

APPLYING RATIONAL AND EMOTIONAL APPROACHES TO MESSAGE CRAFTING FOR INFLUENCING INDIVIDUALS' COOPERATIVE BEHAVIOR IN GROUP SETTINGS

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ABSTRACT *The present study, based on Game Theory, investigates the effect of communication messages on individuals' willingness to cooperate in group settings. Existing literature suggests that different approaches to the decision-making process can influence outcomes and shape individuals' cooperative behavior. Empirical studies have shown that external factors, including message framing and group identity cues, can affect fairness-oriented behavior and decision patterns. The study applied the Ultimatum Bargaining Game to examine how rational versus emotional message framing, combined with ingroup versus outgroup cues, influence cooperative decisions. A total of 122 university students were assigned to four message conditions. The results revealed significant differences in the distribution of offers and acceptance patterns across message models; however, mean offer sizes did not significantly differ between rational and emotional conditions, nor between ingroup and outgroup conditions. These findings suggest that message framing may influence the type of decisions individuals make, even when it does not alter overall generosity levels. A more detailed analysis of behavioral patterns indicates that rational models combined with ingroup cues elicit more fair and cooperative decisions. These results highlight communication messages as potential mechanisms for shaping cooperative behavior in group settings.*

KEYWORDS

COMMUNICATION MESSAGES MODELS, GAME THEORY, GROUP COOPERATION, IN-GROUP BIAS

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INTRODUCTION

Human decision-making is shaped by a combination of cognitive, emotional, and social factors. While rational decision-making is traditionally assumed to lead to utility-maximizing choices, research increasingly shows that emotional cues and group belonging also influence cooperative behavior. The present study examines how communication messages framed as rational or emotional, combined with cues of ingroup or outgroup affiliation, affect fairness-driven decisions in a strategic bargaining task.

Based on previous findings, one might expect that emotional decision-making – especially when constrained by short decision time – would reduce deliberation and lead to less fair or less cooperative choices. Conversely, rational, slower decision-making should encourage fairer outcomes. The study also anticipates that ingroup cues would increase empathy and fairness-oriented behaviors relative to outgroup cues.

Empathy – the capacity to perceive and experience another person’s emotions (Berger, 1987) – has developed through evolutionary pressures and plays a significant role in human behavior and decision-making. The Theory of Mind proposes that individuals understand others by predicting their thoughts and intentions through “mindreading” (Frith & Frith, 2005). Nichols and Stich (2003) argue that imagining others’ mental states, distinct from reflecting on one’s own, is essential to this process. Frith and Frith (2005) further note that unequal access to information can allow an observer to strategically use this understanding.

The ability to anticipate others’ thoughts and feelings is fundamental for functioning in social groups. Humans are inherently social, and a substantial part of the brain is devoted to supporting social interaction – a system referred to as the “social brain” (Gazzaniga, 1985), which enables individuals to navigate complex social environments (Blakemore, 2008).

Research on intergroup dynamics has revealed that individuals exhibit a natural tendency toward favoring members of their own group, a phenomenon known as “in-group bias.” Foundational work by Tajfel and Billig (1974) established the theoretical underpinnings of this bias. Subsequent studies (Hamid, 2022; Pretus et al., 2018; Scheepers et al., 2002; Scheepers et al., 2003; Scheepers et al., 2006) have elaborated on how individuals show preference for their own group, with Scheepers et al. (2002) identifying two phases in the development of in-group bias: the identity construction phase, where an individual aligns with a specific group, and the instrumental phase, where the individual positions the group relative to others in society.

The Theory of Social Belonging proposes that the emotions expressed by others can strongly influence observers’ behavior and decision-making (Schachter, 1959). Empathy-related emotions function like other genuine emotional responses and shape decisions, behaviors, and cognitive processes (Wondra & Ellsworth, 2015). These reactions are guided

by individuals' goals, as they evaluate situations based on whether they support or hinder those goals.

Personality traits also affect decision-making. Characteristics such as modesty, honesty, and low levels of greed are associated with more cooperative behavior, contributing to more successful group outcomes (Moreno Okuno & Mosiño, 2020; Tice et al., 1995; Wang et al, 2011).

Building on these theoretical frameworks, we hypothesize that strategically crafted communication messages can evoke feelings of empathy and in-group belonging. By fostering empathy and a sense of group identity, these messages could encourage more altruistic behaviors and enhance individuals' willingness to cooperate within groups, thereby promoting positive outcomes in collective decision-making and cooperation.

IN-GROUP DECISION MAKING AND GAME THEORY

The intrinsic human inclination to engage in group-based behavior (Blakemore, 2008) is influenced not only by interactions within a given group but also by intergroup dynamics. Such interactions are fundamental for the development of group identity and for the operational phase of in-group bias, as discussed by Scheepers et al. (2002). Identity formation is shaped by a combination of an individual's personal experiences and the vicarious experiences of others to which they are exposed, forming the basis for the development of empathy (Sewell, 2010). Dillard (2015) highlights the role of communication in strategic decision-making, emphasizing that individuals engage in social interaction to influence the decisions of others. As evidenced by these discussions, interaction plays a critical role in shaping individual behavior.

