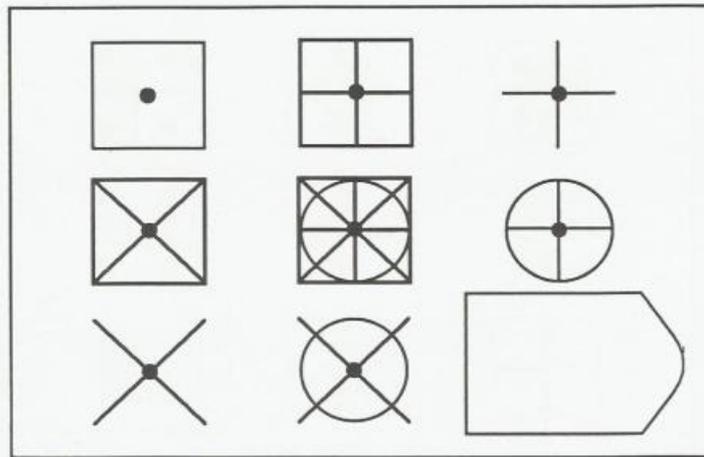
APPENDIX E: RAVEN'S PROGRESSIVE MATRICES

Please try to correctly answer the next three questions. You will receive 5 pence for each correct answer in addition to the participation fee.

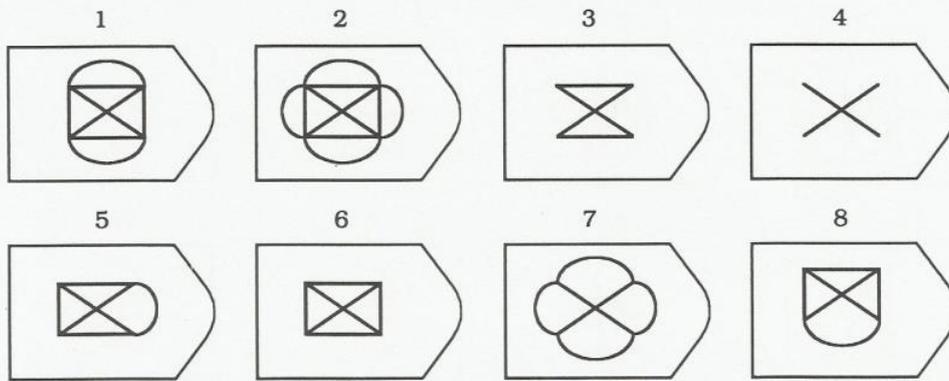
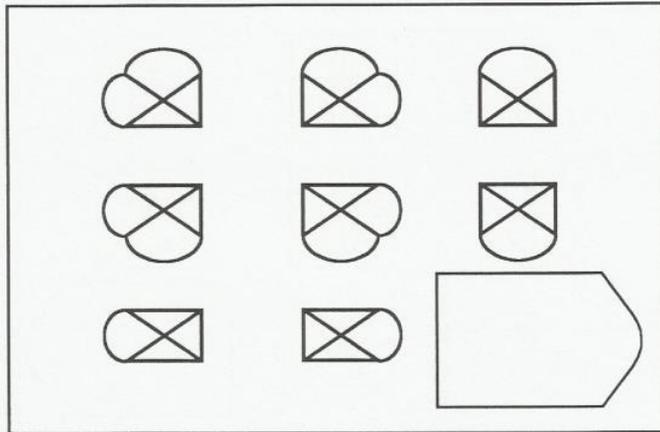
On each of the next three screens, you will be shown an image with a missing piece. You need to choose the missing piece that logically completes the image from among the given options. Please see below for a simple example, where the correct answer is "2".



