MASTERARBEIT | MASTER'S THESIS

Titel | Title

Cooperation or Self-Reliance: The Role of Wealth and Economic Mobility

verfasst von | submitted by

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angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien | Vienna, 2025

Studienkennzahl lt. Studienblatt | Degree programme code as it appears on the student record sheet:	UA 066 840
Studienrichtung lt. Studienblatt | Degree programme as it appears on the student record sheet:	Masterstudium Psychologie
Betreut von | Supervisor:	Univ.-Prof. Dipl.-Psych. Dr. Robert Böhm

Abstract

Cooperation plays a vital role in addressing collective challenges and creating public goods. However, in addition to free-riding, self-reliance can also undermine cooperation by allowing individuals to opt out of collective efforts and instead address the challenge individually. Previous research has shown that wealth increases self-reliant behavior and that environmental unpredictability and resource uncertainty increase cooperative behavior. Yet, little is known about how economic mobility—the perceived possibility of moving up or down in wealth—affects individuals' choices between cooperation and self-reliance. The present study employed a within-participants design with two factors: amount of resources (poor vs. rich) and economic mobility (no mobility vs. mobility) to examine their effects on contributions to a collective solution, an individual solution, and keeping resources. The results indicate that individuals with higher endowments ("rich" individuals) invest more in each of the three options than individuals with lower endowments ("poor" individuals) in absolute terms. However, when measured in relative terms—that is, as a proportion of the total available resources—poor individuals contribute more to the collective solution than rich ones in the no-mobility condition. Furthermore, the findings highlight the importance of distinguishing between upward and downward mobility. When individuals have the possibility of moving up the wealth ladder, they tend to invest more in individual solutions and less in collective ones. In contrast, the risk of downward mobility does not appear to significantly influence cooperative or self-reliant behavior.

Keywords: cooperation, self-reliance, economic mobility, private-public goods game

Kooperation spielt eine zentrale Rolle bei der Bewältigung kollektiver Herausforderungen und der Bereitstellung öffentlicher Güter. Doch neben Trittbrettfahren kann auch Eigenständigkeit kooperatives Verhalten untergraben, indem Individuen sich aus kollektiven Anstrengungen zurückziehen und stattdessen versuchen, die Herausforderung eigenständig zu bewältigen. Frühere Studien zeigen, dass Wohlstand Eigenständigkeit begünstigt und dass Umweltunvorhersehbarkeit sowie Ressourcenunsicherheit kooperatives Verhalten fördern können. Allerdings ist bislang wenig darüber bekannt, wie ökonomische Mobilität – die wahrgenommene Möglichkeit, auf der Wohlstandsskala auf- oder abzusteigen – Entscheidungen zwischen Kooperation und Eigenständigkeit beeinflusst. Die vorliegende Studie verwendete ein Within-Participants-Design mit zwei Faktoren: Ressourcenmenge (arm vs. reich) und ökonomische Mobilität (keine Mobilität vs. Mobilität), um deren Einfluss auf Beiträge zur kollektiven Lösung, zur eigenständigen Lösung und auf das Behalten von Ressourcen zu untersuchen. Die Ergebnisse zeigen, dass Individuen mit höherer Ressourcenzuweisung („reiche“ Personen) absolut gesehen mehr in jede der drei Optionen investieren als Personen mit geringeren Ressourcen („arme“ Personen). Betrachtet man jedoch die relativen Beiträge – also im Verhältnis zur jeweils verfügbaren Ressourcenmenge – tragen arme Personen in der Bedingung ohne ökonomische Mobilität mehr zur kollektiven Lösung bei als reiche Personen. Darüber hinaus unterstreichen die Befunde die Bedeutung der Unterscheidung zwischen auf- und absteigender Mobilität. Wenn Personen die Möglichkeit haben, auf der Wohlstandsskala aufzusteigen, investieren sie tendenziell mehr in eigenständige und weniger in kollektive Lösungen. Im Gegensatz dazu scheint das Risiko eines Abstiegs weder das kooperative noch das eigenständige Verhalten signifikant zu beeinflussen.

Schlüsselwörter: Kooperation, Eigenständigkeit, ökonomische Mobilität, Private-Public Goods Game

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Cooperation or Self-Reliance: The Role of Wealth and Economic Mobility

Humans are inherently social beings who have always relied on cooperation to survive and improve their lives. Throughout history, collaboration has been essential for meeting basic needs—such as providing food, building safe homes, protecting against threats, and fighting diseases. Today, prosocial behaviors, including cooperative efforts, remain crucial in addressing a range of existent challenges, such as climate change, pandemics, and antibiotic resistance (Böhm et al., 2022; Gross & Böhm, 2020). Prosocial behaviors are defined as actions that benefit others in situations involving interdependence between individuals, usually at personal costs (Thielmann et al., 2021). Such behavior can be observed across different social levels: from daily interpersonal exchanges that enhance the well-being of interpersonal relations (Le et al., 2018; Thielmann & Hilbig, 2015) to collective efforts regarding global challenges such as climate change (Alston, 2015; Marx & Weber, 2012).

In addition to solving shared problems, cooperation also plays a central role in creating and maintaining public goods, such as infrastructure, public transportation, healthcare, law enforcement, and education (Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020). These shared resources allow individuals access to services and benefits they could not easily achieve on their own (Boyd & Richerson, 2009; Kallhoff, 2014). Eventually, cooperation is essential to both addressing shared societal problems and ensuring access to public goods that improve quality of life for all.

Free-Riding

However, the provision of public goods presents a classic social dilemma. Public goods are characterized as both non-rival—meaning that one person's use of the resource does not reduce its availability to others—and non-excludable—meaning that, once the good is provided, no one can be excluded from using it (Kollock, 1998). Even those who did not help produce the public good have access to it (Dietz et al., 2003; Hardin, 1968; Ostrom, 2000). This creates a conflict between individual and collective interest: contributing benefits the whole group, but individuals might choose not to contribute while still enjoying the benefits provided by others. This behavior—known as free-riding—undermines cooperation and threatens the sustainability of public goods (Dietz et al., 2003; Fehr & Gaechter, 2002; Hardin, 1968). One definition of free-riding is "the action or practice of benefiting (or seeking to benefit) in some way from the effort, sacrifice, financial outlay, etc., of others, without making a similar contribution" (Fontaine, 2014, p. 361). Tax payments, for instance, support essential public services, yet all citizens benefit from these services equally—even those who do not contribute financially. Free-riders are "free-riding" on others' cooperative efforts (Gross & Böhm, 2020), which is comparable to using public services, such as public transport, without paying (Fontaine, 2014). When too many individuals act this way, public goods can collapse due to insufficient support (Fehr & Gaechter, 2002; Milinski et al., 2008). Importantly, free-riding may not only be motivated by greed but also by fear of being exploited if others fail to contribute (Gross et al., 2020). Thus, cooperation is fragile and can easily break down in the absence of mutual trust and commitment.

Self-Reliance

While free-riding poses a widely recognized threat to cooperation, it is not the only factor undermining collective efforts. In response to the challenges of maintaining cooperation in the presence of free-riding problems, societies increasingly develop individual solutions to shared problems (Gross & Böhm, 2020; Gross & De Dreu, 2019), such as private healthcare, transportation, or education systems. These private alternatives create excludable goods that do not rely on others' contributions (Gross & Böhm, 2020) and therefore avoid the free-rider problem and the potential breakdown of cooperation (Yamagishi, 1988).

Self-reliance refers to individuals having sufficient personal resources to address shared problems independently, without depending on the group or group cooperation (Gross et al., 2020). Although such individual solutions are introduced to compensate for the risk of cooperation failure, they paradoxically weaken the collective efforts even further, creating a "modern tragedy of the commons" (Gross & De Dreu, 2019). The availability of private or local (excludable) goods diminishes the provision of global (non-excludable) public goods due to inefficient allocation of resources to public goods (Aaldering & Böhm, 2019; Aaldering et al., 2018; Wit & Kerr, 2002).

Unlike free-riding, which is often driven by self-interest or greed, self-reliant behavior may come from pessimistic beliefs about others' willingness to cooperate or from a desire to avoid being exploited (Gross & De Dreu, 2019; Gross et al., 2020). In modern societies shaped by technological progress and market economies, cooperation may be viewed as a choice rather than a necessity (Gross & De Dreu, 2019). With economic changes, individualism and valuing independence are rising worldwide (Santos et al., 2017), often at the cost of successful cooperation (Gross & De Dreu, 2019).

Cooperation versus Self-Reliance

In modern societies, individuals often face a choice between public and private approaches to addressing collective challenges, such as choosing between public and private healthcare systems or public and private transportation. However, not all individuals are equally able to opt for self-reliant options, so self-reliance can lead to conflicts within groups on how shared problems should be addressed (Gross & De Dreu, 2019). Those with greater access to resources might often opt for private solutions rather than contributing to collective efforts that benefit the broader community. Research by Gross and Böhm (2020), Gross and De Dreu (2019), and Gross et al. (2020) has shown that the availability of individual solutions can significantly undermine cooperative behavior. The possibility of self-reliance reduces contributions to public goods and overall group welfare. This confirms that, when given the option, individuals tend to prefer local (excludable) goods over global (non-excludable) public goods, prioritizing self-interest over universal welfare (Gross et al., 2020).

Previous studies (Gross & Böhm, 2020; Gross et al., 2020) have demonstrated that self-reliance decreases the effective provision of public goods, particularly when group members differ in their ability to be self-reliant. Furthermore, they have found that this tendency toward individual solutions increases social inequality, especially when some members heavily depend on the collective solution while others do not. Gross and Böhm (2020) have further shown that groups are willing to restrict the availability of individual solutions in order to promote cooperation and reduce inequality. Eliminating individual solutions to shared problems enhances cooperation and decreases inequality—especially between group members with unequal capacities for self-reliance. However, their findings indicate that the willingness to restrict the availability of individual solutions reduces when individual solutions become more affordable, which confirms the findings of increased individualism in wealthier societies. It also suggests a connection between rising wealth inequality and a stronger preference for autonomy and personal freedom over communalism and interdependence (Gross & Böhm, 2020).

Private-Public Goods Game

Game theory offers a theoretical framework for analyzing decision-making in social contexts where outcomes depend on the choices of multiple individuals (Colman, 2003; Thielmann et al., 2021). Economic games build on this framework and serve as experimental tools to study social preferences and prosocial behavior under controlled conditions. These paradigms replicate essential aspects of real-life interdependence, where individuals' outcomes are shaped not only by their own actions but also by the decisions of others (Colman, 2003; Thielmann et al., 2021). A classic example is the public goods game, in which individuals can choose to cooperate or to free-ride on others' cooperative efforts.

The private-public goods game builds on the traditional public goods game by introducing an additional decision option: the ability for individuals to invest in a private solution to a shared problem (Gross & Böhm, 2020). This setting is designed to investigate decision-making in contexts involving a conflict between self-reliance and cooperation (Gross & Böhm, 2020). In private-public goods games, participants who are faced with a shared problem must decide how to allocate their resources toward a public solution, a private solution, and keeping resources for themselves. Successful problem resolution through public solution requires the group's combined contributions to reach a predefined public threshold and benefits all group members. Successful problem resolution through the private solution by reaching a predefined private threshold offers a solution for that certain individual, independent of the group (Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020). As a result, the private-public goods game can examine preferences for self-reliance versus cooperation. It provides a framework for understanding how individuals respond when faced with uncertainty about others' cooperative action and when given the opportunity to solve the problem on their own independently of the group (Gross & Böhm, 2020).

To examine how individuals make decisions when faced with a shared problem, previous research (Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020) has used the private-public goods games, in which participants choose between contributing to a collective solution (cooperation), an individual solution (self-reliance), or keeping resources for themselves (free-riding). A common way to illustrate this setup is through a flood scenario: imagine a village threatened by a flood. Villagers can collectively, by investing enough resources, build a dam that protects the entire village—including those who choose not to contribute. Alternatively, each villager can use their own resources to build a private dam around their own home. This situation presents a social dilemma, where individuals must decide between relying on mutual cooperation or solving the problem independently.

In order to solve the problem collectively, such as building a collective dam, the group must reach a collective threshold—to invest enough resources together in the collective solution to pay for the cost of the collective solution (c_c). In order to solve the problem individually, such as building a private dam, an individual has to reach the private threshold—to invest enough resources in the individual solution to pay for the cost of the individual solution (c_i). The cost of the collective solution is higher than the cost of the individual solution. While the collective solution saves all villagers from flooding, it is uncertain because it requires contributions from more villagers and is vulnerable to exploitation, since non-contributors can still enjoy the protection provided by others. Moreover, the availability of both individual and collective solutions increases the risk of cooperation failure. There is also no benefit to building both a dam around the whole village and a dam around one's own home, as a single dam already provides sufficient protection. However, it is important for every villager to either successfully reach an individual or for the group as a whole to reach the collective solution in order to protect their home (Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020).

For instance, in the study by Gross and De Dreu (2019), participants were organized into groups of four, and each was provided with 10 resource points (RPs) per round across ten rounds (totaling 100 RPs). In each round, participants had to decide how to distribute their RPs between a public (collective) pool, a private (individual) pool, and keeping resources for themselves. Successful resolution of the problem—either through reaching the public or the private threshold—meant that participants could keep any unused RPs. If neither solution was achieved, all remaining RPs were lost. After each round, feedback was given regarding the allocations of other group members and the accumulated totals in both the public and private pools.

