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LET THE DUMMY TALK! - UNILATERAL COMMUNICATION AND DISCRIMINATION IN THREE-PERSON DICTATOR EXPERIMENTS

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Let the Dummy Talk!
- Unilateral Communication and Discrimination in Three-Person Dictator Experiments -

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Abstract

To explain why pre-play communication increases cooperation in games, one refers to a) strategic causes such as efficient communication or reputation effects, and b) changes in the utilities due to social processes. Hitherto experimental support for both explanations is mixed and confounded. Our experimental design eliminates all strategic factors and allows to focus on the effects of communication processes. We clearly find social effects, but none of revealed anonymity or salient communication. The social processes invoked are very heterogeneous but not irregular for different communicators.

Keywords: bargaining, communication, social utility, n-persons dictator game

JEL Classification: C72, C91, D64

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1 Introduction

Face-to-face communication before starting to play a game is usually effective in inducing cooperation between players (Dawes, 1990; Frohlich and Oppenheimer, 1998). In bargaining experiments, the implications are more equal splits and therefore fewer disagreements (Roth, 1995; Schmidt and Zultan, 2005).

One explanation views the communication effects as resulting from changes in utilities, triggered by acquaintance with or attributes of others. Examples are group identity or empathy.[1] Another explanation sees pre-play communication effects caused by strategic issues. Since verbal and non-verbal channels of communication eliminate anonymity, players confront something like a repeated game where their reputation is at risk, so that promises, threats or coordination proposals become strategically meaningful.

Roth (1995) labelled these explanations the *Uncontrolled Social Utility Hypothesis* and the *Communication Hypothesis*. He describes an ultimatum bargaining experiment with two treatments: in the first, unrestricted pre-play face-to-face communication was allowed, and in the second, communication was restricted to non-game topics. Since the restricted treatment was as successful as the unrestricted communication treatment in inducing nearly equal splits, the *Communication Hypothesis* was rejected. Brosig, Ockenfels and Weimann (2003) found, however, for 4-person public goods experiments that mere identification of others via video screen does not enhance contributions, and thus deny explanation by *Social Utility*.

In our view, both interpretations are questionable. Possible strategic effects of face-to-face communication are not fully excluded in the restricted communication treatment, since strategic effects of non-verbal communication and reputation concerns are still present. More generally, the predictions of the two main hypotheses are inherently confounded, as features of full face-to-face communication may enhance affective social factors, but also allow for strategic communication and reputation concerns.[2] Furthermore, social utility communication theories require more than pure visual identification to stimulate social processes.[3]

[1] See Dawes (1990) for experiments on group identity and cooperation.

[2] A recent replication of the experiment by Schmidt and Zultan (2005) incorporated the strategy method. The authors show that responders' strategies differentiate the two treatments, as responders become even less cooperative in the unrestricted treatment than in the no communication treatment.

[3] The pre-play audio-conference in Brosig et al. (2003), although increasing contributions in the early rounds of the game, did not have the same effect as the full face-to-face communication treatments, an observation that can be easily attributed to social utility explanations.

To provide a less biased test of the *Uncontrolled Social Utility Hypothesis* our experimental scenario excludes all strategic aspects. Thus we can more safely interpret any resulting effects of communication as being social. Moreover, we study discrimination between different receivers based on (means of) communication.

Our workhorse is a three-person dictator game. One of three players is the dictator who can allocate a positive amount of money, the "pie", between the three. We shall call the other two players "dummies", as they have no strategic influence, and can merely hope that the dictator may be generous.

In our experiment, communication is one-sided: Only dummies can talk to the dictator, whose reputation is therefore not at risk. Furthermore, communication is without strategic impact since the only conveyors of communication are the powerless dummies. The use of video-interfaces enables us to manipulate communication channels. We assume that face-to-face communication effects are not restricted to actual face-to-face encounters, but can also be attained by video-mediated communication (Brosig et al., 2003).

Our three treatments include a no-communication baseline, a video-only treatment where both dummies are seen, but not heard by the dictator, and an audio-visual treatment where additionally one dummy is heard, but not the other. We thereby hope to test three distinct social mechanisms for the *Uncontrolled Social Utility Hypothesis*:

- **Revealed anonymity hypothesis:** One may feel guilty when taking advantage of others where such feelings are reduced when there are social buffers between the actor and the target. Therefore, without anonymity dictator participants become less opportunistic, and visual exposure (including body gestures, facial expressions) of a dummy will prompt dictator generosity.