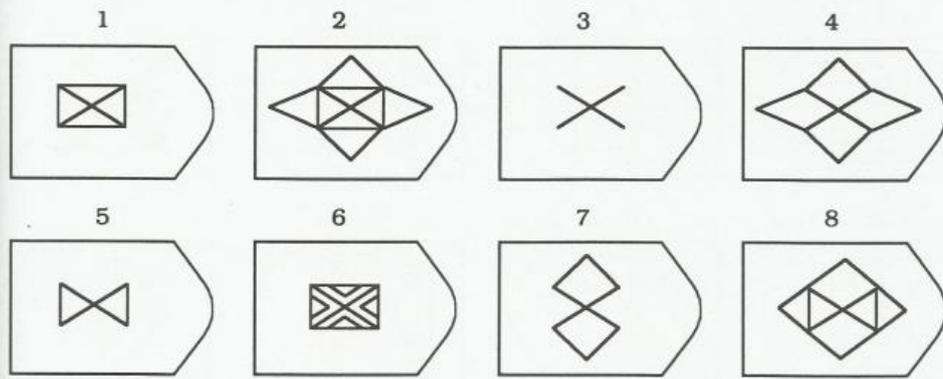
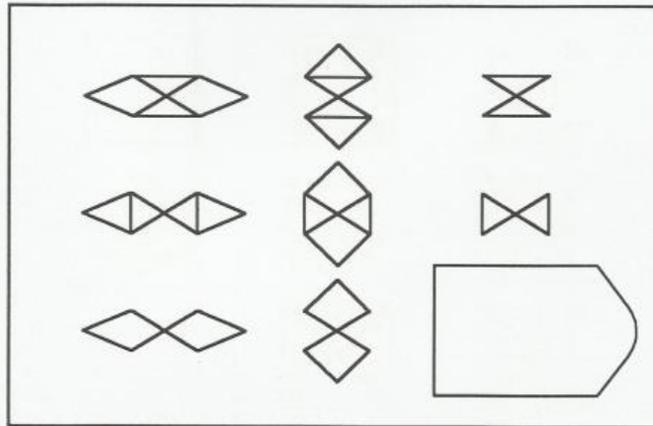
1)



2)



3)



APPENDIX F: BELIFE IN A ZERO-SUM GAME SCALE

To what extent do you agree or disagree with the following statements?
(1 = Strongly Disagree; 7 = Strongly Agree)

	1 (Strongly Disagree)	2	3	4	5	6	7 (Strongly Agree)
Successes of some people are usually failures of others. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If someone gets richer, it means that somebody else gets poorer. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life is so devised that when somebody gains, others have to lose. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In most situations, interests of different people are inconsistent. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Life is like tennis game—A person wins only when others lose. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When some people are getting poorer, it means that other people are getting richer. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When someone does much for others, he or she loses. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The wealth of a few is acquired at the expense of many. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX G: THE BALANCED INVENTORY OF DESIRABLE RESPONDING SHORT FORM

BIDR Using the scale below as a guide, indicate to what extent you think each statement is true.

(1 = Not True; 4 = Somewhat; 7 = Very True)

	1 (Not True)	2	3	4 (Somewhat)	5 (5)	6 (6)	7 (Very True)
I have not always been honest with myself. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I always know why I like things. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's hard for me to shut off a disturbing thought. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never regret my decisions. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I sometimes lose out on things because I can't make up my mind soon enough. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a completely rational person. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am very confident of my judgments (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have sometimes doubted my ability as a lover. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I sometimes tell lies if I have to. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never cover up my mistakes. (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There have been occasions when I have taken advantage of someone. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I sometimes try to get even rather than forgive and forget. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have said something bad about a friend behind his/her back. (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I hear people talking privately, I avoid listening. (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never take things that don't belong to me. (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't gossip about other people's business. (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX H: DEMOGRAPHICS FORM

What is your gender?

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)

What is your age in years?

Imagine that this ladder pictures how American society is set up.

At the top of the ladder are the people who are the best off — they have the most money, the highest amount of schooling, and the jobs that bring the most respect.

At the bottom are people who are the worst off — they have the least money, little or no education, no job, or jobs that no one wants or respects.

