Entitlement in a Real Effort Ultimatum Game

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by

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Data from lab experiments support the claim that individuals have social preferences. Most models of social preferences, however, consider only the distribution of outcomes, not the source of the endowment used in the game. Once the source is considered, outcomes in the ultimatum game are more difficult to interpret. We extend the ultimatum game to allow for responder-produced endowments. We find that offers increase when the responder produces the endowment, but rejection rates are lower. Further, offers remain below 100% of the endowment, suggesting that unproductive proposers feel entitled to a part of the endowment, and responders respect this right. (JEL: C91, D30, D63)

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1 Introduction

In 1981, George Stigler wrote when self-interest and ethical values with verbal allegiance are in conflict, much of the time, most of the time in fact, self-interest theory will win. A massive catalog of laboratory and field studies have gone a long way in challenging the conventional wisdom once held by many economists by illustrating that individuals will regularly and systematically pursue fair outcomes even if it is personally costly. The foundation of much of the experimental research on this topic is the Ultimatum Game (UG) (Guth, Schmittberger, and Schwarze, 1982) and the Dictator Game (DG) (Forsythe et al., 1994).[1] Provided all individuals are motivated only by their material self-interest, Responders in the UG will accept any amount offered. If the Proposer believes that the Responder is self-interested, and is also self-interested, then the proposer will offer the smallest monetary value possible to the Responder. Thousands of UG experiments conducted around the world on a widely diverse set of individuals has, however, shown that Responders in the UG are willing to take costly actions that express their concerns for fairness by rejecting positive offers. The modal and median UG offers are between 40-50%, with average offers lying between 30-40%, and few offers in either the 0-10% or 51-100% range Camerer (2003). Typical results show that offers of 40-50% are rarely rejected, and offers below 20% are rejected about 50% of the time, even when the monetary stakes are the equivalent of several hundred dollars List and Cherry (2000).

Responder rejections in the UG have been generically understood to be an example of negative reciprocity where individuals respond to the feeling of being treated poorly by the Proposer by harming the Proposer, even at a private and substantial cost Camerer (2003). The motivations behind these rejections are not well understood. Many scholars including Frank (1988), Gintis (2003), and Fehr and Fischbacher (2003) posit that experiences in our ancestral past created evolutionary adaptations like negative or strong reciprocity that suggests humans get angry when they are being taken advantage of by others as a survival tactic. Others have argued that standards of fairness (and the reaction to being treated unfairly) are culturally determined, perhaps owing to cultural standards that are transmitted socially through complex processes of socialization. Henrich et al. (2004) find some evidence for the cultural standards hypothesis from a large set of UG experiments performed among a geographically scattered and culturally diverse set of very small hunter-gatherer tribes. In some tribes, responders in the UG accepted virtually every offer made to them, while in others the rejection rate was as high as 67%. Holding true to meta-theories of economic determinism, the authors conclude that both those societies where the productive/economic activity relies upon cooperative production techniques (e.g. team production), and those

[1] In the conventional Ultimatum Game a Proposer and a Responder bargain over a surplus y that is lost if the parties do not agree. The Proposer offers $x \in [0, y]$ to the Responder, keeping yx. The Responder can either accept the offer, thus receiving x with the Proposer receiving yx, or reject the offer in which case both parties receive nothing. In the Dictator Game the Proposer unilaterally decides the division of the surplus y. The Proposer receives yx and and the Responder receives x.

societies that have more experience with exchange under incomplete contracts (e.g. market integration) are more fair-minded than groups that do not have one or both of these experiences, suggesting concerns for fairness are endogenous to cultural/economic habit.

The economic life of an individual in an advanced capitalist society, on the other hand, requires membership in a firm as an input supplier where the assignment of duties to workers and the firms industrial strategy are the responsibility of managers (Dow, 2003; Williamson, 1985; Milgrom and Roberts, 1990). Workers execute their work-task according to their assignment and the owners of the enterprise in turn hold managers in capitalist firms accountable for their performance. Unlike a typical laboratory experiment where the income used in the lab is exogenously endowed, this scenario is one in which one set of individuals produces the income that another set of individuals distributes. Recent evidence from dictator games suggests that the results of an UG where the endowment is endogenously produced could be quite different from the traditional UG (Oxoby and Spraggon, 2008).

