

The relationship between income inequality, group identification and cooperation in social dilemmas

Abstract

The present study examines the relationship between income inequality and group identification as well as the relationship between group identification and cooperation in social dilemmas. After looking at Social Identity Theory and Social Categorization Theory, as well as relative deprivation and the homophily principle, two hypotheses were formed. The first hypothesis predicts that people with a higher group identification cooperate more with their group in social dilemmas. The second hypothesis expects a more unequal income distribution in a group to be related to less group identification. Data of an experimental setting was used (N = 192). The experiment consisted of a version of the public goods game in which individuals were sorted into groups of three. Results of the study indicated that individuals who felt more closely related to their group were more inclined to cooperate in social dilemmas, furthermore, a negative relation between income inequality and group identification was found. These findings can be used in policy that focusses on getting individuals to cooperate, in situations such as the climate crisis or a global pandemic. After the results, suggestions for future research on this topic are proposed.

Keywords: *group identification, income inequality, cooperation, social dilemma*

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Introduction

In situations of social dilemma, individuals are confronted with a choice whether to cooperate in line with a common goal, which they can only reach by collectively cooperating, or if they want to go for personal gain, leading towards a collectively suboptimal outcome (Dawes & Messick, 2000). The importance of cooperation in social dilemmas is now ever so visible with environmental pollution, where all countries should focus a part of their resources on counteracting global warming, however, not all countries have the same outcome in doing so, as some countries produce more pollution and benefit more from it. This inequality can be a barrier for some countries to be able to do everything they should do to prevent further global warming. What is more, the global COVID-19 pandemic is also a good example of a social dilemma in which individuals have a choice. According to Kokudo and Sugiyama (2020), to contain this virus, individuals from all countries should choose for a personally suboptimal choice, to minimize social contact, which requires global cooperation. If not all individuals cooperate with the governmental plead to stay at home, people have a higher chance to get infected and keep spreading the virus, so it is in the interest of the common good to choose the personally suboptimal choice; to conform with the restrictions and regulations, instead of the choice that on the short term is more 'profitable' for individuals, because they must give in some freedom.

In keeping with the principle of homophily in groups (McPherson et al., 2001), it can be expected that people with the same amount of income would identify themselves more with each other. We see in the daily life that income is very unequally divided, yet it is necessary to be able to have all individuals, regardless of income difference, cooperating when facing a social dilemma of the common good. Having more knowledge on what the relationship is between an unequal distribution of goods and identification with a certain group, could help facilitate getting a fair amount of support of most people when facing a social dilemma, which needs to be solved. The theory of inequity aversion (Fehr & Schmidt, 1999) substantiates the idea that when people perceive a situation as unequal, they tend to show an aversion towards this, so this leaning towards a more equitable outcome in a public goods game, could then lead to more identification with a group, considering the homophily principle.

Several studies suggest that a factor that promotes cooperation in social dilemmas is group identification. Group identification is all around us; people belong to groups to which they identify to a certain extent, a so called 'in-group'. However, the mere knowledge of other

groups, 'out-groups' is sufficient to create competition and inter group discrimination, in which people tend to show favouritism towards their own in-group, because they identify more with their in-group (Tajfel et al., 1979). The favouritism for their in-group can create tension in societies in general, and in social dilemmas as well. Nonetheless, it could also be possible to use group identification to incite cooperation with a common goal, for example in protests, individuals tend to be more likely to join when they feel more closely related to the group (Klandermans, 2002).

An extensive amount of research has been conducted that examines cooperation and the different factors related to it, oftentimes they look at the relation with group identification, which plays an important role in achieving more cooperation in social dilemmas (e.g., Oceja, 2007; Fisher & Wakefield, 1998). The relationship of group identification and income inequality however has not been studied much. Smith et al. (2003) for example, did research the relationship between endowment differences and group identification, in combination with cooperation. Even though unequal endowment is different than inequality in income, as endowment looks at the number of resources individuals can contribute at the starting point in the game and inequality in income is about the number of resources individuals earn at the end of the game, it is interesting to see how inequality at both points in the game may influence group identification. Smith et al., (2003) found that, in line with social identity theory, people were more likely to cooperate in social dilemma when they identified themselves more with the group. Moreover, they looked at unequal endowment as predictor for group identification and found that men felt more related to the group with bigger endowment, whereas women felt more related to the group when they had a smaller endowment.