The study was structured into five decision-making blocks, each with a fixed collective solution cost (c_c) of 160 RPs. This meant that a 40% contribution from each group member would be enough to reach the collective threshold. To manipulate the attractiveness of the individual versus collective solution, the cost of the individual solution (c_i) varied across blocks: 80, 70, 60, 50, or 40 RPs, resulting in different independence ratios calculated as $i = c_i / (c_c/n)$, resulting in values of 2.0, 1.75, 1.5, 1.25, and 1.0. A ratio of $i = 1$ indicated equal cost of individual and collective solutions, thereby reducing interdependence. In contrast, higher values of i meant greater relative costs for the individual solution, increasing the interdependence. The findings showed that as individual solutions became more economically attractive (i.e., lower i), participants were more likely to choose self-reliance over cooperation. When codependence was high ($i = 2$), about 80% of participants opted for the collective solution. In contrast, under conditions of minimal codependence ($i = 1$), 99% chose individual solutions. Notably, when i exceeded 1.7, groups on average shifted from individual to collective solutions. However, in situations of intermediate codependence, the presence of competing strategies often resulted in inefficient outcomes and cooperation failure (Gorss & De Dreu, 2019).

Gross et al. (2020) explored how differences in the capacity for self-reliance between group members affect cooperation in solving shared problems. Participants were placed into groups of four and had to collectively or individually reach a solution to avoid losing their monetary units (MU). In the asymmetry condition, half of the participants received 120 MU, while the others were given only 60 MU, simulating real-world inequalities in access to private solutions like healthcare or transportation. The cost of the collective solution (c_c) was set at 180 MU. The cost of the individual solution varied across rounds, manipulating participants' ability to reach the private threshold ($c_i = \infty$, 75, 65, 55, 45).

When the individual solution was unreachable ($c_i = \infty$), the collective solution was reached in 78% of the groups. However, when private and public thresholds were equivalent ($c_i = 45$), cooperation broke down—none of the symmetric groups (equal endowments) and only 26% of the asymmetric groups succeeded in solving the problem collectively (Gross et al., 2020). These findings revealed that making individual solutions accessible reduced group cooperation. Notably, the study also showed that self-reliant individuals, at least to some extent, tended to cooperate even though they did not have to. Still, the overall effect of self-reliance was a rise in wealth inequality and a decrease in collective actions, particularly when differences in group members' capacities were present (Gross et al., 2020).

Gross and Böhm (2020) also examined how unequal access to individual solutions affects the social dilemma between self-reliance and cooperation. In their study, the amount of available resources was manipulated to create within-group inequality. Each group consisted of five members—three “poorer” members who received 80 RPs and two “richer” members who received 130 RPs. The findings revealed that richer participants were more likely to invest in the individual solution and reached the individual threshold more frequently than poorer participants.

Resource Uncertainty

Research suggests that environmental risk—such as adversity or uncertainty—plays a significant role in shaping cooperative behavior. When conditions are tough or unpredictable, working together often becomes more helpful or even necessary. This has been found not only in humans but also in other species like animals and even plants (Andras et al., 2007). In the animal kingdom, one typical response to environmental variability, particularly in food supply, is resource storage. However, when food storage is not possible, in some group-living species cooperation develops as a better solution, such as food sharing and social exchange (Kameda et al., 2002). In human societies, environmental unpredictability similarly encourages cooperative behavior. Kameda et al. (2002) have demonstrated that uncertainty in resource acquisition activates sharing between individuals, for both those who get resources and those who do not. These findings show that individuals are more likely to share when outcomes are uncertain.

Andras et al. (2003) have further found that the frequency of cooperative behavior increases with environmental risk, while non-cooperation and cheating tend to decline. Under high-risk conditions—characterized by low or unstable resources—cooperation can become essential for survival. They have shown that this pattern appears not only in lab experiments but also in agent-based simulations, where cooperation happens more often in high-risk environments than in low-risk ones. Furthermore, they have found that cooperation can be increased due to the complexity of the environmental problem.

The link between risk and cooperation can also be seen outside of research, in real-life situations. The in-group solidarity increases when the group is under threat (Hogg, 1992). For example, during times of war, people often feel more united and willing to help each other. Andras et al. (2007) point out that such increases in cooperation may be driven by perceived threat and resource uncertainty. Interestingly, even perception of risk—without any actual change in objective danger—can promote cooperation, potentially increasing group cohesion without any material cost. Adversity increases subjectively perceived resource uncertainty, and uncertainty further increases cooperation (Andras et al., 2007). Overall, these findings suggest that people tend to rely more on others and cooperate more when the environment is uncertain or challenging. In such situations, acting together is often seen as the safest path forward.

Although previous research has examined how the availability of individual solutions (self-reliance) affects cooperation, as well as how environmental unpredictability and resource uncertainty shape cooperative behavior, little is known about how economic mobility—defined as the perceived ability of individuals to move up or down the economic ladder (Davidai & Gilovich, 2015)—influences individuals' choices between cooperation and self-reliance. This study aims to address this gap.

The Present Study

The present study investigates how individuals allocate resources between a collective solution, an individual solution, and keeping resources for themselves when faced with a shared problem, with a particular focus on the role of economic mobility. The research question guiding this study is: How does economic mobility impact people's preferences for self-reliance versus cooperation? Based on prior findings, the following hypotheses are proposed:

H1: When there is no economic mobility, individuals with lower endowments will contribute more to the collective solution compared to individuals with higher endowments.

H2: In cases of economic mobility, individuals with higher endowments will contribute more to the collective solution than in cases with no economic mobility.

Method

Design

This study aimed to investigate the effects of two independent variables—amount of resources and economic mobility—on the amount of resources invested in the public pool (collective solution), the amount of resources invested in the private pool (individual solution), and the amount of resources kept (free-riding), using a 2 (amount of resources: poor vs. rich) × 2 (economic mobility: no-mobility vs. mobility) within-participants design.

In the poor condition, participants received a total of 80 monetary units (MU). In the rich condition, participants received a total of 130 MU. In the no-mobility condition, the amount of resources remained constant across both decision rounds. In the mobility condition, participants were informed that there is a certain probability that the amount of resources would change in the second decision round. Every participant went through all conditions—first through the no-mobility condition, followed by the mobility condition. Within each economic mobility condition, the order of poor and rich conditions was randomized.

Hence, in total, each participant completed four experimental conditions: (a) poor, no-mobility; (b) rich, no-mobility; (c) poor, mobility; and (d) rich, mobility. In the "poor, no-mobility" condition, participants received 40 MU in each decision round, totaling 80 MU. In the "rich, no-mobility" condition, participants received 65 MU in each decision round, totaling 130 MU. In the "poor, mobility" condition, participants were given 40 MU in the first decision round and were informed that there was a 50% chance of receiving 40 MU in the second round and a 50% chance of receiving 65 MU in the second round. In the "rich, mobility" condition, participants were given 65 MU in the first decision round and were informed that there was a 25% chance of receiving 65 MU in the second round and a 75% chance of receiving 40 MU in the second round. In both conditions with mobility (“poor, mobility” and “rich, mobility”), participants went through two versions of the second decision round—one in which they imagined the amount of resources remained unchanged and one in which they imagined the amount of resources had changed.

The probabilities were chosen such that the expected total amount of resources available to the entire group was equivalent across both economic mobility conditions. In the no-mobility condition, the total amount of resources was $3 \times (40 + 40) + 2 \times (65 + 65) = 500$ MU. In the mobility condition, the expected total amount of resources was $3 \times [40 + (40 \times 0.50) + (65 \times 0.50)] + 2 \times [65 + (65 \times 0.25) + (40 \times 0.75)] = 500$ MU.

Participants

The requirements for participation were being at least 18 years of age and fluent in German, as the survey was conducted in German. The participants were recruited partly ad hoc (48.41%) and partly via the platform Prolific (https://www.prolific.com/; 51.59%). A target sample size of 100 participants was determined based on common standards in the field (e.g., Gross & Böhm, 2020; Gross & De Dreu, 2019). To prevent potential loss of statistical power due to missing data, the study was preregistered to recruit 130 participants. In total, 126 participants completed the study. Of these, one individual was excluded from the analysis because their legal age could not be determined. As a result, the final sample consisted of N = 125 participants.

Among the participants, 51 identified as women (40.8%), 71 as men (56.8%), 2 as non-binary (1.6%), and 1 as diverse (0.8%). The average age of the participants was 31.7 years (SD = 12.6), with ages ranging from 18 to 67 years. Regarding educational background, 47 participants (37.6%) reported holding a school-leaving certificate with eligibility to attend a university (Matura), 28 (22.4%) held a bachelor’s degree, and 36 (28.8%) held a master’s degree or diploma. The remaining participants reported either a school-leaving certificate without eligibility to attend a university (*n* = 11, 8.8%), a doctorate (*n* = 1, 0.8%), or other (*n* = 2, 1.6%).

Materials and Measures

Outcomes

To assess the dependent variables, participants were asked how many MU they wanted to invest in the following three options: (a) the collective solution, (b) the individual solution, and (c) to keep for themselves. In each round, participants were required to choose a whole number of MU—ranging from 0 to 40 or from 0 to 65—depending on the total amount available in that round to invest in each of the three options mentioned above. The sum of MU allocated across the three options had to equal exactly 40 or 65, respectively, corresponding to the total amount of MU available in that round.

Beliefs

Participants were asked to indicate how many MU they believed other group members, on average, invested in each of the three options (collective solution, individual solution, keeping resources) during the first round—once under the condition that the amount of MU would remain the same in the second round, and once under the condition that there was a possibility of a change in players' wealth in the second round. For poor group members, participants were instructed to allocate a whole number between 0 and 40 to each of the three options, ensuring that the total equaled exactly 40 MU. For rich group members, they were asked to do the same using values between 0 and 65, ensuring that the total added up to exactly 65 MU.

Demographic Information

Participants were asked to report their age (entered numerically in years), gender (female, male, non-binary, diverse, or other), and level of education (school-leaving certificate without eligibility to attend a university, school-leaving certificate with eligibility to attend a university [Matura], bachelor's degree, master's degree/diploma, doctorate, or other).

All survey items were mandatory, except for the item regarding participants' level of education.

Procedure

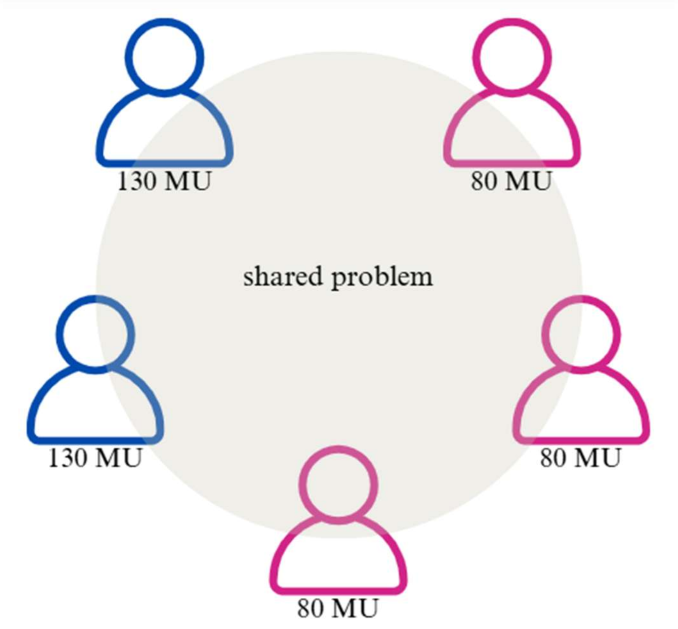
An online survey was developed using the Unipark survey software, and it could be completed on either a personal computer or a smartphone. Data collection took place over a one-month period, starting on December 16th, 2024, and ending on January 16th, 2025. The survey was estimated to take approximately ten to fifteen minutes to complete, with an average processing time of 11.35 minutes (SD = 5.48).

Participants were initially presented with informed consent. If they chose to proceed with the survey, they were then given game instructions. Participants were told that they would be assigned to a group of five individuals. They were informed that they would not receive any information about the identity of the other participants, nor would the other participants receive any information about them. All decisions made during the experiment would remain completely anonymous.

Participants were then introduced to the experimental task, in which their group of five members faced a shared problem that required a solution. They were informed that two of the five group members were classified as rich, each possessing 130 MU, while the remaining three members were classified as poor, each possessing 80 MU (see Figure 1).

Figure 1

Illustration of Group Members



Participants were presented with two possible ways to solve the problem:

1. Individual solution: Participants could solve the problem individually. This solution would apply only to them and would not benefit other group members. To do so, they had to invest 70 MU in the individual solution.

2. Collective solution: Participants could solve the problem collectively, which would resolve the problem for all group members. The collective solution required a total contribution of 200 MU from the group (corresponding to an average of 40 MU per person).

Participants were instructed that they could allocate their available MU across three options:

(a) investing in the individual solution,

(b) investing in the collective solution, and/or

(c) keeping MU for themselves.

It was emphasized that the problem could only be resolved if either the individual or the collective solution was achieved. If neither solution was reached, the participant would lose all of their MU. These rules applied equally to all group members.

The decision-making process took place over two rounds, with participants being able to access only part of their MU in each round. The total amount invested across both rounds was summed. To successfully solve the problem individually, a participant needed to contribute a total of 70 MU across both rounds. To achieve a collective solution, the entire group needed to invest a total of 200 MU across both rounds. Participants were not informed of how other group members allocated their MU.