- **Social communication hypothesis:** Mere exposure may not be the main or the only factor involved. Rather, it is the combination of lifted anonymity and the audio channel with its phonetic and linguistic content which induces empathy towards the communicator. Allocations to the other dummy should not be affected.

- **Salient considerations hypothesis:** During pre-play communication the dummy may emphasize considerations in her favor. For example, by stressing fairness considerations she may make them more salient for the dictator. This effect should also increase the other dummy's share.

Although the last hypothesis is somewhat related to the *Communication Hypothesis* discussed above, it claims a purely social effect, as strategic issues are not present in the game.

According to our experimental results donations to dummies increase when adding communication channels from the baseline over the visual to the audio-visual treatment. On the aggregate level, these results are only significant for dictators and talking dummies when comparing the audio-visual to the baseline treatment. Discrimination between dummy pairs is higher in the audio-visual treatment than in the other treatments, although we find no evidence for discrimination within dummy pairs at the aggregate level. Social ratings of dummies show high correlations with generosity towards them and discriminate dummies in the visual and audio-visual treatment. When looking at specific dummy pairs, results are quite heterogenous but not irregular, suggesting different social processes to be involved. Our results do not corroborate the revealed anonymity nor the salient considerations hypothesis. The *Uncontrolled Social Utility Hypothesis* can thus be refined to the *Social Communication Hypothesis*. Purely social factors play a role, at least when strategic issues are absent.

The paper proceeds as follows: In Section 2, we explain our experimental design and procedures in detail. Section 3 presents our results on average data, evaluations and specific dummy pairs, while Section 4 discusses our results.

2 Experimental design and procedures

In the 3-person dictator game, dictator X can distribute an uneven "pie" of $p = 17.00$ Euros between himself and two dummies Y and Z. The possible allocations (x, y, z) with $x,\ y,\ z > 0$ and $x + y + z = p$ were additionally restricted by $x \in \{0, 2, 4, 6, 8, 10, 12, 14\}$ and $y, z \in \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$. Of these altogether 40 possible proposals (x, y, z) the dictator can select one. This design forces X to prefer one dummy to the other, and excludes the equal split between all three participants. Therefore, if dictators favor one dummy more than the other, this should show up in our data, while indifference between dummies should average out.

We distinguish three treatments:

- **Treatment N (no communication):** In the control treatment the dictator X just chooses an allocation.
- **Treatment V (visual communication):** In this treatment, before deciding about the allocation, the dictator sees a video of both dummies, but cannot hear them.

- **Treatment AV (audio-visual communication):** In the third treatment, the dictator sees both dummies and hears one of them, namely Y, before allocating the pie.

The sessions took place in the video laboratory of the Max Planck Institute in Jena, Germany.[4] Participants were only female students of Jena University. Out of about 650 registered female students a random draw of 332 subjects was invited (dictators and dummies separately) using an Online Recruitment System (Greiner, 2004).

Altogether we used the same 16 dummies for all treatments and 24 dictators, 8 for each treatment. Dummies were matched to pairs by the experimenters, and dictators decided subsequently for all 8 dummy pairs in the same order. After the experiment, in each treatment one dummy pair was randomly assigned to each dictator. Dictators were paid out according to their allocation choice for this dummy pair. Dummies received the average of the selected allocations in the three treatments. This design (including the existence of different treatments) was commonly known by all subjects.

The procedural design for our experiment is due to the nature of the effects and hypotheses we want to test. Note the following specific aspects:

- Their is no efficiency of dictator giving.[5]
- The fixed order of dummy pair presentation to the dictator may cause order effects between dummy pairs.
- In forming pairs of dummies, we tried to (1) match equally attractive dummies, and (2) to have at least one "talking" dummy in treatment AV in each pair. This procedure might bias comparisons of talking and non-talking dummies, but should have no effect on our other analysis.
- To avoid effects of the video position, we altered the position of the talking dummy AV in each round. Thus, in half of the dummy groups the talking dummy's screen was on the left resp. right side.

Upon arrival subjects were welcomed by an experimenter and each participant was led to one of the eight sound-proof booths. Each booth is equipped with a computer, a computer screen, a video camera, a video screen and a microphone. Dummies arrived and played in two cohorts of 8 subjects. They

[4] Instructions can be found in the appendix. Dummy group videos and transcripts can be requested directly from the corresponding author.