Multiple more studies researched inequality or heterogeneity in resources in situations of social dilemma (Buckley and Croson, 2006; Cardenas, 2007; Aksoy and Weesie, 2009) and found that people with lower endowment were more apt to contribute a higher percentage of their endowment than people with higher endowment, so they contributed relatively the most to the common good. Still, not many studies looked at the combination of group identification and inequality in income of the game. Aksoy (2019) did look at the combination of income inequality and cooperation, however, the relation between income inequality and group identification remains unstudied. Thus, it is important for the present study to look at the possible barrier that income inequality poses in the process how individuals identify with a group.

In this study the main question, how income inequality relates to group identification in situations of social dilemma and to what extent group identification relates to cooperation, will be tested using an experimental setting of a public goods game, for experimental settings can easily be manipulated to test how the exact factors relate to each other.

Theory

The public goods game is defined as a setting where people are placed into groups and can use different strategies in a social dilemma; people can choose to cooperate with the other player or to not cooperate. Players who do not cooperate, where the other does cooperate, are called free-riders (Fehr & Gächter, 2000) and they are often punished, leading to a suboptimal outcome for both players.

A stronger group identification has been found to inspire cooperation within groups (e.g., Brown et al., 2017; Turner, 1982). In a pertinent study, Brown et al. (2017) conducted an experiment where they compared groups with a high level of identification to groups where identification was low and how that relates to cooperation within groups. Results showed that higher identification with the in-group motivates more cooperation with the in-group than in conditions of low identification with the in-group.

These findings are consistent with the *Social Identity Theory* (SIT) proposed by Tajfel et al. (1979), which elaborates on how people belong to social groups, based on categories. In particular, people who share more of the same characteristics often feel more group identification with people in their group. This is also the case for characteristics such as level of income, so a more similar income level could influence the group identification of a group. Furthermore, this theory discusses in-group favouritism. This is the tendency of individuals to prefer the group they belong to, their in-group, over groups to which they do not belong, out-groups. Out-groups are often associated with negative stereotypes, which affects the way they perceive other groups and the likelihood to help those not belonging to their group. Hence, when people identify themselves with a certain group, they are more likely to help or cooperate with their in-group than with other groups.

A large volume of experimental studies has looked at unequal endowment in situations of cooperation, which found that inequality in resources leads to less cooperation than for

equally divided resources (e.g., Aksoy, 2019; Buckley & Croson, 2006) whereas the opposite result has also been found; that resource inequality promotes cooperation (e.g., Bergstrom et al., 1986; Chan et al., 1996). Because both positive and negative effects of resource inequality on cooperation have been found, this study proposes that resource inequality alone is not enough to predict cooperation in public goods game. As group identification has been found to encourage cooperation, this factor should be considered as well.

Aksoy (2019) tested the relationship between social identity and cooperation in social dilemmas. In line with SIT, he found that individuals who identify themselves with their group were more likely to cooperate in social dilemmas than people with a more heterogeneous identity, who thus feel less identification towards the same group.

Simpson (2006) tested the relationship between SIT and cooperation as well, but in a more refined manner; a so-called fear/greed approach. This approach looks at how fear for defection and wanting to optimize one's outcome, thus greed, play a role in social dilemmas. Simpson gives an insight into social dilemmas and public goods games because these emotions play a role in the cooperating or defecting behaviour that players show. Results of this study indicate that in cases of defective behaviour because of greed and not fear, identifying more with a group is a good solution in order to have individuals cooperate more.

Building forth on the social identity theory, Turner et al. (1987) describe a theory called the *Self-categorization theory* (SCT). These two theories are related to each other and together are often called the social identity approach. SCT focusses on how individuals categorize themselves into groups, based on their current social context. This context is constantly changing, meaning that individuals can categorize themselves into different groups at different moments. The choice whether to categorize oneself with a certain group depends on multiple factors: perceiver readiness, comparative fit and normative fit. In this study the focus lies on comparative fit, which is the degree that individuals compare certain aspects such as income. When they feel that this aspect is more relatable for them to a certain group than to another, they will be more likely to categorize themselves with the group that is relatively more similar to them. Individuals can especially identify themselves on a certain characteristic when they know little other factors that they can share with people.

