

**'HIDING BEHIND A SMALL CAKE'
IN A NEWSPAPER DICTATOR GAME**

**AXEL OCKENFELS
PETER WERNER**

'Hiding behind a small cake' in a newspaper dictator game*

Axel Ockenfels
University of Cologne

Peter Werner
University of Cologne

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Abstract

We conduct an Internet dictator game experiment in collaboration with the popular German Sunday paper “Welt am Sonntag”, employing a wider and more representative subject pool than standard laboratory experiments. Recipients either knew or did not know the size of the cake distributed by the dictator. We find that, in case of incomplete information, some dictators 'hide behind the small cake', supporting the notion that some agents' beliefs directly enter the social utility function.

Key Words: dictator game, psychological games, incomplete information, newspaper experiment

* Axel Ockenfels (Corresponding author): University of Cologne, Albertus-Magnus-Platz, D-50923 Köln, Germany (e-mail: ockenfels at uni-koeln.de).

Peter Werner: University of Cologne, Albertus-Magnus-Platz, D-50923 Köln, Germany (e-mail: peter.werner at uni-koeln.de).

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1. *Introduction: 'Hiding behind a small cake' in ultimatum and dictator games*

A series of prominent incomplete information ultimatum game studies found that proposers often 'pretend to be fair' if the responder does not know that the cake size is large. In a study by Güth et al. (1996), for instance, the cake could take either a small or a large value, and many proposers offered exactly the equal split of the small cake when its realization was large. The authors call this the 'hiding behind a small cake'-effect (see Mitzkewitz and Nagel, 1993, for the first result along these lines).

Such observations could readily be organized by outcome-based models of social preferences, such as Fehr and Schmidt (1999) and Bolton and Ockenfels (2000, Statement 5). The underlying intuition is that with incomplete information about the cake size, the responder cannot be sure about the (un)fairness of a small offer, which is strategically exploited by proposers. However, more recent studies suggest a complementary explanation. In several intriguing dictator game experiments, subjects were more selfish if they could conceal or delegate their choices, or if they could stay ignorant about the allocation to the recipient (Dana et al., 2007; Andreoni and Bernheim, 2009; Grossman 2010a; Grossman 2010b; Hamman et al., 2010; Matthey and Regner, 2010). In related experiments, some subjects were willing to pay – in some cases substantial shares of the amount at stake – to entirely avoid the dictator decision (Dana et al., 2006; Broberg et al., 2007; Lazear et al., 2010). Moreover, there is evidence from laboratory and field experiments that the observability of actions and social pressure increase donations to charity (see, for example, Ariely et al., 2009; DellaVigna et al., 2009).

One common principle that seems to connect these studies is that beliefs (and beliefs about others' beliefs) directly enter the utility function: some people seem to like to be perceived as fair (e.g., Andreoni and Bernheim, 2009; Grossman 2010a), or feel guilty if their behavior falls short of others' expectations (e.g., Battigalli and Dufwenberg, 2007). This intuition has been most generally modeled within a utility-framework by Battigalli and Dufwenberg (2009), who extend the framework of psychological game theory by Geanakoplos et al. (1989) to dynamic psychological games. The approach allows utilities

to be a function of beliefs, and so can capture the idea that subjects may be concerned about beliefs about others' expectations, or concerns for one's social image as perceived by some audience.

We conduct a large-scale test of the external validity of the 'hiding behind a small cake' strategy, and of belief-dependent preferences in general. Our experiment was carried out with a broader and more representative subject-pool than in usual laboratory experiments – newspaper readers on the Internet. A similar approach to broaden the validity of social and boundedly rational behaviors has been applied by Güth et al. (2003 and 2007) for bargaining games, and Bosch-Domenèch et al. (2002; see also the references therein) for the guessing game by Nagel (1995).

