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Youth's tolerance of corruption: exploring the influence of sensitivity to monetary inequity and sociodemographic factors

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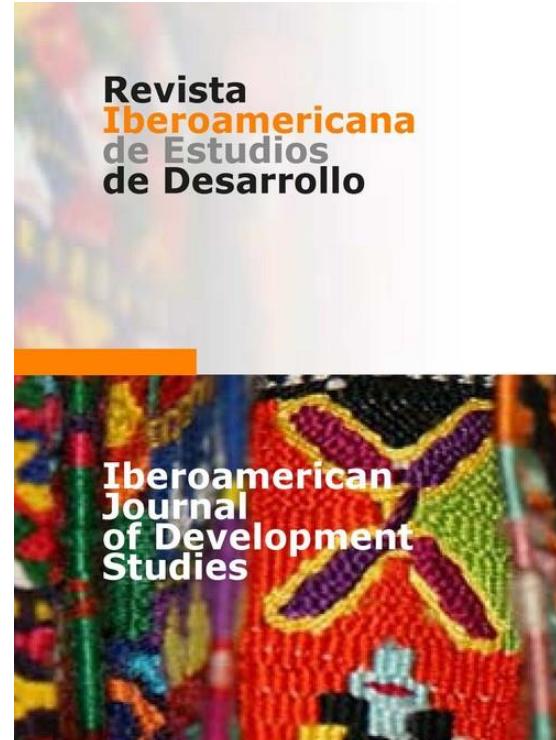
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Youth's tolerance of corruption: exploring the influence of sensitivity to monetary inequity and sociodemographic factors

Tolerancia de los jóvenes a la corrupción: explorando la influencia de la sensibilidad a la inequidad monetaria y de factores sociodemográficos

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Abstract

This study explores the relationship between tolerance of corruption, in-group/out-group sensitivity to differences in random monetary distributions, and sociodemographic variables in young students in Colombia. The results offer evidence of a relationship between aversion to monetary inequity and a reduced tolerance for corrupt acts among young people. The design included two experiments: a corruption task (CT) and a sensitivity to difference in monetary rewards (MR) task. MR had two conditions, one implying social bias as a variable. Participation involved a sample of 220 students, ranging in age from fifteen to twenty-three, representing both public and private universities in Colombia. Participants with preferences for fair distributions had a lower tolerance of corruption. In this study, cognitive and sociodemographic factors influencing corruption tolerance among Colombian youth are identified. Likewise, the methodology used to investigate corruption tolerance is outlined and the mediating role of sensitivity to monetary differences in said acceptance is examined.

Keywords: tolerance of corruption, inequity aversion, sensitivity to monetary differences, sociodemographic variables, type of education.

Resumen

Se explora la relación entre la tolerancia a la corrupción y la sensibilidad de los estudiantes colombianos a las diferencias en las distribuciones monetarias aleatorias y variables sociodemográficas. Se proporciona evidencia de una relación entre la aversión a la inequidad monetaria y una reducida tolerancia a actos corruptos entre los jóvenes. El diseño incluyó dos experimentos: una tarea de corrupción y una tarea de sensibilidad a las diferencias en las recompensas monetarias. Participaron 220 estudiantes, con edades entre quince y veintitrés años, tanto de universidades públicas como privadas. Los participantes con preferencias por distribuciones justas mostraron una menor tolerancia a la corrupción. En este estudio, se identifican los factores cognitivos y sociodemográficos que influyen en la tolerancia a la corrupción entre la juventud colombiana. Asimismo, se describe la metodología utilizada para investigar la tolerancia a la corrupción y se examina el papel mediador de la sensibilidad a las diferencias monetarias en dicha aceptación.

Palabras clave: tolerancia a la corrupción, aversión a la inequidad, sensibilidad a las diferencias monetarias, variables sociodemográficas, tipo de educación.

1

Introduction

«Corruption» has been defined historically by political scientists as a group of practices and behaviors deviating from the assigned responsibilities of a public position for the sake of self-interest and individual gain, including bribery, nepotism, and misappropriation of public resources for private-regarding use (Nye 1967). The conventional understanding of corruption traces its roots back to the ancient Greek philosopher Aristotle, who likened «corruption» to «tyranny». According to Aristotle, the tyrant, in opposition to the king, studies his own advantage rather than that of his subjects (Heidenheimer & Johnston 2002).

Through the course of history, there has been an extensive debate regarding the definition of this phenomenon. From a moralist standpoint, which follows the ideals of philosophical thinkers like Rousseau, «corruption» is defined as the deviance of morality. From this perspective, «corruption» as a normative concept implies that an individual's behavior has been tainted, going from «good» to «bad» (Heidenheimer & Johnston 2002). Banfield (1958) also supported this point of view, by considering corruption as a lack of moral behavior that held back society.

On the contrary, the revisionist point of view provides value-neutral or value-free definitions. Unlike the moralists, this side of the debate does not consider the social and ethical implications of corruption. Robbins (2000), for example, went beyond individual behavior by arguing that corruption is a systemic phenomenon, consisting of a series of normalized rules, transgressing legal entities, reinforced by existing inequalities. Certainly, some revisionist authors consider corruption to be helpful in maintaining the political system of nations (Farrales 2005). Leff (1964) argues that corruption is an extra-legal institution benefiting individuals or groups and allowing them to gain influence over the actions of bureaucracy.

Another debate around the definition of «corruption» involves the aspect of «legality», as some scholars argue, whether or not it should be considered when evaluating a behavior as corrupt. Skinner (1965) and Neild (2002) argued that the definition of «corruption» depends heavily on public opinion. Thus, not every corrupt act is necessarily illegal. The definition of «corruption» will vary depending on the chronological time, society and culture. The prior discussion shows that establishing a precise definition is challenging, yet there is a consensus

that «corruption» refers to acts in which power and influence are used for personal gain in a manner that contravenes the established rules of the game (Jain 2001).

The common practice of referring to «corruption» as «unidimensional and synonymous with bribery» neglects other forms of corruption (*e.g.*, favoritism, improper interference, conflicts of interest, etc.), which are more prevalent in developed countries and often overlooked by conventional corruption-perception indexes focusing primarily on bribery (Andersson 2017, p. 59). A growing body of literature has emphasized the existence of various «forms» of corruption. Dincer and Johnston (2019) distinguish between «lawful» and «unlawful corruption», based on the nature of benefits received by public officials in exchange for providing specific advantages to private individuals or groups. To elaborate, «unlawful corruption» occurs when public office is exploited for personal gains, typically involving cash or gifts provided to a government official. Conversely, «lawful corruption» happens when the misuse of power is driven by political motives, such as campaign contributions to or endorsements by a government official (*e.g.*, lobbying activity).