According to SCT, people can ascribe themselves a collective identity or a personal identity. De Cremer and Van Vugt (1998) investigated via an experimental setting how people's

self-categorization relates to their behaviour in social dilemmas. Specifically, they investigated whether people would contribute more to the public good when identification with the collective was more salient than personal identity. The results of this study showed, in line with their expectations, that people were indeed more likely to have higher contributions towards the common good when the collective identity was made more salient than in the condition where the focus lied on a personal identity for the participants.

Taking another perspective into account; Currarini & Mengel (2016) tested the effects of homophily, which I will elaborate on later, and how a shared social identity relates to in-group favouritism. Using a public goods game, individuals played a sequence of eight rounds with either an in-group member or out-group member and they differed between rounds where players knew whether the opposing player belonged to the same group or not. Results showed that the when homophily was present in the public goods game, meaning that people in groups were similar to each other, and when information was available about the group of their opposing player, people were more prone to cooperation. But there was not so much cooperation when the information about groups was not known. Even though this study looks at in -and outgroups, it is an important study because it shows that individuals cooperate more when they know that people belong to their group.

All this brings us to **Hypothesis 1 (H1)**: People with a higher group identification are more likely to cooperate more with their group in social dilemmas.

A further approach about how people tend to form groups is the homophily principle (McPherson et al., 2001), which is a theory that proposes that individuals tend to have a social network around them of people who are similar to them regarding sociodemographic, behavioural and intrapersonal characteristics. These sociodemographic characteristics include one's level of income (Mele, 2021; Currani et al., 2009). Viewing the social network one has as a group, it is feasible to say that individuals can self-categorize themselves with others in a group whom have a comparable income to them. Similarly, individuals might not identify themselves with others that have very different incomes than themselves.

An example of a study that looked at how inequality of resources relates to the cohesiveness of a group is one conducted by Anderson et al. (2004). In this study they found that less cohesion in a group leads to people relating less to that group. The experiment they

did, tested the contribution of people in a public goods game. They identified that when it was publicly known that there was inequality in endowment sizes among group members, there was a lower group cohesion and lower in-group identification. This study shows through the homophily principle that more dissimilarity in endowment can lead to less group identification. Although endowment of resources is different from income in public goods games, these concepts both are about inequality of resources and hence might relate to group identification in a similar way.

Ellemers (2002) aimed to explain possible reasons for low in-group identification. She did so by connecting SCT to the relative deprivation theory (Walker & Pettigrew, 1987). The latter theory looks at how people compare themselves to others and how they perceive their own merit in comparison to them. She argued that people who felt relatively deprived within their own group could feel less close to that group, thus experiencing less group identification. This feeling of personal relative deprivation comes forth from a feeling of injustice, because individuals evaluate a situation regarding what people in their immediate environment have in comparison to what they themselves have. This is an important find for this study, because when there is income inequality, relative deprivation can be felt, resulting in a possible lower identification with their group, leading to distancing themselves from the group they initially felt related to.

Taking all the above into account **Hypothesis 2 (H2)** is proposed: A more unequal income distribution in a group is related to less group identification.

Methods

The data used for this research comes from a computerized experiment, which was conducted in the Experimental Laboratory for Sociology and Economics (ELSE) in 2019. The participants (N = 192) were students at the Utrecht University, whom were sorted into 64 groups of 3. They were recruited using an internet recruitment system, ORSEE (Greiner, 2015). The average age of the participants was 24 years. 66% of them identified as female, 32% as male and 2% as other. The fundamental part of this experiment involved a version of the public goods game with peer punishment, in which people played repeated rounds (Fehr & Gächter, 2000). The income that participants received after the game depended on their behaviour in game, how much they contributed to the common good. The mean income, what each individual received at the end of the game, was 15 euros (min=5, max=22). The participants were randomly placed

into an individual workspace and were informed about the experiment through a written instruction. There were 2 conditions; one where participants were sorted into groups based on similarity in their normative views on how much each group member should contribute and one where these normative views differ. For this study however these conditions are not important, so there will be no further elaboration on these normative views. The game is played for twenty rounds, after the tenth round, one member is exchanged in each group, however the member exchange is also not important for the present study (but see Otten et al., 2020).