Decision-making is inherently tied to the availability and quality of information. The greater the quantity and diversity of information at an individual's disposal, the better equipped the individual is to predict potential outcomes and make more informed decisions. Gerbrandy (2007) expands on this idea by suggesting that the type of information individuals receive, which he terms "signals," is more crucial than the mere quantity of information. The nature of these signals can shape the course of action an individual takes in any given situation.

Traditional economic theories assume that individuals make purely rational, utility-maximizing decisions. Yet empirical research shows that people often achieve better outcomes when they deviate from strict rationality (Allot, 2006; Askari et al, 2019; Howard et al., 1993). Emotions play a central role in these deviations: they influence strategic choices and can lead individuals to act beyond narrow self-interest (Ketelaar, 2004). Although emotions have often been viewed as opposing logic (Sewell, 2010), evolutionary perspectives suggest the opposite – emotions are adaptive and support rational long-term decision-making. Frank (1988) argues that emotions promote behaviors that protect social relationships and group cohesion, helping individuals prioritize long-term

outcomes over immediate gains. This challenges the notion that emotions are inherently irrational and underscores their functional role in human decision-making.

Tversky and Kahneman (1983) demonstrated that decision-making processes are often prone to predictable biases, which deviate from optimal rationality. Polšek and Bokulić (2013) emphasize that behavioral economics explains these deviations as the result of various cognitive biases that influence decision-making, which classical economic theories fail to account for. Through their work on framing effects, Tversky and Kahneman (1983) illustrate how the presentation of information can significantly alter the decisions individuals make, a finding that underscores the importance of how messages are communicated.

Strategic decision-making unfolds within complex social environments, which often require simplified analytical models. Game Theory provides one such framework for modeling these interactions (Delrieux & Legris, 2003). Early formulations assumed fully rational players with complete information who maximize utility. However, these assumptions are limited in real interactive settings, where individuals lack full control over outcomes and do not know others' actions. As Colman (2003) notes, this makes strict utility maximization problematic, since outcomes depend heavily on the expectations and behavior of other players.

This critique of classical Game Theory has prompted scholars such as Allot (2006), Colman (2003), and Sally (2004) to argue that the assumptions of rationality and complete information rarely hold in real-world situations. This has led to the development of alternative models that incorporate emotional, psychological, and informational factors. Allot (2006) suggests that in certain games, players can achieve outcomes that exceed those predicted by classical Game Theory, a result driven by emotional and strategic considerations. As Sperber and Wilson (1986), Colman (2003), and others note, emotions, along with incomplete or asymmetrical information, complicate the assumption that all players enter a game with an identical understanding of the situation.

In response to these critiques, Askari et al. (2019) introduce the concept of hyper-rational behavior, where players consider not only their own potential benefits but also the benefits to others when making decisions. This approach suggests that moving beyond purely self-interested rationality can lead to more favorable outcomes. Similarly, Howard et al. (1993) offer the Theory of Drama and Irrational Choice, which proposes a more flexible approach, wherein individuals adapt their strategies based on the specific rules, dynamics, and possible outcomes of a situation.

Ultimately, decisions are based on the information available, which is influenced by interpersonal interaction. The complexity of social relationships and the presence of competing individual goals further complicate the decision-making process (Delrieux & Legris, 2003). The application of Game Theory provides a useful framework for modeling these interactions, though contemporary research emphasizes the need to account for

emotional, psychological, and informational factors in understanding human behavior in strategic settings (Polšek & Bokulić, 2013).

MESSAGE CREATION MODELS

One perspective on communication as a complex phenomenon is that it emerges from the integration of three distinct yet interrelated components: the content of the information conveyed, the mode of expression, and the interpretation or misinterpretation of that content (Luhmann, 1992). This view represents one of many approaches to understanding the multifaceted nature of communication. Luhmann further posits that these elements cannot function in isolation; rather, it is the synthesis of all three that constitutes communication. As he notes:

Communication captures a distinction between the informational value of its content and the motives behind its utterance. It can prioritize either the informational or the expressive dimension, or it can shift emphasis between the two. However, communication always relies on the fact that both are experienced as a form of selection, thus distinguishing them. (Luhmann, 1992, p. 252)

Another perspective asserts that humans engage in communication with the primary objective of effecting change in the attitudes, beliefs, or behaviors of their interlocutors (Dillard, 2015). To achieve this goal, communicators craft messages designed to influence others. A substantial body of research (Bloom, 2017; Dickert & Slovic, 2009; Dickert et al., 2011; Hsee & Rottenstreich, 2004; Small et al., 2006) has explored the interplay between rational and emotional appeals, particularly examining the extent to which individuals attempt to elicit either an emotional or a rational response from their audience. The findings from these studies consistently suggest that emotional appeals are more commonly employed by communicators. By invoking emotions, communicators aim to foster empathy and understanding of their perspective, thereby influencing the recipient's behavior.