Similar to Henrich et al. (2004), in this paper we examine how the specific mode of economic production where one party generates a surplus that is then bargained over influences the perception of fairness. To do this we use a simple extension of the Ultimatum Game where the surplus bargained over is produced by the Responder. Specifically, we implement two basic treatments, in two different versions of the UG. In the first treatment, Responders solve math problems to generate an endowment of \$10, \$20, or \$40 which the Proposer distributes. In the second treatment, the Proposer is randomly endowed with a \$10, \$20, or \$40 endowment. We embed this structure in a Full-UG where proposers can choose any offer between 0% and 100% of the endowment, and a Mini-UG where the proposer can offer either 20% or 80% of the endowment.

There are two main results. First, in the Full-UG offers are considerably higher in the Responder produces treatment for every level of endowment. But, rejection rates are lower, suggesting that at the very least, the Responder's sense of entitlement to a portion of the endowment does not increase when the Responder produces the endowment. In the Mini-UG, the incidence of the 50% offer is somewhat higher in the Responder produces treatment, but rejection rates of the 20% offer are considerably *lower* in the Responder produces treatment. This is the key finding of the paper, as it implies that Responders are less willing to destroy the surplus if they produce it themselves.

The paper proceeds as follows. Section 2 reviews the relevant literature on endogenous notions of fairness and how they relate to the source of an endowment in laboratory experiments. Section 3 presents the design and results of the Full-UG. Section 5 presents the design and results of the Mini-UG. Section 6 concludes, and discusses the implications of the results for future work. There is an Appendix that contains subject instructions for the Responder produces treatment in both the Full- and Mini-UG.

2 Endogenous notions of Fairness: A (Short) Review of the Evidence

Konow (2003) notes that political and moral philosophy has offered no shortage of normative theories that describe what a fair allocation is, yet there is a "remarkable lacunae in

the literature regarding our knowledge of how accurately these theories correspond to the fairness preferences that guide everyday individuals. For example, some normative theories of distributive justice suggest that an individual should own the fruits of one's own labor, or perhaps that these fruits should be distributed from each according to his ability, to each according to his need. Still other normative principles might suggest that distributional concerns should not factor into the calculus of societal welfare. In other words, we know what suggestions Rawls or Nozick might make about how to split a pie under different circumstances, but we know far less regarding what individuals are thinking about when they are actually making such decisions.[2]

We share Konows opinion that the experimental method may offer a way to evaluate positive theories of fairness (or positive theories of value) since bargaining experiments can be altered in simple, salient ways that can be compared to a well-defined set of control characteristics. Some recent research suggests that the source of the income in a bargaining situation does play a role in determining the outcome of the bargain. In particular, there are two relevant papers that we directly build upon: Cherry, Frykblom, and Shogren (2002) and Oxoby and Spraggon (2008). Cherry, Frykblom, and Shogren (2002) find that dictator allocations vary considerably with how the role of dictator is determined, and whether the endowment is produced by one of the subjects. Others have found a similar effect of the source of the endowment on dictator games, namely, when the dictator produces the endowment offers fall considerably (Cherry, 2001; Ruffle, 1998; List, 2007).

Most relevant to this paper is Oxoby and Spraggon (2008), where the dictator game is extended to allow for either the dictator or receiver to produce the endowment divided by the dictator. In treatments where the dictator produces the endowment, without exception, dictators transfer nothing to the receiver. More interesting, however, is that in treatments where the receiver produces the endowment, dictators still only transfer about 50% of the endowment.[3] Of course, this is far above allocations typically seen in dictator games, but is far below the amount the dictators felt entitled to when they produced the endowment themselves.

Oxoby and Spraggon (2008) see this as a legitimization of property rights, stemming from the fact that dictators do offer more when the receiver produces the endowment. They, however, ignore the discrepancy between offers when the dictator produces the endowment and when the dictator does not. Partly because of this, we interpret their results as subjects feeling entitled to a claim on the surplus because of their stated role in the game. In other words, dictators are entitled to a share of the output by virtue of being the dictator. However,

[2]In truth, we also do not know how Rawls or Nozick would actually behave when making allocation decisions. A hallmark of the experimental method is that each observation is explicitly (monetarily) costly to the experimental subject which is thought to help mitigate hypothetical bias in responses. That is, someone could say that they are a Rawlsian, but experiments test whether their actions and behaviors are, in fact, Rawlsian.