The experiment consisted of four conditions (trials), in each of which participants were required to solve the problem either individually or collectively to avoid losing all MU in that trial. Participants were informed that it would be randomly determined before each trial whether they would be assigned the role of a poor group member or a rich group member. They were also informed that the rules would change slightly after the second trial and that the modified rules would be introduced before the third trial.

At the end of the instructions, participants were asked to confirm whether they had carefully read and understood the instructions and were given the option to either proceed or review the instructions again. This option to review the instructions was offered twice. If, after the third reading, a participant still said that they did not understand the instructions, the survey ended for them.

After the game instructions, participants initially entered the no-mobility condition. The order of the poor and rich conditions within the no-mobility condition was randomized. Of the participants, 55 (44%) entered the poor condition first, followed by the rich condition, while 70 participants (56%) entered the rich condition first, followed by the poor condition. In the rich condition, participants imagined that they were a rich group member with 65 MU in each decision round. In the poor condition, participants imagined that they were a poor group member with 40 MU in each decision round.

In both trials, before making a decision regarding allocation of their resources, participants were again presented with a brief version of the game instructions and a figure illustrating their current condition (see Figures 2 and 3). The instructions reminded them that MU had to be allocated across the individual solution, the collective solution, and keeping MU; that the contributions from both rounds would sum up; that the individual solution required 70 MU while the collective solution required 200 MU; and that failing to reach one of these thresholds meant losing all MU.

Figure 2

Illustration of the Condition "Poor, No-Mobility"

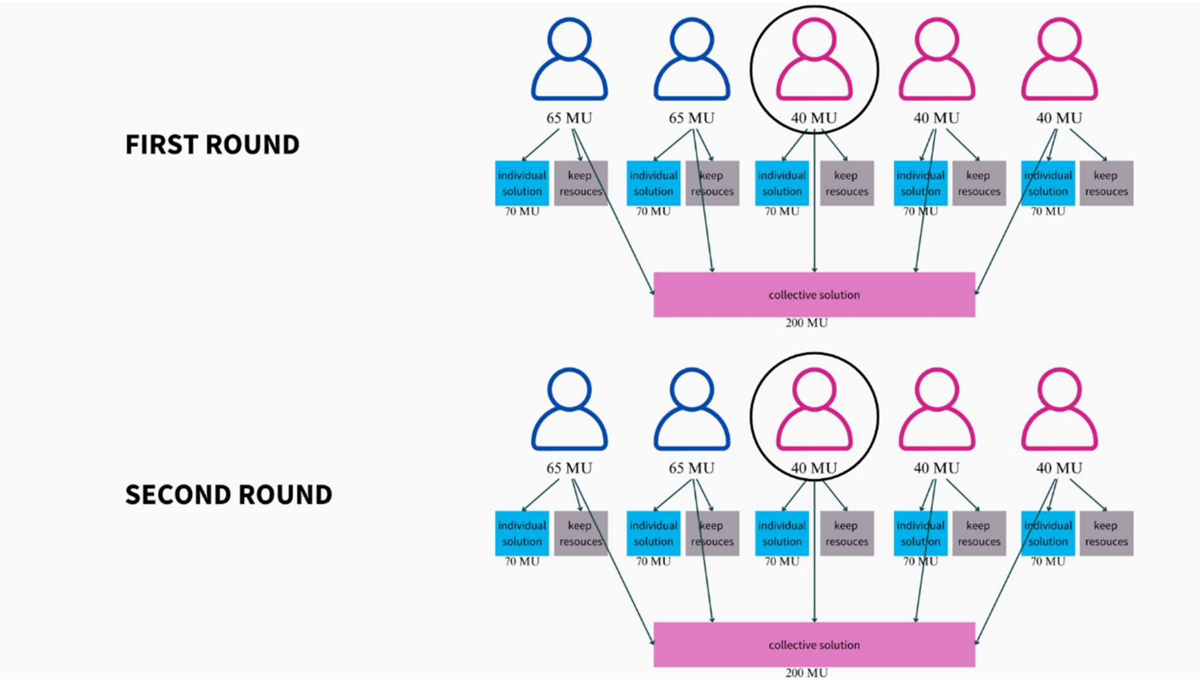
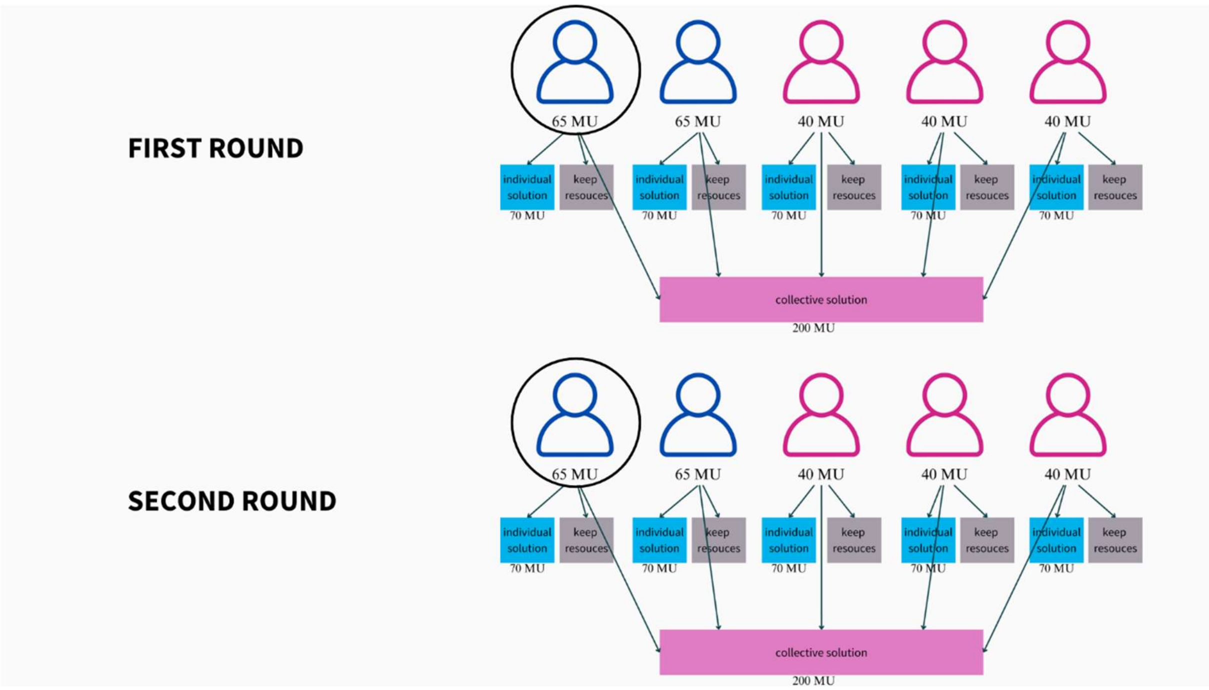


Figure 3

Illustration of the Condition "Rich, No-Mobility"



In each condition, after reviewing the instructions, participants proceeded to the first round, where they decided how to allocate their MU (40 in the poor condition, 65 in the rich condition) among the individual solution, the collective solution, and keeping MU. After the first round, participants moved to the second round, where they again decided how to allocate their MU (40 in the poor condition, 65 in the rich condition) across the three options. Participants had the option to return to the previous page to view how many MU they had already invested in each option and change their decision from the first round.

After making allocation decisions in both trials of the no-mobility condition, participants were asked to estimate how many MU other group members, on average, had invested in each of the three available options—the individual solution, the collective solution, and keeping resources—during the first round of decision-making. First, participants estimated how poor group members had allocated their 40 MU and then how rich group members had allocated their 65 MU. Participants were instructed that their estimates must sum to 40 MU for poor members and 65 MU for rich members, reflecting the total amount available to them in the first round.

Next, participants moved on to the mobility condition and were presented with modified rules. They were told that they would complete two more trials, again making allocation decisions across two rounds. In the second round, there would be a probability that the wealth status of group members would change. Specifically, group members who were poor in the first round had a 50% chance of becoming rich in the second round, while group members who were rich in the first round had a 75% chance of becoming poor in the second round. Participants were again informed that their initial classification as a poor or rich group member in the first round would be determined randomly.

The order of the poor and rich conditions within the mobility condition was randomized. Of the participants, 62 (49.6%) entered the poor condition first, followed by the rich condition, while 63 participants (50.4%) entered the rich condition first, followed by the poor condition. In the rich condition, participants imagined being a rich group member with 65 MU in the first decision round while having a 75% chance of becoming poor and having 40 MU in the second round and a 25% chance of staying rich with 65 MU in the second round. In the poor condition, participants imagined being a poor group member with 40 MU in the first decision round while having a 50% chance of becoming rich and having 65 MU in the second round and a 50% chance of staying poor with 40 MU in the second round.

In both trials, before making allocation decisions, participants were again presented with a brief version of the game instructions and a figure illustrating their current condition (see Figures 4 and 5). The instructions reminded them that MU had to be allocated across the individual solution, the collective solution, and keeping MU; that the contributions from both rounds would sum up; that the individual solution required 70 MU while the collective solution required 200 MU; and that failing to reach one of these thresholds meant losing all MU.

Figure 4

Illustration of Condition "Poor, Mobility"

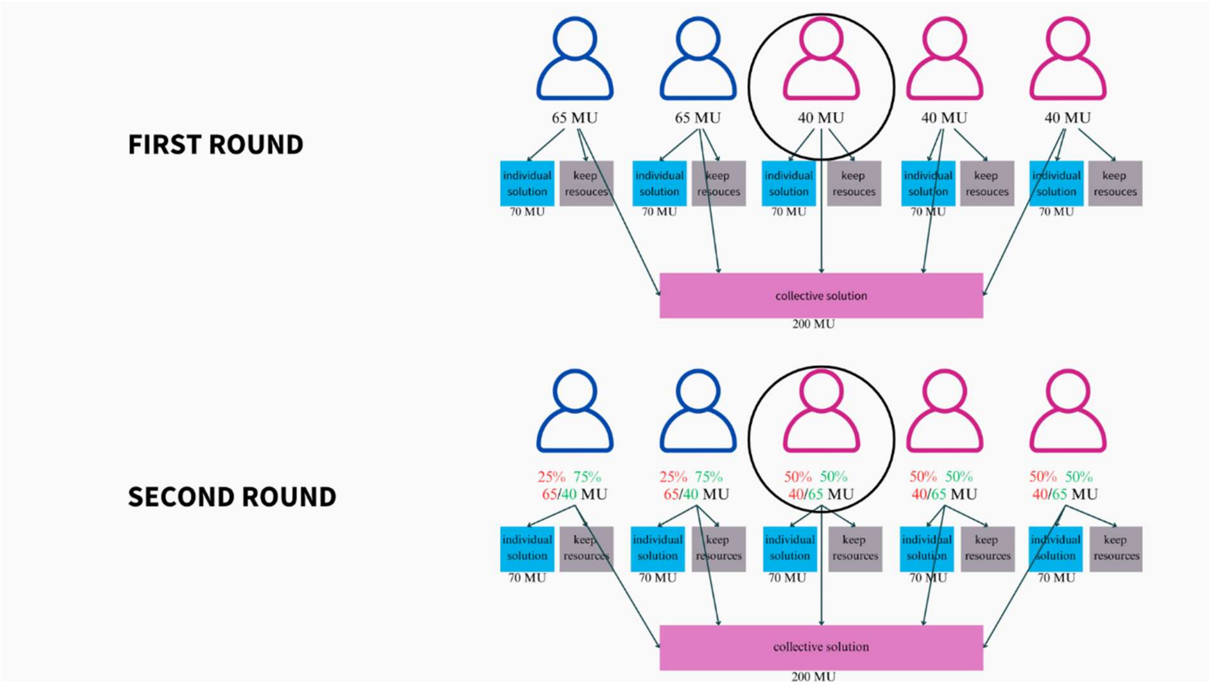
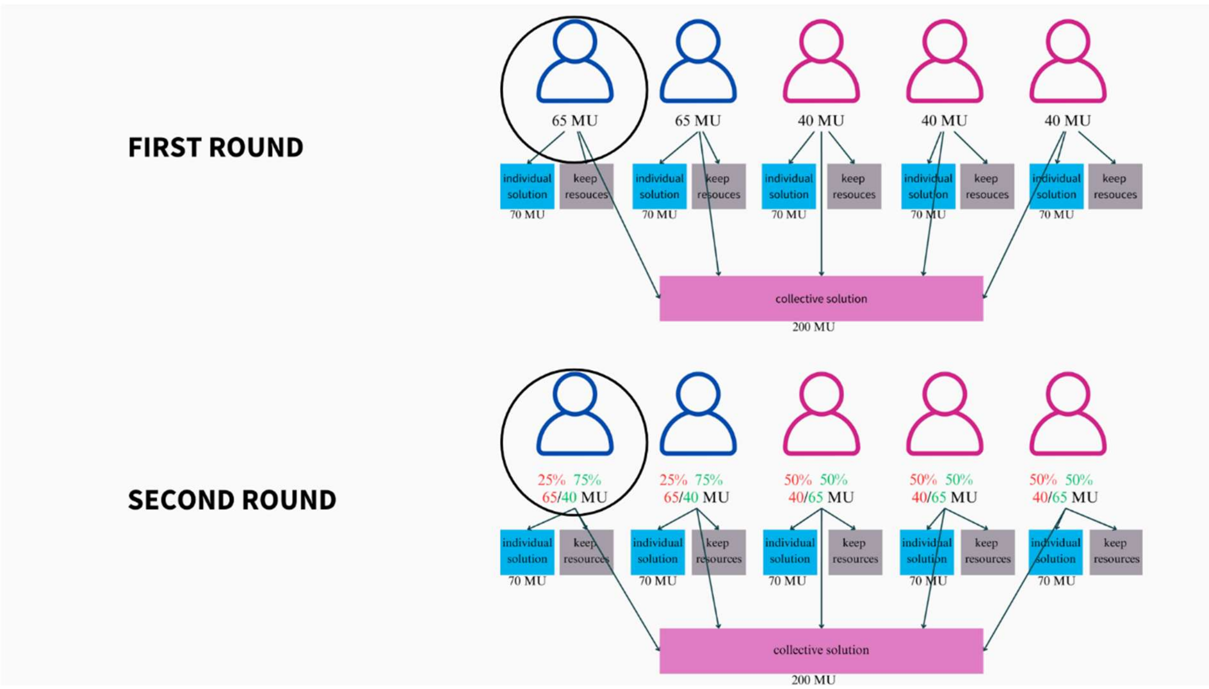


Figure 5

Illustration of Condition "Rich, Mobility"



In each condition, after reviewing the instructions, participants proceeded to the first round and decided how to allocate their MU (40 in the poor condition, 65 in the rich condition) among the individual solution, the collective solution, and keeping MU. After the first round, participants moved on to the second round. In the mobility condition, in both trials (as a poor and as a rich group member), participants went through two versions of the second decision round—one in which they imagined the amount of resources remained unchanged and one in which they imagined the amount of resources had changed. Participants had the option to return to the previous page to view how many MU they had already invested in each option and change their decision from the first round.

