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## INDICATORS OF HUMAN SOCIALITY IN SLOVENIA AND THE NETHERLANDS: EVIDENCE FROM EXPERIMENTS WITH STUDENTS\*\*

**Abstract.** *In the article we report a series of experiments with volunteers designed to detect differences in behavioural characteristics among Slovenian, Dutch and international students. Using eight standard tasks from experimental economics, we investigate the differences using experimental measures of solidarity, trust, cooperation, positive and negative reciprocity, competition, honesty, and risk attitudes. No significant cohort effects in any of the eight decisions are found when we compare the Slovenian and international cohorts. Still, when comparing the Dutch and Slovenian cohorts, Dutch students are found to exhibit lower levels of solidarity, generosity and honesty. This points to differences in sociality between institutionally similar yet ideologically distant countries like Slovenia and the Netherlands.*

**Keywords:** *cross-national study, experimental economics, game theory, sociality*

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### Introduction

Experiments are the original way of doing research in the natural sciences. In contrast, since the mid-20th century in the social sciences experiments have only been the key method of research in psychology. The Asch

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\*\* This research was financially supported by the Slovenian Research Agency (ARRS) through research project J7-6828 and by the University of Amsterdam through the Speerpunt Behavioural Economics. Ule's research is supported by the Slovenian Research Agency (research program P1-0285). The research of Velkavrh is supported by the Slovenian Research Agency (research program P1-0285, research projects J1-9110, J1-9186 and J1-2451 and Young Researchers Grant). The content of this article is part of a broader analysis presented in a chapter of Velkavrh's doctoral dissertation entitled "Behavioral traits across time and countries: essays on indirect reciprocity, deception and nationality", that will be defended at the Faculty of Mathematics, Natural Sciences and Information Technologies at the University of Primorska.

DOI: 10.51936/tip.59.2.487-508

conformity experiments and Milgram experiments about hierarchical submission had a strong impact on both the expert and general public in the 1960s (M. Ule, 2004). In economics, the experiments initially focussed on testing the standard assumptions about the efficiency of free markets (V. L. Smith, 1962), but eventually covered the general area of human decision-making, overlapping with fields such as psychology, social psychology, and evolutionary biology.

Experiments (the laboratory in particular) are a much more marginal method in sociology and anthropology. This is despite them offering an important tool for both basic and auxiliary research that is able to yield important, systematic, controlled and highly replicable insights into social human behaviour. Instead, the method of choice for quantitative research in sociology is the vignette study, which surveys human attitudes in hypothetical situations. In contrast, experiments can position subjects in real social or economic situations where each decision holds real social or economic consequences for all involved. When these situations mimic real-life conflicts and trade-offs, they raise real moral dilemmas, which offers an insight into non-hypothetical values and actual human decision processes. A typical example of such an approach is experimental economics using game theory to design simple versions of actual economic dilemmas, and offering performance-based monetary incentives for the realism of decisions. A design of this nature can increase both the internal and external validities of laboratory experiments for the social sciences (Hertwig and Ortmann, 2001; Schram, 2005).

The main advantage of the experimental method is a clear, efficient, transparent, replicable and reliable tool for detecting causal relationships (e.g., Ule and Živoder, 2018). In the social sciences, it facilitates exact analysis of phenomena up to a medium scope such as interpersonal relations, conformism, biased judgement, and social exchange. Controlled experimentation has in recent decades thus led to substantial conceptual revolutions in several social disciplines. Economists have developed theories of pro-social motives that are not driven by individual market success, political scientists have developed and then criticised the theory of rational electoral choice, while communication scientists have engaged in a systematic exploration of the influence process (Webster and Sell, 2014). One particular advantage offered by experiments is replicability of the decision environment across different locations like cities, countries and cohorts. This facilitates cross-cultural research that is low on noise and confounds.

In this article, we report the results of one such experimental study that replicated the same experiment in two cities in Slovenia and one in the Netherlands. Our experiment was built around a fixed sequence of eight economic tasks that induced different moral or economic phenomena: solidarity, cooperation, dominance, positive and negative reciprocity,

trust, honesty, and risk aversion. In all three locations, we recruited local and international students in order to compare the behavioural characteristics of Slovenian students with those of international students and students from a distant European society: the Netherlands.

## **Theoretical concepts and contexts**

Sociality is “fundamentally dynamic and dialectical, subject to extension and contraction, and having both positive and negative valences, it is not only a resource but also a burden” (Sillander, 2021: 1–2). The general social sciences aim to describe how the most common behavioural characteristics of human sociality vary within and across different contexts, which offers an insight into their drivers and evolution across history and geography. Heterogeneity in sociality may, for instance, help explain differences in the dominant responses by people to social crises and conflicts. Culture is one source of contextual variance, and it is important to understand the extent to which it impacts the heterogeneity in sociality.