Heidenheimer and Johnston (2002) have categorized the phenomenon into «white», «grey», or «black corruption», according to its acceptance in different societal environments. «Black corruption» encompasses all actions condemned as «corrupt», both by the moral elites of the corresponding country and the general citizenry, resulting in a congruence between the law and public opinion in this type of corruption. «Grey corruption» corresponds to an ambiguous situation where there is no full consensus, but relevant sectors of the population — the moral elite — support the condemnation of such actions as «corrupt». It often occurs that there are norms sanctioning actions falling within this typology, yet the citizenry does not openly reject such behaviors. A typical example is tax evasion by public officials abusing their position in certain countries with a limited civic culture. «White corruption» faces little strong opposition from society; neither the elite nor the general citizenry openly condemns it. On the contrary, they tolerate it, although not entirely, at least in some of its aspects. In this scenario, there are no condemning laws for such practices, due to their lack of widespread support.

«Corruption» is a broad, complex, and prevalent phenomenon that affects countries worldwide and has a devastating impact on the economy when ordinary citizens become involved (Waismel-Manor *et al.* 2022). The underlying assumption in corruption research is that it is best analyzed from a principal-agent perspective, where the agent misuses the power entrusted by the principal to improve their benefit instead of the principal's gain (Jaakson *et al.* 2019). This perspective views corrupt behavior through the calculation of individual cost-

benefit. Corrupt behavior occurs whenever perceived benefits outweigh costs, and this corruption manifests itself in bribery, embezzlement, fraud, extortion, and favoritism (Andvig & Fjelstad 2001).

Corruption poses a significant problem for the macroeconomic development of developing countries. Latin America loses around 4.4 % of its Gross Domestic Product (GDP) to inefficiency and corruption in public spending (Michele *et al.* 2018). In the case of Colombia, a low- and middle-income country (LMIC), corruption can amount to 18.4 billion USD in losses per year (Contraloría General de la República 2018). It is a widespread issue in the sociopolitical context, generating a culture of non-compliance with rules and failing to establish a culture of legality among citizens (Newman & Angel 2017). The Index of Public Integrity, grouping measures of transparency, e-government, openness to trade, freedom of the press, and budget transparency, ranks Colombia 60th among 106 countries, making it the tenth country with the worst integrity among Latin American nations (Transparency International 2020). Despite the efforts, such as the creation of the Anti-Corruption Statute in Colombia, which establishes various controls and sanctions to prevent corruption, there have been no significant advances in the fight against corruption in recent years (Ayala-García *et al.* 2022).

Complementary to this discussion and integral to the design of the scenario proposed in this research, it becomes essential to analyze the relationships between corruption and social practices that are not illegal but may be perceived as immoral or, at the very least, as sources of conflict of interest, particularly corruption and lobbying. In a broad context, private interests can attempt to gain political influence through two different modes of behavior: «corruption» and «lobbying». Both involve seeking assistance from the public sector in return for certain favors; one could contend that lobbying, in essence, represents a distinct manifestation of corruption that targets legislative bodies or other regulatory agencies (Campos & Giovannoni 2007).

Campos and Giovannoni (2007) provide empirical evidence supporting the notion that «lobbying» constitutes a socially viable alternative to the direct methods of influence employed by companies with policymakers, particularly as a substitute for resorting to corruption. Another argument positing lobbying and corruption as substitutes is grounded in the notion that «lobbying» provides the lobbyist with the ability to alter regulations, rendering corruption unnecessary (Harstad & Svensson 2011).

Goldberg (2018) has proposed that both «lobbying» and «corruption» are based on exchanges that rely on access and trust; however, these shared conditions differ in their

expectations and outcomes. For this author, «lobbying» turns into «corruption» if it has the same effects as other forms of corruption that do not seek political influence. This may sound trivial or even tautological, but it indicates that the relationship between «lobbying» and «corruption» is not dichotomous but rather continuous. «Corruption» serves as a catalyst for the erosion of trust in the rule of law, administered by the bureaucracy and safeguarded by jurisdiction. It also undermines the integrity of the policymaking process, which ideally should mirror the interests of the constituency. Furthermore, lobbying, if unchecked, can similarly contribute to these adverse effects and transform into a corruptive influence.

According to Dimant and Tosato (2018), investigating corruption is crucial, due to its political, social, and economic implications, affecting the entire population of a country. In the Latin American context, individuals tend to have favorable attitudes towards corrupt acts of social or political groups they identify with, especially in situations of conflict with opposing groups. In these situations, any action that facilitates gaining an advantage over the conflicting group is accepted, even if it involves corruption. The impact of corruption in regions such as Latin America tends to persist, due to attitudes related to tribal ethics (López-López *et al.* 2016) and an exacerbated utilitarianism common in the region (Salgado 2004).

From a traditional economic standpoint, the rational choice theory proposes that the decision to engage in corrupt behavior results from strategically calculating selfish actions (Dupuy & Neset 2018). Recent research is based on the analysis of micro-individual aspects underlying decision-making in the face of corrupt behavior (Julián & Bonavia 2020). According to these models, proximity to peers who engage in corrupt behavior increases the tendency to be corrupt or to accept such behavior (Gino & Galinsky 2012). By surrounding oneself with corrupt individuals, there is a normalization of these behaviors, which leads to them being less socially penalized (Köbis *et al.* 2017). Additionally, as it becomes evident that these behaviors produce a benefit for the individual who executes them, the social group perceives them as an ideal way of acting (Julián & Bonavia 2020).

1.1. Corruption, cognitive development, and other sociodemographic factors

There is no consensus in the academic literature regarding the understanding and acceptance of «bribery» in childhood. From a developmental perspective, judgments on «bribery» among children aged six to ten have been assessed to determine whether their disapproval varies based on the setting (public or private). It has been found that bribery's

rejection increases with age. In an experiment conducted by Reyes-Jaquez and Koenig (2022), young children displayed a higher bribery-acceptance rate when the experimenter was present, as opposed to when they were absent. In contrast, older children showed similar rejection rates in all environments (Reyes-Jaquez & Koenig 2022). Children can recognize abuses of power, exemplified by bribery and its associated negative traits like bias and secrecy. They actively reject unethical actions tied to authority-based corruption when encountered (Reyes-Jaquez & Koenig 2021). Regardless, Wang *et al.* (2015) have found evidence suggesting an increasing tolerance of corruption in childhood and adolescence. Still, they noted that moral evaluation of such transgressions leads to a reduction in tolerance.