In our context, the idea of belief-dependent preferences suggest that part of the reason for the 'hiding behind a small cake'-effect in the incomplete information ultimatum game is that this strategy allows proposers with a large cake to maintain a positive social image and to not disappoint what they think is the responder's expectation: if the actual cake size is not revealed to the recipient, she cannot distinguish whether little giving is due to nature or due to the proposer's greediness. To test our hypothesis, we conducted an incomplete information dictator game: The size of the cake to be divided was either large or small, with equal probability. In one experimental condition, only dictators got to know the actual cake size, whereas in the other condition recipients were informed about the cake size after the dictator's decision. Dictators knew what recipients learn about the actual cake size. If dictators were only concerned about consequences, they would not care about what recipients know about the cake size (our null hypothesis). Dictators who care about avoiding guilt or being perceived as fair, however, would tend to hide behind the small cake when recipients are only incompletely informed.

The model-framework of dynamic psychological games has been investigated in a number of laboratory studies. Positive correlations between actions and beliefs have been found, e.g., in the context of trust (Charness and Dufwenberg, 2006) and dilemma games (Dufwenberg et al., 2010). However, it has recently been argued that a direct test of belief-dependent preferences is very difficult, as some of these results might be

confounded by consensus effects (Ross et al., 1977): a dictator's own preferences might shape her beliefs about recipients' expectations. In that case, the decision of a dictator would be influenced by unconsciously projecting on recipients what she would expect as an appropriate gift in their roles. To circumvent consensus effects, Ellingsen et al. (2010) provided decision-makers with the information about expected transfers of recipients in trust and dictator games and found only little correlation between expectations and actual transfers.

Our experiment excludes all strategic incentives to be fair in standard economic models with or without preferences for outcome fairness (as described by Forsythe et al., 1994, and Bolton and Ockenfels, 2000, among others). Moreover, consensus effects could not explain hiding behind the small cake, because in our context hiding is not about (probably flawed) judgment of beliefs but about strategic belief manipulation: avoiding guilt and maintaining the illusion of a fair transfer in our setting may involve manipulating the opponent's belief away from the true state of the world in case of incomplete information.

2. Experimental design

The experiment was conducted via Internet on the “Welt online” website (www.welt.de), the homepage of a major German daily paper “Die Welt”, between 19 July and 2 August 2009. Readers could access the experiment website, read the instructions and enter their decisions at any time during the two weeks period through a link in the business section on “Welt online”. Moreover, the online experiment was announced in an article about economic decision-making in the popular Sunday paper “Welt am Sonntag” (coverage of more than 1,254,000 readers) on 19 July 2009 that included an invitation to participate.¹

Experiments with newspaper readers can utilize a broad audience to test the empirical validity of laboratory findings. However, the advantage of higher subject pool representativeness comes at the cost of possible biases. Güth et al. (2007) list three

¹ The article was also available online on “Welt online” during the time the experiment was conducted. The article was not directly related to our study, and the announcement of the experiment did not include a description of the decision situation.

reasons why data from newspaper experiments might be distorted. We addressed all three in our setup. First, Güth et al. observed that there might be a shift towards well-educated participants who might be more likely to read a newspaper.² In our case, we asked participants about their highest school graduation in a post-experimental questionnaire and control for a possible effect in our statistical analyses. The second bias in newspaper experiments refers to the selection into the experiment, as subjects in newspaper experiments usually know the decision situation before deciding to participate. Therefore, we restricted the participation to participants who registered with a valid e-mail address before the decision task was described. Double participations were countervailed by placing cookies on the computers of the subjects.³ Finally, newspaper experiments might differ from laboratory studies in the mode of presentation, as the instructions are sometimes embedded into less abstract contexts which might influence decisions. To avoid framing effects, the instructions in our experiment were formulated in a neutral way, not unlike what is done in laboratory experiments (a translation of the instructions can be found in Appendix A2).

In our experiment, the cake size to be distributed was either small, $C_{small} = 1,000$ Euros, or large, $C_{large} = 3,000$ Euros, with equal probability.⁴ Dictators were always informed about the actual cake size. In our NOINFO treatment, recipients were informed only about the amount dictators gave to them. In the INFO treatment, recipients were also informed about the realized cake size. We decided to give this additional information to recipients only *after* the experiment, together with information about the game outcome, in order to keep the information at the time of the dictator's decision constant across treatments. However, recipients in the INFO treatment were able to evaluate the fairness of the dictator's decision after the experiment. The respective information conditions were known to all participants.