Societies are often compared on dimensions like trust, cooperation, honesty, fairness, reciprocity, and risk attitudes (e.g., Boer and Fischer, 2013; Thöni, 2019). These are among the key characteristics of human sociality and commonly viewed as positive. None is simple or one-dimensional, and we can find a wealth of related concepts in sociology and psychology. Trust, for instance, has emotive, behavioural and communication elements, even if it cannot be commanded, but only offered and accepted. Trust is not simply a rational act; it always contains an element of faith, but not blind faith. Trust therefore presupposes risk and may lead to disappointment and regret if expectations are unmet (Luhmann, 1988). Similarly, the display of solidarity or reciprocity in relationships spans positive and negative orientations. Solidarity may require social exclusion, while positive reciprocity often emerges in relationships that understand negative reciprocity. Demonstrations of solidarity, honesty and reciprocity in relationships also depend on the expressed strength of prosocial orientations and the wider social context (Smith and Sorrell, 2014).

Moreover, it is not merely the behaviour that varies situationally for the same person; the core motivations to act also vary situationally within the same individual (Ross and Nisbett, 1991). For example, while the reciprocity of prosocial individuals does not strongly depend on the impressions of the other (honesty, intelligence and unintelligence, in particular), that of the pro-self individuals is chiefly promoted by impressions of honesty/sincerity and less by intelligence/unintelligence (Van Lange and Semin-Goossens, 1998).

In this article, laboratory experiments are used to explore whether the influence of dominant cultural patterns and national traditions can be

detected over the variance in social behaviour from personal aspects. We control for social and institutional factors by creating similar experimental incentives and environments in all geographical locations under study, and by controlling for our subjects' demographic characteristics. This would be difficult to control in a conventional public opinion survey. Survey responses are also often subject to prevailing stereotypes and prejudices in given national or social settings. One's personal sense about the basic characteristics of sociality may be especially driven by prejudices and stereotypes that affect the social categorisation of individuals or groups, such as those describing what is typical or atypical for the social functioning of people from one's own groups or from some foreign, especially marginal group (M. Ule, 2004). While every nation possesses stereotypes about how it compares to others, they can be misleading (Scheuch, 1993). There are hence few cross-national comparative studies of sociality, for example the regional analysis of 30 European countries by Koster (2013) and a comprehensive cross-cultural study by Hofstede et al. (2010) that compares over 75 countries and regions on several dimensions, including individualism/collectivism, power distance, and uncertainty avoidance.

Since sociality is most clearly expressed in practice in people's actual behaviour in various social situations, we decided to conduct a comparative incentivised experimental study among Slovenian, Dutch and international students with respect to eight indicators of sociality: solidarity, trust, cooperation, positive and negative reciprocity, competition, honesty, and risk attitudes. These indicators were measured with eight standard tasks from experimental economics. In so doing, we are aware that "individual and cultural differences in game behaviors can reflect both the ways in which people perceive game situations and their general social preferences" (Yamagishi et al., 2013: 260).

Cross-cultural experimental comparative research is more commonly employed for individual tasks, although some studies have a larger scope. For example, Henrich et al. (2005) implemented three experimental economic tasks in 15 small-scale societies around the world, testing assumptions about economic rationality in the social behaviour of people from different social and cultural backgrounds. The key results of this research were:

*first, there is no society in which experimental behavior is fully consistent with the selfishness axiom; second, there is much more variation between groups than previously observed, although the range and patterns in the behavior indicate that there are certain constraints on the plasticity of human sociality; third, differences between societies in market integration and the local importance of cooperation explain a substantial portion of the behavioral variation between groups; fourth,*

*individual-level economic and demographic variables do not consistently explain behavior within or across groups; and fifth, experimental play often reflects patterns of interaction found in everyday life.* (Henrich et al., 2005: 797–798)

The scope of our study is broader as we cover eight classic economic tasks, yet it is narrower in geographic comparison given that our subjects come overwhelmingly from various European countries, primarily Slovenia and the Netherlands. Our working hypothesis is therefore that the sociality patterns in our samples are mostly similar, with the variance driven more by demographic characteristics than nationality.

## Research methods

To gather the data, we organised a series of experiments with volunteers recruited from among students at various faculties in Koper and Ljubljana in Slovenia, and in Amsterdam in the Netherlands. In total, 128 subjects participated in the experiment, each once. Our sample contains 49 Slovenian students who study in Slovenia, 23 Dutch students who study in the Netherlands, and 56 international students who study in Slovenia or in the Netherlands but are neither Slovenian nor Dutch. All the Slovenian and Dutch students in our sample study in their home country. The experimental sessions were conducted between May 2017 and February 2018. The experiment was conducted through computers, using the Z-tree experimental software (Fischbacher, 2007).

Statistical analysis was performed in the statistical software Program R (R Core Team, 2019) using stats and vgam packages (Yee, 2010).

Each subject participated in an identical sequence of eight experimental tasks at a laboratory dedicated to economic experiments at their university. After the experiment, the subjects completed a brief questionnaire that included demographic and background information. Communication between subjects was not allowed during the experiment. Anonymity was assured throughout the experiment by placing subjects randomly in private cubicles and making it obvious that the experimenters could not connect their decisions to their names.