Neuropsychology has shown that brain regions related to reward, specifically unexpected rewards, are more sensitive in adolescence than in adulthood, even when the rewards are small and unrelated to behavior (Van Leijenhorst *et al.* 2010). This suggests fundamental differences in how uncertain rewards are processed at different ages. Activation of the reward-related *nucleus accumbens* reaches its peak in mid-adolescence and decreases in late adolescence and early adulthood, modulated by developmental differences in a general tendency to pursue personal goals (Schreuders *et al.* 2018). MR generate a strong activation in the bilateral ventral striatum and medial prefrontal cortex, even in adolescence (Van Duijvenvoorde *et al.* 2014).

Studies conducted in Latin America from a social psychology standpoint highlight that the social perception and attitudes towards corruption are influenced by various factors, including the country's economic situation, satisfaction with government performance, personal economic status, occupational status, gender, and age, among other variables (Gaddi 2023). Additionally, distrust in the integrity of the political system is associated with a higher tolerance for bribery (González-Ramírez & Monsiváis-Carrillo 2022).

The need to examine the role of decision-making in studying corruption tolerance becomes evident when considering that the condemnation of an unethical action requires, at a minimum, that the action was willingly exercised (Pozsgai-Alvarez 2022). Sociocultural beliefs regarding illegality, institutional illegitimacy, and survival increase the likelihood of adolescents evaluating corruption more positively. Age plays a role likewise: sixth-grade students are more tolerant of corruption than eleventh-grade students, demonstrating greater acceptability towards nepotism too (Martínez & Posada 2022). Certain studies have evidenced that tie-based corruption, such as nepotism, is commonly practiced in social settings where

favoritism and interpersonal connections mediate public and private decision making (Zheng *et al.* 2020).

In Latin America, there is a growing acceptance of corruption among adolescents (Velez & Knowles 2020). This is concerning because the attitudes of young people towards democracy and trust in government are negatively associated with corruption measures (Torney-Purta *et al.* 2004). Moreover, trust in civic institutions is lower in countries with corrupt and less effective government institutions (Lauglo 2013), potentially increasing permissiveness towards corrupt acts, due to broader social attitudes and corruption levels in government (Schulz *et al.* 2018).

Gender is also a significant factor in understanding this phenomenon, as women tend to perceive more risk than men (Liu *et al.* 2022). On the other hand, households headed by males were more prone to participate in, or rationalize, bribery, potentially due to increased engagement with government officials in the labor market. There is empirical correlation suggesting that a higher percentage of women in Public Administration positions correlates with lower levels of corruption (Dollar *et al.* 2001, Jha & Sarangi 2018), a trend that persists as individuals gain more experience (Pereira & Fernandez-Vazquez 2022).

Contrary to this, studies have shown that interpersonal trust decreases tolerance to corruption (Cohaila 2020), as well as prosocial behaviors, such as a person's proclivity to punish unjust behaviors and seek fairness, despite them benefiting them or not (Cameron *et al.* 2008). It has also been found that tolerance of corruption and subsequent engagement in unethical practices may be mediated by the cost of bribery in terms of social welfare (Cameron *et al.* 2008). Carrasco *et al.*'s (2020) investigation showed that civic knowledge and understanding of the consequences of corrupt acts are negative predictors of tolerance towards corruption in Latin American youth.

1.2. Inequity aversion, sensitivity to monetary reward, and tolerance of corruption

According to the Transparency Corporation for Colombia (2019) (as cited in Ibarra-Barajas *et al.* 2021), a staggering sum of \$17.9 billion (COP), equivalent to around \$430 million (USD), of the national budget was redirected towards corrupt activities in 2018, exacerbating the structural problem of inequity. This issue is rooted in factors such as economic distribution disparities, resource concentration, and the absence of state's regulation in specific regions of the country (Sánchez-Torres 2017).

Research indicates that both the perception and experience of «corruption» wield significant influence over various forms of political participation in Colombia (Langbein & Sanabria 2013). In response, efforts in developing nations like Colombia strive to combat corruption by establishing high-profile, independent anti-corruption agencies with prosecutorial powers and launching campaigns to promote transparency. Even so, a comprehensive and promising research agenda in this field is imperative for understanding how corruption establishes itself in diverse contexts and why it endures over time (Olken & Pande 2012).

It has also been hypothesized that inequity aversion predicts people's engagement in corrupt practices and its widespread within society considering an individual's inclination to display unjust behaviors as a response to unfair distributions (Baymul 2019). «Inequity aversion» has been defined from different frameworks as one's disposition to reject inequitable distributions upon perceived unfairness (Fehr & Schmidt 1999, Vale & Brosnan 2017). Two types of «inequity aversion» have been defined: «advantageous inequity (AI) aversion», in which an individual rejects an unfair distribution that favors them, and «disadvantageous inequity (DI) aversion», which involves the rejection of unjust distributions negatively impacting the individual (Brosnan 2006).

A classic study on social decision-making (Sanfey 2007) highlighted that emotional reactions serve as a mechanism to avoid inequity, fostering mutual reciprocity, emphasizing the importance of reputation, and encouraging the punishment of individuals attempting to exploit others. Negative emotional states were observed, because of both inequity and nonreciprocity (Sanfey 2007). The perpetuation of unfairness in a chain of unjust behaviors has been elucidated through the concept of «generalized negative reciprocity». In this framework, an individual who is treated unfairly is more likely to propagate an unjust response not only toward the original transgressor but also toward uninvolved third parties (Gray *et al.* 2014). A study conducted by Strang *et al.* (2016) reported that emotion regulation strategies can diminish generalized negative reciprocity.

According to Montero's (2007) classical economic research on the Ultimatum Game (UG), inequity aversion can, ironically, predict inequity when participants estimate a higher total pay-off based on a specific distributive scenario; for example, when bargaining, participants who showcased high levels of inequity aversion accepted unfair distributions, whether these benefited them or not, in the pursuit of not being left out of the negotiation.

Montero's (2007) findings exemplified how both monetary and social rewards motivate behavior and decision-making in both private and public settings. Response speeds in reward-related tasks are faster than in tasks without rewards: increasing the magnitude of the reward causes faster response speeds in tasks of monetary incentive delay and social incentive delay (Wang *et al.* 2017). A study conducted by McAuliffe *et al.* (2002) demonstrated that the type of reward (abstract, such as money, or concrete, in-kind rewards like candy) significantly influence the acceptance of DI in both adults and children (McAuliffe *et al.* 2022). Adults showed a higher level of DI aversion when faced with unjust monetary distributions, rather than candy ones. In this study, we will focus on MR, because neuroscientists have repeatedly emphasized their importance as the primary motivators of behavior and key components in the control of actions, decisions, goal-directed behavior, and learning (Hidi 2016).