Now think about your family. Please tell us where you think your family would be on this ladder. Select the place that best represents where your family would be on this ladder.

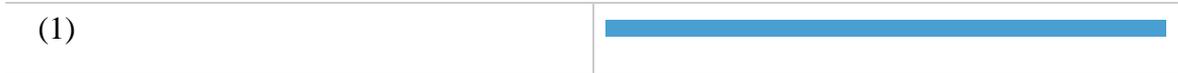
▼ 10 (1) ... 1 (10)

Do you believe in God?

- Yes (1)
- No (2)

Do you believe in God?

Definitely not Definitely yes
0 1 2 3 4 5 6 7 8 9 10



Please choose the option below that best describes your religious affiliation.

▼ Christian, Anglican (1) ... Other (24)

How happy do you feel in general?

(0 = Extremely Unhappy, 10 = Extremely Happy)

Extremely Unhappy Extremely Happy
0 1 2 3 4 5 6 7 8 9 10



Please take a moment to think about what makes your life feel important to you. Please respond to the following statement as truthfully and accurately as you can, and also please remember that it is very subjective question and that there is no right or wrong answer. Please answer according to the scale below:

My life has a clear sense of purpose.

- Absolutely Untrue (1)
- Mostly Untrue (2)
- Somewhat Untrue (3)
- Can't Say True or False (4)
- Somewhat True (5)
- Mostly True (6)
- Absolutely True (7)

Do you believe in evolution?

Definitely not

Definitely yes

0 1 2 3 4 5 6 7 8 9 10

(1)



Do you believe in karma?

Definitely not

Definitely yes

0 1 2 3 4 5 6 7 8 9 10

(1)



Do you believe in witchcraft?

Definitely not Definitely yes
0 1 2 3 4 5 6 7 8 9 10



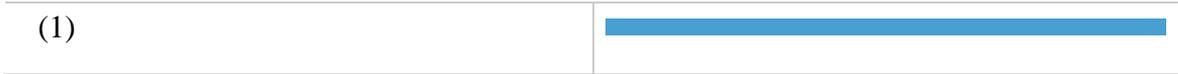
Do you believe in alternative medicine?

Definitely not Definitely yes
0 1 2 3 4 5 6 7 8 9 10



All things considered, how satisfied are you with your life as a whole these days?
(1 = Completely dissatisfied; 10 = Completely satisfied)

Completely dissatisfied Completely satisfied
1 2 3 4 5 6 7 8 9 10



APPENDIX I: CORRELATION MATRICES WITH CONFIDENCE INTERVALS

Table I.1. Detailed correlation matrix for the overall sample (with CIs)

		FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
FLIQ	Pearson's r	—											
	+95% CI	—											
	-95% CI	—											
CPT	Pearson's r	0.398 ***	—										
	+95% CI	0.468	—										
	-95% CI	0.333	—										
CRT	Pearson's r	0.335 ***	0.903 ***	—									
	+95% CI	0.407	0.915	—									
	-95% CI	0.261	0.891	—									
CTSQ AOT	Pearson's r	0.199 ***	0.324 ***	0.266 ***	—								
	+95% CI	0.274	0.393	0.347	—								
	-95% CI	0.119	0.253	0.187	—								
CTSQ CMT	Pearson's r	-0.129 **	-0.227 ***	-0.172 ***	-0.430 ***	—							
	+95% CI	-0.047	-0.146	-0.085	-0.353	—							
	-95% CI	-0.210	-0.306	-0.256	-0.506	—							
CTSQ PIT	Pearson's r	-0.206 ***	-0.333 ***	-0.266 ***	-0.517 ***	0.252 ***	—						
	+95% CI	-0.123	-0.259	-0.189	-0.450	0.339	—						
	-95% CI	-0.282	-0.404	-0.342	-0.581	0.164	—						
CTSQ PET	Pearson's r	0.127 **	0.200 ***	0.179 ***	0.286 ***	-0.208 ***	-0.184 ***	—					
	+95% CI	0.213	0.279	0.260	0.359	-0.126	-0.101	—					
	-95% CI	0.050	0.124	0.098	0.212	-0.289	-0.264	—					