In each task, the subjects could obtain points with their decisions. At the end of the experiment, we randomly selected one task and paid each subject 10 eurocents for every point they had obtained in the selected task. In this way, the decisions were not hypothetical but held real consequences for the subjects' earnings. Performance-based earnings are the key element of economic experiments, intended to increase the realism of every decision the subjects make (e.g., Hertwig and Ortmann, 2001). The subjects had

the payment procedure explained to them before the experiment yet did not know which task would be paid, inducing them to consider each of the eight tasks as if it were one that would determine the earnings for all subjects. A participation fee and earnings from a disconnected post-experimental task were added on top of the money earned from the decisions and the total paid to the subject anonymously and in private before they left the laboratory. The average earnings were EUR 12 for an average duration of 50 minutes, a substantial premium over the average student wage. No other benefits were accrued from participation, except for the money earned from fees and decisions and this was advertised during the recruitment.

Each session began with instructions about laboratory conduct and then the subjects participated in the eight experimental tasks as described below. For each task, they first received the description written in a neutral language to avoid framing, and then everyone simultaneously submitted their decision. Subjects did not learn about the decisions of the other subjects until the end of the experiment to avoid any spill-overs between the tasks and to assure we could analyse each task separately. All interactive tasks were therefore translated into simultaneous games. The complete instructions and raw data are available upon request from the authors.

The experiment comprised of six interactive tasks (two 3-player games, four 2-player games), and two individual tasks. Everyone completed the tasks in the sequence presented below, starting with the Solidarity game and finishing with the Risk task. In the interactive tasks, the subjects were randomly grouped in pairs or triplets. Identities of group members were not revealed to protect anonymity. We derive a simple prediction for each task using standard economic theory. We do not consider that subjects may randomise (use mixed strategies).

### *Task 1: Solidarity game*

The “Solidarity game” investigates prosocial attitudes of fortunate individuals with regard to less fortunate others. It was developed by Selten and Ockenfels (1998) to measure the “willingness to help people in need who are similar to oneself but victims of outside influences such as unforeseen illness, natural catastrophes, etc.” (Selten and Ockenfels, 1998: 518). In this game, donations are one-sided and there is no mechanism for explicit reciprocity.

The specific setup is as follows. Each subject in a group of 3 will play a lottery that gives either 60 points (“rich”) with a  $\frac{2}{3}$  probability, or 4 points (“poor”) with a  $\frac{1}{3}$  probability. Before a subject is told the outcome of anyone’s lottery, they make two decisions that only become relevant if they later receive 60 points in their private lottery. First, they decide how many of their 60 points they would donate to a poor subject if there were just one

in their group. Second, they decide how many points they would donate if both of the other subjects in their group were poor.

The final payoffs are as follows. If all three subjects are rich (poor), each gets 60 (4) points. If just two subjects are rich and donate  $x_1 \in \{0, \dots, 60\}$  and  $y_1 \in \{0, \dots, 60\}$  to the third poor subject, the former end with  $60-x_1$  and  $60-y_1$  points whereas the third ends with  $4+x_1+y_1$  points. If only one subject is rich and donates  $x_2 \in \{0, \dots, 30\}$  to each other subject, she ends with  $60-2x_2$  points, and the other two with  $4+x_2$  points each.

A rich donor does not benefit financially from helping the poor. The standard prediction for the game is therefore that no donations will be made. However, a donor might donate some points if they dislike large inequalities (Fehr and Schmidt, 1999). Indeed, evidence from previous experiments suggests that many subjects commit to positive donations, leading to substantial average solidarity (Selten and Ockenfels, 1998). Solidarity can be affected by culture, however. For example, Ockenfels and Weimann (1999) found that subjects in the western part of Germany donate significantly more often (79% vs 52%) and higher average amounts (25%–31% vs 16%–20% of points) than those in the eastern part of Germany. As shown by Brosig-Koch et al. (2011), these differences between West and East Germans were still visible in 2009 even after controlling for other variables such as education and gender.

### *Task 2: Public goods game*

The “Public goods game” models a problem of cooperation where the selfish interests of individuals conflict with the collective interest of the group as a whole (e.g., Andreoni, 1988). It exposes the free-riding problem that occurs when selfish individuals use and enjoy the benefits of publicly provided work, like clean environment and public facilities, but do not provide any work themselves. Widespread free-riding may destroy public good provision by the others (e.g., Marwell and Ames, 1979). Collective problems investigated with this game include teamwork, public space organisation, donations to charities, and global pollution.

In our setup, the subjects are placed in groups of 3. Each must allocate 9 tokens between two projects: *private* and *common*. Any token allocated by any subject to the common project yields 2 points to each subject. Each token allocated by a subject to their private project yields 4 points to the subject and no points to the other two. A token in the common project is less profitable for the contributor, but more profitable for the group. Subjects can earn 54 points each if they invest all tokens in the common project. Yet, every subject can earn more by allocating their own tokens to their private project. They thereby earn points from both the common and private projects. Still, if everyone free-rides like this, there is no public good and the

subjects earn just 36 points each. If three group members contribute  $(x_1, x_2, x_3)$  to the common project, subject  $i$  earns  $\pi_i = 2(x_1 + x_2 + x_3) + 4(9 - x_i)$  points.