In-group favoritism bias is also posited to be linked to strategic thinking and decision-making in distributive decisions, because people are more likely to favor members of their group, anticipating a monetary reward in the future (Everett *et al.* 2015). Other studies suggest that in-group favoritism does not flexibly adjust children's responses in distributive equity situations (Gonzalez *et al.* 2020, McAuliffe & Dunham 2017, Stagnaro *et al.* 2018), nor in in/out-group trust situations and economic cooperative decisions (Grueneisen *et al.* 2021).

The present study is essential, because the relationship between the behavior of young people and corruption in a lower-middle-income country (LMIC) like Colombia is not fully understood, and the sociocultural and cognitive variables influencing the decision to act corruptly are not fully explored. Moreover, it should be acknowledged that there is limited research on the relationship between «corruption» and «inequity aversion» in monetary reward situations, despite theoretical hypotheses or assumptions from the economic discipline by authors such as Montero (2007) and Baymul (2019).

It aims to identify the relationship between the «level of corruption» and «sensitivity to differences» in random monetary distributions, as well demographic variables such as gender, type of education, socioeconomic stratum (SES), age and in-group/out-group social bias in Colombian students. Previous studies suggest that acceptance of corrupt acts is reduced in young students in public and private universities in Colombia with aversion to monetary inequity, aligning with the notion that monetary prosocial tendencies decrease justification for corruption.

Method

2.1. Design

All subjects participated in two experiments: a corruption task (CT) and a sensitivity to monetary reward (MR) differences task. CT allows categorizing subjects' responses according to four levels of corruption («not evidenced», «slight», «moderate», and «severe») and analyzing the influence of variables such as «age», «SES» (five strata), two types of the educational systems («private» and «public»), and three genders («female», «male», and «non-binary»). MR allows identifying participants' sensitivity to different distributions of MR according to three types of aversion (AI, DI, and equity aversion). MR has two conditions that have a social bias variable: in the in-group condition, it was proposed that the counterpart was the participant's best friend, and in the out-group condition, the counterpart was suggested to be an unknown individual. In the second condition, the monetary amounts offered in each round were counterbalanced. The tasks were presented according to the following order: *a)* condition 1: known partner, and *b)* condition 2: unknown partner.

2.2. Participants

The sample consisted of 220 university students, with an age range between fifteen and twenty-three years old ($Mdn = 20$, $min = 15$, $max = 23$; $M = 19.7$, $SD = 2.1$), enrolled in four private and three public universities (see Table 1) in Colombia. There is a high homogeneity in the educational, geographical, and socioeconomic areas between private educational institutions, as well as between public educational institutions. Therefore, it is not necessary to analyze clusters for each university (Fajardo *et al.* 2021, Martin 2018, Mejía 2016). The SES is the classification of residential properties in Colombia. This is an ordinal categorization of six levels (one being very low and six being very high), created by the Colombian state (see Table 1). Minors who voluntarily agreed to participate signed an informed assent and their respective legal guardians signed an informed consent following what is required by Resolution 8430 of 1993 from the Ministry of Health in Colombia, which establishes the scientific, technical, and administrative regulations for health research.

Variable		N	%
Gender	Female	142	64.5
	Male	73	33.2
	Non-binary	5	2.3
Socioeconomic stratum	One	24	10.9
	Two	12	5.5
	Three	34	15.5
	Four	61	27.7
	Five	43	19.5
	Six	46	20.9
Type of education	Private	154	70.0
	Public	66	30.0

Table 1

Characteristics of the participating sample

Source: Authors.

2.3. Pilot test

In the pilot phase, a total of 14 participants were interviewed in three rounds. In the first round, four subjects, three women and one man aged between seventeen and twenty years ($M = 18.5$, $SD = 1.8$) solved the initial version of both the CT and MR tasks. The analysis of the responses allowed us to establish that the context and instructions given for the task were clear and encouraged the participation of the subjects. However, during the MR task it was evident that large differences between the prize to be obtained by the subject and the prize of the counterpart (nine coins versus one coin, or eight coins versus four coins, in the inequity aversion task) caused the subjects to systematically reject the result of each toss.ç

2.4. Material and procedure

As previously mentioned, two tasks were designed: the vaccine distribution scenario (CT) and the roulette task (MR). The first task, the «vaccine distribution scenario», is based on

two economic games: the Bribery Game (Abbinck *et al.* 2002) and the Corruption Game (Köbis *et al.* 2015, Köbis *et al.* 2017). CT has a typical triadic structure of many corrupt transactions in acquisition situations: two players in the competition —one of whom is a potentially corrupt player (the participant)—; another hypothetical player, who competes with the participant, and a third player, who resembles a government official who assigns a contract or prize to the highest bidder. All participants are expected to assume the role of the potentially corrupt player.

Participants can offer a bribe to an official to avoid splitting the contract amount with the competing player and thus «break» the equilibrium in their favor. The game is configured so that the other player does not have the opportunity to bribe the official. Theoretically, both players in competition can be corrupt, but to reduce complexity in the initial implementation of the corruption game only one corrupt option is introduced for the participant.

In this game, the following scenario was established:

You are the manager of a mail and goods distribution company. The Ministry of Public Health announces a large contract for the distribution of vaccines against COVID-19. Two private companies compete with their budget for the distribution of this batch of vaccines by making an offer through a public tender; the best offer (that is, the highest offer) would win the entire vaccine distribution contract worth one hundred and twenty million pesos (COP 120,000,000, equivalent to USD 30,700). Equal bids lead to an equal division of the contract worth sixty million pesos (COP 60,000,000 COP equivalent to USD 15,000). In the first phase, you must decide whether or not to undertake a lobbying strategy with the high official of the Ministry, who has the power to decide on the winner of the tender. You can invite him and his family to dinner at a prestigious restaurant in Bogotá, which ensures you a bidding advantage of 50 % of equal bids. This process is common and not a crime, although it could be frowned upon, as it guarantees private benefits for the official and would give you an advantage for your offer. Neither you nor your family has access to the vaccines. Would you invite the official to dinner?

Afterward, a secondary situation was proposed: «There is also the opportunity to invite the official and their family on an anonymous all-expenses-paid vacation to Miami (USA). Your company's offer would remain anonymous, except for the official invited to vacations. This invitation ensures advantages in 100 % of equal bids. Neither you nor your family would have access to the vaccines. Would you invite the official to Miami?».

In the third phase of the experiment, the situation proposed the prior invitation to the official. But, unlike phase two, on this occasion the participant and his family would have access

to vaccines against COVID-19. Having said this, the third prompt was the following: «There is also the opportunity to invite the official and their family on an anonymous all-expenses-paid vacation to Miami (USA). Your company's offer would remain anonymous, except for the official invited to vacations. This invitation ensures advantages in 100 % of equal bids. You and your family will have access to the vaccines. Would you invite the official to Miami?».