In the poor condition, 56 (44.8%) participants were presented with the version without change first and the version with change afterwards, whereas 69 (55.2%) participants were presented with the version with change first and the version without change afterwards. In the rich condition, 65 (52.0%) participants were presented with the version without change first and the version with change afterwards, whereas 60 (48.0%) participants were presented with the version with change first and the version without change afterwards.

After both trials in the mobility condition, participants were asked to estimate how many MU other group members, on average, had invested in each of the three options—the individual solution, the collective solution, and keeping resources—during the first round, assuming the possibility of a change in wealth status in the second round. First, participants were instructed to estimate how poor group members had allocated their 40 MU, followed by an estimation of how rich group members had allocated their 65 MU in the first round. Participants were instructed that their estimates must sum to 40 MU for poor group members and 65 MU for rich group members, reflecting the total amount available to them in the first round.

After completing the experimental task, participants were asked to provide demographic information, including their age, gender, and level of education.

Data Analysis

To test the two hypotheses presented, a 2 (amount of resources: poor vs. rich; within-participants factor) × 2 (economic mobility: no-mobility vs. mobility; within-participants factor) repeated measures analysis of variance (ANOVA) was conducted using the software programs jamovi and RStudio. Both independent variables—amount of resources and economic mobility—were treated as within-participants factors, as each participant was exposed to all conditions. For the confirmatory analysis, the absolute amount of MU invested in the collective solution during the first round functioned as the dependent variable. The significance level (α) was set at .05. It was preregistered that, in addition to the repeated measures ANOVA, a multilevel analysis using a random intercept model would be conducted, including both factors and their interaction as terms, with the amount of resources invested in the collective solution as the dependent variable. The results of the multilevel analysis yielded qualitatively identical results to those of the repeated measures ANOVA and can be found in the Appendix (Table 25).

In addition to the confirmatory analysis, a series of exploratory analyses were conducted using repeated measures ANOVAs, including the same two within-participants factors and the following dependent variables:

First round

(a) absolute amount of resources invested in the individual solution

(b) absolute amount of resources kept

(c) relative amount of resources invested in the collective solution

(d) relative amount of resources invested in the individual solution

(e) relative amount of resources kept

Second round (no change in resource amount)

(f) absolute amount of resources invested in the collective solution

(g) absolute amount of resources invested in the individual solution

(h) absolute amount of resources kept

(i) relative amount of resources invested in the collective solution

(j) relative amount of resources invested in the individual solution

(k) relative amount of resources kept

Total across rounds (no change in resource amount)

(l) absolute amount of resources invested in the collective solution

(m) absolute amount of resources invested in the individual solution

(n) absolute amount of resources kept

(o) relative amount of resources invested in the collective solution

(p) relative amount of resources invested in the individual solution

(q) relative amount of resources kept

Second round (with change in resource amount)

(r) relative amount of resources invested in the collective solution

(s) relative amount of resources invested in the individual solution

(t) relative amount of resources kept

Total across rounds (with change in resource amount)

(u) relative amount of resources invested in the collective solution

(v) relative amount of resources invested in the individual solution

(w) relative amount of resources kept

Beliefs about other members' contributions

(x) belief regarding investment in the collective solution

(y) belief regarding investment in the individual solution

(z) belief regarding resources kept

For analyses (c) to (e), relative contributions from the first round were calculated by dividing the absolute contributions from that round by the expected total resource amount. In the no-mobility condition, the total resource amount was 130 for rich players (65 + 65) and 80 for poor players (40 + 40). In the mobility condition, the expected total resource amount was 65 + (65 × 0.25) + (40 × 0.75) for rich players and 40 + (40 × 0.5) + (65 × 0.5) for poor players.

For analyses (i) to (k), relative contributions from the second round when the resource amount remained unchanged were calculated by dividing the absolute contributions from that round by the total available resource amount. In both mobility conditions, this was 130 (65 + 65) for rich players and 80 (40 + 40) for poor players.

For analyses (o) to (q), relative total contributions when the resource amount remained unchanged were calculated by dividing the absolute total contributions (i.e., from the first and the second round when the resource amount remained unchanged) by the total available resource amount. In both mobility conditions, this was 130 (65 + 65) for rich players and 80 (40 + 40) for poor players.

For the analyses (r) to (t), relative contributions from the second round when the resource amount changed were calculated by dividing the absolute contributions from that round by the total available resource amount. In the no-mobility condition, this amount was 130 for rich players and 80 for poor players. In the mobility condition, the total was 105 (65 + 40) for both rich and poor players.

For the analyses (u) to (w), relative total contributions when the resource amount changed were calculated by dividing the absolute total contributions (i.e., from the first round and the second round with a change in resource amount) by the total available resource amount. In the no-mobility condition, the total was 130 for rich players and 80 for poor players. In the mobility condition, the total was 105 (65 + 40) for both rich and poor players.

For each dependent variable, if the interaction between resource amount and economic mobility was significant, only the following pairwise comparisons were reported:

(a) rich participants’ contributions in the no-mobility condition vs. the mobility condition

(b) poor participants’ contributions in the no-mobility condition vs. the mobility condition

(c) rich vs. poor participants' contributions in the no-mobility condition

(d) rich vs. poor participants' contributions in the mobility condition.

The remaining two pairwise comparisons—rich participants in the no-mobility condition vs. poor participants in the mobility condition, and poor participants in the no-mobility condition vs. rich participants in the mobility condition—were not relevant and are therefore not reported.

Additionally, an exploratory multilevel analysis using a random intercept model was conducted to examine whether demographic variables (age, gender, and education) influenced the dependent variable used in the confirmatory analysis—that is, the absolute amount of resources invested in the collective solution during the first round. In this analysis, both factors (amount of resources and economic mobility) and their interaction, as well as the demographic variables, were included as predictors. Since some factor levels of gender and education did not include a sufficient number of participants ($n < 20$), these categories were excluded from the analysis. Specifically, the excluded levels were as follows: for gender, non-binary, diverse, and other; and for education, school-leaving certificate without eligibility to attend a university, doctorate, and other.

Regarding the assumptions of the repeated measures ANOVAs, all dependent variables were either measured on a numeric scale ranging from 0 to 40 or 0 to 65 or calculated as proportions to reflect percentages, thereby meeting the requirement of a metric scale level. The assumption of homogeneity of variances does not apply here, as no between-participants factors were included in the design. The assumption of sphericity was also met, as both within-participants factors consisted of only two levels. Although some deviations from normality were observed, these can be considered acceptable due to the robustness of ANOVA against violations of this assumption.

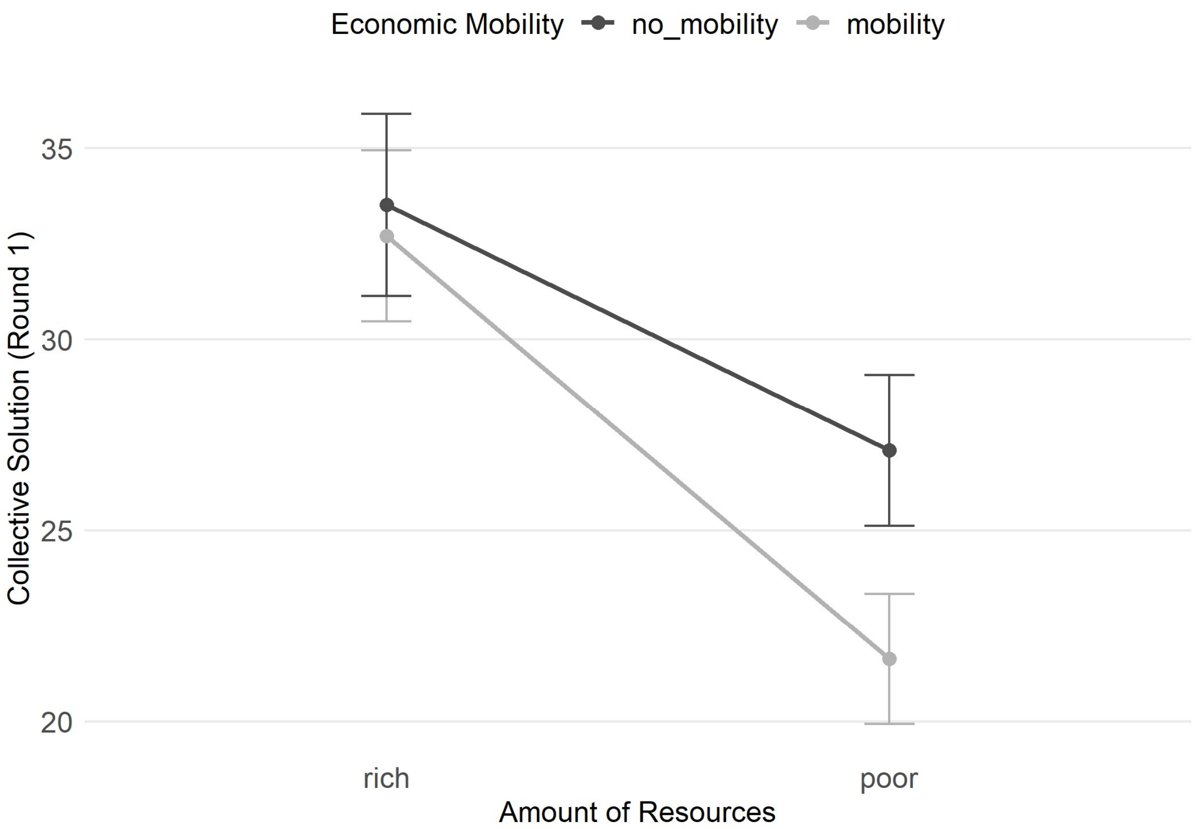
Results

Confirmatory Analysis

A 2 (amount of resources: poor vs. rich) × 2 (economic mobility: no-mobility vs. mobility) repeated measures ANOVA with resources invested in the collective solution in the first round as the outcome revealed a significant main effect of amount of resources ($F(1, 124) = 64.00$, $p < .001$, $\eta_p^2 = .34$), indicating that rich participants invested significantly more in the collective solution than poor participants ($M_{DIFF} = 8.74$, $SE = 1.09$). The main effect of economic mobility was also significant ($F(1, 124) = 8.74$, $p = .004$, $\eta_p^2 = .07$), showing that participants invested significantly more resources in the collective solution under the no-mobility condition than under the mobility condition ($M_{DIFF} = 3.14$, $SE = 1.06$). The interaction between the amount of resources and economic mobility was also significant ($F(1, 124) = 5.28$, $p = .023$, $\eta_p^2 = .04$). Bonferroni-corrected post-hoc comparisons revealed no significant difference between rich participants in the no-mobility and mobility conditions ($M_{DIFF} = 0.82$, $SE = 1.70$, $p_{bonf} = 1.00$). However, poor participants invested more resources in the collective solution under the no-mobility condition than under the mobility condition ($M_{DIFF} = 5.46$, $SE = 1.18$, $p_{bonf} < .001$). Additionally, rich participants invested significantly more in the collective solution than poor participants, both in the no-mobility condition ($M_{DIFF} = 6.42$, $SE = 1.59$, $p_{bonf} < .001$) and in the mobility condition ($M_{DIFF} = 11.06$, $SE = 1.38$, $p_{bonf} < .001$). The absolute investments in the collective solution from the first round as a function of resource amount and economic mobility can be seen in Figure 6.