The standard theory predicts no contributions to the common project, which is interpreted as an example of a free market failing to lead to efficient economic outcomes. In contrast, experimental evidence shows that many subjects contribute considerable amounts to the common project (40%–60% on average; see, e.g., Ledyard, 1995; Chaudhuri, 2011). Average contributions are similar in countries with highly integrated market economies (Brandts et al., 2004), yet vary from 22% to 65% in small-scale societies (Henrich et al., 2005).

### Task 3: Trust game

The “Trust game” is a simultaneous variant of the dynamic investment game that is used to measure both trust and trustworthiness among experimental subjects (Berg et al., 1995; Bohnet and Zeckhauser, 2004). The idea behind the model is that trust increases social welfare but may be prone to abuse and is therefore risky. The standard example is of two traders who can avoid lawyer fees if they trade without any contracts. One sends money to the other and the other should send goods back to the first after receiving the money. This exchange can be enforced with a contract. However, if one trusts the other to return the goods, the two can avoid the contract-associated costs. Related dilemmas emerge in many daily interactions and trust is an essential element of functional societies. The trust game measures the fundamental level of trust in a society: towards anonymous strangers.

Our game involves a pair of subjects, a *trustor* and a *proxy* (trustee). Each has two available actions. The trustor (she) is given 40 points that she can either *hold* or *transfer*. The proxy (he) gets 0 points if the trustor holds. Yet, if the trustor transfers, the proxy takes the trustor’s 40 points and turns them into 120 points that she can either *keep* or *share* equally with the trustor. In our task, the proxy decides whether to share without yet knowing the decision of the trustor. The final payoffs are shown in the table below. Each cell corresponds to a pair of actions and shows the resulting payoffs for the trustor (first number) and the proxy (second number).

Table 1: TRUST GAME

		(proxy)	
		<i>keep</i>	<i>share</i>
(trustor)	<i>hold</i>	40 , 0	40 , 0
	<i>transfer</i>	0 , 120	60 , 60

Source: own analysis.



The standard prediction is that the proxy will keep the points, to which the rational response of the trustor is to hold her points. This is obviously inefficient because both can earn 60 points if they transfer and share their points. The trustor would transfer her points only if she trusts that the proxy will share. A transfer therefore indicates trust and sharing indicates trustworthiness.

The common experimental finding from the sequential version of the trust game is that people generally show a substantial amount of trust, even to complete strangers, and that trust is often rewarded (Berg et al., 1995). This indicates that trust and reciprocity are both important economic primitives. There is some experimental evidence that trust varies across similar countries. For example, Willinger et al. (2003) found that in Germany subjects trusted more than in France, despite trustworthiness being similar in the two countries. Survey questionnaires, for comparison, may suggest greater variation in trust than what is observed in incentivised experiments. For instance, Holm and Danielson (2005) found similar levels of experimental trust between subjects in Tanzania and Sweden, despite significantly different responses to the survey's trust questions. Survey results concerning trust may measure social stereotypes or private trustworthiness rather than actual trust and depend on how respondents understand and interpret the questions as well as their subjective reference point (Glaeser et al., 2000; Sapienza et al., 2013; Banerjee, 2018). The fact that Eurostat (2013) and the World Values Survey (Inglehart et al., 2018) both found that respondents in Slovenia had less trust than those in the Netherlands makes it interesting to gather evidence about their actual trust in incentivised experimental exchanges.

#### *Task 4: Ultimatum game*

The "ultimatum game" is a simple model of bargaining (Güth et al., 1982). A *proposer* suggests a division of 100 points, while the *responder* then either accepts or rejects this division. In case of rejection, the two earn nothing. This game is used to investigate the prosocial attitudes of proposers and the negative reciprocity of responders. By rejecting a positive offer, the responder sacrifices a positive earning to indicate displeasure and punish the proposer. At the same time, a high offer indicates that the proposer understands the possibility of such negative reciprocity among the people in their community.

Our setup considers the simultaneous version of the originally sequential decision game (like, e.g., in Harrison and McCabe, 1996). In our pairs, the proposer (she) offers a number of points  $P \in \{0, \dots, 100\}$  to the responder (he) who at the same time indicates the minimum number of points  $X \in \{0,$

..., 101} he is willing to accept. Here  $X=0$  means “accept any proposal”, while  $X=101$  means “reject every proposal”. Offer  $P$  is then compared to the minimum  $X$ . If  $P \geq X$ , the offer is accepted, the proposer earns  $100-P$  points, and the responder earns  $P$  points. If  $P < X$ , the offer is rejected and both subjects earn 0 points.

The standard prediction for the dynamic game is that the responder will accept any positive offer and the proposer will offer either 0 or 1 point. Although the theory is less narrow for our simultaneous version of the game, the most plausible theoretic predictions are like those above. Choosing  $X \leq 1$  means the responder will earn points whenever the proposer makes a positive offer (as they mostly do). Choosing  $X > 1$ , on the other hand, risks losing positive earnings from low offers. A rational responder should therefore choose a higher minimum  $X > 1$  only when she is willing to incur a cost up to  $X$  to punish the proposer for an unfair offer.