In the MR task, a roulette, and its prize table (see Figure 1) were designed based on the proposals of Qiu *et al.* (2017) and Williams and Moore (2014). When it is impossible to achieve an equitable distribution by attributes, it can be achieved by proposing a mechanism that generates equal opportunities for each party to access the resource, *i.e.*, through procedural justice (Chaudhuri *et al.* 2016). A fair procedure (*e.g.*, a wheel) would provide a 50/50 chance of obtaining the largest reward. In this study, the preferences of young people are compared according to advantageous (AI), disadvantageous (DI), and equitable (DE) outcomes.

In this task, the allocation of resources is related to the final position of the roulette, which proposes 13 spins with three possible coin distributions: *a*) AI («6 for myself and 4 for the other»), *b*) DI («4 for myself and 6 for the other»), and *c*) equity («5 for each»). The participant does not make decisions about the distribution of coins but rather accepts or rejects the one granted by the roulette. It is a modified version of the Dictator Game, that is traditionally used in economic reasoning tasks. Similar versions, where imposed distributions are accepted or rejected, have been used before to measure altruism (Hutcherson *et al.* 2015). In our task, the distributions were hypothetical, and participants did not receive any monetary incentive. The task was presented on a casino roulette wheel organized by colored areas: blue (AI), white (equitable), and yellow (DI) (see Figure 1).

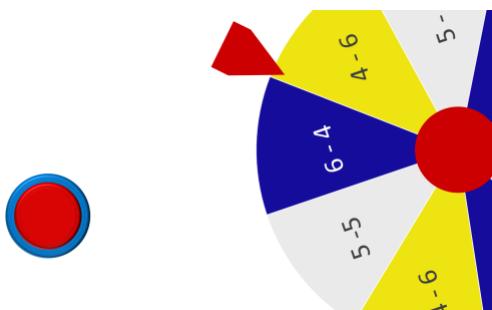


Figure 1

The prize roulette

Source: Authors.

These areas contain different predetermined coin distributions, as previously mentioned. In the in-group condition, the following prompt was given to the participants: «In this game, you will simultaneously win coins for yourself and your best friend. When spinning the roulette wheel, you would win as many coins as indicated on the wheel, provided that you accept the result; if you do not accept it, you can spin the roulette wheel again, but you will not win anything. You can spin it up to 13 times. The total sum of all coins will be the final prize».

In the out-group condition, the participants were asked to consider instead that they were competing with an unknown player.

2.5. Categories and analysis plan

In the CT task, the subject had two response options to each of the three hypothetical scenarios: «Yes» or «No». Systematically rejecting the possibility of engaging in a corrupt act in each phase refers to «non-evidenced corruption». «Mild corruption» is delineated by the subject's proclivity to engage in lobbying activities. «Moderate corruption» is identified through the subject's propensity to proffer gifts to individuals involved in corrupt practices, and «severe corruption» manifests when the subject exhibits a disposition to accept personal and direct benefits from individuals engaged in corruption, considering such gifts as a form of recompense.

In task MR, sensitivity to monetary difference is established when a particular roulette outcome is rejected more than 50 % of the time. Aversion to DI is identified when the subject rejects more than 50 % of the roulette outcomes that do not favor them; aversion to AI is identified when the subject rejects more than half of the roulette outcomes that do favor them. Aversion to equity (EA) is identified when the subject rejects more than half of the outcomes that distribute resources equally between both players. The criteria are presented in Table 2.

Category	Subcategory	Definition	Performance level	
			High	Low
Aversion to a DI distribution type		This occurs when the subject rejects inequitable distributions where their disadvantageous	The subject rejects between 3 and 5 disadvantageous	The subject rejects less than 3 disadvantageous

	counterpart obtains more inequitable resources	inequitable distributions	inequitable distributions
AI	This occurs when the subject rejects inequitable distributions in which their counterpart receives fewer resources	The subject rejects between 3 and 5 inequitable distributions	The subject rejects less than 3 advantageous distributions
EA	This occurs when the subject rejects equitable distributions where they receive the same number of resources as their counterpart	The subject rejects between 2 and 3 equitable distributions	The subject rejects only 1 equitable distribution

Note: AI = «advantageous inequity»; DI = «disadvantageous inequity»; EA = «equity aversion».

Table 2

Analysis criteria for the category aversion to a distribution type

Source: Authors.

Given that our metric for the corruption game is represented on an ordinal scale spanning from 1 (indicating a low level of acceptance) to 4 (indicating a high level of acceptance), we employed an ordinal logistic regression for our analysis. One advantage of Bayesian approaches is that probability distributions of regression estimates are obtained and, instead of strict p -values, overall probabilities of the estimates can be reported. Particularly, we report the probability of the direction, positive or negative, of the regression weights (Makowski *et al.* 2019). Bayesian regressions were conducted in Python using the PyMC3 package, and the R-hat measure was used to determine convergence (4 chains, 10,000 samples each). The specification for the regression was:

$$\text{Corruption} = \beta_0 + \beta_1 \text{Difference Sensitivity} + \beta_2 \text{Public Edu.} + \beta_3 \text{SES} + \beta_4 \text{Gender} + \beta_5 \text{Age}$$

Corruption is a discrete aggregate measure. It is the sum of the scores of three questions, ranging from 1 (minimum acceptance of corruption) to 4 (maximum acceptance of corruption). It is not a measure of corruption, but rather of accepting hypothetical situations presented in the

texts. However, the term «corruption» is used for notational brevity. The demographics are *Public Education*, *SES*, *Gender*, and *Age*. *Public education* is a categorical variable («public» vs. «private»). *SES* are discrete socioeconomic strata ranging from one (lowest SES) to six (highest SES). *Gender* has three levels (female, male, and non-binary). *Age* is represented in years.

Sensitivity to monetary difference is a discrete aggregate measure obtained by adding the strength of AI (1 low, 2 high), DI (1 low, 2 high), and EA (1 low, 2 high) when there was no in-group favoritism, minus the same sum when there was in-group favoritism. This indicator measures changes in preferences for equitable monetary redistribution relative to in-group favoritism. Larger values indicate preferences for equitable redistribution independent of in-group preferences. This regression provides evidence that preferences for equitable monetary distributions (sensitivity to monetary difference) correlate with acceptance of hypothetical corrupt practices, while controlling for demographic information.

To perform the ordinal logistic Bayesian regression, the following priors and likelihoods were used. In terms of likelihood, in ordinal regression, the probability of being in a level, in our case of accepting situations of corruption, depends on *a*) the logistic function, which takes as input the regression equation (Eq. 1), and *b*) thresholds for the 4-1 levels of corruption; for example, assuming that Eq. 1 has weights all equal to 1 and the variables are all 1, then the result is 6 (5 variables plus the intercept). This 6, along with the thresholds, is used to calculate the probability, with the logistic function, of observing a level of corruption.