Dickert, Sagara, and Slovic (2011) underscore the importance of the cognitive processing strategies employed by individuals when engaging with information. Automatic and rapid processing typically leads to stronger emotional responses and requires minimal cognitive effort, thereby heightening the emotional impact on decision-making. In contrast, rational processing is deliberate, controlled, and cognitively demanding, resulting in decisions that are more reasoned and logically driven. The authors emphasize that the manner in which information is processed directly affects empathic responses, with affective reactions generally being less aligned with long-term goals compared to more rational, deliberative responses. Similarly, Small et al. (2006) demonstrate that when individuals engage in careful, reflective processing of information, the likelihood of empathic responses motivating prosocial actions, such as helping others, declines. This is attributed to the fact that individuals who have more time and information tend to adopt

a more strategic, long-term perspective, reducing the influence of immediate emotional impulses on decision-making.

The framing of messages, specifically the distinction between positive and negative messaging, has also been the focus of substantial research (Kahneman & Tversky, 1979; Levy, 1992; Maheswaran & Meyers-Levy, 1990; Meyerowitz & Chaiken, 1987; Smith & Petty, 1996). Meyerowitz and Chaiken (1987), and Maheswaran and Meyers-Levy (1990) find that individuals are more responsive to negative messages, that is, those emphasizing the potential loss or absence of benefits resulting from inaction, than to positive messages emphasizing the potential benefits of taking action. Smith and Petty (1996) argue that negative messages tend to evoke stronger fear responses, leading individuals to engage in more thoughtful and careful consideration of the message. This increased scrutiny is associated with more rational processing.

The theoretical and empirical frameworks discussed above support the conclusion that communication messages can significantly influence human behavior. The content of the message, the mode of delivery, and the surrounding context (e.g., the presence of external distractions) all play pivotal roles in shaping decision-making processes. Moreover, decision outcomes are often guided by the way in which messages are framed and by the communicators' strategic objectives. The modeling of communication messages, therefore, typically aligns with the specific goals of the communicator, influencing the recipient's actions and decisions in accordance with the desired outcomes of the interaction.

GPA model

Building upon the theoretical framework, Dillard (2015) developed a communication model known as the GPA Theory, which stands for Goals, Plans, and Actions. This theory outlines the process by which individuals create messages intended to produce specific effects on their recipients. According to Dillard, the GPA theory integrates elements of scientific realism and social constructionism, positioning it as a theory of meaningful behavior. In this framework, the individual is understood to make intentional decisions about the content and delivery of messages, guided by a clear awareness of the goal that they aim to achieve. However, Dillard clarifies that this does not imply complete awareness of every step in the messaging process. Rather, it suggests that individuals are conscious of the overarching goal they wish to attain and act strategically to fulfill it.

The GPA theory is structured around three key sequences: (1) goal – the desired future state the individual aims to achieve through communication, (2) plan – the method or approach the individual adopts to reach that goal, and (3) action – the specific message or communicative act through which the individual attempts to realize the goal.

Dillard (2015, p. 8) points out that "GPA Theory views communication as an interactive process in which each actor adjusts his or her message behavior to the other actor. The adjustments are made messages that vary in terms of explicitness, dominance, argument, and control. A slightly deeper perspective prompts the question what is communication

for? GPA Theory replies that communication is for getting things done.” Ultimately, Dillard suggests that all communicative goals are oriented toward effecting change in the interlocutor’s attitudes, beliefs, or behaviors.

METHODOLOGY AND RESEARCH DESIGN

The research aimed at isolating the most effective message model for encouraging individuals’ cooperative behavior in a group setting was conducted by applying Game Theory, specifically the Ultimatum Bargaining Game (Güth et al., 1982).

The Ultimatum Bargaining Game is a well-known experiment that explores human decision-making. The game involves two players who must decide how to divide a given sum of money. The first player, known as the proposer (player A), suggests a way to split the amount, while the second player, the responder (player B), chooses to either accept or reject the offer. If the responder accepts, the money is distributed as proposed. If he rejects it, neither player receives anything. Both participants are aware of the rules before the game begins.

Delrieux and Legris (2003) highlight Game Theory as a valuable tool for studying human behavior under controlled conditions that simulate real-world situations. The Ultimatum Bargaining Game is widely applied in the social sciences, particularly in research examining individual decision-making behavior across various contexts (Krawczyk, 2017).

The study was carried out using this game format, involving either two or three participants (players), and followed the established methodology outlined by Harrison and McCabe (1996) and Güth et al. (2007).

A total of 122 university students participated in the study. The sample included 69 females and 53 males, with a mean age of $M = 24,94$; $SD = 5,09$, with the majority of the sample (76.2%) comprised individuals who were 25 years of age or younger. Participants were students of Multimedia and Design programs both at both undergraduate and graduate levels, at the University North, Croatia. Of the total sample, 83 were undergraduate students and 39 were graduate students in their first year of their graduate program.

Participants were assigned to conditions using a random assignment procedure, ensuring approximately equal distribution across message-model groups.