[5] Due to the payoff rules dummies are paid out the average of all three treatments. Dictators thus reduce their own share by three Euros for each Euro actually given to a dummy.

received the instructions which were (announced to be) the same for all treatments and roles, and were told that they will be either in role Y or Z. After reading their instructions they had 10 minutes to prepare their talk. Dummies had to record their message twice. Each time, they had 2 minutes to speak freely into the video camera. We imposed no restriction on what to say. After recording both messages, dummies could decide which of the two messages the experimenter should use for the remaining procedure (without having seen them).

Figure 1: Example of the video screen with a dummy pair

The experimenters edited the recorded video messages according to the conducted treatment. For this, we formed 8 dummy groups, which remained constant for the rest of the experiment. On the next day, dictator participants arrived and played in cohorts of 4 subjects. Dictators received the same instructions as the dummies. They were informed about their role and treatment, i.e. whether or not they see the videos and hear one dummy. After the instruction phase, dictators played 8 rounds, one for each dummy pair. Each round proceeded as follows:

- In treatments V and AV the prepared video was played, where the communication was channelled according to treatment.
- The dictator chose the allocation (x, y, z) on a computer screen.
- Dictators then rated the dummies they saw. Ratings were elicited by bipolar scales: active - passive and lively - dull, attractive - unattractive and pleasant - unpleasant, strong - weak and influential - uninfluential corresponding to the three factors of the semantic differential – activity, evaluation, and potential (Osgood, Suci and Tannenbaum, 1957). In the control treatment N this step was left out.

After playing all eight rounds, payoffs were calculated as described above. The dictators were immediately paid in cash and left the laboratory whereas dummies were paid later.[6] The sessions lasted on average about 60 minutes for dictators and 45 minutes for dummies. The average earnings per play were 15 Euros for dictators, 7.20 Euros for talking dummies Y and 6.80 Euros for the non-talking dummies Z.[7]

3 Results

We first describe the overall effects of communication channels. Next, we review the various ratings provided by dictators. We conclude with an analysis of the dummies' ways of arguing and allocations to the specific dummy pairs.

3.1 Communication channel effects

The first data column of Table 1 lists the average relative shares of the pie for all treatments and roles. In Table 2, first data column, results of Mann-Whitney-U tests on overall treatment effects are reported.

				Dummy Group							
		All	$\varnothing\sigma^2 \cdot 10^2$	1	2	3	4	5	6	7	8
N	$\varnothing x/p$	.71	.735	.65	.65	.72	.75	.68	.75	.72	.74
	$\varnothing y/p$	.14	.387	.14	.16	.12	.11	.18	.12	.13	.13
	$\varnothing z/p$	.16	.466	.21	.19	.16	.14	.15	.13	.15	.14
V	$\varnothing x/p$	.63	.338	.59	.65	.62	.62	.65	.65	.63	.68
	$\varnothing y/p$	.18	.341	.18	.17	.18	.15	.16	.21	.24	.17
	$\varnothing z/p$	.18	.324	.23	.18	.20	.23	.19	.15	.13	.15
AV	$\varnothing x/p$	.57	.895	.54	.60	.60	.53	.59	.51	.65	.54
	$\varnothing y/p$	.23	.768	.23	.22	.18	.20	.21	.33	.21	.29
	$\varnothing z/p$	.19	.587	.23	.18	.21	.27	.20	.15	.15	.17

Table 1: Average relative shares of x, y and z (and variances) in treatments N, V and AV, overall and separated by dummy pairs

There are small but significant effects of the communication treatment on dictator giving. Dictators' average self-allocation x is significantly lower in the audio-visual treatment AV than in the baseline treatment N. The average self-allocation in the video-only treatment V is between those in treatments AV and N, but the difference is non-significant in both cases.

[6] Dummy participants could collect their payments either at the institute's office, the next time they participated in an (other) experiment, or by meeting with the experimenters at a specific time at the university.

[7] All numbers include a show-up fee of 4 Euros. Note that for dummies we list here the average allocation for all three treatments.

Allocations to the talking dummies in treatment AV are the highest across treatments and dummy roles and significantly exceed what dummies get in the baseline treatment. Again, the allocations in treatment V do not differ significantly from the allocations in the other treatments. Allocations to non-talking dummies did not differ significantly across treatments. Thus, our results support the *Social Communication Hypothesis*, while the evidence for the *Revealed Anonymity Hypothesis* is poor. When looking at dummy pairs, we find that 13 out of the 16 dummies received more in treatment V than in the baseline. When comparing treatments V and AV, 6 of the talking and 6 of the non-talking dummies get more in the latter than in the former.[8]