In ultimatum game experiments across industrialized societies, the average offers are typically between 30% and 45% of the total, which are usually accepted. Offers below 20% are rare and often rejected (Camerer, 2003). Still, rejection patterns and the notion of a fair division might be country-specific (Roth et al., 1991 compared ultimatum bargaining in Israel, Japan, Slovenia, and the United States; see also Oosterbeek et al., 2004). Henrich et al. (2005) found larger differences between small-scale non-industrialised societies, with average offers ranging between 26% and 58% and a related variance in rejection patterns.

**Task 5: Chicken game**

This simple game measures subjects’ tendency to compromise and adopt a submissive role in society, which promotes hierarchical ranking. Subjects are paired and each chooses either option A (dominant) or option B (compromise). If one chooses A and the other chooses B, they earn 70 and 30 points, respectively. If both choose to dominate with A, they both earn 0 points. If both choose to compromise with B, they each earn 40 points. The table below shows how again the payoffs correspond to the chosen options.

Table 2: CHICKEN GAME

	A	B
A	0, 0	70, 30
B	30, 70	40, 40

Source: own analysis.

It is best to choose A when the other chooses B, and to choose B when the other chooses A. The standard prediction is therefore that, despite facing a

symmetric social situation, the subjects will make asymmetric choices, with the dominant subject earning much more than the compromising subject. While subjects may agree that specialisation is efficient, they would disagree on who should profit from domination. In the absence of communication, like in our experiment, choosing A suggests a willingness to compete for a leading social position.

This game was recently experimentally studied in the Netherlands by de Heus et al. (2010) who found that compromise B is chosen by up to 87.5% of the subjects, but cross-country comparisons are scarce. Carment (1974), for example, found that in a repeated similar experiment Indian males initially compromise slightly more than Canadian males but the latter compromise more in the end.

### *Task 6: Reward game*

In this task, we investigate positive reciprocity. Our “reward game” models an exchange of favours between two subjects in a pair, the *sender* (she) of a gift and its *recipient* (he). The sender’s wealth is at risk of partial destruction. She can gift some of their wealth to the recipient who holds the power to prevent the destruction of the sender’s remaining wealth. The recipient must pay to protect the sender but may do this as gratitude for the sender’s gift. A sender may then send a positive gift if she expects such positive reciprocity from the recipient. This “gift-exchange” was proposed by Akerlof (1982) as a model to explain why wages are often above the bare minimum. Well-paid workers make a bigger effort which, through positive reciprocity, benefits workers and employees alike. Low wages may on the other hand be perceived as unfair and lead to low productivity and high unemployment (Akerlof and Yellen, 1990).

In our game, we pair the subjects and then each sender is given 90 points and their recipient is given 10 points. The sender chooses a number of points  $G \in \{0, \dots, 90\}$  to give to the recipient, while the recipient chooses the minimum gift  $X \in \{0, \dots, 91\}$  for which he will protect the sender’s (remaining) points. Here,  $X=0$  means “always protect the sender”, and  $X=91$  means “never protect the sender”. Sender’s gift  $G$  is then compared to the recipient’s demand  $X$ . When  $G \geq X$ , the recipient pays 10 points and earns gift  $G$ , while the sender earns  $90-G$  points. If  $G < X$ , the recipient earns  $G+10$  points but does not protect the sender, who earns just one-third of their remaining points,  $(90-G)/3$ .

The standard prediction for the sequential version of our game is that the recipient will never protect the sender’s points because this is costly. The sender will thus not send any gift to the recipient. The prediction for our simultaneous game is similar: the recipient’s demand is so high ( $X \geq 60$ ) that the sender prefers to give nothing and suffer the destruction, earning

30 points and losing 60, despite the protection costing just 10 points. The recipient in this case earns 10 points.

In contrast, most recipients in similar experiments appear to usually reciprocate gifts, which rationalises gift sending. Senders in turn often send substantial gifts to the recipients, increasing the efficiency of their exchange (in Fehr et al., 1993, the average gift exceeded 40% of the total). This efficiency does not substantially differ among industrialised countries, with Germany leading Israel, Japan and the United States, but Spain lagging behind with fewer gifts and lower reciprocity (Waichman et al., 2015).

### *Task 7: Lying task*

In this individual task, a subject rolls a die in private and then reports a number from 1 to 6, which determines their payoff: 10 times the reported number. The subject is instructed to report the number of points they privately observe on their die. However, nobody can see their die, so they are free to report a high number even if they have thrown a lower number. The standard prediction is that everyone will report number 6, regardless of what they actually throw on their dice. There is no interaction between the subjects in this task and thus it can reveal the tendency to comply with instructions in the absence of any social context other than the relationship of authority between the experimenter and the subject. This task is hence used in the literature to investigate honesty by comparing the distribution of the numbers reported with the expected uniform distribution of the numbers observed.