The objective of the experiment was to examine the influence of different message models on participant behavior. Specifically, four message models were tested:

- R1: A rational approach to decision-making, emphasizing in-group belonging.
- R2: A rational approach to decision-making, emphasizing out-group belonging.
- E1: An emotional approach to decision-making, emphasizing in-group belonging.
- E2: An emotional approach to decision-making, emphasizing out-group belonging.

Participants were divided into four groups based on the message models. The distribution of participants was as follows: 29 participants in the R1 group, 31 in the R2 group, 31 in the E1 group, and 31 in the E2 group. The total sample comprised 122 individuals, 51 participants with the role of player A and 71 participants with the role of player B, who were further divided into 31 two-member subgroups and 20 three-member subgroups.

The messages presented to the participants were developed based on the GPA model (Dillard, 2015) and informed by previous research. The message formulations for each group were as follows:

R1: "When making a decision to offer/accept an offer, take as much time as you need and think it through. Analyze the ratio of what you invest versus what you will receive. On the other side are your colleagues – people you have spent time with at the University and with whom you share common experiences."

R2: "When making a decision to offer/accept an offer, take as much time as you need and think it through. Analyze the ratio of what you invest versus what you will receive. On the other side are participants from different parts of the world, whom you do not know, and with whom you are connected via a random web-based application."

E1: "You have 20 seconds to make a decision to offer/accept an offer. Consider your preferred option and act accordingly. On the other side are your colleagues – people you have spent time with at the University and with whom you share common experiences."

E2: "You have 20 seconds to make a decision to offer/accept an offer. Consider your preferred option and act accordingly. On the other side are participants from different parts of the world, whom you do not know, and with whom you are connected via a random web-based application."

In addition to the messages, participants were provided with detailed instructions regarding the rules of the game and the procedure of the experiment. The success of the individual groups was recorded across ten sets (repetitions). Participants were required to make bids from a pool of 100 available units. The bids were categorized into five distinct ranges for analytical purposes: 0-24, 25-49, 50, 51-75, and 76-100.

RESULTS

Individuals' behavior when making decisions depending on the message model

The analysis of the average offers made by player A to player B (see Table 1) reveals that players who were instructed with the R2 message model made the highest average offers (48.15%), while those with the E2 message model made the lowest average offers (36.29%).

Table 1. Display of average offers, most frequent offers, acceptance rate and small offers acceptance rate depending on the message model

| Message model | Average offer | Mod | Mod2 | Acceptance rate | Small offer acceptance rate |
|---------------|---------------|---------------|-----------------------|-----------------|-----------------------------|
| R1 | 41,65 | 25-49 (42,5%) | 50 (37,5%) | 56,83% | 35,29% (6/17) |
| R2 | 48,81 | 25-49 (46,9%) | 50 (29,2%) | 45,38% | 15,39% (2/13) |
| E1 | 45,16 | 25-49 (39,2%) | 50 (25,4%) | 65,38% | 37,04% (10/27) |
| E2 | 36,29 | 25-49 (38,5%) | 50 and 51-75 (15,4%)* | 63,08% | 36,59% (15/41) |
| Total | 42,49 | 25-49 (41,8%) | 50 (26,7%) | 58,03% | 33,67% (33/98) |

*Two options with the same percentage

Across all message models, the most frequent offer within the defined offer ranges was between 25% and 49% of the available funds. Players with the R2 message model most commonly made this offer (46.9%). The second most common offer across all message models was 50% of the available funds. This offer was most frequently made by players with the R1 message model (37.5%) and least frequently by players with the E2 message model (15.4%).

Statistical analysis using the χ^2 test (see Tables 2 and 3) revealed a significant relationship between the message model and the offer ranges made by player A to player B. Specifically, players with the R1 message model made significantly more offers of equal distribution (50%) and significantly fewer offers below 25% than expected. Players with the R2 message model were significantly less likely to make offers in the highest range (76%-100%) than expected. Players exposed to the E2 message model made significantly fewer offers of 50%, but significantly more offers below 25% and in the highest range (76%-100%).

Table 2. Display of the results of the distribution of offers and model messages

| Offer range | | Message model | | | | Total |
|-------------|----------------|---------------|------|------|------|-------|
| | | R1 | R2 | E1 | E2 | |
| 0-24 | Count | 8 | 16 | 19 | 26 | 69 |
| | Expected Count | 16,2 | 17,6 | 17,6 | 17,6 | 69,0 |
| 25-49 | Count | 51 | 61 | 51 | 50 | 213 |
| | Expected Count | 50,1 | 54,3 | 54,3 | 54,3 | 213,0 |
| 50 | Count | 45 | 38 | 33 | 20 | 136 |
| | Expected Count | 32,0 | 34,7 | 34,7 | 34,7 | 136,0 |
| 51-75 | Count | 11 | 15 | 18 | 20 | 64 |
| | Expected Count | 15,1 | 16,3 | 16,3 | 16,3 | 64,0 |
| 76-100 | Count | 5 | 0 | 9 | 14 | 28 |
| | Expected Count | 6,6 | 7,1 | 7,1 | 7,1 | 28,0 |

| Offer range | | Message model | | | | Total |
|-------------|----------------|---------------|-------|-------|-------|-------|
| | | R1 | R2 | E1 | E2 | |
| Total | Count | 120 | 130 | 130 | 130 | 510 |
| | Expected Count | 120,0 | 130,0 | 130,0 | 130,0 | 510,0 |

Table 3. Display of the χ^2 test results of the relationship between offers distribution and the message model

| | Chi-Square Tests | | |
|------------------------------|---------------------|----|-----------------------|
| | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 38,539 ^a | 12 | ,000 |
| Likelihood Ratio | 45,220 | 12 | ,000 |
| Linear-by-Linear Association | ,077 | 1 | ,781 |
| N of Valid Cases | 510 | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 6,59.