				Dummy Group							
		All	σ^2	1	2	3	4	5	6	7	8
V vs. N	x	-	-	-	-	-	< .064*	-	-	-	-
	y	-	-	-	-	-	-	-	-	-	-
	z	-	-	-	-	-	> .029**	-	-	-	-
AV vs. V	x	-	> .008***	-	-	-	-	-	< .090*	-	< .060*
	y	-	> .025**	-	-	-	-	-	> .045**	-	> .029**
	z	-	> .027**	-	-	-	-	-	-	-	-
AV vs. N	x	< .034**	-	-	-	< .044**	< .003***	-	< .002***	-	< .008***
	y	> .011**	> .013**	> .050**	-	-	-	-	> .000***	-	> .000***
	z	-	> .085*	-	-	-	> .004***	-	-	-	-
V y vs. z		-	-	< .094*	-	-	< .004***	-	> .086*	-	-
AV y vs. z		-	> .078*	-	-	-	-	-	> .004***	-	> .004***

Table 2: Results (p-values) of one-sided Mann-Whitney-U tests comparing (variance of) allocations to Dictator (x), Talking Dummy (y) and Non-Talking Dummy (z) in treatments N, V, and AV, and of Wilcoxon Matched Pairs test comparing (variance of) allocations to talking and non-talking dummies in treatment AV, for the average of all dummy pairs and separately for each dummy pair. '<' and '>' show the direction of the relation, '-' means non-significant, *,**,*** indicates significance on the 10%, 5%, 1% level, respectively.

[8]Unfortunately, we cannot use these numbers for statistical tests for reasons of dependency of observations.

We find no significant (Pearson) correlations between allocations and the dummy groups order position, except for one negative correlation for non-talking dummies in treatment AV (r=-.319, p=0.010). We consider this as an outlier (due to the specificities in dummy groups 6 and 8 to be discussed below) and conclude that there are no order effects in our data.

How much do dictators discriminate between dummies? In 75% of all decisions dictators chose a pie distribution with minimum payoff difference between the two dummies (i.e. a difference of 1 Euro). This tendency was prominent in the treatments N and V (84.4% and 82.8% of all cases), but significantly lower in treatment AV (57.8%, Chi-Square test, two-tailed, $p<0.01$). Otherwise, allocations to talking and non-talking dummies do not differ significantly in treatments V and AV (see Table 2, last two rows).

A measure of the dictators' discrimination between dummy pairs is the variance of allocations between individual dummy groups. Data column 2 of Table 1 reports the average variance, non-parametric tests on variance differences between treatments are reported in column 2 of Table 2. Variance in allocations is significantly higher in treatment AV than in treatment V and (except for x) in treatment N, while the latter two do not differ significantly. In treatment AV, the variance in talking dummies' shares is weakly significantly higher than for non-talking dummies.

3.2 Dictators' Evaluations of Dummies

To validate the theoretical grouping into three psychological factors, a series of principal-components analyses were computed on the dictators' ratings of dummies, for each treatment, and for each role in treatment AV. All factor analyses yielded an identical factor solution with two factors: The first factor (Eigenvalues around 3.5) includes the scales corresponding to the 'potency' and 'activity' factors. The second factor (Eigenvalues exceeding 1.0) corresponds to 'evaluation'. On these two factors, we ran the same statistics as for the allocation choices. Table 3 lists the average ratings given to the dummies, while Table 4 presents test results on treatment effects and between-dummy discrimination.

In treatment V, talking dummies were rated (weakly significantly) higher on the potency/activity factor, while non-talking dummies scored higher on the evaluation factor. However, looking at the results on the dummy pair level reveals quite some heterogeneity. In treatment AV, talking dummies Y were perceived as more active/potent than the non-talking dummies Z, while there was no difference in the evaluation ratings.

				Dummy Group							
		All	$\varnothing\sigma^2$	1	2	3	4	5	6	7	8
V	$\varnothing E_y$	0.56	4.39	-0.50	-0.88	1.25	1.88	-1.38	2.13	2.13	-0.13
	$\varnothing E_z$	1.41	5.88	3.00	-0.63	2.38	2.50	1.00	-0.63	3.13	0.50
	$\varnothing PA_y$	0.70	26.72	3.00	-3.88	0.50	-2.75	-3.88	2.88	7.63	2.13
	$\varnothing PA_z$	-1.39	26.84	-1.50	-4.13	1.25	4.13	3.75	-8.00	-2.25	-4.38
AV	$\varnothing E_y$	1.05	4.56	0.75	-0.63	0.13	1.88	-1.00	4.13	1.50	1.63
	$\varnothing E_z$	1.22	4.96	2.75	-1.50	2.38	3.75	0.13	-0.25	2.00	0.50
	$\varnothing PA_y$	3.02	25.49	5.13	-3.25	-0.13	4.75	-2.75	7.38	9.00	4.00
	$\varnothing PA_z$	-2.00	33.56	-4.00	-5.38	0.50	4.25	5.38	-7.25	-3.63	-5.88