Fischbacher and Föllmi-Heusi (2013) estimated that no more than 22% subjects lied by reporting the most profitable number, while almost 40% of subjects were potentially honest. Moreover, many subjects lied by reporting the second-most profitable number, perhaps trying to appear honest in order to maintain a favourable self-image. Experimental data from 47 countries show that honesty varies between countries, but on average only 23.4% of the potential profit from lying is actually taken (Abeler et al., 2019).

### *Task 8: Risk task*

This individual task investigates risk attitudes in the absence of social interaction. A subject is presented with three choices, each between two options. Each choice concerns two options E and F. Option E is always the same lottery yielding either 80 or 20 points with equal probability. Option F is a sure payment, but the amount differs between the three choices, rising from 38 to 50. These three choices are:

- a.  $E = [80p : \frac{1}{2} \mid 20p : \frac{1}{2}]$  or  $F = 38$   
 b.  $E = [80p : \frac{1}{2} \mid 20p : \frac{1}{2}]$  or  $F = 44$   
 c.  $E = [80p : \frac{1}{2} \mid 20p : \frac{1}{2}]$  or  $F = 50$

The expected payoff from choosing option E is 50 (calculated as  $80/2 + 20/2$ ). In pairs (a) and (b), this is better than the payoff from choosing option F. The standard economic theory assumes that people maximise their expected payoff and are therefore neutral with respect to risk (if they know the probabilities). This implies choosing E in both (a) and (b). On the other hand, we may have *risk-averse* subjects who would sacrifice some payoff to avoid risks. These might choose F over E even when F yields less than 50. Choosing F in (a) or (b) therefore suggests that the subject is risk-averse. We say below that those who always choose F exhibit high risk aversion. Those who choose F only in (b) and (c) exhibit moderate risk aversion. In contrast, a subject who seeks risks should always choose E, even in pair (c).

Our task is a simplified version of the classic risk aversion measure by Holt and Laury (2002) who estimate that the majority of people are risk-averse. However, Vieider et al. (2015) found significant cross-country differences in risk attitudes. While in developed countries the subjects are on average risk-averse, in others they can be risk-neutral (e.g., Brazil, Malaysia) and even risk-seeking (e.g., Ethiopia, Nicaragua, Saudi Arabia). Rieger et al. (2015) found that Slovenians are more risk-averse than the Dutch, although this was based on hypothetical choices.

## Results

Our sample consists of 128 students, of whom 59% are female, 40% are economists (enrolled in finance, business, accounting, or economics tracks), and 62.5% had participated in economic experiments before. Subjects were divided into three cohorts based on their nationality: 38% were Slovenian nationals participating in Slovenia, 18% were Dutch nationals participating in the Netherlands, and 44% were international students from 30 countries, participating in either Slovenia or the Netherlands. Among the internationals, 62.5% came from Europe.

There are 12 decisions of interest in our experiment. In the solidarity game, subjects make two decisions: how much to donate if one group member is poor (Sol1), and how much to donate if two group members are poor (Sol2). In the public goods game, we measure donation to the common project (PG). In the trust game, we check if the trustors transfer (Tr1) and if the proxies share (Tr2). In the ultimatum game, we measure the proposer's offer (Ult1 = P) and the responder's minimum (Ult2 = X). In the chicken game, we determine if the subject chooses the dominant action A (Chic). In the reward game, we measure the sender's gift (Rew1 = G) and the recipient's minimum

demand (Rew2 = X). With the lying task, we measure the reported number following the roll of die (Die). In the risk task, the variable (Risk) is 0 if F is always chosen; 1 if (E, F, F) are chosen in (a,b,c); 2 if (E, E, F) are chosen in (a, b, c); and 3 if E is always chosen. Given that the choices for 6 subjects violate this framework, we exclude them from our analysis for this task. A higher value of (Risk) indicates more risky choices and therefore lower risk aversion. In the trust, ultimatum and reward games, only half the subjects choose for each role, resulting in 64 observations per variable.

Table 3: STANDARD PREDICTIONS AND OBSERVED AVERAGES FOR ALL DECISIONS IN ALL TASKS

	Sol1 (0–60)	Sol2 (0–30)	PG (0–9)	Tr1 (0/1)	Tr2 (0/1)	Ult1 (0–100)	Ult2 (0–101)	Chic (0/1)	Rew1 (0–90)	Rew2 (0–91)	Die (1–6)	Risk (0–3)
Standard prediction	0	0	0	0	0	≤1	≤1	0.5	0	≥60	6	2.5
Average observed	12.6	8.1	3.2	0.47	0.55	45.5	28.2	0.33	30.3	51.8	4.5	1.4
Normalised average (SD)	0.21 (0.18)	0.27 (0.24)	0.35 (0.29)	0.47 (0.50)	0.55 (0.50)	0.45 (0.16)	0.28 (0.25)	0.33 (0.47)	0.34 (0.17)	0.57 (0.29)	0.71 (0.29)	0.47 (0.26)

Source: own analysis.