Figure 6

Investments in the Collective Solution in the First Round as a Function of Resource Amount and Economic Mobility



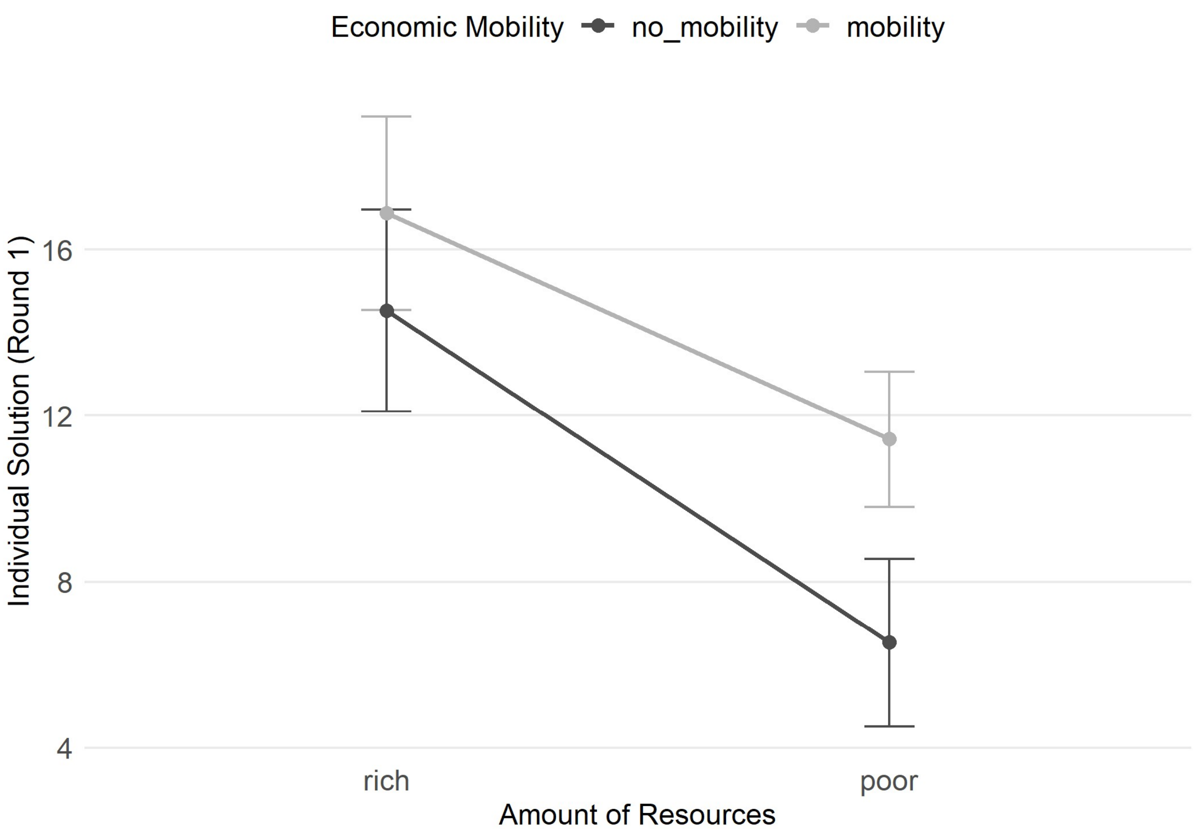
Note. Error bars represent 95% confidence intervals adjusted for within-participants variability (normalized error bars).

Exploratory Analyses

A 2 (amount of resources: poor vs. rich) × 2 (economic mobility: no-mobility vs. mobility) repeated measures ANOVA with resources invested in the individual solution in the first round as the outcome revealed a significant main effect of amount of resources (F(1, 124) = 36.88, $p < .001$, $\eta_p^2 = .23$), indicating that rich participants invested significantly more in the individual solution than poor participants ($M_{DIFF} = 6.72$, $SE = 1.11$). The main effect of economic mobility was also significant (F(1, 124) = 10.37, $p = .002$, $\eta_p^2 = .08$), showing that participants invested significantly fewer resources in the individual solution under the no-mobility condition than under the mobility condition (M_{DIFF} = -3.62, *SE* = 1.12). The interaction between the amount of resources and economic mobility was not significant ($F(1, 124) = 1.68$, $p = .197$, $\eta_p^2 = .01$). The absolute investments in the individual solution from the first round as a function of resource amount and economic mobility can be seen in Figure 7.

Figure 7

Investments in the Individual Solution in the First Round as a Function of Resource Amount and Economic Mobility

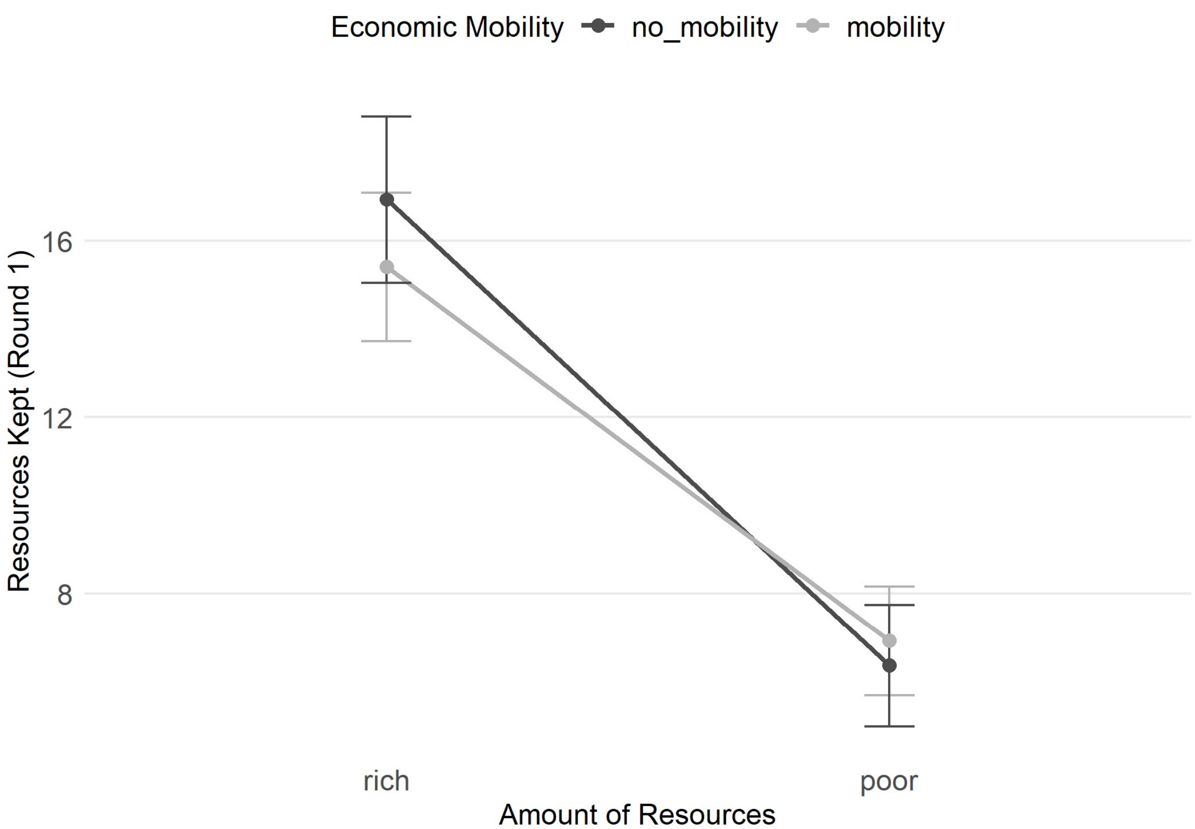


Note. Error bars represent 95% confidence intervals adjusted for within-participants variability (normalized error bars).

A 2 (amount of resources: poor vs. rich) × 2 (economic mobility: no-mobility vs. mobility) repeated measures ANOVA with resources kept in the first round as the outcome revealed a significant main effect of amount of resources (F(1, 124) = 119.76, p < .001, $\eta_p{}^2$ = .49), with rich participants keeping significantly more resources than poor ones (M_{DIFF} = 9.53, SE = 0.87). The main effect of economic mobility (F(1, 124) = 0.45, p = .504, $\eta_p{}^2$ = .00) and the interaction between the two factors (F(1, 124) = 1.82, p = .180, $\eta_p{}^2$ = .01) were not significant. The absolute amount of resources kept in the first round as a function of resource amount and economic mobility can be seen in Figure 8.

Figure 8

Resources Kept in the First Round as a Function of Resource Amount and Economic Mobility



Note. Error bars represent 95% confidence intervals adjusted for within-participants variability (normalized error bars).

A summary of the additional exploratory analyses is presented in the Appendix (Tables 1-24), corresponding to analyses (c) to (z) described in the Data Analysis section.

Exploratory analyses involving demographic variables (age, gender, and education) revealed no significant effects of these variables on absolute contributions to the collective solution in the first round. The overall pattern of results for the experimental factors and their interaction remained unchanged, indicating that demographic variables did not significantly influence the dependent variable (see Appendix Table 26).

Discussion

Cooperation is essential for addressing collective challenges and ensuring the provision of public goods. While free-riding has long been recognized as a central threat to cooperation, recent research has highlighted that self-reliance—where individuals solve shared problems independently—can also undermine collective efforts (Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020). This issue becomes especially relevant in contexts where private solutions are easily accessible, and cooperation shifts from being a necessity to a personal choice (Gross & De Dreu, 2019). Another important factor that may influence these decisions is economic mobility, defined as the perceived opportunity to move up or down the economic ladder (Davidai & Gilovich, 2015). The present study examined how individuals' resource endowment and the presence of economic mobility affect their preferences for cooperation versus self-reliance when facing a shared problem.

Both hypotheses formulated prior to the study were not supported by the results. The first hypothesis predicted that, within the no-mobility condition, individuals with lower endowments would contribute more to the collective solution than individuals with higher endowments. Contrary to this expectation, the findings revealed that individuals with higher endowments (i.e., rich participants) invested significantly more in the collective solution than those with lower endowments (i.e., poor participants) within the no-mobility condition. The second hypothesis assumed that individuals with higher endowments would contribute more to the collective solution in the mobility condition compared to the no-mobility condition. However, the results showed no significant difference in the contributions to the collective solution from individuals with higher endowments (i.e., rich individuals) between the two conditions. In summary, both hypotheses were rejected.

However, the hypothesis tests were based solely on the absolute investments in the collective solution in the first round. The results showed that individuals with higher endowments contributed more resources not only to the collective solution but also to the individual solution and to keeping resources, compared to individuals with lower endowments. Rich participants had more resources at their disposal, and they invested more in each of the available options. For this reason, the present study also examined relative contributions—i.e., contributions expressed as a percentage of the total amount available to each individual in a given trial.

Furthermore, it is important to note that participants were required to meet either the collective or individual threshold in each trial across both rounds. They were free to decide how to allocate their resources—whether by distributing them relatively evenly between the two rounds or by investing nearly all or all of their resources in the first round and little or nothing in the second, or vice versa. The hypotheses were tested based on the contributions made in the first round. In addition, the study conducted exploratory analyses of both absolute and relative contributions in the second round, as well as of absolute and relative total contributions across both rounds, under conditions in which the resource amount remained constant or changed in the second round. For conditions with a change in resource amount, only relative contributions were analyzed in order to ensure comparability between the no-mobility and mobility conditions. The results of exploratory analyses can be found in the Appendix (Tables 1-24) and are summarized in the following sections.

Investments in the Collective Solution

Regarding investments in the collective solution in the first round, rich individuals contributed more than poor individuals in absolute terms, both under the no-mobility and mobility conditions. However, the analysis of relative contributions revealed that, under the no-mobility condition, poor individuals invested a higher percentage of their available resources than rich individuals. In contrast, under the mobility condition, rich individuals invested a higher percentage of their available resources than poor individuals. This finding suggests that, in the absence of economic mobility, individuals with lower endowments contribute a higher percentage of their available resources to the collective solution—that is, they cooperate more relative to what they have—compared to individuals with higher endowments, even though the latter ultimately contribute more in absolute terms because they have more resources at their disposal. Furthermore, this finding indicates that when there is a chance of change in resource amount—representing a potential loss for rich individuals and a possible gain for poor individuals—rich individuals invest more in the collective solution relative to their available resources than poor individuals.

When the resource amount remained unchanged, rich individuals invested more in the collective solution than poor individuals in absolute terms—both in the second round overall (i.e., independently of the economic mobility condition) and in total across both rounds under both the no-mobility and mobility conditions. However, in relative terms, poor individuals invested more than rich individuals in the second round overall (i.e., independently of the economic mobility condition). In total across both rounds, poor individuals invested more than rich individuals in relative terms under the no-mobility condition; however, under the mobility condition, there was no difference in total relative contributions to the collective solution between rich and poor individuals.

Furthermore, when the resource amount remained unchanged, there was no significant difference in rich individuals’ absolute or relative investments in the collective solution between the no-mobility and mobility conditions in any of the rounds. This finding contradicts the second hypothesis, which predicted that individuals with higher endowments would contribute more to the collective solution under the mobility condition than under the no-mobility condition. In contrast, poor individuals contributed more under the no-mobility condition than under the mobility condition—both in the first round and across both rounds, in absolute as well as relative terms.

Overall, the findings regarding investments in the collective solution showed that there was either no difference between the no-mobility and mobility conditions or that participants invested less under the mobility condition compared to the no-mobility condition. These results contradict predictions based on previous literature (e.g., Andras et al., 2003; Kameda et al., 2002), which suggests that under conditions of resource uncertainty and unpredictability, individuals tend to cooperate more. Instead, the findings suggest that it is important to distinguish between "negative" and "positive" uncertainty. For poor individuals, uncertainty implies the possibility of gaining more resources than they currently have (i.e., upward mobility), and under this positive uncertainty, they tend to cooperate less. However, the results suggest that rich individuals do not significantly change their cooperative behavior when faced with negative uncertainty—namely, the risk of having fewer resources in the future than they currently possess (i.e., downward mobility).