Table 3: Average (variance of) ratings for the evaluation (E_y,E_z in $[-6, 6]$) and potency/activity (PA_y,PA_z in $[-12, 12]$) factors to talking dummy Y and non-talking dummy Z in treatments V and AV, overall and separated by dummy pairs

				Dummy Group							
		All	σ^2	1	2	3	4	5	6	7	8
AV vs. V	E_y	-	-	-	-	-	-	-	> .017**	-	> .029**
	E_z	-	-	-	-	-	-	-	-	-	-
	PA_y	> .040**	-	-	-	-	> .017**	-	> .016**	-	-
	PA_z	-	-	-	-	-	-	-	-	-	-
V E_y vs. E_z		< .008***	-	< .016***	-	-	-	< .078*	> .016**	-	-
V PA_y vs. PA_z		> .082*	-	> .055*	-	-	< .004***	< .008***	> .004***	> .004***	> .031**
AV E_y vs. E_z		-	-	< .094*	-	< .023**	< .031**	-	> .004***	-	> .078*
AV PA_y vs. PA_z		> .004***	< .055*	> .004***	-	-	-	< .008***	> .004***	> .004***	> .004***

Table 4: Results (p-values) of one-sided Mann-Whitney-U tests comparing (variance of) ratings of Talking Dummy (y) and Non-Talking Dummy (z) in treatments V and AV, and of one-sided Wilcoxon Matched Pairs test comparing (variance of) ratings to talking and non-talking dummies in treatment AV, for the average of all dummy pairs and separately for each dummy pair. '<' and '>' show the direction of the relation, '-' means non-significant, *,**,*** indicates significance on the 10%, 5%, 1% level, respectively.

Strong (Pearson) correlations were found between the dictators' perception of the dummies, as reflected in the ratings, and the share of the pie allocated to them. The evaluation factor of a dummy was positively correlated with her share of the pie, for both roles and both communication treatments (r=0.337, p<0.001 in treatment V, r=0.473, p<0.001; r=0.597, p<0.001 for talking and non-talking dummy, respectively, in treatment AV). The potency/activity factor was strongly correlated with both, the dummies' shares and their evaluation factors in treatment V (r=0.311, p<0.001 and r=0.360, p<0.001, respectively). In treatment AV only the potency/activity ratings of the non-talking dummies were correlated with their allocation share (r=0.359, p<0.005). Although the ratings were correlated between the two dummies (only in treatment AV,

r=0.304, p<0.05), one dummy's allocation was not found to be correlated with the other's ratings.

To summarize, the social perception of a dummy by the dictator seems to affect her share. Since the ratings were obtained after the dictator's allocation decision, we cannot exclude, however, that evaluations were driven by the allocation decision, and not vice versa.

3.3 Dummies' argumentation and pair specificity

Interestingly, most of the dummy subjects avoided appealing to the dictator. In fact, 10 of the 16 dummies completely refrained from mentioning the game, talking only about themselves, their hobbies, their last vacations, etc. Of the remaining six dummies, one dummy merely described the rules, and two mentioned that they would prefer the dictator role (one of them became talking dummy in pair 1). So only three dummies actually made any reference to possible pie distributions. Of those, one (talking dummy 4) just asked for money, saying she needed it. Another one (talking dummy 6) somehow carefully remarked that sometimes outcomes of such experiments are not just, and that she hoped this will not be the case here. She also mentioned that she was happy not to be in the dictator role, as she is not good in making decisions under time constraints. The last dummy (talking dummy 2) stated that she is curious about the dictator's decision, but that she herself always favors an even, fair distribution. For these three pairs, the time spent on this content accounted for less than 20 seconds of the 2 minutes.

Table 1 reports the average allocations to our 8 different dummy groups. We provide two measures of differences in allocations between dummy pairs: First, Table 2 shows the results of tests on communication channel[9] and discrimination; and second, Table 5 presents comparisons between allocations to dummy pairs mentioning the allocation task, and the average allocations of the remaining 4 dummy pairs where no reference to the game was made (further called 'the others'). All tests rely on the 8 dictators as independent observations.[10]

For dummy pairs 2, 5 and 7, we find no treatment effects in allocations at all and therefore no support for any of our hypotheses. Especially, the argument of talking dummy 2, that she would herself allocate the pie evenly, seems to

[9] Although dummies were anonymous in the baseline treatment, we still use the individual pair's allocations in our comparisons to control for order effects.