² As the authors state, however, this is a general problem in experimental economics as participants in laboratory studies are usually students.

³ The validity of the e-mail addresses and occurrence of double entries (e.g. by deleting cookies or opening the experiment website from different computers) were checked after the experiment. Datasets of participants that fell under this category (altogether 29 observations) were removed from the sample.

⁴ The reason for the choice of high monetary payoffs was to create an incentive to participate when readers discovered the invitation to the experiment on the homepage of “Welt am Sonntag”. We will discuss in Section 3, how the low probability that decisions would be paid out might affect dictator transfers.

We used the strategy method (Selten, 1967) to collect decisions conditioned on the cake size (large or small) and conditional on being a dictator.⁵ Participants received no feedback on the outcome of the game during the two weeks field time. After the experiment had ended and all decisions were collected, participants were randomly matched with an anonymous partner and assigned their roles (dictator or recipient). The size of the cake was then randomly determined and payoffs were calculated. One randomly selected pair was then paid out; the others were only informed about their role, hypothetical payoffs and – depending on role and treatment – the realized cake size.⁶ Altogether 853 participants took part in our experiment, differing widely with respect to age and educational background (see Appendix A1 for descriptive statistics).⁷ We automatically measured the time from entering our webpage until leaving it. Overall, the median participation time in the experiment was approximately 6 minutes. The average payoff was 3.52 Euros (the randomly drawn dictator gave 1,500 out of 3,000 Euros to the recipient).

After the experiment, subjects were asked to participate in a survey, collecting information about demographics, whether the decision task was fully understood, and whether subjects had previously read the article about decision making in the “Welt am Sonntag” or on the Internet.

⁵ One reason for employing the strategy method was to decrease the probability that subjects in the recipient-role drop out during the experiment because of their strategic disadvantage.

⁶ E-mails with the information about hypothetical payoffs and winner notifications were sent to all participants on August 12, 2009.

⁷ While we cannot rule out that our Internet experiment may not be representative of the “Welt am Sonntag” readers, the table in Appendix A1 shows that participants in the experiment are much more heterogeneous with respect to demographic backgrounds than usual laboratory subject pools. The average age of our participants was 37.1 years, and the educational background differs widely. More than half of the participants became aware of the experiment on the Internet without knowing the article from the Sunday paper. Unfortunately, the technical environment did not enable us to collect the number of subjects who initially read the instructions but did not complete the experiment.

3. Results

On average, dictators give 442 (435) Euros to recipients in the INFO (NOINFO) treatment if the cake is small.⁸ If the cake is large, average givings increase substantially to 1,238 (1,219) Euros in the INFO (NOINFO) treatment.⁹ To investigate if there is a 'hiding behind the small cake'-effect, we compare the two information conditions with respect to the frequency of absolute dictator transfers D in the interval $0 < D \leq 500$ for $C_{large} = 3,000$ Euros. If dictators care about what recipients think, we expect to see more dictators who choose half (or less) of the *small* cake in NOINFO than in INFO for the *large* cake size, because giving half of the small cake (or less) allows maintaining the belief that the cake size is actually small. This is what we find: Out of 421 (432) dictators in the INFO (NOINFO) treatment with a *large* cake, 44 (64) chose strictly positive transfers equal to half or less than half of the *small* cake, and 11 (33) chose transfers that are exactly equal to half of the small cake. Both differences across treatments are significant (two-sided χ^2 -tests, $p = .028$ and $< .001$, respectively). Table 1 shows straightforward probit analyses that corroborate the 'hiding behind the small cake'-effect, controlling for various factors. The first specification for each dependent variable controls for the treatment and previous knowledge of the newspaper article on economic decision making, whereas the second specification additionally includes demographic variables. The treatment dummy NOINFO is always significant. Both, whether subjects have read the article and the educational background have no impact. However, females are less likely to choose a strictly positive transfer below or equal to 500 Euros in case of the large cake.