The first row shows the variable and the range of values it can take. The second row shows its theoretically predicted value. The third row shows its observed average value. The fourth row normalises this average to the interval [0,1]; standard deviation is shown in parentheses.

Table 3 shows the overall results for all 12 variables from our 8 experimental tasks. The behaviour in all our experimental tasks, unsurprisingly, differs substantially from predictions according to the standard theory, but is consistent with previous experimental evidence.

To investigate the similarities and differences among our three student cohorts, we ran a series of 12 regressions – one for each variable. In each regression, we investigate how the cohort affects a specific variable, controlling for familiarity with experiments, gender, study track (whether the subject is enrolled in one of the ‘economist’ tracks) and whether the subject is a male economist. Male economists have, for instance, been observed in previous experiments to be significantly less solidary than other subjects (e.g., Selten and Ockenfels, 1998). For non-binary experimental tasks, we confirmed our results with additional Tobit regressions (available upon request). To facilitate comparison across studies and models, we normalise each non-binary variable to the interval [0,1].

Table 4 summarises the regression results for all 12 variables. The main observation is that the differences between our Slovenian and international cohorts are never significant at the 5% level. We find only one marginal difference between these two cohorts with respect to positive reciprocity

in the reward game. Still, this marginal significance disappears, when we compare the Slovenian students against the pooled Dutch and international cohorts, which suggests the lack of significance is not due to the small number of observations. We therefore conclude that there are no significant differences in any of our variables between the Slovenian and international students.

Table 4: REGRESSION RESULTS FOR VARIABLES OF INTEREST FROM OUR EIGHT EXPERIMENTAL TASKS

	Sol1	Sol2	PG	Chic	Die	Risk	Tr1	Tr2	Ult1	Ult2	Rew1	Rew2
INT	-0.05 (0.24)	0.41 (0.27)	-0.20 (0.30)	-0.26 (0.59)	0.46 (0.32)	-0.10 (0.27)	-1.22 (0.80)	0.24 (0.74)	0.07 (0.23)	-0.18 (0.42)	-0.37 (0.28)	0.75* (0.41)
NL	-0.80** (0.33)	-0.71* (0.38)	-0.53 (0.37)	1.07* (0.62)	1.09** (0.44)	-0.02 (0.31)	-1.10 (0.93)	0.08 (0.84)	-0.40 (0.27)	-0.91* (0.54)	-0.76** (0.34)	0.32 (0.48)
Econ	-0.31 (0.30)	-0.64* (0.34)	-0.40 (0.37)	0.66 (0.63)	-0.05 (0.38)	-0.11 (0.31)	-0.06 (0.97)	-0.61 (0.79)	-0.64** (0.28)	0.07 (0.48)	0.05 (0.34)	-0.48 (0.47)
Male	0.16 (0.22)	0.13 (0.26)	0.60** (0.29)	-0.16 (0.58)	0.23 (0.32)	0.21 (0.26)	0.73 (0.77)	0.51 (0.73)	0.08 (0.22)	0.80* (0.42)	0.30 (0.26)	-0.29 (0.39)
Male Econ	-0.39 (0.40)	-0.45 (0.46)	-0.98** (0.49)	0.31 (0.82)	0.70 (0.55)	0.43 (0.41)	0.12 (1.10)	-0.75 (1.19)	0.39 (0.32)	-0.59 (0.68)	-0.15 (0.39)	1.12 (0.69)
Exper	-0.54** (0.23)	-0.59** (0.26)	-0.07 (0.29)	0.49 (0.53)	0.16 (0.31)	0.26 (0.25)	-0.10 (0.67)	-0.89 (0.71)	-0.18 (0.20)	0.81* (0.45)	-0.45* (0.24)	0.13 (0.40)
N	128	128	128	128	128	122	64	64	64	64	64	64

Source: own analysis.

Explanatory variables are dummy variables: Econ = 1 for economics student; Male = 1 for male; MaleEcon = 1 for male economics student; NL = 1 for Dutch cohort; INT = 1 for international cohort (Slovenian cohort is a reference group); Exper = 1 if the subject attended at least one experiment in the past. Models for binary variables Chic, Tr1 and Tr2 are logit regressions, and other models are fractional logit regressions. Standard errors in parentheses. Coefficient of the constant omitted for brevity.

The coefficients' signs indicate whether a particular explanatory variable has a positive (+) or negative (-) effect on the dependent variable, and stars \*\* or \* indicate whether this effect is significant at the 0.05 or 0.1 level.

In contrast, we find significant differences for three measures of sociality between the Slovenian students and the Dutch ones. The Slovenian students give more in solidarity (Sol1 17.4 vs. 6.4), are more honest because they report lower die throws (Die 4.0 vs. 5.3), and send higher gifts in the reward game (Rew1 38.3 vs. 21.7). There were two further marginally significant differences (in Chic and Ult2) and, for a more statistically powerful comparison, we recheck them in new regressions comparing the Dutch against the pooled Slovenian and international cohorts (which do not differ significantly). This yielded an additional significant difference (at the 5% level) between the Dutch and the pooled cohort in the chicken game, where the Dutch were more likely to choose the dominant action (Chic 0.57 vs 0.28). The Dutch students also show significantly less solidarity and honesty than

the pooled Slovenian and international students. In our experimental tasks, the Dutch students therefore appear to be an outlier against the Slovenian and international student benchmark.