Table I.1. Detailed correlation matrix for the overall sample (with CIs)

		FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
BZSG	Pearson's r	0.010	-0.124 **	-0.115 **	0.060	-0.094 *	0.083 *	-0.165 ***	—				
	+95% CI	0.087	-0.046	-0.034	0.142	-0.007	0.178	-0.082	—				
	-95% CI	-0.073	-0.204	-0.194	-0.039	-0.178	-0.007	-0.247	—				
PD Stage 1	Pearson's r	0.060	0.057	0.046	0.054	-0.070	-0.046	0.027	-0.015	—			
	+95% CI	0.137	0.139	0.130	0.132	0.016	0.044	0.105	0.070	—			
	-95% CI	-0.014	-0.025	-0.032	-0.034	-0.149	-0.130	-0.054	-0.107	—			
ΔPD	Pearson's r	-0.025	-0.014	-0.003	-0.031	0.018	0.035	-0.106 *	0.066	0.470 ***	—		
	+95% CI	0.079	0.087	0.095	0.060	0.115	0.135	-0.008	0.158	0.519	—		
	-95% CI	-0.118	-0.108	-0.105	-0.131	-0.071	-0.057	-0.208	-0.029	0.418	—		
Ingroup bias	Pearson's r	0.002	-0.067	-0.069	-0.116 **	0.068	0.030	-0.058	-0.043	-0.040	-0.011	—	
	+95% CI	0.077	0.007	0.004	-0.021	0.152	0.115	0.020	0.049	0.043	0.100	—	
	-95% CI	-0.073	-0.140	-0.147	-0.207	-0.016	-0.055	-0.139	-0.125	-0.132	-0.125	—	
Fairness	Pearson's r	0.077	0.062	0.068	0.034	-0.102 *	-0.094 *	-0.008	-0.076	0.157 ***	-0.041	0.159 ***	—
	+95% CI	0.151	0.139	0.148	0.129	-0.011	-0.011	0.075	0.010	0.241	0.062	0.304	—
	-95% CI	-0.001	-0.014	-0.011	-0.055	-0.190	-0.185	-0.089	-0.172	0.075	-0.145	0.014	—

* p < .05, ** p < .01, *** p < .001

Note. Confidence intervals based on 1000 bootstrap replicates.

Table I.2. Detailed correlation matrix for believers (with CIs)

		FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
FLIQ	Pearson's r	—											
	+95% CI	—											
	-95% CI	—											
CPT	Pearson's r	0.364 ***	—										
	+95% CI	0.462	—										
	-95% CI	0.260	—										
CRT	Pearson's r	0.292 ***	0.916 ***	—									
	+95% CI	0.394	0.930	—									
	-95% CI	0.193	0.901	—									
CTSQ AOT	Pearson's r	0.140 *	0.320 ***	0.271 ***	—								
	+95% CI	0.248	0.406	0.371	—								
	-95% CI	0.034	0.222	0.163	—								
CTSQ_CMT	Pearson's r	-0.090	-0.204 ***	-0.151 **	-0.387 ***	—							
	+95% CI	0.026	-0.098	-0.043	-0.277	—							
	-95% CI	-0.206	-0.318	-0.269	-0.497	—							
CTSQ PIT	Pearson's r	-0.202 ***	-0.293 ***	-0.230 ***	-0.482 ***	0.198 ***	—						
	+95% CI	-0.098	-0.190	-0.129	-0.376	0.321	—						
	-95% CI	-0.311	-0.396	-0.333	-0.582	0.079	—						
CTSQ_PET	Pearson's r	0.132 *	0.212 ***	0.179 **	0.229 ***	-0.151 **	-0.170 **	—					
	+95% CI	0.244	0.312	0.277	0.334	-0.044	-0.067	—					
	-95% CI	0.019	0.099	0.067	0.120	-0.267	-0.285	—					
BZSG	Pearson's r	0.039	-0.156 **	-0.134 *	-0.084	-0.027	0.133 *	-0.209 ***	—				
	+95% CI	0.153	-0.041	-0.025	0.045	0.092	0.256	-0.077	—				
	-95% CI	-0.083	-0.282	-0.257	-0.205	-0.149	-0.006	-0.324	—				
PD Stage 1	Pearson's r	0.015	-0.036	-0.028	0.056	-0.048	-0.030	-0.019	-0.023	—			
	+95% CI	0.127	0.075	0.082	0.165	0.061	0.086	0.096	0.090	—			
	-95% CI	-0.093	-0.150	-0.139	-0.056	-0.163	-0.154	-0.131	-0.136	—			