We assigned a normal prior centered at zero with a wide standard deviation of 20 to the three thresholds. We assigned a Laplace prior centered at μ with standard deviation σ to the regression weights. We assigned a normal prior centered at zero with a standard deviation of 2 to both μ and σ . We truncated σ to positive values. Given the units of the variables, these are sufficiently wide/uninformative priors to run the Bayesian regression.

Using leave-one-out (loo) cross-validation, we compared the Eq. 1 model with a null model (only intercept) or only demographic variables. The loo criterion is an information criterion that seeks to balance model complexity (number of parameters) and fit the data (likelihood), where smaller values are better models. We found that the three models are similar in terms of loo (*null* = 493.53, *Eq. 1* = 493.12, and *Demographics* = 492.73). The differences are too small to be considered relevant (< 0.1); that is, the three models are similar in complexity and fit. Since one of the objectives is to explore relationships between variables, and because of its conceptual relevance, we present the Eq. 1 model.

3

Results

The frequency of the *Corruption* variable among the participants indicates a high non-evident corruption (45.8 %), meaning that, despite the escalation of the reward, they never accept a corrupt act. The parameters obtained via Markov chain Monte Carlo (MCMC) converged (all R-hat values were below 1.05). The average of the posterior predictive is close to the average of the observed data (Figure 2). Figure 2 also displays a U-shape. Participants tended to accept the extremes, *i.e.*, the situation of simple lobbying and not necessarily corrupt (corruption level 1) and the situation of giving bribes and selfish benefits (corruption level 4).

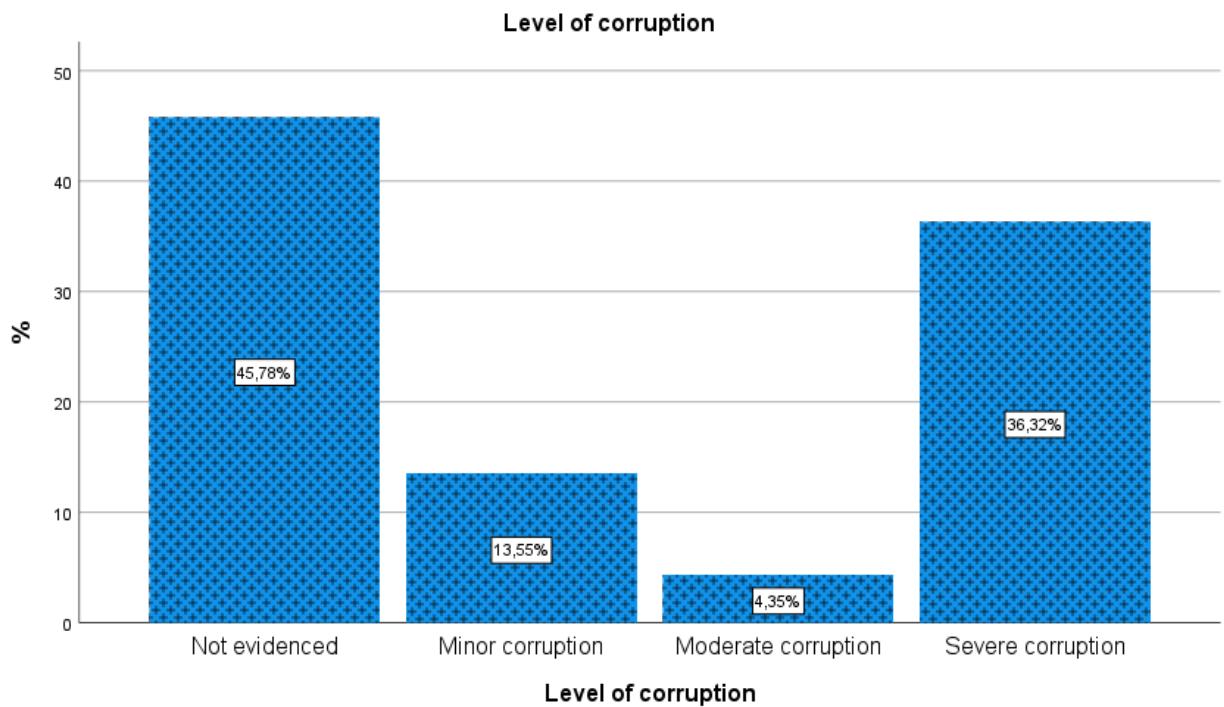


Figure 2

Level of corruption evidenced by the participants

The posterior predictive is the distribution of predicted values by the model given the parameters and observed data [$p(\text{ypred}|\text{parameters}, \text{yobs})$]. The y -axis is the frequency in the data or model, and the x -axis represents the four levels of corruption (Figure 3).

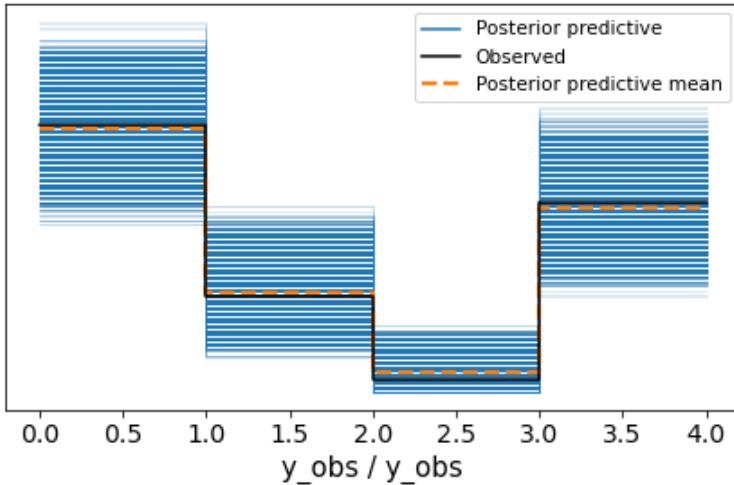


Figure 3

Posterior predictive

Source: Authors.

The results of the Bayesian regression (Figure 4) indicate that the type of education modifies tolerance to corruption. The posterior probability of observing a positive regression weight was 0.04, indicating that corruption scores were lower in public institutions than in private ones. The posterior probability of the regression weight for men being greater than that for women was 0.57, and for non-binary individuals, greater than that for women, was 0.27. In general, men were more likely to tolerate corrupt situations, followed by women and non-binary individuals.

The regression estimate for SES was mostly negative. The posterior probability of being greater than zero was 0.38, suggesting that participants with higher self-esteem were less likely to accept hypothetical corrupt situations. The regression estimate for age was mostly negative. The posterior probability of being positive was 0.03, suggesting that older students were less likely to accept corrupt situations. Finally, the regression estimates for sensitivity difference, which measures how much participants prefer monetary distributions for outgroup members, were mostly negative. The posterior probability of being greater than zero was 0.13. Participants with stronger preferences for fair distributions for outgroup members tended to report lower corruption scores.