Our final results concern the role of demographic characteristics in sociality. None of the characteristics we controlled for consistently affects behaviour across different tasks. We do, however, find significant effects in specific tasks. Students familiar with previous economic experiments show less solidarity than other subjects. Men contribute more to the common good, but only if they are not economists. Economists offer less in bargaining.

## Discussion

The overall behavioural patterns in our experiments are consistent with those seen in previous economic experiments, confirming the discrepancy between standard economic theory and actual behaviour. The behaviour of the Slovenian and international students is similar in all of our measures of sociality. This is interesting given that the international students come from 30 different countries that vary in many dimensions like culture, individualism/collectivism, development, GDP, and corruption. Most of the international students are from European countries, however.

Having students for subjects is standard but not ideal. On one hand, students may behave slightly less socially desirable in the sense of generosity/altruism, cooperation, and trustworthiness/reciprocity than the general population (e.g., Carpenter et al., 2008; Anderson et al., 2013; Falk et al., 2013). On the other hand, the use of a student population in all of our experimental locations facilitates a level comparison, and ensures a degree of homogeneity and internal validity as students are more likely to understand questions and experimental instructions.

In contrast to the international students, the Dutch students show less solidarity, honesty, generosity and compromise compared to the Slovenian benchmark. These differences indicate that the Dutch students are more self-oriented. The comprehensive cultural study by Hofstede et al. (2010) of 75 countries and regions may explain the nature of this contrast, showing that Slovenians and the Dutch differ in several dimensions. In particular, Slovenia is among the collectivistic and the Netherlands among the most individualistic countries. Collectivistic countries strive for loyalty and commitment to a group (e.g., extended family, organisation) which consists of strong bonds and provides safety and protection. Individuals then feel responsible for other in-group members and act to promote the (relatively large) group goals. In comparison, individualistic countries emphasise independence, with a focus on oneself and one's closest family. In light of our experiment, Slovenian students may have considered the other subjects,



most of whom were Slovenians, as members of their group and hence behaved socially desirable, whereas the Dutch students did not. This may be explained by the relative heterogeneity of our experimental sessions in the Netherlands, where 69% of the participants were non-Dutch (international) compared to the relative homogeneity of the sessions in Slovenia where just 9% of the participants were international. The Dutch students are therefore relatively unlikely to interact with another Dutch person, but the Slovenian ones are likely to interact with another Slovenian student. This does not explain the relatively high sociality among the international students, who are unlikely to share the experimental session with many participants from their own country, except if they consider other international students as members of their group. Still, the nationality component was significant only in some experimental tasks.

We also observe a localised effect of our control variables on gender, study track, and general familiarity with experiments. This is similar to the result in Benndorf et al. (2017) that familiarity affects behaviour in only one out of six tasks similar to ours'. In our experiment, familiarity significantly reduced only solidarity, next to two other marginal effects. The "economist" (study track) variable significantly reduced only the offers in the ultimatum game, which is consistent with, e.g., Carter and Irons (1991). Gender significantly affected only the public goods game, where men were more cooperative than women among non-economists, as also observed by Brown-Kruse and Hummels (1993). The marginal effect with men demanding more than women in the ultimatum game is also similar to Eckel and Grossman's (2001) finding that men reject offers more often than women do.

Cross-country and cross-national experiments are attractive, yet challenging. Researchers must control for potential currency, experimenter and language effects (Roth et al., 1991; Thöni, 2019). We used the same payment schemes and experimenters in all locations. The instructions were given in the language of instruction at the university where we ran our sessions. In the Netherlands, they were given in English while in Slovenia they were translated into equivalent Slovenian. The experimenters were fluent in both languages.

## Conclusion

Using incentivised experiments, we find that Slovenian students are similar to a sample of international students in all eight of our economic tasks that measure various aspects of sociality. In contrast, we find that the Dutch students differ from the Slovenian students in some of these tasks. Our results are significant despite the relatively small differences established among the three cohorts of students. Indeed, the similarity between

the Slovenian and internationally sampled students in all of our eight tasks is more telling than any odd difference might be. For our eight measures of sociality, the Slovenian students are very similar to the mixed international student population, confirming the view that student culture crosses borders. On the other hand, the Dutch students appear as an outlier since they are less solidary, honest, generous, and less often adopt a submissive role than the Slovenian students. Therefore, the Dutch students appear more self-oriented and less prosocial. These results were observed despite the small Dutch sample (our statistical power was sufficient and confirmed by ex-post analysis) and are thus likely to extend to larger samples. Future studies should however explore whether this observation can be generalised to non-student populations. If our findings are not generalisable, they might be an effect of the variation in the local educational practices and systems. If they are, the differences in sociality may point to the existence of historically embedded cultural distinctions between a social democratic and a market-liberal society.

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