Table I.2. Detailed correlation matrix for believers (with CIs)

		FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
ΔPD	Pearson's r	-0.024	-0.084	-0.023	-0.016	0.067	-0.039	0.062	0.031	0.492 ***	—		
	+95% CI	0.205	0.136	0.184	0.123	0.256	0.186	0.247	0.194	0.594	—		
	-95% CI	-0.232	-0.296	-0.215	-0.149	-0.133	-0.264	-0.124	-0.130	0.374	—		
Ingroup bias	Pearson's r	-0.029	-0.060	-0.065	-0.073	0.003	-0.001	-0.030	0.076	0.032	0.206 *	—	
	+95% CI	0.084	0.054	0.052	0.055	0.118	0.119	0.082	0.187	0.148	0.400	—	
	-95% CI	-0.143	-0.163	-0.180	-0.204	-0.126	-0.117	-0.138	-0.029	-0.077	-0.016	—	
Fairness	Pearson's r	0.016	0.054	0.059	0.207 ***	-0.215 ***	-0.136 *	0.014	0.048	0.162 **	-0.211 *	0.030	—
	+95% CI	0.123	0.167	0.180	0.321	-0.111	-0.018	0.130	0.167	0.275	-0.020	0.258	—
	-95% CI	-0.097	-0.052	-0.050	0.087	-0.325	-0.240	-0.091	-0.066	0.044	-0.406	-0.187	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. Confidence intervals based on 1000 bootstrap replicates.

Table I.3. Detailed correlation matrix for non-believers (with CIs)

		FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
FLIQ	Pearson's r	—											
	Upper 95% CI	—											
	Lower 95% CI	—											
CPT	Pearson's r	0.397 ***	—										
	Upper 95% CI	0.493	—										
	Lower 95% CI	0.299	—										
CRT	Pearson's r	0.354 ***	0.885 ***	—									
	Upper 95% CI	0.458	0.906	—									
	Lower 95% CI	0.242	0.859	—									
CTSQ AOT	Pearson's r	0.162 **	0.164 **	0.125 *	—								
	Upper 95% CI	0.274	0.275	0.241	—								
	Lower 95% CI	0.033	0.050	0.005	—								
CTSQ CMT	Pearson's r	-0.082	-0.119 *	-0.087	-0.207 ***	—							
	Upper 95% CI	0.053	-0.004	0.036	-0.084	—							
	Lower 95% CI	-0.206	-0.237	-0.206	-0.344	—							
CTSQ PIT	Pearson's r	-0.150 *	-0.298 ***	-0.243 ***	-0.458 ***	0.170 **	—						
	Upper 95% CI	-0.032	-0.190	-0.129	-0.358	0.299	—						
	Lower 95% CI	-0.253	-0.400	-0.352	-0.547	0.049	—						
CTSQ PET	Pearson's r	0.087	0.139 *	0.138 *	0.309 ***	-0.219 ***	-0.145 *	—					
	Upper 95% CI	0.209	0.250	0.250	0.424	-0.112	-0.030	—					
	Lower 95% CI	-0.038	0.027	0.022	0.200	-0.333	-0.269	—					
BZSG	Pearson's r	-0.097	-0.209 ***	-0.189 **	-0.020	-0.016	0.161 **	-0.187 **	—				
	Upper 95% CI	0.022	-0.091	-0.071	0.105	0.104	0.288	-0.063	—				
	Lower 95% CI	-0.214	-0.326	-0.301	-0.152	-0.119	0.025	-0.297	—				
PD Stage 1	Pearson's r	0.111	0.166 **	0.141 *	0.082	-0.117	-0.069	0.081	-0.003	—			
	Upper 95% CI	0.230	0.269	0.251	0.200	-0.006	0.064	0.209	0.127	—			
	Lower 95% CI	-0.005	0.060	0.029	-0.048	-0.236	-0.186	-0.039	-0.127	—			