⁸ Throughout the paper, we report the results for the full sample of participants. Results do not change if we restrict our analysis to participants who stated that they fully understood the decision situation (altogether 701, or 82.2% of the subjects).

⁹ We do not find statistically significant differences between overall distributions, if we compare the information conditions with respect to absolute transfers D or relative transfers S (percentages of the cake sent) with two-sided Mann-Whitney-U tests. Compared to other dictator game experiments, transfers for both cake sizes are relatively large. This might be explained by the fact that from the perspective of the subjects, the probability of being chosen for payoff was only small, which has been found to increase the generosity of dictators (see Sefton, 1992; Forsythe et al., 1994). Similar to these studies, we find a strong shift towards equal splits in our data: 53.5% (56.1%) of the dictators in the INFO (NOINFO) treatment sent 500 Euros in case of the small cake; 44.9% (47.3%) of the dictators in INFO (NOINFO) transferred 1,500 Euros when the cake size was large. (Comparing information conditions with two-sided χ^2 -tests yields no significant differences between the treatments in the shares of equal splits.) Finally, we find no systematic impact of the demographic background on dictator decisions in simple OLS regression models (not reported here) with the shares of the large and the small cake transferred as dependent variables.

Table 1. Probit models on individual transfer choices
 (dependent variable: probability that subject chooses a transfer D with $0 < D \leq 500$
 or $D = 500$ if cake size is large)

Model	1	2	3	4
Dependent Variable	prob($0 < D \leq 500$)	prob($0 < D \leq 500$)	prob($D = 500$)	prob($D = 500$)
NOINFO	0.246** [0.112]	0.276** [0.116]	0.536*** [0.157]	0.576*** [0.162]
ARTICLE KNOWN	-0.130 [0.114]	-0.141 [0.117]	0.062 [0.147]	0.082 [0.151]
ABITUR		-0.030 [0.159]		0.185 [0.200]
UNIVERSITY		0.126 [0.157]		-0.051 [0.210]
GENDER		-0.377*** [0.127]		-0.315* [0.168]
CONSTANT	-1.225*** [0.093]	-1.071*** [0.166]	-1.972*** [0.144]	-2.000*** [0.235]
Age Interval Dummies	No	Yes	No	Yes
Observations	839	821	839	821
log-likelihood	-313	-300	-166	-162

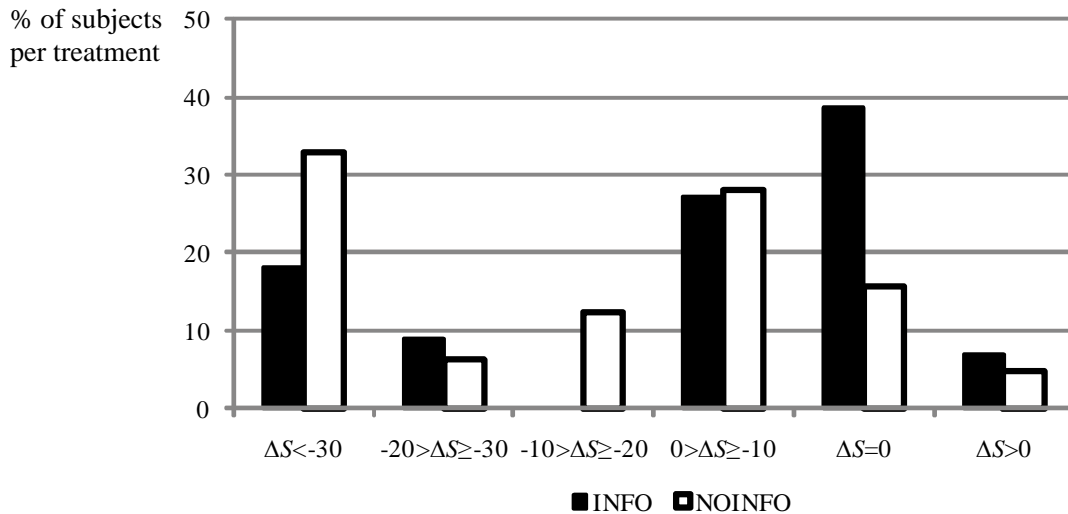
Standard errors are given in brackets. *, ** and *** denote significance on the 10%, 5% and 1%-level, respectively. The dummy variable ARTICLE KNOWN equals 1 if the participant became aware of the experiment through the article in “Welt am Sonntag”. Dummies for school graduation include ABITUR (the German A-level) and UNIVERSITY (a degree from a university or a university of applied sciences); the reference group consists of subjects who completed secondary education. The dummy variable GENDER takes the value of 1, if the participant is female. Dummies for age intervals include the categories ‘between 31 and 45 years’, ‘between 46 and 60 years’ and ‘> 60 years’ (the reference group are subjects ≤ 30 years) and are insignificant.