A t-test for independent samples was employed to examine whether there was a statistically significant difference in the offers made by player A based on message models designed to emphasize rational or emotional decision-making. The message models were categorized according to the decision-making approach: rational (R1 and R2) and emotional (E1 and E2). The t-test was chosen due to the sample size being appropriate for this test. The results indicated that there was no statistically significant difference between the groups ($p > 0.05$).

Further, the study explored whether a statistically significant difference existed in the distribution of offers within specified ranges, in relation to the rational and emotional message models. The message models were again grouped according to decision-making approach (R1 and R2 as rational models; E1 and E2 as emotional models). Given the smaller sample sizes within each offer range, a χ^2 test was applied.

The results revealed a statistically significant difference in the offer distributions across the groups (see Tables 4 and 5). Players exposed to the rational message models made significantly fewer small offers (below 25%) than those exposed to the emotional message models. Conversely, in the case of the highest offers (76%-100%), players with rational message models made significantly more high offers. This affects the results of the analysis of player A's general average bid, depending on the message model (Table 1).

Additionally, for offers that represented an equal distribution of resources (50%), players instructed with rational message models made significantly more such offers than players who received emotional message models.

Table 4. Display of the results of the relationship between the distribution of offers and rational/emotional message models

| Message model R-E | | Offer range | | | | | Total |
|-------------------|----------------|-------------|-------|-------|-------|--------|-------|
| | | 0-24 | 25-49 | 50 | 51-75 | 76-100 | |
| Rational | Count | 24 | 112 | 83 | 26 | 5 | 250 |
| | Expected Count | 33,8 | 104,4 | 66,7 | 31,4 | 13,7 | 250,0 |
| Emotional | Count | 45 | 101 | 53 | 38 | 23 | 260 |
| | Expected Count | 35,2 | 108,6 | 69,3 | 32,6 | 14,3 | 260,0 |
| Total | Count | 69 | 213 | 136 | 64 | 28 | 510 |
| | Expected Count | 69,0 | 213,0 | 136,0 | 64,0 | 28,0 | 510,0 |

Table 5. Display of the χ^2 test results of the relationship between the distribution of offers and rational/emotional message models

| | Chi-Square Tests | | |
|------------------------------|---------------------|----|-----------------------|
| | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 27,213 ^a | 4 | ,000 |
| Likelihood Ratio | 28,342 | 4 | ,000 |
| Linear-by-Linear Association | ,826 | 1 | ,363 |
| N of Valid Cases | 510 | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 13,73.

Using a t-test of independent samples, the existence of a statistically significant difference in the ratio of the amount of player A's offers and the model of messages aimed at encouraging in-group and out-group feelings was investigated. The message models were grouped based on encouraging the feeling of in-group and out-group belonging (R1 and E1; R2 and E2). A t-test was applied due to the compared sample sizes. The results showed the absence of a statistically significant difference ($p > 0.05$).

The existence of a statistically significant difference in the ratio of the offers according to the defined range and the model of messages aimed at encouraging the in-group and out-group belonging was investigated. The message models were grouped based on encouraging the feeling of in-group and out-group belonging (R1 and E1; R2 and E2). The χ^2 test was applied because the samples grouped according to the defined range were smaller. The results showed the absence of a statistically significant difference ($p > 0.05$).

Analyzing the results, it was noticed that players B accepted an average of 58.03% of the offers sent to them by players A (see Table 1). The offers were accepted in more cases by players whose instructions had message models based on an emotional approach to decision-making (E1 – 65.38%, E2 – 63.08%) than those with the instructions based on a rational approach to decision-making (R1 – 56.83%, R2 – 45.38%). Through a separate

analysis of different decision-making approaches, it was observed that in both cases the percentage of accepted offers was higher in cases where the message models were based on encouraging the in-group bias of the players (R1 and E1).

Using the χ^2 test, a statistically significant difference was observed in the relationship between the message model and the message acceptance rate, according to the defined range (see Tables 6 and 7). Players with message model R1 accepted offers of 50% significantly more than expected, while accepting significantly fewer than expected offers between 51% and 75% and between 76% and 100%. Players with message model R2 were significantly less likely than expected to accept offers below 25%. Players with the E1 message model accepted offers of 50% significantly more than expected, and accepted significantly fewer than expected offers between 25% and 49%. Players with message model E2 were significantly more likely than expected to accept offers of less than 25% and those between 25% and 49%, and significantly less than expected offers of 50% of available funds.