Table I.3. Detailed correlation matrix for non-believers (with CIs)

		FLIQ	CPT	CRT	CTSQ AOT	CTSQ CMT	CTSQ PIT	CTSQ PET	BZSG	PD Stage 1	ΔPD	Ingroup bias	Fairness
ΔPD	Pearson's r	-0.064	-0.042	-0.101	-0.015	-0.140	0.030	-0.103	0.182	0.456***	—		
	Upper 95% CI	0.143	0.160	0.096	0.194	0.035	0.256	0.125	0.388	0.555	—		
	Lower 95% CI	-0.264	-0.223	-0.273	-0.213	-0.313	-0.221	-0.325	-0.045	0.335	—		
Ingroup bias	Pearson's r	0.056	-0.041	-0.048	-0.105	0.095	0.019	-0.066	-0.131 *	-0.110	-0.217 *	—	
	Upper 95% CI	0.162	0.071	0.073	0.025	0.227	0.154	0.047	0.005	0.028	-0.009	—	
	Lower 95% CI	-0.049	-0.151	-0.167	-0.230	-0.037	-0.109	-0.179	-0.263	-0.236	-0.403	—	
Fairness	Pearson's r	0.157 **	0.105	0.104	-0.084	-0.033	-0.095	-0.013	-0.181 **	0.153 *	-0.218 *	0.263 ***	—
	Upper 95% CI	0.266	0.210	0.219	0.053	0.096	0.038	0.116	-0.056	0.275	-0.004	0.459	—
	Lower 95% CI	0.048	-0.008	-0.010	-0.218	-0.159	-0.206	-0.130	-0.301	0.024	-0.398	0.071	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. Confidence intervals based on 1000 bootstrap replicates.

CURRICULUM VITAE

Ensar Acem

EDUCATION:

- 2020 – 2023 **MA., Psychological Sciences**, Kadir Has University
([Moral Intuitions Lab](#))
GPA: 3.87 /4.00
- 2015 – 2019 **BA., Psychology**, Ankara University
GPA: 3.80 /4.00, Highest Honor Degree

GRANTS, HONORS, & SCHOLARSHIPS:

- 2022 – 2024 Research Assistant Scholarship, Templeton Religion Trust Long-Term
Research Grant
- 2021 – 2022 Research Assistant Scholarship, TUBITAK 3501
- 2020 – 2023 Full Tuition Waiver, Kadir Has University
- 2018 – 2019 ERASMUS+ Internship Grant (**two times**)
- 2018 – 2019 Very High Achievement Award, Ankara University (**two times**)
- 2016 – 2019 State Scholarship, Republic of Turkey
- 2015 – 2018 Dean's High Honor, Ankara University
(I have been awarded High Honor in every semester)
- 2015 – 2016 SABANCI Achievement Grant (Renounced)

CURRENT RESEARCH:

- 2022 – Present **Funded by Templeton Religion Trust (funding ID: TRT0424)**
Principal Investigators: Assoc. Prof. Onurcan Yilmaz, and Dr.
Ozan Isler
Title: Religion as Universal Moral Compass: Does Religious
Belief Promote Behavioral Consistency Across Moral Domains?
Sub-projects (SP):
- 1) Consistency of moral beliefs & behaviors
 - 2) Religious group bias in anonymous interactions
 - 3) Intention-behavior gap in moral dilemmas
 - 4) Left-wing authoritarianism and moral behaviors
 - 5) Do meta-ethical beliefs predict moral behaviors?
 - 6) How do reflection and IQ relate to ideology and religious
belief?
 - 7) The test of the dual-process model vs. the counter-normative
model of religiosity
 - 8) The predictive powers of Morality-as-Cooperation vs. Moral
Foundations Questionnaire-2 in moral behavior
 - 9) The determinants of moral courage: A comparison of third-
party punishment vs. moral courage (The development of Moral
Courage Game Protocol)

2021 – Present

Funded by European Research Council, Advanced Grant (ERC-AdG)

Advisors: Assoc. Prof. Onurcan Yilmaz, Dr. Ozan Isler, Prof. Simon Gaechter

Project: Contextual and cognitive underpinnings of political polarization in the domain of cooperation (in a registered report submission to *Nature Human Behaviour*)

2021 – Present

Department of Psychology, Kadir Has University

Principal Investigators: Assoc. Prof. Onurcan Yilmaz, Dr. Ozan Isler

Project 1: The effects of implicit, explicit, and supraliminal religious primes on prosociality

Project 2: A high-powered test of the Reflective Doubt Hypothesis

Project 3: Effects of intuition and reflection on moral foundations in a non-WEIRD sample

Advisors: Assoc. Prof. Onurcan Yilmaz, Dr. Ozan Isler

Project 4: A high-powered test of intuitive vs. reflective cooperation accounts (**MA thesis**)

Advisor: Assoc. Prof. Onurcan Yilmaz

Project 5: Reflective foundations of the Morality as Cooperation Theory (**pending**)

Advisor: Prof. Adil Saribay

Project 6: Is there a racial bias in academic citations? A meta-science project (**pending**)

RESEARCH EXPERIENCE:

Summer – Fall 2019 **Environmental Health Group, London School of Hygiene and Tropical Medicine,**

University of London (Funded by ERASMUS+)

Principal Investigators: Prof. Robert Aunger, Prof. Val Curtis

Project: Evolved Human Motives: A questionnaire validation study

2018 – 2019

Experimental Psychology Laboratory, Ankara University
(Research Assistant)

Advisor: Prof. Hakan Cetinkaya

Project 1: Temporal SNARC: The effect of time on spatial mental representation

Project 2: Interaction between number and shape size in spatial response time

Project 3: Confounding effect of color in implicit measurements of SNARC

- Summer 2018 **Social Neuroscience Lab, Institute of Cognitive Neuroscience, University College London (UCL)(Funded by ERASMUS+)**
Principal Investigator: Dr. Sarah White
Project 1: Spontaneous mentalizing (Theory of Mind) in autism
Project 2: Spontaneous mentalizing in mothers of children with autism
- Summer 2017 **Eye Tracking Lab, Department of Linguistics, Ankara University (Internship)**
Principal Investigators: Prof. Ozgur Aydin, Prof. Iclal Ergenc
Project 1: The effect of the position of lexical bundle on working memory
Project 2: Awareness of lexical stress in dyslexic children
- Spring 2017 **Experimental Psychology Laboratory, Ankara University**
Principal Investigators: Prof. Hakan Cetinkaya
Project 1: Implicit attitudes toward rape in males
Project 2: The effect of menstrual cycle on economic risk-taking behavior

TEACHING EXPERIENCE:

- Fall 2022 **Department of Psychology, Kadir Has University (Teaching Assistant)**
Class: Introduction to Statistics (undergrad-level)

OTHER EXPERIENCE:

- 2021 – Present **Moral Intuitions Lab**
- Academic Proofreading – Team Leader
 - Grant Applications & Project Writing:
 - 5 rejections (including ERC Starting Grant), 1 acceptance, 1 under review.
 - Peer Review Training
- 2020 – Present **Social Media**
- Content Creation & Social Media Management:
 - I manage multiple Twitter accounts with 50k+ organic followers (Average monthly tweet impression ≈ 8 Million)