The 'hiding behind the small cake'-effect is further corroborated if we look at the differences of relative dictator givings S (the percentage shares of the cake sent to the recipient) across cake sizes. Here, we restrict ourselves to those 108 subjects (44 in INFO and 64 in NOINFO), who give strictly positive transfers smaller or equal to 500 in case of C_{large} , and who thus are candidates for hiding concerns in the NOINFO treatment. To test if the information condition has an influence, we calculate the relative shares transferred for the large cake size $S(C_{large})$ and for the small cake size $S(C_{small})$ and compare our treatments with respect to the difference between these shares $\Delta S := S(C_{large}) - S(C_{small})$. That is, we measure how relative transfers react to an increase of the amount at stake. While preferences for outcome fairness are consistent with the notion that with increasing

cake sizes, dictators keep a higher relative share (and thus $\Delta S < 0$), the information condition is predicted to not matter. In that case, distributions of ΔS should be roughly the same in our treatments.

However, Figure 1 shows that the differences between shares given for large and small cakes, ΔS , vary substantially across information conditions. While in the INFO treatment, nearly 40% of the dictators choose the same relative giving, independent of the cake size, only a minority of some 16% of dictators in the NOINFO treatment do so ($p = .012$, two-sided Fisher's exact test). This is mirrored by the fact that there are almost three times as many dictators in NOINFO decreasing their share by 10%-points or more with a larger cake than in the INFO treatment ($p = .017$, two-sided Fisher's exact test). This difference in within subject behavior, too, suggests that giving in INFO is (partly) motivated by a concern that takes the recipients' information and beliefs into account.