Table 6. Display of the results of the relationship between the distribution of accepted offers and the message model

| Offer range | | Message model | | | | Total |
|-------------|----------------|---------------|------|------|------|-------|
| | | R1 | R2 | E1 | E2 | |
| 0-24 | Count | 3 | 1 | 8 | 12 | 24 |
| | Expected Count | 5,5 | 4,8 | 6,9 | 6,7 | 24,0 |
| 25-49 | Count | 22 | 14 | 20 | 35 | 91 |
| | Expected Count | 20,9 | 18,4 | 26,2 | 25,6 | 91,0 |
| 50 | Count | 35 | 24 | 35 | 13 | 107 |
| | Expected Count | 24,6 | 21,6 | 30,8 | 30,0 | 107,0 |
| 51-75 | Count | 5 | 14 | 17 | 17 | 53 |
| | Expected Count | 12,2 | 10,7 | 15,2 | 14,9 | 53,0 |
| 76-100 | Count | 2 | 6 | 4 | 5 | 17 |
| | Expected Count | 3,9 | 3,4 | 4,9 | 4,8 | 17,0 |
| Total | Count | 67 | 59 | 84 | 82 | 292 |
| | Expected Count | 67,0 | 59,0 | 84,0 | 82,0 | 292,0 |

Table 7. Display of the χ^2 test results of the relationship between the distribution of accepted offers and message models

| | Chi-Square Tests | | |
|------------------------------|---------------------|----|-----------------------|
| | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 38,237 ^a | 12 | ,000 |
| Likelihood Ratio | 42,071 | 12 | ,000 |
| Linear-by-Linear Association | 1,500 | 1 | ,221 |
| N of Valid Cases | 292 | | |

a. 5 cells (25,0%) have expected count less than 5. The minimum expected count is 3,43.

Again, a t-test for independent samples was conducted to assess whether there was a statistically significant difference in the proportion of accepted offers by player B, in relation to message models designed to emphasize either rational or emotional approaches to decision-making. The message models were categorized according to the decision-making approach: rational (R1 and R2) and emotional (E1 and E2). The t-test was employed due to the appropriateness of the sample sizes for this statistical test. The results revealed no statistically significant difference between the groups ($p > 0.05$).

Further analysis was conducted to examine whether a statistically significant difference existed in the proportion of accepted offers by player B, categorized according to defined offer ranges, in relation to the rational and emotional message models. The message models were again grouped according to decision-making approach (R1 and R2 for rational models, E1 and E2 for emotional models). Given the smaller sample sizes within each offer range, a χ^2 test was applied. The results indicated a statistically significant difference in the distribution of accepted offers across the defined offer ranges, depending on the message model used (see Tables 8 and 9). Players exposed to rational message models were significantly less likely to accept small offers (<25%), but significantly more likely to accept offers that represented an even distribution of available funds (50%). Conversely, players exposed to emotional message models were significantly more likely to accept offers in the 51%-75% range.

Table 8. Display of the results of the relationship between the distribution of accepted offers and rational/emotional message models

| Message model R-E | | Offer range | | | | | Total |
|-------------------|----------------|-------------|-------|-------|-------|--------|-------|
| | | 0-24 | 25-49 | 50 | 51-75 | 76-100 | |
| Rational | Count | 8 | 51 | 76 | 29 | 15 | 179 |
| | Expected Count | 14,4 | 51,4 | 63,6 | 36,6 | 13,1 | 179,0 |
| Emotional | Count | 25 | 67 | 70 | 55 | 15 | 232 |
| | Expected Count | 18,6 | 66,6 | 82,4 | 47,4 | 16,9 | 232,0 |
| Total | Count | 33 | 118 | 146 | 84 | 30 | 411 |
| | Expected Count | 33,0 | 118,0 | 146,0 | 84,0 | 30,0 | 411,0 |

Table 9. Display of the χ^2 test results of the relationship between the distribution of accepted offers and rational/emotional message models

| | Chi-Square Tests | | |
|------------------------------|---------------------|----|-----------------------|
| | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 12,596 ^a | 4 | ,013 |
| Likelihood Ratio | 12,944 | 4 | ,012 |
| Linear-by-Linear Association | ,800 | 1 | ,371 |
| N of Valid Cases | 411 | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 13,07.

When a t-test for independent samples was conducted to examine whether there was a statistically significant difference in the proportion of offers accepted by player B, in relation to the message models designed to promote in-group or out-group affiliation, the results indicated no statistically significant difference between the two groups ($p > 0.05$).

Again, a χ^2 test was employed to investigate whether the proportion of accepted offers, categorized into specific offer ranges, differed significantly based on the message models encouraging in-group or out-group identification. The analysis revealed a statistically significant difference in the distribution of accepted offers across the defined offer ranges, contingent on the type of message model (see Tables 10 and 11). Participants exposed to message models fostering in-group bias were significantly more likely to accept offers corresponding to an equal distribution (50%) of available funds, and significantly less likely to accept offers above 50%.