[10] As a third measure, one may consider the non-parametric analysis of variance between allocations to dummy groups in treatment AV using non-parametric matched pairs tests in a round robin design, provided in Tables 7, 8 and 9 in the appendix. These results support the conclusions drawn in this section.

Pair	Distribution argument used	$\varnothing x/p$	$\varnothing y/p$	$\varnothing z/p$	Wilcoxon p-values for x	for y	for z
1	*don't want to be dictator*	.54	.23	.23	.002***	.471	.002***
2	*prefers even distribution*	.60	.22	.18	.180	.449	.196
4	*asking for money*	.53	.20	.27	.275	.054*	.002***
6	*sometimes outcomes are not just*	.51	.33	.15	.238	.025**	.012**
other 4	*no reference to game*	.60	.22	.18	-	-	-

Table 5: Average allocation shares to dummy pairs mentioning the allocation task (as share of the pie) and one-sided Wilcoxon Matched Pairs Signed Ranks test results of comparisons to average allocations to dummy pairs not talking about the game. *,**,*** indicate significance on the 10%, 5%, 1% level, respectively.

have no impact on dictators decisions (see Table 5). Table 6 shows that both, the talking and non-talking dummy in dummy group 2, are rated lower on both rating scales than dummies in groups where no reference to the game was made.

For pairs 1 and 3, the treatment effects are only significant for one variable when comparing treatment AV with the baseline, and non-significant for all other comparisons. This, at best, provides weak support to the social communication hypothesis. For dummy pair 1, dictators favored the non-talking dummy in treatment V, and in treatment AV at their own expense in comparison with other dummy pairs. The talking dummy of pair 1 is perceived as more potent/active and the non-talking dummy scored more on the evaluation scale, when compared to other dummy pairs.

For pairs 6 and 8 self-allocations x in treatment AV are significantly lower than in N and V, while the latter two do not differ. The reverse patterns are observed for the allocation to the talking dummy. The talking dummies in these groups get significantly more than the non-talking dummies, whose share did not differ between treatments.[11] Altogether, there is no evidence for the *Revealed Anonymity Hypothesis*, but some support for the the *Social Communication* explanation.

Dummy pair 4 is special: the non-talking dummy's allocation is raised at the expense of the dictator's self-allocation x when she is seen by the dictator in the video-only treatment V, and is higher than the talking dummy's share. This effect is (non-significantly) strengthened when adding the audio-channel in treatment AV. The share of the talking dummy (who is asking for money in her talk) does not differ significantly between treatments, but is lower than that of the talking dummies in dummy groups with no reference to the game,

[11] Talking dummy 6, who hopes that the results of the experiment will be fair, was quite successful in increasing her income (compared to the other dummy groups), however, at the expense of her non-talking dummy partner. But in dummy group 8 without referring to the game nearly the same allocation results as well as ratings have been observed.

while her partner is performing better than the rest. Surprisingly, in this pair both, the talking and the non-talking dummy, are rated higher on both scales than the dummies in other pairs.

Pair	Distribution argument used	E_y	PA_y	E_z	PA_z
1	*don't want to be dictator*	0.75	5.13*	2.75**	-4.00
2	*prefers even distribution*	-0.63***	-3.25***	-1.50***	-5.38**
4	*asking for money*	1.88*	4.75*	3.75**	4.25**
6	*sometimes outcomes are not just*	4.13***	7.38***	-0.25***	-7.25***
other 4	*no reference to game*	0.56	2.53	1.25	-0.91

Table 6: Average ratings (E_y,E_z in $[-6, 6]$), (PA_y,PA_z in $[-12, 12]$) for dummy pairs using special argumentations. *,**,*** indicate significance on the 10%, 5%, 1% level, respectively, of one-sided Wilcoxon Matched Pairs Signed Ranks tests of comparisons to average evaluations for dummy pairs not talking about the game (as listed in last row).

To sum up, the ratings for the specific dummy pairs show that preferences between dummies are already existent in treatment V, but did not yet translate to significant payoff discriminations. With the additional communication channel in treatment AV, talking dummies are rated higher at the potency/activity scale, while ratings in evaluation were quite stable and even strengthened. Here, this yielded more discrimination in dictator giving to the talking and the non-talking dummy, but in both directions.