Figure 1. Shifts in relative dictator transfers ΔS

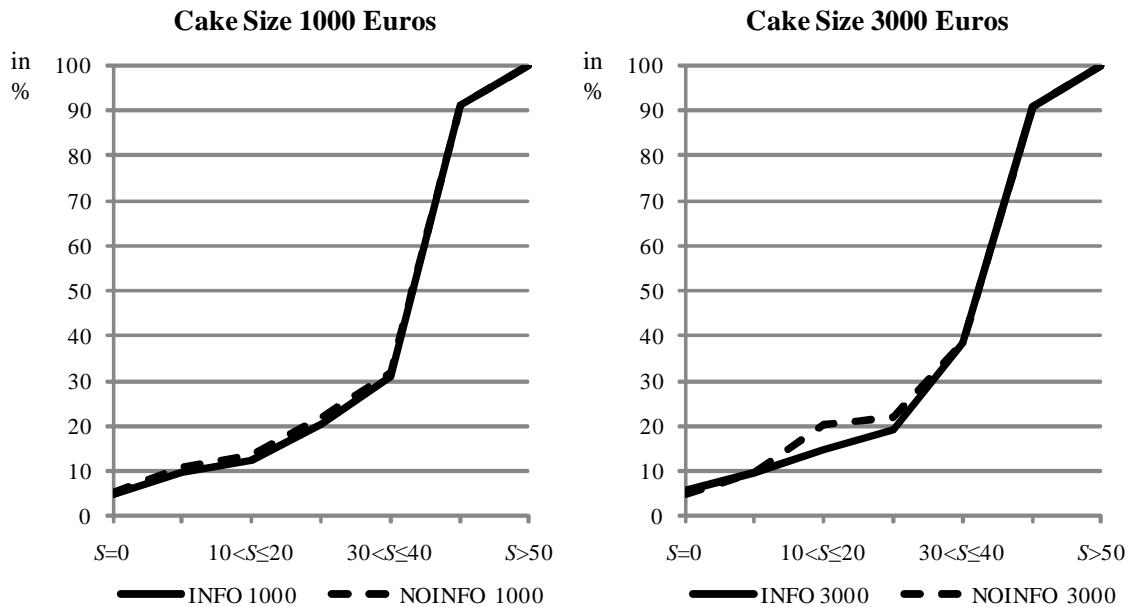


The graph is restricted to strictly positive transfers equal to or below half of the small cake (500) in case of C_{large} . It displays observed within subject differences ΔS between $S(C_{large})$, the share of the cake transferred to the recipient for the large cake size, and $S(C_{small})$, the share transferred in case of the small cake, comparing the two information conditions.

Finally, Figure 2 shows cumulative frequencies of relative transfers S separately for each cake size and treatment in 10%-intervals. $S = 0$ is displayed here as a category of its own. For the small cake, the distributions of shares in both treatments are virtually the same.

For the large cake, however, there is a gap at the 10-20% interval: 10.5% of the observations in the NOINFO treatment, but only 5.1% of the observations in the INFO treatment fall under this category. Because giving half of the small cake in case of the large cake yields $S = 16.7\%$ ($= 500/3000$), this observation is in line with the 'hiding behind a small cake'-effect. Figure 2 additionally shows that the shift of behavior is local in the sense that the frequency of very small or very large transfers seems largely independent of the information condition. This suggests that the 'hiding behind the small cake'-effect is largest when it does not cost too much to convey the illusion of a fair offer in terms of deviations from the preferred outcome in the INFO treatment. Accordingly, we observe somewhat higher frequencies of observations in the 20-30% and 30-40% interval for the large cake size in the INFO treatment than in the NOINFO treatment (4.2% versus 1.9% for the 20-30% interval, and 19.7% versus 16.6% for the 30-40% interval, respectively); the shares of observations in the 40-50% interval are identical across treatments (52.3%).

Figure 2. Cumulative frequencies of relative dictator giving S per cake size and treatment



Relative dictator transfers S are the shares of the respective cakes assigned to the recipients. Transfers are divided into 10%-intervals with $S = 0$ as a separate category.

4. Conclusion

Following up studies on incomplete information ultimatum bargaining, we have conducted an experiment in collaboration with a major German Sunday paper, and with a wider and more representative subject pool than in usual laboratory experiments. Subjects played a one-shot dictator game in which the cake size could take values of either 1,000 or 3,000 Euros. Whereas in one treatment recipients are informed ex-post about the realization of the cake, they remain ignorant in another condition.

We find that some dictators in our newspaper experiment hide behind the small cake, much like what has been observed in laboratory ultimatum games (e.g., Mitzkewitz and Nagel, 1993, and Güth et al., 1996), and related to what has been recently found in laboratory dictator games (see Introduction). In ultimatum games, the leading explanation for this effect is strategic proposer behavior in view of outcome-based fairness preferences of responders. However, in our dictator game setting, outcome-based preferences do not predict any strategic response to incomplete information. Yet, we observe in our newspaper experiment that some dictators keep a larger share of the large cake when this can be done without sacrificing the illusion of having chosen a fair gift. This strongly suggests that these dictators care about what recipients believe, providing evidence for some people's willingness to strategically manipulate beliefs in dictator games. By the same token, our evidence suggests that the strategic, outcome-based motivations attributed to the 'hiding behind a small cake' effect in ultimatum bargaining in previous studies are likely to provide only an incomplete picture of the subjects' concerns.