In the second round of the mobility condition, when the resource amount changed, individuals who were previously poor and now had more resources contributed more to the collective solution than those who were previously rich and now had fewer resources. However, when considering total relative contributions across both rounds in the mobility condition, no significant difference was observed between previously poor and previously rich individuals. Furthermore, it was shown that rich individuals contributed more to the collective solution in relative terms under the no-mobility condition than under the mobility condition in the second round when the resource amount changed. Yet, across both rounds, there was no significant difference in their relative contributions between the two conditions. In contrast, poor individuals showed no significant difference between the no-mobility and mobility conditions in the second round when the resource amount changed. Yet, across both rounds, they contributed more to the collective solution under the no-mobility condition than under the mobility condition in relative terms.

Investments in the Individual Solution

In the first round, rich individuals invested more resources in the individual solution than poor individuals, regardless of the economic mobility condition—both in absolute terms and relative to their total available resources. In the second round and across both rounds, under the no-mobility condition, rich individuals invested more than poor individuals, but only in absolute terms; no such differences were observed for relative contributions. Under the mobility condition, when the resource amount remained unchanged, there was no significant difference in either absolute or relative second-round investments between rich and poor individuals. However, across both rounds, rich individuals still contributed more than poor individuals in absolute terms (but not in relative terms) under the mobility condition when the resource amount remained unchanged.

The predictions based on previous studies (e.g., Gross & Böhm, 2020; Gross et al., 2020)—namely, that individuals with higher endowments are more likely to contribute to the private solution than those with lower endowments—were supported by the present findings in terms of absolute investments under the no-mobility condition. However, when extending the analysis to relative contributions and to conditions involving economic mobility, this pattern was no longer consistently observed.

In the first round, participants invested more resources in the individual solution under the mobility condition than under the no-mobility condition, regardless of their available resource amount—both in absolute and relative terms. Furthermore, when the resource amount remained unchanged, there was no significant difference in rich individuals’ contributions between the no-mobility and mobility conditions, either in the second round or across both rounds. In contrast, poor individuals invested more in the individual solution under the mobility condition than under the no-mobility condition—both in the second round and across both rounds, and in both absolute and relative terms, when the resource amount remained unchanged.

In contrast to the findings regarding investments in the collective solution, the results show that under conditions of upward mobility—that is, the possibility of gaining more resources—individuals tend to invest more in the individual solution. In summary, individuals appear to choose self-reliance more frequently and cooperation less frequently when there is a prospect of upward mobility. In contrast, individuals facing the risk of downward mobility do not show any significant change in their behavior toward the individual solution, just as they do not significantly change their contributions to the collective solution in response to the possibility of negative change.

In the second round under the mobility condition—when the resource amount changed—previously poor individuals (now with more resources) invested more than previously rich individuals (now with fewer resources) in the individual solution. However, there was no significant difference in total relative contributions between rich and poor individuals across both rounds. In the second round, when the resource amount changed, poor individuals contributed more to the individual solution in relative terms under the mobility condition than under the no-mobility condition. In contrast, rich individuals showed no difference in their relative second-round contributions between the two economic mobility conditions. Furthermore, across both rounds, participants invested more in the individual solution in relative terms under the mobility condition than under the no-mobility condition, regardless of their available resource amount.

In summary, the findings show that poor individuals tend to invest more in the collective solution under the no-mobility condition than under the mobility condition. In contrast, they are more likely to invest in the individual solution when upward mobility is possible, that is, under the mobility condition. However, no such differences were observed in the contributions of rich individuals between the no-mobility and mobility conditions. This raises an important question: Why does the possibility of upward mobility lead to a shift away from cooperation toward greater self-reliance among poor individuals, whereas the threat of downward mobility does not significantly affect the behavior of rich individuals? This pattern is particularly surprising given the asymmetry in the design of the game: rich individuals faced a 75% chance of downward mobility, while poor individuals had only a 50% chance of moving up. One might have expected stronger behavioral differences among rich individuals across conditions, given their higher likelihood of experiencing change. These findings suggest that positive uncertainty (the chance of upward mobility) may have a stronger motivational pull than negative uncertainty (the threat of loss), at least in the context of social dilemmas involving choices between cooperation and self-reliance. The possibility of improvement appears to promote self-reliant behavior, whereas the risk of loss does not necessarily promote cooperation.

Resources Kept

When the resource amount remained the same, rich individuals kept more resources than poor individuals in the first round, as well as across both rounds, regardless of the economic mobility condition—both in absolute terms and relative to the total amount of resources available. Furthermore, in the second round under the mobility condition, rich individuals kept more resources than poor ones—again, both in absolute and relative terms. However, in the second round under the no-mobility condition, rich individuals kept more resources than poor ones only in absolute terms, but not in relative terms.

There was no significant main effect of economic mobility on the amount of resources kept in any round when the resource amount remained unchanged—neither in absolute nor in relative terms. Furthermore, there were no significant differences in the amount of resources kept by rich individuals between the no-mobility and mobility conditions, nor in the resources kept by poor individuals between these two conditions.

Regarding resources kept when the resource amount changed, previously poor individuals (now with more resources) kept more resources than previously rich individuals (now with fewer resources) in the second round under the mobility condition. However, across both rounds in the mobility condition, there was no significant difference in the amount of resources kept by previously poor versus previously rich individuals. Furthermore, when the resource amount changed, rich individuals kept more resources in relative terms in the no-mobility condition than in the mobility condition in the second round. In contrast, poor individuals kept more resources in relative terms in the mobility condition than in the no-mobility condition. However, across both rounds, there was no significant difference in the relative amount of resources kept by rich individuals between the two conditions. In contrast, poor individuals kept more resources in relative terms under the mobility condition than under the no-mobility condition across both rounds.

Beliefs

Regarding beliefs about other group members' contributions, participants believed that rich group members would contribute more to all three options—the collective solution, the individual solution, and keeping resources. There were no significant differences between the no-mobility and mobility conditions in the amount participants believed other members would contribute, nor was there any interaction between resource amount and economic mobility for any of the three options—collective solution, individual solution, and keeping resources.

Beliefs about other group members' investments in the first round align with the average investment behavior in terms of available resource amount, as participants believed that rich members would contribute more than poor members to each of the three options. These beliefs were supported by the actual behavior: in absolute terms, rich individuals indeed invested more than poor individuals in all three options in the first round.

Strengths and Limitations

The present study employed a two-round design, but unlike other economic game designs with multiple decision rounds, it can be considered a one-shot decision scenario in the sense that participants received no feedback between rounds. In contrast to previous studies (e.g., Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020), participants did not receive any information after the first round about how other group members had distributed their resources. As a result, they had no insight into how others might allocate their resources across the available options. This lack of feedback made the collective solution a riskier choice, as its success depended on coordinated group behavior. In contrast, the individual solution represented a safer, more self-reliant option. As argued by Gross and De Dreu (2019), individualism should not be equated with selfishness but rather represents a distinct strategy that emerges when the need for reciprocity declines.

The experimental design—where feedback on others' contributions was absent—made the collective solution riskier than in previous studies (e.g., Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020), where participants could adapt their behavior based on feedback about group dynamics. This raises the question of whether the observed choices reflected genuine preferences for the collective versus individual solution or whether they reflected strategic behavior, as one strategy (investing in the individual solution) may have appeared more rational than the other (investing in the collective solution) under these conditions. However, the situation in which no information was available about other group members' contributions mirrors many real-world scenarios in which individuals must decide whether to cooperate or act self-reliantly without knowing in advance how cooperative others will be. For example, in organizational or team contexts, individuals deciding whether to take initiative on shared tasks often do so without knowing whether their colleagues will contribute equally. In such cases, cooperation carries inherent risk, and opting for a self-reliant strategy may appear safer or more rational. Thus, while the experimental design may have increased the uncertainty associated with the collective solution, it also reflects the reality of many everyday decisions in which information about others' cooperative behavior is limited or unavailable.

One important limitation of the present study is that participants' decisions had no real behavioral consequences, as the outcomes were purely hypothetical and not linked to behavior-contingent incentives. Unlike prior studies using economic games that provided real monetary outcomes to simulate real-world stakes (e.g., Gross & Böhm, 2020; Gross & De Dreu, 2019; Gross et al., 2020), the present design relied solely on imagined scenarios. The absence of real monetary consequences may limit the ecological validity of the findings, as participants might behave differently when their own resources are at stake. As Thielmann et al. (2021) argue, public goods games with real monetary outcomes directly reflect social preferences while reducing the risk of socially desirable responding.

Furthermore, the present study used the same distribution of endowments as Gross and Böhm (2020), with a majority of participants receiving a low endowment to reflect the right-skewed wealth distribution in society at large (Piketty & Saez, 2014; Scheffer et al., 2017). On the other hand, the experimental design involved groups of five, consisting of the participant and four additional imaginary group members. Thus, the success of cooperation—namely, the creation of a collective solution—depended on the combined contributions of only five individuals. In contrast, real-world collective problems typically involve substantially larger groups. In such contexts, the impact of individual solutions is relatively smaller, and the success of the collective solution is less vulnerable to the actions of self-reliant individuals or free-riders. For instance, in systems like public healthcare or taxation, the large number of contributors helps to buffer the effects of non-cooperators, thereby making collective solutions more robust.

Although the research question suggests an investigation into how economic mobility influences individuals' decisions between self-reliance and cooperation, the present study did not directly examine contributions to the collective solution in relation to contributions to the individual solution, or vice versa. Instead, the three contribution options—investments in the collective solution, the individual solution, and resources kept—were analyzed separately as a function of economic mobility and resource amount. While this approach provides valuable insights into how each option is influenced by these factors in a context where individuals must allocate their resources between cooperation, self-reliance, and keeping resources, it does not allow for direct comparisons between the options or for assessing trade-offs between cooperative and self-reliant strategies.

The present study employed a within-participants design, which offers several advantages, such as increased statistical power relative to sample size and better control for individual differences. However, it also comes with certain limitations, including potential order effects, carryover effects, and practice effects. In the present study, the order of the rich and poor conditions was randomized to prevent order effects. However, the order of the no-mobility and mobility conditions was not randomized: the no-mobility condition always preceded the mobility condition. Moreover, participants were informed from the beginning that the group would consist of both rich and poor members with varying amounts of resources and that their assignment as a rich or poor member would be randomized in each trial. However, participants were not informed in advance that a mobility condition would follow, in which the distribution of resources could change. It is possible that participants were cognitively prepared for how to behave as rich and as poor group members, but the introduction of the mobility condition came as a surprise. As a result, they may have attempted to behave consistently, that is, in a manner similar to how they behaved in the no-mobility condition. Moreover, the present study, using a within-participants design, was able to replicate the findings of Gross et al. (2020) and Gross and Böhm (2020), which were based on a between-participants design.

The dependent variables were always assessed in the same order—in each round of each trial, participants were first asked how many of their MU they wanted to invest in the individual solution, then in the collective solution, and finally how many they wanted to keep for themselves. While this fixed order may represent a limitation due to potential order effects, it was chosen deliberately to avoid participant confusion.

Future Research

Building on the limitations discussed above, future research could adopt several strategies to improve the understanding of how economic mobility influences decisions between cooperation and self-reliance. First, to capture trade-offs between cooperation and self-reliance, future studies should examine contributions to the collective and individual solutions as interdependent choices, rather than analyzing them separately. Second, while the present study used small hypothetical groups of five individuals, future research could explore how group size affects cooperation under conditions of economic mobility. Larger group sizes would better reflect real-world collective action problems and may reduce the perceived risk associated with the collective solution. Third, future studies should randomize the order of economic mobility conditions to better control for potential order and carryover effects. Additionally, when manipulating multiple factors—such as economic mobility and resource amount—it would be recommended to either inform participants about both factors from the beginning or introduce both unexpectedly. This would ensure a more consistent cognitive framing and avoid potential bias due to asymmetric expectations. Furthermore, future research should use incentivized designs to better capture real-world decision-making dynamics.

Finally, an important point for future research involves clarifying the asymmetry observed between the effects of upward and downward mobility. In the present study, upward mobility appeared to have a stronger influence on resource allocation decisions than downward mobility—even though the likelihood of downward mobility (75% for rich individuals) was higher than that of upward mobility (50% for poor individuals). Future research should investigate whether this pattern persists under alternative game designs. For instance, the probabilities could be manipulated so that upward and downward mobility are equally likely or even assign a higher likelihood to upward mobility. Additionally, qualitative approaches could offer valuable insights into how individuals interpret upward versus downward mobility and how it shapes their preferences for cooperative versus self-reliant behavior.

Conclusion

The present study aimed to examine how economic mobility influences individuals' preferences for self-reliance versus cooperation. The findings highlight a distinction between upward and downward economic mobility: When upward mobility is possible, individuals tend to reduce cooperative strategies and show a stronger preference for self-reliance. In contrast, the risk of downward mobility does not appear to substantially affect cooperative or self-reliant strategies, challenging assumptions from prior research that unpredictability or negative uncertainty necessarily promotes cooperation. Future research should further investigate how opportunities to move up the economic ladder versus threats of moving down shape cooperative and self-reliant behavior in social dilemmas.

Furthermore, the study emphasizes the importance of distinguishing between absolute and relative measures of cooperation. While wealthier individuals contribute more to collective solutions in absolute terms, poorer individuals contribute a larger proportion of their available resources. This suggests that conclusions about who is "more cooperative" depend on whether contributions are assessed in absolute terms or relative to individuals' total endowments.