Game

Every round of the game that is played in the experiment has two stages, where the second stage is a stage with punishment. For this study, the second stage is not important and thus only the first stage will be taken into account (see Otten et al., 2020). Subjects are placed in a group of three. To start with, each individual (i) obtains an endowment of 20 monetary units (MU), who then has to decide how much they want to contribute to a public good (ci), where the possible contributions range is $\{0, 1, \dots, 20\}$ in monetary units. The amount of MU not contributed by i is kept by i . The public good consists of the contributions of all three members of the group. Every contribution made by members, leads to a certain return or income (mi) per point contributed with $mi < 1$. The multiplication factor of the public good M consists of the sum of these returns, with $N > M > 1$. Here N indicates the group size of three. The situation in this game is a social dilemma because $mi < 1$, so it is individually more profitable to contribute nothing at all, but since $M > 1$, it is collectively the most profitable if everyone contributes their full endowment. After each round, the decisions made by every individual and the income of each member in a group is communicated to the other members, so there is full information about the contributions and income of other players after every round played. In each group, two individuals are randomly assigned a low return ($mi = 0.5$) and one is randomly assigned high return ($mi = 0.75$), this makes the public good multiplication factor $M = 1.75$. It is known to players who has a high return and who has a low return rate.

Cooperation

The measurement for cooperation is determined by how much every individual contributes on average in the game (ranging from 0 to 20 MU). The more i contributes to the common good, the more cooperation is perceived. After both the tenth and twentieth round, the average of contributions over the last ten rounds is measured and used as the participant's cooperation score.

Group identification

After round ten and after round twenty the individuals are asked to indicate how much they identify with their group. This is measured by taking the average of the answers on a Likert scale from 1 (strongly disagree) to 7 (strongly agree) on how much they agree with the following six statements:

1. I identify with other members of this group.
2. I feel strong ties to this group.
3. I am like other members of this group.
4. This group is an important reflection of who I am.
5. I feel proud to be a member of this group.
6. I would like to continue working with this group.

These statements are commonly used in order to measure group identification in lab experiments (Leach et al., 2008; Ouwerkerk et al., 1999). The average value of these six statements will be used because the Cronbach's alpha (.93) indicates a very high reliability (See Appendix).

Inequality

Income inequality is measured by looking at the group's gini-coefficient of income before punishment. The coefficient is averaged over ten rounds and is measured twice, after the tenth and after the twentieth round. The gini-coefficient's range is 0-1, when it is equal to zero, there is perfect equality in a group (all individuals own the same number of resources), when it is equal to 1 there is perfect inequality (one individual owns all resources). The gini-coefficient is a widely used method to measure income inequality (De Maio, 2007) and is therefore chosen to indicate income inequality in this research.

To test the robustness of our results, another variable, which measures income inequality in a different manner will be used. This variable is measured by looking at the mean income per individual in a group after ten rounds, whereafter all the possible differences between the income of every i is added. For example, the mean income in a group is distributed accordingly: the mean income of i_1 was 20, i_2 averagely earned 30 over 10 rounds and i_3 earned 40. The income inequality score of this group is calculated as follows:

$$2 * ((40 - 30) + (40 - 20) + (30-20)) = 80$$

So, a higher score on this variable means that the differences between individual's incomes are greater and when the sum is small, this means there is little income inequality in the group. In Table 1 (below) this variable is referred to as 'Average inequality'.

Analysis

To statistically test these hypotheses, multiple regression analyses will be conducted using SPSS. To test H1, a regression analysis will be conducted between the independent variable, group identification and the dependent variable, cooperation. To test H2, the dependent variable group identification and the independent variable income inequality will be tested. This will be done twice, first using the gini-coefficient and second by using the group's average income inequality. All tests for the hypotheses will be tested with and without control variables, i.e. the condition of the group (similar normative views or dissimilar normative views), the part in which the variables are measured (after the tenth round and after the twentieth round) and for H1 political views will also be taken into account (measured from 1-10, where closer to 1 means a more left political orientation and closer to 10 a more right political orientation), because this may influence how much they would contribute to the common good. Concerning H2, cooperation will also be used as control variable in order to separate the two hypothesis and to see whether cooperation is a significant confounder for group identification when testing for income inequality.

Table 1*Descriptive statistics.*

	N	Minimum	Maximum	Mean	Std. Deviation
Group identification	384	1.00	7.00	3.261	1.674
Cooperation	384	1.10	20.00	14.115	4.887
Gini score	384	.00	.16	.060	.033
Average inequality	384	.00	85.60	33.931	20.292
Valid N (listwise)	384				

*The N is $2 * 192 = 384$ because measurements are done twice (once after round 10 and once after round 20).