While our study provides large-scale and statistically significant evidence for the external validity of belief-dependent preferences, we also emphasize that there is considerable heterogeneity of behaviors and concerns: the share of dictators exhibiting the 'hiding behind a small cake' is in fact relatively small (as illustrated by the rather small 'dent' in NOINFO 3000 in Figure 2). Moreover, our study suggests that the effect is quite cost-sensitive: the hiding effect almost only occurs in cases where making the offer compatible with a recipient's belief that the cake is small is relatively cheap (in terms of

deviations from the preferred outcome in INFO). On the other hand, the social distance between our anonymous and demographically dispersed subjects is likely to be larger than in both, laboratory and naturally occurring settings, perhaps reducing the subjects' concern for the opponent's belief below what can typically be expected in other contexts. Thus, of course, our evidence is only a first (yet rather demanding) step in validating the role of beliefs in utility functions out of the laboratory.

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Appendix

A1: Questionnaire Data (n = 853 participants)

Variable	Category	%-Share
Understood the decision task	Yes	82.2
	No	12.1
	No entry	5.7
Knowledge of article in “Welt am Sonntag”	Yes	42.9
	No	55.5
	No entry	1.6
Age	≤ 30 years	33.8
	between 31 and 45 years	39.7
	between 46 and 60 years	20.3
	> 60 years	3.5
	No entry	2.7
Gender	Female	37.0
	Male	60.6
	No entry	2.4
Highest Graduation	Secondary Education	29.1
	Abitur (German A-level)	27.9
	University Degree	40.2
	No entry	2.8

A2: Instructions

Below we present the instructions for the experiment, translated from German. Treatments INFO and NOINFO differ only in the one sentence marked in the text.

Welcome Screen

Welcome to the Internet experiment! The experiment is conducted by Prof. Dr. Axel Ockenfels and the Cologne Laboratory for Economic Research in cooperation with Welt am Sonntag.

In this experiment you can earn money. How much depends on your decisions, the decisions of other participants and a random draw. In sum, up to 3,000 Euros will be paid out to the participants. The funds have been provided by the German Research Foundation (DFG) for economic experiments.

How you can earn money is explained on the following pages.

You can participate in this experiment until Sunday, 2 August 2009. Each person is allowed to participate only once.

Please fill in a valid email address. We need the address to send you the results of the experiment and to contact you in the case that you have earned money. After that, your email address will be deleted. All data and information gathered in the experiment will be made anonymous by the University of Cologne and used only for scientific purposes.

After you have entered your email address, you will receive detailed instructions for the experiment. If you have questions, please contact internet-experiment@wiso.uni-koeln.de.

Please enter your email address: _____

Decision Situation

In this experiment you interact with a randomly selected participant. The other participant remains anonymous, and your identity will not be communicated to the other participant.

Every pair of participants consists of a type A player and a type B player. Which type you are will be determined randomly after the experiment.

A monetary “cake” has to be divided between participants type A and type B in this experiment. The size of the cake is uncertain: its value can either be 1,000 Euros or 3,000 Euros, with equal probability of 50 %.

The division of the cake is determined as follows:

For every cake size, type A specifies how much he transfers to player B. Hence, type A is able to make his choice dependent on the cake size (1,000 or 3,000 Euros).

Type B makes no decision.

After all participants have made their decisions and the experiment is over, we adopt the following procedure for every pair of participants.

First, for each pair it is randomly determined, which participant is type A and which participant is type B.

Then the cake size is determined. With 50% probability it has a value of 1,000 Euros, with 50% probability it has a value of 3,000 Euros.

Next, the division of the cake is realized according to type A’s decision. Type B receives the transfer, and type A keeps the cake minus the transfer.

After that, participants are informed via email about their type, the decision of type A and the resulting payoffs.

[INFO] The information about the realization of cake (1,000 or 3,000 Euros) will be communicated to both participants, type A and B.

[NOINFO] The information about the realization of cake (1,000 or 3,000 Euros) will be communicated only to participant type A. Type B will not be informed about which cake was divided.

From all pairs, one pair will be randomly selected. The payoffs resulting from the decisions of this pair will be transferred to the respective participants. These participants will be asked via email to contact the University of Cologne for disbursement details.

The decisions of all other participants will not be paid out.