Artificial Intelligence and Open Science Statement

The author of this thesis declares the use of artificial intelligence tools. Specifically, ChatGPT was used for rephrasing, translating content between English and German, and generating R-codes. Additionally, Scribbr was used for proofreading and generating references.

This study was preregistered on November 26th, 2024, on the platform AsPredicted and is accessible via the following link: aspredicted.org/w5fh-cq4w.pdf. This study was approved by the Departmental Review Board of the Department of Occupational, Economic and Social Psychology of University of Vienna on November 27th, 2024 (No. 2024/W/022). The preregistration, English translation of the game instructions, dataset, and analysis code are available on the Open Science Framework at https://osf.io/76wnt/.

References

Aaldering, H., & Böhm, R. (2019). Parochial Versus Universal Cooperation: Introducing a Novel Economic Game of Within- and Between-Group Interaction. *Social Psychological And Personality Science*, *11*(1), 36–45. https://doi.org/10.1177/1948550619841627

Aaldering, H., Velden, F. S. T., Van Kleef, G. A., & De Dreu, C. K. W. (2018). Parochial cooperation in nested intergroup dilemmas is reduced when it harms out-groups. *Journal Of Personality And Social Psychology*, *114*(6), 909–923. https://doi.org/10.1037/pspi0000125

Alston, M. (2015). Social work, climate change and global cooperation. *International Social Work, 58*(3), 355–363. https://doi.org/10.1177/0020872814556824

Andras, P., Lazarus, J., & Roberts, G. (2007). Environmental adversity and uncertainty favour cooperation. *BMC Evolutionary Biology*, *7*(1), 240. https://doi.org/10.1186/1471-2148-7-240

Andras, P., Roberts, G., & Lazarus, J. (2003). Environmental Risk, Cooperation, and Communication Complexity. In *Lecture notes in computer science* (S. 49–65). https://doi.org/10.1007/3-540-44826-8_4

Boyd, R., & Richerson, P. J. (2009). Culture and the evolution of human cooperation. *Philosophical Transactions Of The Royal Society B Biological Sciences*, *364*(1533), 3281–3288. https://doi.org/10.1098/rstb.2009.0134

Böhm, R., Holtmann-Klenner, C., Korn, L., Santana, A. P. & Betsch, C. (2022). Behavioral determinants of antibiotic resistance: The role of social information. *Applied Psychology Health And Well-Being*, *14*(3), 757–775. https://doi.org/10.1111/aphw.12345

Colman A. M. (2003). Cooperation, psychological game theory, and limitations of rationality in social interaction. *The Behavioral and brain sciences*, *26*(2), 139–198. https://doi.org/10.1017/s0140525x03000050

Davidai, S., & Gilovich, T. (2015). Building a More Mobile America—One Income Quintile at a Time. Perspectives on Psychological Science, 10(1), 60-71. https://doi org.uaccess.univie.ac.at/10.1177/1745691614562005

Dietz, T., Ostrom, E., & Stern, P. C. (2003). The Struggle to Govern the Commons. *Science*, *302*(5652), 1907–1912. https://doi.org/10.1126/science.1091015

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, *415*(6868), 137–140. https://doi.org/10.1038/415137a

Fontaine, P. (2014). FREE RIDING. *Journal Of The History Of Economic Thought*, *36*(3), 359–376. https://doi.org/10.1017/s1053837214000376

Gross, J., & Böhm, R. (2020). Voluntary restrictions on self-reliance increase cooperation and mitigate wealth inequality. *Proceedings of the National Academy of Sciences of the United States of America*, *117*(46), 29202–29211. https://doi.org/10.1073/pnas.2013744117

Gross, J., & De Dreu, C. K. W. (2019). Individual solutions to shared problems create a modern tragedy of the commons. *Science advances*, *5*(4), eaau7296. https://doi.org/10.1126/sciadv.aau7296

Gross, J., Veistola, S., De Dreu, C. K. W., & Van Dijk, E. (2020). Self-reliance crowds out group cooperation and increases wealth inequality. *Nature communications*, *11*(1), 5161. https://doi.org/10.1038/s41467-020-18896-6

Hardin, G. (1968). The Tragedy of the Commons. *Science*, *162*(3859), 1243–1248. https://doi.org/10.1126/science.162.3859.1243

Hogg, M. A. (1992). *The Social Psychology of Group Cohesiveness: From Attraction to Social Identity*. https://ci.nii.ac.jp/ncid/BA20766095

Kallhoff, A. (2014). Why societies need public goods. *Critical Review Of International Social And Political Philosophy*, *17*(6), 635–651. https://doi.org/10.1080/13698230.2014.904539

Kameda, T., Takezawa, M., Tindale, R. S., & Smith, C. M. (2002). Social sharing and risk reduction: Exploring a computational algorithm for the psychology of windfall gains. *Evolution and Human Behavior, 23*(1), 11–33. https://doi.org/10.1016/S1090-5138(01)00086-1

Kollock, P. (1998). Social dilemmas: The anatomy of cooperation. *Annual Review of Sociology, 24*, 183–214. https://doi.org/10.1146/annurev.soc.24.1.183

Le, B. M., Impett, E. A., Lemay, E. P., Jr., Muise, A., & Tskhay, K. O. (2018). Communal motivation and well-being in interpersonal relationships: An integrative review and meta-analysis. *Psychological Bulletin, 144*(1), 1–25. https://doi.org/10.1037/bul0000133

Marx, S. M., & Weber, E. U. (2012). Decision making under climate uncertainty: The power of understanding judgment and decision processes. *Climate change in the Great Lakes region: Navigating an uncertain future*. Michigan State University Press.

Milinski, M., Sommerfeld, R. D., Krambeck, H., Reed, F. A., & Marotzke, J. (2008). The collective-risk social dilemma and the prevention of simulated dangerous climate change. *Proceedings Of The National Academy Of Sciences*, *105*(7), 2291–2294. https://doi.org/10.1073/pnas.0709546105

Ostrom, E. (2000). Collective Action and the Evolution of Social Norms. *The Journal Of Economic Perspectives*, *14*(3), 137–158. https://doi.org/10.1257/jep.14.3.137

Piketty, T., & Saez, E. (2014). Inequality in the long run. *Science (New York, N.Y.)*, *344*(6186), 838–843. https://doi.org/10.1126/science.1251936

Santos, H. C., Varnum, M. E. W., & Grossmann, I. (2017). Global increases in individualism. *Psychological Science*, *28*(9), 1228–1239. https://doi.org/10.1177/0956797617700622

Scheffer, M., Van Bavel, B., Van De Leemput, I. A. & Van Nes, E. H. (2017). Inequality in nature and society. *Proceedings Of The National Academy Of Sciences*, *114*(50), 13154–13157. https://doi.org/10.1073/pnas.1706412114

Thielmann, I., Böhm, R., Ott, M., & Hilbig, B. E. (2021). Economic Games: An Introduction and Guide for Research. *Collabra: Psychology*, *7*(1). https://doi.org/10.1525/collabra.19004

Thielmann, I., & Hilbig, B. E. (2015). Trust: An integrative review from a person-situation perspective. *Review of General Psychology, 19*(3), 249–277. https://doi.org/10.1037/gpr0000046

Wit, A. P., & Kerr, N. L. (2002). „Me versus just us versus us all“ categorization and cooperation in nested social dilemmas. *Journal Of Personality And Social Psychology*, *83*(3), 616–637. https://doi.org/10.1037/0022-3514.83.3.616

Yamagishi, T. (1988). Exit from the group as an individualistic solution to the free rider problem in the United States and Japan. *Journal Of Experimental Social Psychology*, *24*(6), 530–542. https://doi.org/10.1016/0022-1031(88)90051-0

Appendix

Table 1

Results of the Repeated Measures ANOVA on Relative Investments in the Collective Solution (First Round)

Effect	F(1, 124)	p	η_p^2	Post-hoc tests
Amount of resources	1.04	.309	.01	
Economic mobility	11.31**	.001	.08	no-mobility > mobility (M_{DIFF} = 0.03, SE = 0.01)
Interaction	54.00***	< .001	.30	rich, no-mobility vs. rich, mobility (M_{DIFF} = -0.04, SE = 0.01, p_{bonf} = .073) poor, no-mobility > poor, mobility (M_{DIFF} = 0.10, SE = 0.01, p_{bonf} < .001) rich, no-mobility < poor, no-mobility (M_{DIFF} = -0.08, SE = 0.01, p_{bonf} < .001) rich, mobility > poor, mobility (M_{DIFF} = 0.06, SE = 0.01, p_{bonf} < .001)

Note. **p < .01. ***p < .001

Table 2

Results of the Repeated Measures ANOVA on Relative Investments in the Individual Solution (First Round)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	9.84**	.002	.07	rich > poor (M_{DIFF} = 0.03, SE = 0.01)
Economic mobility	14.52***	< .001	.11	no-mobility < mobility (M_{DIFF} = -0.04, SE = 0.01)
Interaction	0.01	.915	.00	

Note. **$p < .01$. ***$p < .001$

Table 3

Results of the Repeated Measures ANOVA on Relative Amount of Resources Kept (First Round)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	52.01***	< .001	.30	rich > poor (M_{DIFF} = 0.06, SE = 0.01)
Economic mobility	0.07	.791	.00	
Interaction	0.81	.370	.01	

Note. ***$p < .001$

Table 4

Results of the Repeated Measures ANOVA on Absolute Investments in the Collective Solution (Second Round, Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	62.65***	< .001	.34	rich > poor (M_{DIFF} = 9.06, SE = 1.14)
Economic mobility	0.54	.462	.00	
Interaction	1.69	.196	.01	

Note. ***p < .001

Table 5

Results of the Repeated Measures ANOVA on Absolute Investments in the Individual Solution (Second Round, Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	12.77***	< .001	.09	rich > poor (M_{DIFF} = 3.99, SE = 1.12)
Economic mobility	0.04	.835	.00	
Interaction	10.35**	.002	.08	rich, no-mobility vs. rich, mobility (M_{DIFF} = 2.70, SE = 1.48, p_{bonf} = .426) poor, no-mobility < poor, mobility (M_{DIFF} = -3.07, SE = 1.01, p_{bonf} = .018) rich, no-mobility > poor, no-mobility (M_{DIFF} = 6.87, SE = 1.47, p_{bonf} < .001) rich, mobility vs. poor, mobility (M_{DIFF} = 1.10, SE = 1.39, p_{bonf} = 1.00)

Note. $^{**}p < .01$. $^{***}p < .001$

Table 6

Results of the Repeated Measures ANOVA on Absolute Amount of Resources Kept (Second Round, Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	103.19***	< .001	.45	rich > poor (M_{DIFF} = 12.0, SE = 1.18)
Economic mobility	0.41	.523	.00	
Interaction	5.26*	.023	.04	rich, no-mobility vs. rich, mobility (M_{DIFF} = -2.30, SE = 1.33, p_{bonf} = .513)
				poor, no-mobility vs. poor, mobility (M_{DIFF} = 1.20, SE = 0.94, p_{bonf} = 1.00)
				rich, no-mobility > poor, no-mobility (M_{DIFF} = 10.20, SE = 1.35, p_{bonf} < .001)
				rich, mobility > poor, mobility (M_{DIFF} = 13.70, SE = 1.45, p_{bonf} < .001)

Note. *p < .05. ***p < .001

Table 7

Results of the Repeated Measures ANOVA on Relative Investments in the Collective Solution (Second Round, Unchanged Resource Amount)

Effect	*F*(1, 124)	*p*	η_p^2	Post-hoc tests
Amount of resources	11.29**	.001	.08	rich < poor (M_{DIFF} = -0.03, *SE* = 0.01)
Economic mobility	1.12	.293	.01	
Interaction	2.53	.114	.02	

Note. ***p* < .01

Table 8

Results of the Repeated Measures ANOVA on Relative Investments in the Individual Solution (Second Round, Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	0.50	.479	.00	
Economic mobility	1.07	.303	.01	
Interaction	12.06***	< .001	.09	rich, no-mobility vs. rich, mobility (M_{DIFF} = 0.02, SE = 0.01, p_{bonf} = .426) poor, no-mobility < poor, mobility (M_{DIFF} = -0.04, SE = 0.01, p_{bonf} = .018) rich, no-mobility vs. poor, no-mobility (M_{DIFF} = 0.02, SE = 0.01, p_{bonf} = .538) rich, mobility vs. poor, mobility (M_{DIFF} = -0.04, SE = 0.01, p_{bonf} = .068)

Note. ***$p < .001$

Table 9

Results of the Repeated Measures ANOVA on Relative Amount of Resources Kept (Second Round, Unchanged Resource Amount)

Effect	*F*(1, 124)	*p*	η_p^2	Post-hoc tests
Amount of resources	18.69***	< .001	.13	rich > poor (M_{DIFF} = 0.04, *SE* = 0.01)
Economic mobility	0.03	.870	.00	
Interaction	5.05*	.026	.04	rich, no-mobility vs. rich, mobility (M_{DIFF} = -0.02, *SE* = 0.01, p_{bonf} = .513) poor, no-mobility vs. poor, mobility (M_{DIFF} = 0.02, *SE* = 0.01, p_{bonf} = 1.00) rich, no-mobility vs. poor, no-mobility (M_{DIFF} = 0.03, *SE* = 0.01, p_{bonf} = .197) rich, mobility > poor, mobility (M_{DIFF} = 0.06, *SE* = 0.01, p_{bonf} < .001)