As can be seen in Table 1, the income inequality measured with the gini-coefficient in the experiment was not very high. In the experiment, the gini-coefficient ranged from perfect equality (gini = .00) to a gini-coefficient of .16, meaning that the resources were overall fairly equally distributed. Moreover, the mean score on the gini-coefficient was only .06 (Table 1). The limitations of this study will be addressed in the discussion section.

Results

The main focus of this research is how inequality of income relates to group identification, and another important aspect is how this group identification relates to cooperative behaviour in social dilemmas. We will be starting with the relation between cooperation and group identification, as it is our first hypothesis.

In order to see whether a higher level of group identification relates positively to the degree of cooperation of the participants, a linear regression analysis was used. When looking at the relationship of these two variables alone in Table 2 (Model 1), it becomes clear that the independent variable, group identification, does have a significant positive relation with the dependent variable, cooperation ($B = .860$, $t(1,382) = 6.028$, $p < .001$). H1 is hence supported. This means that after ten rounds of playing the game, individuals that identified more with their group, tended to contribute more MU to the common good on average over ten rounds, therefore cooperating more with the group. Individuals that identified the least with the group (scoring 1 on the group identification measures) on average contributed $1 * .860 + 10.909 = 11.769$. Individuals that identified the most with the group (scoring a 7 on group identification) on average contributed $7 * .860 + 10.909 = 16.929$ to the common good. The mean difference in contribution for these extremes on the group identification scale is then 5.16 MU, which means

that the effect size of the relationship between group identification and cooperation is quite substantial. When controlling for political orientation, the condition and the part of the game (Model 2), group identification still has a significant effect on cooperation ($B = .870$, $t(4,379) = 6.128$, $p < .001$) and this model explains 12,8 percent of the variance of cooperation ($R^2 = .128$).

Meanwhile, political orientation also shows to have a significant correlation with cooperation ($t = -3.869$, $p < .001$), which suggests that individuals that had a more left political preference were more likely to contribute more to the common good than individuals that identify more to a right political preference. However, the part ($p = .222$) and the condition ($p = .366$) have no significant effect on the level of cooperation. This means that it did not matter for the level of cooperation whether the individuals had similar or dissimilar normative views or if the contributions were measured after the tenth or twentieth round.

Additionally, there was no sign of collinearity, which signifies that the independent variables did not significantly interact with each other as the Variance Inflation Factor (VIF) scores of all variables were < 1.1 . If the VIF score exceeds 4 it is commonly accepted that the collinearity is a problem, but the lower the VIF score, the more independent the variables are and thus the more reliable the model. This suggests that this model is very reliable.

Table 2

Regression of cooperation on group identification and control variables.

	Model 1		Model 2	
	B	s.e.	B	s.e.
Group identification	.860***	.143	.870***	.142
Part			.573	.469
Condition			.429	.475
Political view			-.440***	.114
(Constant)	10.909***	.583	11.605***	1.033
F	36.336***		13.853***	
R ²	.087		.128	
N	384		384	

* $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed.

In order to test the second hypothesis (H2), firstly a regression was conducted, looking only at the relationship between income inequality and group identification. As can be seen in Table 3 (Model 1), it became clear that these did in fact not relate to each other significantly ($B = -.086$, $t(1,382) = -.033$, $p = .974$). This model does not significantly predict group identification on itself ($R^2 = .000$). Signifying that H2 is not supported when this relation is tested on itself.

When adding the control variables to the model in Table 3 (part, condition and cooperation), the model (Model 2) did become a significant predictor: $F(4,379) = 14.698$, $p < .001$. It then predicts 13.4% of the variance of group identification as $R^2 = .134$.

Table 3 shows that, when adding the control variables, income inequality does have a negative significant relationship with group identification, hence showing support for H2 ($B = -10.385$, $t(4,379) = -3.632$, $p < .001$). Consequently, when the gini coefficient is lower, meaning that there is less income inequality, the individuals score higher on group identification. The average difference in group identification between the groups with most income inequality ($\text{gini} = .16$) and individuals with the least income inequality ($\text{gini} = .00$) is 1.66:

$$(.16 - 0) * -10.385 = 1.66.$$

That means that individuals who had the most income inequality in the group tended to score 1.66 points lower on group identification than when there was no income inequality in the group. 1.66 points difference shows that the effect size of the relationship between the gini coefficient and group identification is quite large, when comparing to the standard deviation of group identification: 1.674 (Table 1).