4 Discussion

Unilateral audio-visual communication in the three-person dictator game inspires generosity of dictators whereas pure visual exposure (including body gestures, facial expressions, etc.) has no significant effect, at least according to our data. Thus the *Revealed Anonymity Hypothesis* is not supported by our data, which confirms the conclusions of Brosig et al. (2003).

Variance in allocations seems to depend more on social evaluation of both persons rather than on salient content of the dummy talk. In the ratings of the dummies, discrimination is already existent in our video-only treatment V, but usually does not affect allocations. Thus, visual exposure suffices to induce social processes and evaluation, but is not strong enough to cause action.

Adding the audio channel in treatment AV strengthens most ratings and increases allocations to dummies, but in a discriminative way.[12] Mostly just one dummy gains, either at the expense of the dictator or the other dummy.

[12]Bolton, Katok and Zwick (1998) also observed that dictators who played sequentially with 10 different, anonymous receivers allocated different amounts to recipients.

This supports the *Social Communication Hypothesis* and somewhat rejects the *Salient Considerations* interpretation of unilateral communication.

Participants with no strategic power mostly avoid referring to the game when given the unrestricted opportunity to speak to the only powerful player.[13] Such dummy behavior is a reasonable tactic since it may be risky to raise fairness issues. Discussing pie distribution and raising fairness issues in a self-serving way may provoke the dictator to assume a self-serving attitude as well. It thus may be better to appear as a friendly and congenial partner.

Overall, our experiment is a paradigm ruling out strategic considerations but allowing for various communication channels. Inducing one-way communication, and using the same communicators in different communication settings allowed to study the social effects of communication on altruistic dictator giving in great detail. We thereby have been able to refine the *Uncontrolled Social Utility Hypothesis* to a more controlled *Social Communication Hypothesis*.

[13] Schmidt and Zultan (2005) report that responders in an ultimatum experiment refer to possible pie distributions and engage in threats and promises in their unilateral pre-play communication.

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A Non-parametric analysis of variance in dummy pairs

To provide a non-parametric measure of variance between allocations in different dummy groups, we run one-sided Wilcoxon Matched Pairs Signed Ranks tests in a complete round robin design for allocations in treatment AV. Results are reported in Table 7 for dictators self-allocations, in Table 8 for allocations to talking dummies, and in Table 9 for allocations to non-talking dummies. In each cell of the tables, only significant p-values are reported. '<' and '>' indicate the direction of the relationship, from row to column, '-' means insignificant, and *,**,*** mark results significant on the 10%, 5%, 1% level, respectively.

x_1 .54	-							
x_2 .60		-						
x_3 .60			-					
x_4 .53				-				
x_5 .59					-			
x_6 .51		< .078*	< .078*		< .031**	-		
x_7 .65				> .059*		> .020**	-	
x_8 .54			< .063*				< .094*	-
	x_1 .54	x_2 .60	x_3 .60	x_4 .53	x_5 .59	x_6 .51	x_7 .65	x_8 .54

Table 7: Variance of dictators' self-allocations

y_1 .23	-								
y_2 .22		-							
y_3 .18			-						
y_4 .20				-					
y_5 .21					-				
y_6 .33	> .055*	> .023**	> .004***	> .031**	> .023**	-			
y_7 .21						< .008***	-		
y_8 .29	> .063*		> .016**		> .016**	> .055*		-	
	y_1 .23	y_2 .22	y_3 .18	y_4 .20	y_5 .21	y_6 .33	y_7 .21	y_8 .29	

Table 8: Variance of allocations to talking dummies

z_1 .23	-							
z_2 .18		-						
z_3 .21			-					
z_4 .27		> .016**	> .078*	-				
z_5 .20				< .086*	-			
z_6 .15	< .094*		< .094*	< .008***		-		
z_7 .15	< .094*			< .023**			-	
z_8 .17	< .063*			< .023**				-
	z_1 .23	z_2 .18	z_3 .21	z_4 .27	z_5 .20	z_6 .15	z_7 .15	z_8 .17

Table 9: Variance of allocations to non-talking dummies

B Experiment Instructions

(translated from German)

Welcome and many thanks for your participation in this experiment. **Please do not touch any of the equipment before we ask you to do so.** If you have problems with the equipment or other questions, please use the microphone, or ask one of the experimenters. Please read the following instructions carefully. Instructions are identical for every participant. You are able to earn money during the experiment. The amount you earn depends on your own decisions and the decisions of other participants of the experiment.