Note. *p < .05. ***p < .001

Table 10

Results of the Repeated Measures ANOVA on Total Absolute Investments in the Collective Solution (Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	80.59***	< .001	.39	rich > poor (M_{DIFF} = 17.8, SE = 1.98)
Economic mobility	5.41*	.022	.04	no-mobility > mobility (M_{DIFF} = 3.88, SE = 1.67)
Interaction	5.57*	.020	.04	rich, no-mobility vs. rich, mobility (M_{DIFF} = 0.42, SE = 2.56, p_{bonf} = 1.00)
				poor, no-mobility > poor, mobility (M_{DIFF} = 7.33, SE = 1.81, p_{bonf} < .001)
				rich, no-mobility > poor, no-mobility (M_{DIFF} = 14.35, SE = 2.68, p_{bonf} < .001)
				rich, mobility > poor, mobility (M_{DIFF} = 21.26, SE = 2.23, p_{bonf} < .001)

Note. *p < .05. ***p < .001

Table 11

Results of the Repeated Measures ANOVA on Total Absolute Investments in the Individual Solution (Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	32.91***	< .001	.21	rich > poor (M_{DIFF} = 10.7, SE = 1.87)
Economic mobility	5.36*	.022	.04	no-mobility < mobility (M_{DIFF} = -3.81, SE = 1.64)
Interaction	6.49*	.012	.05	rich, no-mobility vs. rich, mobility (M_{DIFF} = 0.35, SE = 2.59, p_{bonf} = 1.00)
				poor, no-mobility < poor, mobility (M_{DIFF} = -7.97, SE = 2.00, p_{bonf} < .001)
				rich, no-mobility > poor, no-mobility (M_{DIFF} = 14.87, SE = 2.72, p_{bonf} < .001)
				rich, mobility > poor, mobility (M_{DIFF} = 6.55, SE = 2.22, p_{bonf} = .023)

Note. *p < .05. ***p < .001

Table 12

Results of the Repeated Measures ANOVA on Total Absolute Amount of Resources Kept (Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	150.27***	< .001	.55	rich > poor (M_{DIFF} = 21.5, SE = 1.75)
Economic mobility	0.00	.954	.00	
Interaction	0.44	.508	.00	

Note. ***p < .001

Table 13

Results of the Repeated Measures ANOVA on Total Relative Investments in the Collective Solution (Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	21.61***	< .001	.15	rich < poor (M_{DIFF} = -0.08, SE = 0.02)
Economic mobility	8.80**	.004	.07	no-mobility > mobility (M_{DIFF} = 0.05, SE = 0.02)
Interaction	10.04**	.002	.08	rich, no-mobility vs. rich, mobility (M_{DIFF} = 0.00, SE = 0.02, p_{bonf} = 1.00)
				poor, no-mobility > poor, mobility (M_{DIFF} = 0.09, SE = 0.02, p_{bonf} < .001)
				rich, no-mobility < poor, no-mobility (M_{DIFF} = -0.13, SE = 0.02, p_{bonf} < .001)
				rich, mobility vs. poor, mobility (M_{DIFF} = -0.04, SE = 0.02, p_{bonf} = .426)

Note. **p < .01. ***p < .001

Table 14

Results of the Repeated Measures ANOVA on Total Relative Investments in the Individual Solution (Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	0.00	.957	.00	
Economic mobility	9.10**	.003	.07	no-mobility < mobility (M_{DIFF} = -0.05, SE = 0.02)
Interaction	10.29**	.002	.08	rich, no-mobility vs. rich, mobility (M_{DIFF} = 0.00, SE = 0.02, p_{bonf} = 1.00) poor, no-mobility < poor, mobility (M_{DIFF} = -0.10, SE = 0.03, p_{bonf} < .001) rich, no-mobility vs. poor, no-mobility (M_{DIFF} = 0.05, SE = 0.02, p_{bonf} = .195) rich, mobility vs. poor, mobility (M_{DIFF} = -0.05, SE = 0.02, p_{bonf} = .191)

Note. **p < .01

Table 15

Results of the Repeated Measures ANOVA on Total Relative Amount of Resources Kept (Unchanged Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	31.49***	< .001	.20	rich > poor (M_{DIFF} = 0.08, SE = 0.01)
Economic mobility	0.01	.927	.00	
Interaction	0.50	.481	.00	

Note. ***p < .001

Table 16

Results of the Repeated Measures ANOVA on Relative Investments in the Collective Solution (Second Round, Changed Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	64.12***	< .001	.34	rich < poor (M_{DIFF} = -0.07, SE = 0.01)
Economic mobility	3.08	.082	.02	
Interaction	4.27*	.041	.03	rich, no-mobility > rich, mobility (M_{DIFF} = 0.04, SE = 0.01, p_{bonf} = .048) poor, no-mobility vs. poor, mobility (M_{DIFF} = -0.00, SE = 0.01, p_{bonf} = 1.00) rich, no-mobility < poor, no-mobility (M_{DIFF} = -0.05, SE = 0.01, p_{bonf} = .002) rich, mobility < poor, mobility (M_{DIFF} = -0.09, SE = 0.01, p_{bonf} < .001)

Note. *p < .05. ***p < .001

Table 17

Results of the Repeated Measures ANOVA on Relative Investments in the Individual Solution (Second Round, Changed Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	3.58	.061	.03	
Economic mobility	1.62	.206	.01	
Interaction	15.45***	$< .001$	.11	rich, no-mobility vs. rich, mobility ($M_{DIFF} = 0.03$, $SE = 0.01$, $p_{bonf} = .338$) poor, no-mobility < poor, mobility ($M_{DIFF} = -0.05$, $SE = 0.01$, $p_{bonf} = .002$) rich, no-mobility vs. poor, no-mobility ($M_{DIFF} = 0.02$, $SE = 0.01$, $p_{bonf} = .538$) rich, mobility < poor, mobility ($M_{DIFF} = -0.05$, $SE = 0.01$, $p_{bonf} < .001$)

Note. $^{***}p < .001$

Table 18

Results of the Repeated Measures ANOVA on Relative Amount of Resources Kept (Second Round, Changed Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	16.40***	< .001	.12	rich < poor (M_{DIFF} = -0.03, SE = 0.01)
Economic mobility	0.34	.559	.00	
Interaction	45.06***	< .001	.27	rich, no-mobility > rich, mobility (M_{DIFF} = 0.05, SE = 0.01, p_{bonf} < .001) poor, no-mobility < poor, mobility (M_{DIFF} = -0.06, SE = 0.01, p_{bonf} < .001) rich, no-mobility vs. poor, no-mobility (M_{DIFF} = 0.03, SE = 0.01, p_{bonf} = .197) rich, mobility < poor, mobility (M_{DIFF} = -0.09, SE = 0.01, p_{bonf} < .001)

Note. ***p < .001

Table 19

Results of the Repeated Measures ANOVA on Total Relative Investments in the Collective Solution (Changed Resource Amount)

Effect	$F(1, 124)$	p	$\eta_p{}^2$	Post-hoc tests
Amount of resources	16.11***	< .001	.12	rich < poor (M_{DIFF} = -0.06, SE = 0.01)
Economic mobility	12.44***	< .001	.09	no-mobility > mobility (M_{DIFF} = 0.06, SE = 0.02)
Interaction	19.46***	< .001	.14	rich, no-mobility vs. rich, mobility (M_{DIFF} = -0.01, SE = 0.02, p_{bonf} = 1.00) poor, no-mobility > poor, mobility (M_{DIFF} = 0.13, SE = 0.02, p_{bonf} < .001) rich, no-mobility < poor, no-mobility (M_{DIFF} = -0.13, SE = 0.02, p_{bonf} < .001) rich, mobility vs. poor, mobility (M_{DIFF} = 0.02, SE = 0.02, p_{bonf} = 1.00)

Note. ***p < .001

Table 20

Results of the Repeated Measures ANOVA on Total Relative Investments in the Individual Solution (Changed Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	3.27	.073	.03	
Economic mobility	9.68**	.002	.07	no-mobility < mobility (M_{DIFF} = -0.05, SE = 0.02)
Interaction	2.77	.098	.02	

Note. $^{**}p < .01$

Table 21

Results of the Repeated Measures ANOVA on Total Relative Amount of Resources Kept (Changed Resource Amount)

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	8.21**	.005	.06	rich > poor (M_{DIFF} = 0.03, SE = 0.01)
Economic mobility	0.34	.564	.00	
Interaction	12.16***	< .001	.09	rich, no-mobility vs. rich, mobility (M_{DIFF} = 0.04, SE = 0.02, p_{bonf} = .207) poor, no-mobility < poor, mobility (M_{DIFF} = -0.05, SE = 0.02, p_{bonf} = .018) rich, no-mobility > poor, no-mobility (M_{DIFF} = 0.08, SE = 0.02, p_{bonf} < .001) rich, mobility vs. poor, mobility (M_{DIFF} = -0.01, SE = 0.01, p_{bonf} = 1.00)

Note. $^{**}p < .01$. $^{***}p < .001$

Table 22

Results of the Repeated Measures ANOVA on Beliefs About Others' Investments in the Collective Solution

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	10.13**	.002	.08	rich > poor (M_{DIFF} = 3.86, SE = 1.21)
Economic mobility	0.32	.574	.00	
Interaction	2.90	.091	.02	

Note. **$p < .01$

Table 23

Results of the Repeated Measures ANOVA on Beliefs About Others' Investments in the Individual Solution

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	84.02***	< .001	.40	rich > poor (M_{DIFF} = 13.1, SE = 1.43)
Economic mobility	0.38	.538	.00	
Interaction	2.50	.117	.02	

Note. ***$p < .001$

Table 24

Results of the Repeated Measures ANOVA on Beliefs About Others' Amount of Resources Kept

Effect	$F(1, 124)$	p	η_p^2	Post-hoc tests
Amount of resources	71.25***	< .001	.37	rich > poor (M_{DIFF} = 8.08, SE = 0.96)
Economic mobility	0.04	.839	.00	
Interaction	0.09	.766	.00	

Note. ***p < .001

Table 25

Linear Mixed Model Predicting Collective Solution (Round 1) from Amount of Resources and Economic Mobility

Fixed Effects							
	Estimate	*SE*	95% CI LL	95% CI UL	*df*	*t*	*p*
Intercept	33.52	1.56	30.47	36.57	264.81	21.56	<.001***
Amount of resources	-6.42	1.49	-9.34	-3.50	372.00	-4.31	<.001***
Economic mobility	-0.82	1.49	-3.74	2.10	372.00	-0.55	.585
Amount of resources * Economic mobility	-4.64	2.11	-8.77	-0.51	372.00	-2.20	.029*

Random Effects		
	Variance	*SD*
Intercept (ID)	163.0	12.77
Residual	139.2	11.80

Model Fit		
R^2 (conditional)	R^2 (marginal)	ICC
.572	.071	.539

Post-hoc-test: Amount of Resources					
Contrast	Estimate	*SE*	*df*	*t*-ratio	*p*
rich - poor	8.74	1.06	372	8.29	< .001***
Post-hoc-test: Economic Mobility					
Contrast	Estimate	*SE*	*df*	*t*-ratio	*p*
no-mobility - mobility	3.14	1.06	372	2.97	.003**
Post-hoc-test: Amount of Resources * Economic Mobility					
Contrast	Estimate	*SE*	*df*	*t*-ratio	p_{bonf}
rich, no-mobility – rich, mobility	0.82	1.49	372	0.55	1.00
poor, no-mobility – poor, mobility	5.46	1.49	372	3.66	.002**
rich, no-mobility – poor, no-mobility	6.42	1.49	372	4.31	<.001***
rich, mobility – poor, mobility	11.06	1.49	372	7.41	<.001***

Note. *p*-values for fixed effects were calculated using Satterthwaite's approximation. Confidence intervals for fixed effects were calculated using the profile likelihood method. Model equation: Collective solution ~ Amount of resources × Economic mobility + (1 | ID). CI = confidence interval; LL = lower limit; UL = upper limit. *p < .05. **p < .01. ***p < .001

Table 26

Linear Mixed Model Predicting Collective Solution (Round 1) Including Demographic Variables

Fixed Effects							
	Estimate	*SE*	95% CI		*df*	*t*	*p*
			LL	UL			
Intercept	31.01	4.52	22.27	39.74	114.92	6.85	<.001***
Amount of resources	-5.58	1.64	-8.78	-2.37	324.00	-3.41	<.001***
Economic mobility	-0.61	1.64	-3.82	2.59	324.00	-0.38	.708
Age	0.09	0.14	-0.18	0.36	104.00	0.65	.520
Gender (male vs. female)	-2.64	2.81	-8.07	2.79	104.00	-0.94	.350
Education (Bachelor's vs. Matura)	1.84	3.48	-4.88	8.56	104.00	0.53	.598
Education (Master's vs. Matura)	-1.81	3.99	-9.51	5.88	104.00	-0.46	.650
Amount of resources* Economic mobility	-5.37	2.32	-9.90	-0.84	324.00	-2.32	.021*

Random effects		
	Variance	*SD*
Intercept (ID)	168.80	12.99
Residual	146.10	12.09
Model fit		
R^2 (conditional)	R^2 (marginal)	ICC
.570	.074	.536

Note. p-values for fixed effects were calculated using Satterthwaite's approximation. Confidence intervals for fixed effects were calculated using the profile likelihood method. Model equation: Collective solution ~ Amount of resources × Economic mobility + Age + Gender + Education + (1 | ID).

CI = confidence interval; LL = lower limit; UL = upper limit. *$p < .05$. ***$p < .001$