Table 10. Display of the results of the distribution of accepted offers and in-group/out-group message models

| Message model I-O | | Offer range | | | | | Total |
|-------------------|----------------|-------------|-------|-------|-------|--------|-------|
| | | 0-24 | 25-49 | 50 | 51-75 | 76-100 | |
| In-group | Count | 16 | 58 | 94 | 36 | 9 | 213 |
| | Expected Count | 17,1 | 61,2 | 75,7 | 43,5 | 15,5 | 213,0 |
| Out-group | Count | 17 | 60 | 52 | 48 | 21 | 198 |
| | Expected Count | 15,9 | 56,8 | 70,3 | 40,5 | 14,5 | 198,0 |
| Total | Count | 33 | 118 | 146 | 84 | 30 | 411 |
| | Expected Count | 33,0 | 118,0 | 146,0 | 84,0 | 30,0 | 411,0 |

Table 11. Display of the χ^2 test results of the relationship between the distribution of accepted offers and in-group/out-group message models

| | Chi-Square Tests | | |
|------------------------------|---------------------|----|-----------------------|
| | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 18,137 ^a | 4 | ,001 |
| Likelihood Ratio | 18,428 | 4 | ,001 |
| Linear-by-Linear Association | 2,070 | 1 | ,150 |
| N of Valid Cases | 411 | | |

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 14,45.

Analysis of the decision-making process concerning small offers reveals that participants exposed to message models emphasizing out-group affiliation (R2 and E2) were more likely to make such offers compared to those exposed to message models promoting in-group bias (R1 and E1). Additionally, players who received message models rooted in an emotional approach to decision-making were more inclined to make small offers than those guided by rational decision-making approaches.

Similarly, small offers were more frequently accepted by players exposed to message models based on emotional decision-making. A comparison between the in-group and out-group message models further indicates that players exposed to out-group-oriented messages were significantly more likely to accept small offers than those exposed to in-group-oriented messages.

Overall, the results indicate significant patterns in the distribution of offers and acceptance rates across message models. χ^2 tests showed significant relationships between message model and distribution of offers. However, t-tests did not reveal significant differences in mean offer values between rational and emotional conditions, nor between in-group and out-group conditions. These null results contradict the initial hypotheses and warrant further interpretive analysis. Significant χ^2 findings suggest that message framing influences which type of offer participants choose rather than the overall mean generosity.

DISCUSSION

This study examined how different message framings influence cooperative decisions in the Ultimatum Bargaining Game. While existing literature suggests that rational conditions and in-group cues should elicit more fairness-oriented choices, the findings present a mixed pattern.

The study sample consisted of university students. Hanel and Vione (2016) found that research outcomes derived from student populations are generally consistent with those obtained from the broader general population. As such, the findings of this study may serve as a basis for guiding research in the broader/general population.

The analysis of the experimental results revealed that participants who were exposed to the R1 message model, which emphasized a rational approach to decision-making and in-group belonging, exhibited the highest levels of willingness for fairness. This finding supports the conclusions of Mussel et al. (2013), who, through the use of the Ultimatum Bargaining Game, demonstrated that when a rational approach is encouraged, players tend to seek equitable distributions of resources, contrary to the predictions of traditional economic theories of rationality. Similarly, Suneja and Das (2023) found that participants generally exhibited altruistic behaviors, both in making offers and accepting them, in the context of the same game. They further observed that higher levels of altruism were associated with situations where players interacted with others from the same social group, suggesting that in-group bias influences altruistic behavior. These findings align with the results of this paper.

Further supporting these findings, Sierksma et al. (2014) demonstrated that in-group bias is more pronounced when a rational decision-making approach is emphasized, a pattern also observed in the present research. Additionally, Zhang et al. (2020) used the Ultimatum Bargaining Game to show that players are more likely to offer equal splits of

resources to in-group members, but are also more likely to reject unfair offers within their social group. This suggests that fairness norms are deeply ingrained in decision-making, particularly when the players are members of the same social group. Similarly, Van 't Wout et al. (2006) observed that players in the role of player B, when faced with unfair offers, experienced greater frustration when the offers came from human participants as opposed to computer-generated ones. The authors explain this frustration as arising from a desire to punish unfair behavior and a strong expectation that real people will act according to social norms. This supports the argument that incorporating social norms into a rational decision-making framework leads to more altruistic outcomes.

The findings of this study further suggest that participants exposed to message models encouraging a rational approach to decision-making exhibited higher levels of fair distribution in their offers. This is consistent with the research of Mussel et al. (2013) and Suneja and Das (2023), who found that individuals prioritize fair distributions of resources when adopting a rational approach. Notably, this was reflected in the rejection of offers greater than 50%, which can be interpreted as players demonstrating a preference for fairness even when it results in a less advantageous outcome for themselves. Rational in-group messages led to more equitable offer distributions, consistent with theories suggesting that fairness norms are more salient when cognitive deliberation aligns with shared group identity. Emotional conditions produced less consistent fairness patterns, often leading to more extreme offers.