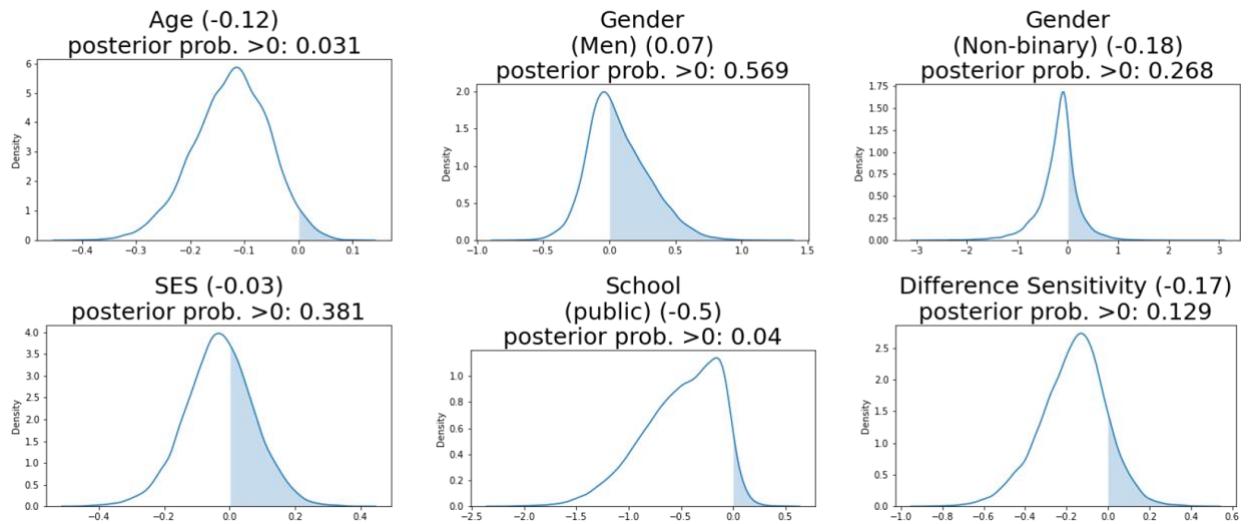


Figure 4

Bayesian regression. Posterior distributions for each of the regression parameters (distributions are 95 % posterior density intervals)

Source: Authors.

The blue shading and the title of each panel highlight the amount of mass greater than zero. The mean of the posterior is indicated in parentheses in the title. The intercept is not shown (prob. $>0 = 0.325$, mean = 0.12). In summary, the results indicate notable patterns. First, there is posterior evidence that sensitivity difference affects tolerance to corruption scenarios. Second, participants who were in a public university reported reduced tolerance for corruption, as opposed to those from private institutions. Third, self-esteem, gender, and age affected tolerance to corruption, with participants with higher self-esteem, non-binary individuals, and older individuals tending to report less tolerance to corruption situations.

4

Discussion

The aim of this study was to explore the correlation between level of corruption and sensitivity to differences in random monetary distributions, along with demographic variables such as *Gender*, *Type of Education*, *SES*, *Age*, and *Social Bias*. The results revealed several noteworthy relationships. Participants with stronger preferences for fair distributions for outgroup members tended to report lower corruption scores. Interestingly, the likelihood of accepting a corrupt act decreased with higher levels of education, and this pattern varied based

on the type of education. Moreover, participants from a higher socioeconomic status were less inclined to accept hypothetical corrupt situations, compared to their counterparts from a lower socioeconomic status. Our results contribute by identifying sociodemographic variables that influence corruption tolerance in Latin American youth, shedding light on the investigation of corruption tolerance, and elucidating the role played by sensitivity to monetary differences.

These results unveil the existing relationship between tolerance of corruption and its relationship with fairness and prosocial behavior. As previous studies have shown, both interpersonal trust (Cohaila 2020) and preference for equity (Cameron *et al.* 2008) are predictors of a person's willingness to reject corruption as well as key components to reduce it. We can also assume that, as tolerance of corruption decreases the higher the educational level, education plays a pivotal role in a person's awareness regarding fairness, civic knowledge, and political issues. This aligns with Carrasco *et al.* (2020) on overall civic knowledge as a negative predictor of tolerance of corruption.

Viewed through the lens of Heidenheimer and Johnston (2002), two types of rewards for corrupt acts were posited: «grey», associated with lobbying practices (slight corruption), and «black», involving economic rewards (severe corruption). When faced with different types of corruption, it was observed that 45.8 % of the population exhibited zero tolerance of corruption, irrespective of the offered reward; these individuals rejected any gain. The data indicated a general rejection of the corrupt agent's proposal in the case of «grey corruption» (only 13.6 % accepted slight corruption), while 36.3 % accepted «black corruption» (severe corruption). «Grey corruption», representing hidden areas of corruption, was accepted without necessarily compromising one's position or social status, providing contextual acceptance. Notably, «black corruption» was only accepted when a highly valuable reward was offered, justifying the perceived risk associated with acceptance.

Concerning individual preferences for distributions (sensitivity to monetary differences), participants with low sensitivity (strong inclinations for unjust distributions) demonstrated a higher level of tolerance regarding corrupt situations. Conversely, individuals with high sensitivity (strong inclinations for fair distributions) exhibited a lower tolerance for corruption.

To our knowledge, present study is the first to empirically establish the relationship between aversion to inequity and tolerance of corruption in the context of resource distribution within a hypothetical scenario. The hypothesis posits that each participant's sense of justice and emotional responses, particularly their sensitivity to monetary difference, prevent them from

being tolerant of corruption when offered a reward in a resource distribution situation impacting the welfare of others. On the other hand, negative emotions arising from unfair distributions were considered a potential explanation for why some individuals might engage in corrupt acts while others would not (Gray *et al.* 2014). The relationship between lower sensitivity and higher levels of corruption could be explained through generalized negative reciprocity.

In the research design of the CT task, the overall monetary and social reward value progressively increased in each phase. As previously established by McAuliffe *et al.* (2022), the type of reward significantly influences people's decision-making. It could be said that, in both tasks, the total amount of coins and overall private benefit (given access to vaccines before the rest of the population) obtained upon bribe impacted participant's choices. While explicit bribery, different to lobbying, carries a huge social cost, as it is more likely to be punished, it could be evidenced that, for certain individuals, the type of reward and compensation predicts their willingness to engage in corrupt acts, as perceived benefits outweigh costs (Andvig & Fjelstad 2001).