This is not the only predictor that has a significant effect on the level of group identification; the level of cooperation ($t = 6.941$, $p < .001$) and the condition ($t = 2.519$, $p = .012$) were also significant. Thus, contributing more towards the common good is a significant predictor for having a higher group identification. However, the part of the game was not a significant predictor for group identification.

Moreover, these variables did not show any collinearity either, as the VIF scores of these variables were all < 1.4 .

Table 3*Regression of inequality (gini) on group identification with control variables.*

	Model 1		Model 2	
	B	s.e.	B	s.e.
Gini	-.086	2.635	-10.385***	2.859
Part			-.151	.160
Condition			.405*	.161
cooperation			.133***	.019
(Constant)	3.731***	.179	2.497***	.342
F	.001		14.698***	
R ²	.000		.134	
N	384		384	

* p < .05, ** p < .01, *** p < .001, two-tailed.

For the sake of testing how robust the income inequality result is, a different measure than the gini-coefficient is used to test for correlation with group identification; the sum of the income average income in a group. It is demonstrated in Table 4 (Model 1) that on itself, this variable does not significantly correlate with group identification ($B = .005$, $t(1,382) = 1.130$, $p = .259$), and therewith, as well as the gini-coefficient on itself, shows no support for H2. Furthermore, the model is not reliable, as it does not predict any percentage of group identification ($R^2 = .000$).

However, Model 2 of Table 4 shows that when adding control variables, i.e., part, condition, and the amount of cooperation, the sum of difference in income is negatively significantly related to group identification ($B = -.016$, $t(4,379) = -3.121$, $p = .002$), meaning that like the gini-coefficient, more income inequality is related to a lower identification with the group. This finding is in line with the expectation of H2. The effect size of this variable on group identification is large, looking at the difference between individuals that scored lowest (.00) on the sum of difference in income of the group and individuals that scored highest (85.60):

$$(85.60 * -.016) = -1.37.$$

Looking at the standard deviation of group identification, (1.674), it can be said that there is quite a large effect size. Individuals that scored lowest on this measurement of income inequality scored on average 1,37 points higher on group identification than individuals that were in a group with the most income inequality.

In line with the analysis with the gini-coefficient, cooperation has a significant relationship with group identification when it is added as control variable ($t = 6.581, p < .001$). meaning that cooperation still seems to have a significant positive relationship with group identification, as well as with income inequality. Table 4 shows that the condition also has a significant relation to group identification, however its significance is less significant than the other significant variables ($t = 2.563, p = .011$). The part of the game remains an insignificant predictor for group identification. All these variables do not significantly interact with each other, for the reason that the VIF scores of all variables in this regression are < 1.6 . The fact that support for H2 is found only when controlling for cooperation, means that cooperation is a confounder to the relationship between income inequality and group identification, as it interacts with both the dependent and independent variable.

Table 4

Regression of inequality (sum income inequality) on group identification with control variables.

	Model 1		Model 2	
	B	s.e.	B	s.e.
Average inequality	.005	.004	-.016***	.005
Part Condition			-.143	.161
cooperation			.413*	.161
(Constant)	3.565***	.167	.136***	.021
F	1.278		2.334***	
R ²	.003		.127	
N	384		384	

* $p < .05$, ** $p < .01$, *** $p < .001$, two-tailed.

Conclusion and Discussion

To answer the main question of this research, how income inequality relates to group identification in situations of social dilemma and to what extent group identification relates to cooperation, two hypotheses were formed. Starting with H1, based on SCT and SIT (Tajfel & Turner, 1979; Turner et al., 1987): People with a higher group identification cooperate more with their group in social dilemmas. The results of the analyses show that H1 is significantly supported. Thus, we can assume that in situations of social dilemma, such as the climate crisis and a pandemic, individuals will be more likely to cooperate with the collective when they feel closely related to the collective. This finding shows support for other studies that have been conducted (Aksoy, 2019; Brown et al., 2017; De Cremer and Van Vugt, 1998; Turner, 1982).