1. The experiment

The rules of the experiment are very simple. There are three Persons X, Y and Z. There is a certain amount of money to distribute, which size is 17 Euros. In the experiment, Person X decides how she wants to divide the money. When doing so she is restricted to some rules, which are described in section 2. Before Person X decides about the distribution, she watches a video tape, which was recorded before with Persons Y and Z. Details about this are described in section 3. Exactly as Person X proposed, the amount of money will be distributed and paid out according to the rules in section 4. The procedure of this experiment requires, that the participants in the roles of X, Y and Z participate in the experiment at different dates. Specifically, the participants Y and Z are invited first, while the participants in the role of Person X participate in the experiment at a later date.

2. Rules for distribution

Person X is bound to the following rules for the distribution of the amount of money:

a) The sum of allocations to the three persons must be 17 Euros.

b) Person Y and Z may only get either 1, 2, 3, 4, 5, 6, 7, 8, or 9 Euros.

c) Person X may only get either 0, 2, 4, 6, 8, 10, 12, or 14 Euros.

Therefore, there are 40 distribution possibilities. These are listed in a table at the end of these instructions.

3. Video recording

In the experiment, persons in the role of Y and Z will be given the opportunity to one-sidedly communicate to the person in the role of X. They have

10 minutes to prepare for this. After the preparation time, participants in the roles of Y and Z have two minutes to record a video message. During this time Persons Y and Z are allowed to speak freely about everything, including the experiment. Before her decision the videos of Person Y and Z are presented to Person X. There are three possibilities: 1. Person X sees and hears none of the two Persons Y and Z. 2. Person X sees Person Y as well as Person Z, but cannot hear any of the two. 3. Person X sees Person Y as well as Person Z, but can hear either only Person Y or only Person Z.

4. Calculations of payoffs

Every participant in the role of Y makes up a pair with exactly one participant in the role of Z. The recorded video of this pair will be shown to exactly 24 different participants in the role of X. Every Person X sees 8 different pairs. She decides for every pair which she sees about the distribution of the amount of money. After the experiment one of the 8 pairs will be randomly selected for each Person X. Then, Person X gets the amount which she allocated to herself. Person Y and Z get the average of the amounts, which 3 persons in the role X have allocated to them. Due to the experimental procedure, participants in the role of Y and Z cannot be paid out immediately after the experiment, because their specific payoff can only be calculated after the participants in the role X have participated in the experiment. To handle the payoffs, one experimenter will be at the university at different times in the following week. The specific dates and locations will be sent early enough by e-mail. However, to pick up your payoff in cash you might come directly to the institute on every working day in the same or the following week, from 9am to 4pm. Participants in the role of X are paid out in cash immediately after the experiment.

If you have any questions regarding these instructions, please ask one of the experimenters.

The 40 different distribution possibilities

x	0	0	2	2	2	2	4	4	4	4
y	9	8	9	8	7	6	9	8	7	6
z	8	9	6	7	8	9	4	5	6	7
x	4	4	6	6	6	6	6	6	6	6
y	5	4	9	8	7	6	5	4	3	2
z	8	9	2	3	4	5	6	7	8	9
x	8	8	8	8	8	8	8	8	10	10
y	8	7	6	5	4	3	2	1	6	5
z	1	2	3	4	5	6	7	8	1	2
x	10	10	10	10	12	12	12	12	14	14
y	4	3	2	1	4	3	2	1	2	1
z	3	4	5	6	1	2	3	4	1	2

C Instructions for the Questionnaire

(translated from German)

In the following, we will ask you for your evaluation of the persons viewed.

Here it is described how to use the scales. In case you are not sure how to fill out the questionnaire have a look at this instruction again.

In case you find a person to rate very similar to an attribute at the end of the scale, then check one of the following boxes

active X o o o o o o passive
active o o o o o o X passive

In case you find a person to rate quite similar to an attribute at the end of the scale, then check one of the following boxes

active o X o o o o o passive
active o o o o o X o passive

In case you find a person to rate lightly similar to an attribute at the end of the scale (but not really neutral), then check one of the following boxes

active o o X o o o o passive
active o o o o X o o passive

Naturally, the horizontal direction of your cross depends on which of the two attributes on the scale describes the person you are rating best.

When the person you are rating can be described neutral with regards to the two attributes, that means that both attributes apply to the person alike, you should mark the box in the middle.

active o o o X o o o passive

Please mark down whether you knew the person you are rating before. Please mark whether you have just seen the person (e.g. at university) but not known her personally, or whether you know your partner personally.