In analyzing the relationship between player A's offers and the promotion of in-group versus out-group belonging (when other factors are excluded), no statistically significant differences were found in the offers made. However, a significant difference emerged in the acceptance of offers by player B. Players exposed to message models promoting in-group bias were more likely to accept fairer offers and reject those perceived as unfair. These results align with the findings of Suneja and Das (2023), Sierksma et al. (2014), and Zhang et al. (2020), all of whom observed that in-group members tend to exhibit a stronger preference for fairness in resource allocation. The rejection of offers exceeding 50% is consistent with Zhang et al.'s (2020) assertion that players are more likely to reject offers they perceive as unfair, particularly when the offers are made by members of their own social group. This behavior can also be linked to the work of Nowak et al. (2000), who proposed that players who aim to build a positive reputation tend to act with consistency and prioritize fairness over economic self-interest. These players, while appearing to act irrationally by rejecting offers that benefit them, are motivated by long-term reputational considerations and a desire to act according to social norms.

The absence of significant differences in mean offer sizes suggests that message framing may not be strong enough to alter global generosity levels. The cognitive/emotional manipulations may have influenced how participants distribute offers rather than the amount they offer overall. This indicates that fairness norms in bargaining contexts may be robust to simple framing interventions.

This study has several limitations. The reliance on a convenience sample of university students may constrain generalizability, though prior evidence suggests this may not be critical. Factors influencing cooperation, particularly for players B who can punish undesirable behavior, warrant further investigation. The lack of significant differences in mean offer sizes suggests that message framing shapes the distribution of offers rather than overall generosity, highlighting the robustness of fairness norms and the need for additional research to examine these dynamics in greater depth.

CONCLUSIONS

The study demonstrates that communication messages can influence cooperative behavior, particularly by shaping the distribution patterns of offers in a bargaining context. While rational and emotional messages did not significantly alter mean offer sizes, message framing affected the types of decisions participants made, with rational ingroup messages promoting more equitable outcomes.

These results expand our understanding of how message framing and group identity cues interact to shape cooperative behavior, providing a foundation for further research into communication-based mechanisms for enhancing cooperation.

The study also represents an effort to explore the interplay between rational and emotional message framing and ingroup versus outgroup cues within the Ultimatum Bargaining Game. The findings reveal that, although framing does not necessarily alter the overall size of offers, it may shape patterns of resource distribution, highlighting the nuanced ways in which individuals respond to social and emotional signals. By illuminating these effects, the research positions communication messages as subtle yet potent levers for guiding cooperative behavior and decision-making in social interactions. Future studies should consider employing stronger rational and emotional inductions and incorporating physiological measures to more directly track emotional activation. Expanding research to culturally more diverse samples would help assess the generalizability of the findings, while longitudinal or repeated-interaction designs could provide deeper insight into how cooperative behaviors evolve over time.

These findings may have practical implications across social and organizational contexts, guiding communication strategies to enhance group cooperation, informing public messaging for better collective decision-making, and shedding light on fairness perception in resource distribution. Overall, the study highlights how subtle variations in communication can meaningfully shape behavior and social interactions.

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PRIMJENA RACIONALNIH I EMOCIONALNIH PRISTUPA IZRADI PORUKA ZA UTJECAJ NA KOOPERATIVNO PONAŠANJE POJEDINACA U GRUPNOM OKRUŽENJU

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SAŽETAK Ova studija, temeljena na teoriji igara, istražuje učinak komunikacijskih poruka na spremnost pojedinaca na suradnju u grupnom okruženju. Postojeća literatura sugerira da različiti pristupi procesu donošenja odluka mogu utjecati na ishode i oblikovati kooperativno ponašanje. Empirijske studije pokazale su da vanjski čimbenici, uključujući način formuliranja poruka i poticaje na grupnu pripadnost, mogu utjecati na obrasce odlučivanja povezane s pravednošću. U istraživanju je primijenjena ultimativna igra cjenkanja kako bi se ispitalo kako racionalno uokvirene poruke i emocionalno uokvirene poruke, u kombinaciji s unutargrupnim i izvangrupnim poticajima, utječu na odluke o suradnji. Ukupno 122 studenta raspoređena su u četiri eksperimentalne skupine. Rezultati su pokazali značajne razlike u distribuciji ponuda i prihvaćanja ponuda između različitih modela poruka, no prosječne ponude nisu se statistički razlikovale ovisno o racionalnim i emocionalnim uvjetima, kao ni između unutargrupnog i izvangrupnog konteksta. Nalazi upućuju na to da komunikacijske poruke mogu do neke mjere oblikovati tipove odluka čak i kada ne mijenjaju ukupnu razinu kooperativnosti. Detaljnija analiza ponašanja ukazuje na to da racionalni modeli u kombinaciji s unutargrupnim poticajima potiču pravednije i kooperativnije odluke. Ti rezultati ukazuju na komunikacijske poruke kao potencijalne mehanizme za poticanje suradnje u grupnim okruženjima.

KLJUČNE RIJEČI

MODELI KOMUNIKACIJSKIH PORUKA, TEORIJA IGARA, GRUPNA SURADNJA, UNUTARGRUPNA PRISTRANOST

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