For H2, which stated that ‘A more unequal income distribution in a group is related to less group identification.’, based on SCT, SIT, relative deprivation theory and the homophily principle (McPherson et al., 2001; Tajfel & Turner, 1979; Turner et al., 1987; Walker & Pettigrew, 1987), strong evidence was found. However, this was only after adding control variables to the regression. Without control variables, the relationship of income inequality, both measured by the gini-coefficient and the sum of inequality in a group, with group identification was not significant. So, on itself, income inequality had no correlation with group identification and hence does not support H2. These models with control variables, however, strongly supported H2 by indicating that both inequality measures were significantly negatively related to group identification with cooperation as confounder for this relation. This argues that more income inequality in a group is related to less identification with the group and that cooperation interacts with both variables. So, for example in the COVID-19 pandemic, by reducing inequalities in income between all individuals involved, individuals could identify more to the group of people participating in making policies and by doing so it might inspire more cooperative behaviour in following policy and thus the virus could be eliminated faster. By using two different measurements for income inequality from which the same conclusion can be reached, it can be argued that the measurement of income inequality is robust enough.

In conclusion, support is found for both H1 and H2. In social dilemmas more income inequality relates to less identification with the group and having less identification with the group is related to cooperating less with the group for the common good. What is more, cooperation seems to be a confounder in the relationship between income inequality and group

identification. These findings are important to take into account when dealing with paramount social dilemmas such as the climate crisis. By reducing income inequalities between countries, everyone will be able to cooperate more in realizing the climate goals and they can feel more related to other countries, as there will be no more barrier of income on group identification.

Consistent with findings of Mele (2021) and Currani et al. (2009), the present study has found that income inequality indeed can be an obstacle for individuals to self-categorize with a group. This finding builds forth on SCT. Likewise, it builds forth on SIT, as it already established that level of income could be a factor that unites people in groups. Now it becomes clear that inequality in income can actually be a barrier for group identification as well.

Regarding the homophily principle, support is found in the way that individuals that are more alike in their income level seem to feel more closely related to each other. Furthermore, individuals can see income inequalities as relative deprivations for themselves and perceive the situation as less just. Other studies that looked at unequal endowments (Buckley and Croson, 2006; Cardenas, 2007; Aksoy and Weesie, 2009) had found that this type of inequality is negatively related to group identification. The fact that inequality in income is found to be negatively related to group identification as well, shows that both types of inequality can be a hurdle to group identification and even to cooperation. In future research it could be interesting to see whether one of these two types of inequality has a larger effect on group identification, so both variables should be experimentally manipulated and compared.

In the experiment used, income inequality was not a manipulated factor, therefore we cannot speak of causality for this factor, so other factors that were not taken into account could in theory influence this relationship. Even though in the experiment there was variance in income level, resulting in income inequality, the variance was relatively small. The average gini-coefficient was merely .06, which indicates that the division in income was fairly equal. Seeing as the gini-coefficient ranges from 0 to 1, and the maximum value of the gini-coefficient was .16, this indicates that income inequality could have been manipulated to be more unequal and then the effect it has on group identification could be observed in a better way. After testing both variables of income inequality, results showed that on itself these variables did not have a significant relation to group identification, that may be due to the fact that the amount of income inequality was not that substantial. In future research, income inequality should experimentally be manipulated to the point that income inequality is more prevalent and has a higher mean on the gini-coefficient.

In sociology, experiments can be very useful, as, all behaviour in the experiment can be directly monitored, which leads to a more complete view on the situation and exact responses can be observed. However, manipulating variables artificially in experimental settings does go at the expense of the external validity, meaning that the findings of this study are difficult to generalize for the 'real' world. For example, groups of three were used in the experiment, but groups in the 'real' world can be as big as a whole country, so these findings are not that easily generalized to the larger groups. Furthermore, it is challenging to generalize because of the manipulation of variables, which cannot be done so easily in real life. Therefore, in order to be able to generalize a bit more, it might be interesting in future research to look at how individuals behave in bigger groups where there is more income inequality than in this experiment. Moreover, in the experiment, individuals were sorted into groups anonymously and then asked how much they identify with this group, whereas in the real-world individuals are often in groups with others whom they do know, so this anonymity in the experiment for group identification is also difficult to externalize.

Concludingly, the current study has helped substantiate and build forth on the existing theories SCT, SIT, relative deprivation and the homophily principle. It additionally clarifies that income inequality is a possible barrier for group identification and this relationship should therefore be examined more closely when manipulated in an experimental setting, to see whether it is a significant relationship even without cooperation as confounder.

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Appendix

Table 5

Cronbach's alpha for the GI measurements

Construct	Total items	Cronbach's alpha	Mean inter-item correlation
Group identification	6	.93	.68