PUBLICATIONS IN PROGRESS:

1. **Acem, E.**, Yilmaz, O. (invited submission). Moral intuition. In: Allison, S. T. (eds) *The Encyclopedia of Heroism Studies*. Springer, Cham.
2. **Acem, E.**, Yilmaz, O., Isler, O., & Gaechter, S. (in a registered report submission). Contextual and cognitive underpinnings of political polarization in the domain of cooperation.
3. **Acem, E.**, Yilmaz, O., & Isler, O. (in a registered report submission). Reflective disbelief or reflective doubt: How do cognitive styles affect the belief in God or gods?.
4. **Acem, E.**, Isler, O., Yilmaz, O., & Maule, J. (in a registered report submission). Fearing God or society? On the validity and effects of religious primes on prosociality.
5. Dogruyol, B., Velioglu, I., Bayrak, F., **Acem, E.**, Isler, O., & Yilmaz, O. (in submission). An Independent Test of the Moral Foundations Theory.
6. Wu, R., Lim, J. T., Ahmed, Z., **Acem, E.**, Chowdhury I., & White, S. (under review). Do autistic adults spontaneously reason about belief? A detailed exploration of alternative explanations. <https://doi.org/10.21203/rs.3.rs-267044/v1>

ORAL PRESENTATIONS:

1. Cetinkaya, H., **Acem, E.**, & Sakin, M. (2021). *Temporal-SNARC: Time may be of a special way of spatial mental representation*. ICP 2020+: The 32nd International Congress of Psychology, Prague, Czech Republic.
2. **Acem E.** (2018). *Theory of Mind and implicit mentalizing in autism*. 1st Annual Cognitive-Experimental Psychology Conference, Ankara University, Turkey.
3. **Acem E.** (2018). *Sociobiology of incest taboo*. 7th Annual Sociology Conference, Ankara University, Turkey.

POSTER PRESENTATIONS:

1. **Acem E.**, Sakin M., Cetinkaya H. (2018). *The confounding effect of color in the implicit measures of SNARC Effect*. 1st Annual Cognitive-Experimental Psychology Conference, Ankara University, Turkey.

INVITED TALKS:

2022 *Graduate Education and Internship Abroad*. Mersin University Psychology Students Society.

2018 *Improve Your Career Abroad: How and Why Erasmus+ Internship?* Ankara Uni. Psychology Students Society.

CERTIFICATES:

2022 Digital Marketing, European Bank for Reconstruction and Development (EBRD)

2021 Introduction to R, DataCamp

2021 Introduction to Statistics in Spreadsheets, DataCamp

2020 The Data Scientist's Toolbox, Johns Hopkins University

2019 Improving Your Statistical Inferences, Eindhoven University of Technology

2019 Introduction to Python, Ankara University Neuroscience Society

2015 Computer Usage, Ministry of Education, Turkey

AFFILIATIONS:

- The Center for the Science of Moral Understanding, University of North Carolina ([Affiliate](#))
- The Moral Intuitions Lab at Kadir Has University ([Research Assistant](#))

SKILLS:

- **Eye tracking:** Tobii Eye Tracker, Tobii Studio, SMI Eye Tracker, BeGaze.
- **Experimental design:** SuperLab.
- **Online data collection:** Prolific, Qualtrics, Survey Monkey, Google Forms.
- **Statistical analysis:** GPower, SPSS, JASP, Jamovi, R (intermediate), Mplus (beginner).
- **Programming:** Python (beginner).
- **Reference management:** Zotero.
- **Social media management:** Twitter, TweetDeck.
- **Image editing:** Pixlr X, Adobe Photoshop (intermediate).
- **Others computer skills:** MS Office, MS Teams, Google Suite, Zoom, Slack, etc.
- **Languages:** Turkish, English.