Regarding the relationship between sociodemographic variables and tolerance of corruption, age emerged as a predictor of increased tolerance of corruption, with younger individuals being more inclined to accept it. This aligns with previous explorations that found young individuals are generally more likely to engage in bribery (Mangafić & Veselinović 2020, Torgler & Valev 2006). It could also be mentioned that the lack of explicit supervision in the CT task could explain why children were more likely to engage in corrupt practices than their counterparts, as they are more inclined to reject unethical actions based on the presence of an authority figure (Reyes-Jaquez & Koenig 2021).

When analyzing the *Gender* variable, the probability of accepting a corrupt act significantly decreased among individuals identifying as female. As previous studies have shown, women are more averse to risk than men (Liu *et al.* 2022), making them less willing to engage in acts that could have a high cost for them. In the case of female participants, we could hypothesize that being caught or punished outweighs the benefit. This is an interesting area of study yet to be developed.

The probability of accepting a corrupt act decreased with increasing levels of education, varying depending on the type of education. The sophistication hypothesis proposes that populations with higher levels of education develop more sophisticated political attitudes (Highton 2009). Thus, it is expected that adults with higher levels of education possess extensive and organized knowledge that determines more structured political opinions, facts,

and concepts. Accumulation of information and knowledge is crucial to both societies and individuals, as more informed individuals tend to make for a more interested and participatory electorate (Persson 2015). Due to their ability to critically evaluate the functioning of institutions and government officials, politically sophisticated students exhibit lower tolerance for corruption.

There's also an interesting key point to highlight regarding this last finding. Corruption significantly influences public education experiences in multiple ways. Empirical evidence from developing countries confirms a robust negative relationship between corruption and expected years of schooling. At low corruption levels, expected years of schooling in public higher education increases, while, at high levels of corruption, enrollment in public higher education decreases, as well as expected years of schooling (Duerrenberger & Warning 2018). This means that both students and education's quality are directly affected by state corruption. This disparity is key to understanding why there's a higher probability of aversion to corruption in official education, compared to private education.

This research also uncovered an inverse relationship between the probability of accepting a corrupt act and socioeconomic status (SES). Individuals with higher SES levels are less likely to accept hypothetical corrupt situations, as found by Carrasco *et al.* (2020) in a study comparing corruption tolerance in several Latin-American countries. Their research revealed a negative correlation between the SES of schools and corruption tolerance: the higher the SES level, the lower the corruption tolerance. These findings underscore the necessity for curricular interventions within educational contexts to mitigate the likelihood of corruption tolerance and enhance societal equity. This emphasizes the importance of reinforcing civic competencies and levels of civic knowledge among prospective citizens, achievable through initiatives targeting the responsible and ethical utilization of state resources.

A fundamental difference between the studies discussed here lies in how tolerance for corruption is measured. It predominantly relies on ordinal acceptance scales, where a character decides (usually corrupt), and participants express their acceptance or rejection of that decision (Li *et al.* 2018). In this case, participants face a gradation of the reward to be obtained in the corrupt situation and decide whether or not to participate. This method of scaling the reward helps distinguish low tolerance for corruption from high tolerance and their relationship with incentive. Additionally, as discussed by Pozsgai-Alvarez (2015), this tolerance can be evaluated based on the type of activity considered conceivable and achievable, such as being willing to

commit extortionary or collusive corruption, describing the nature of two possible relationships between the corruptor and the corrupt.

To the best of our knowledge, this study may be the first to investigate the relationship between sensitivity to monetary injustice towards out-group members and tolerance for corruption. Regression estimates indicate that tolerance of corruption tends to decrease in those who are more sensitive to differences in monetary distributions, theoretically exhibiting more equitable behavior in situations of distributive justice. In summary, there is further evidence that sensitivity to monetary difference modulates tolerance of corruption, highlighting that people who tend to incorporate more equitable distribution practices towards the out-group are likely to reject corrupt acts. This finding contributes to the understanding of behavior within a framework of distributive justice. It is known that the amount of reward individuals are willing to sacrifice to increase the net pay of others is lower under a loss frame than under a gain frame (Boun-My *et al.* 2018). There is also evidence that individuals' preferences for AI may differ depending on their role in determining the allocations. Participants show a much lower preference for equitable offers than for advantageous offers if they can determine the allocations in the money distribution environment (Li *et al.* 2018).

In this report, it is shown that a tendency toward equity in out-group monetary distribution situations is a factor that decreases tolerance of corruption, which may not be the case for individuals who tend to favor equity only within in-group distributive scenarios. The presence of inequity in monetary distribution can affect feelings of reconciliation in peace processes, such as those underway in Colombia. The presence of inequity in monetary distribution can even impact people's feelings of reconciliation in peace processes like those unfolding in Colombia (Rincón-Unigarro *et al.* 2022). There may be cultural biases or developmental trajectories that explain this result; for example, acceptance of nepotism and social favoritism are predictors of tie-based corruption (Zheng *et al.* 2020), and people are more likely to favor members of their group, anticipating a monetary reward in the future (Everett *et al.* 2015).

5

Conclusions

Present study provides evidence of the relationship between corruption tolerance in schooled adolescents and young adults and sensitivity to economic differences in a resource distribution situation. Instead of using traditional CT, such as the Dictator Game, this research introduced a new task involving a ranked increase in the type of reward, from an institutional gain to a personal gain. The second task, examining sensitivity towards monetary differences, deviates from the norm (the Inequity Game) by including a new category —aversion to equity—, in addition to the usual examination of disadvantageous/AI. Moreover, this study includes a variable comparing resource distribution between unknown peers and known peers (intra and exo-group bias). To our knowledge, this research is the first to investigate the relationship between corruption tolerance and sensitivity to economic differences.

Regarding the limitations of this study, it should be mentioned that the sample of university students was convenience-based and not necessarily representative of the entire student population nor the SES distribution of the country. In this sense, the results obtained should be analyzed with caution. However, these results are valuable as priors for future work. Additionally, the scarcity of literature on these topics from a non-binary gender perspective posed a theoretical difficulty in studying the findings that considered this variable, so many of the proposed conclusions had limited scope.

In the future, it would be interesting to replicate the task, but with distributions of coins that could be exchanged for real rewards and not in a hypothetical exercise, to evaluate if aversion to advantageous and disadvantageous inequality is affected and what implications this has in societies as unequal as the Colombian one, where the top 1 % of the population is concentrated around 20 % of the income (Cepal 2022). In summary, this study contributes to closing the literature gap surrounding tolerance of corruption, sensitivity to monetary distributions, and their relationship with socioeconomic variables. Specifically, evidence is proposed that supports the hypothesis of a relationship between aversion to inequity and tolerance for corruption in situations involving the distribution of resources.

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