[3]There is considerable variation across endowment sizes within the receiver produced endowment treatment. For small endowments ($10), the average transfer is 27.5%, for medium endowments ($20) it is 46%, and for large endowments ($40) the average transfer is 63%.

it is not clear whether the receiver honors the same sense of entitlement that the dictator exhibits. After all, when the dictator produces the endowment, the dictator feels entitled to 100% of the endowment. When the receiver produces the endowment, the dictator still feels entitled to between 25% and 75% of the endowment, despite the fact that the dictator did absolutely nothing to produce the endowment, and is randomly allocated the role of dictator.

In light of these findings, and the ambiguity in interpretation we see, we extend the dictator game protocol used in Oxoby and Spraggon (2008) to compare bargaining outcomes in a UG when the surplus is exogenously determined to the case where the surplus is produced by the Responder via a simple real-effort task. We focus on responder behavior to investigate if concerns for fairness (measured by the rate of rejections conditional on the offer made) change for the Responder when they have produced the surplus, compared to the conventional UG case, where the surplus is simply provided by the experimenter.

The literature suggests that offers of 20% of the endowment are rejected about 50% of the time in conventional exogenous endowment UGs, so in order to investigate if the origin of the surplus affects the rate of rejection, we would ideally have a large number of low offers (20% or less of the endowment) made by the Proposer. There is, of course, no guarantee that a sample of experimental subjects will voluntarily make low offers. Furthermore, it is entirely possible that UG offers by the Proposer could actually increase when the Responder produces the surplus in the same way they do in Oxoby and Spraggons Dictator Game. In addition to collecting data on an ultimatum game where proposers can make any offer they wish, we also exercise further experimental control by collecting data on two mini-ultimatum game treatments where we restricted the choice set to offers the Proposer could potentially make to the Responder to either 20% or 80% of the endowment (Falk, Fehr, and Fischbacher, 2003, 2008).

3 Experimental Protocol 1

In this series of experiments, two different versions of the ultimatum game are played, with no subject participating in more than one treatment of one version of the game. In the first version, the full ultimatum game, subjects are randomly assigned either the role of proposer or responder. Each proposer is randomly matched with at most one responder. Although all subjects are in the lab together, they cannot learn the identity of the person they are paired with. Subjects are then read a set of instructions detailing the task they must complete to produce the endowment, the possible endowment sizes, and that they will play an ultimatum game after the endowment is produced. Importantly, they are told before producing the endowment what their respective roles in the ulitimatum game will be. This is a departure from many of the earned endowment experiments, where subjects learn the game they will be playing, and their roles in the game, after producing the endowment.[4]

[4]This could be a potentially important departure. Because subjects know that they could lose a portion or all of the endowment they produce, they may limit their effort at the outset. Although this is an interesting question, it does not undermine our results, as we will be comparing across

Table 1
Endowment Size, Full UG

Correct answers	Endowment
0 – 13	\$10
14 – 25	\$20
> 26	\$40

Notes: Monetary units were denoted in U.S. dollars in all sessions. The exchange rate was equal to one.

3.1 Production

To produce the endowment, subjects have 5 minutes to correctly answer as many addition problems as possible. The addition problems are randomly generated, but common to all subjects in a given session. The problems consist of adding together three two-digit numbers (e.g. 19+63+45). After the 5 minutes are up, the subjects are informed of how many problems were answered correctly, and how large the endowment is. The endowment sizes are detailed in table **??**. Both the proposer and the responder learn the size of the endowment before the ultimatum game is played.

3.2 Treatments

This part of the experiment has one treatment. The control is the standard ultimatum game, with an exogenous endowment. Here, the proposer is randomly allocated one of the three endowment sizes outlined in table 1. In the treatment, the proposer produces the endowment.

4 Results of the Full Ultimatum Game

Table 2 provides the descriptive statistics for the full ultimatum game (UG). There are 48 subjects in the exogenous treatment, and 62 subjects in the responder produces treatment. The average percent offer in the exogenous treatment (42.5%) is within the range typically seen for UGs. This is of note given that there are few exogenous endowment UGs where it is known by the subjects that different proposers receive different size endowments. Interestingly, there is a considerable variation in percent offers across the endowments. The \$20 endowment has the highest percent offer at 45%, while the \$40 endowment has the lowest at 37.5%. These differences are statistically significant at all conventional levels based on a Mann-Whitney test.

Results are quite different for the responder produces (endogenous) treatment. Subjects were fairly evenly divided between the \$20 endowment (32) and the \$40 endowment (26),

treatments that all have this feature. But, comparison of our results with other earned endowment games should be done with care.

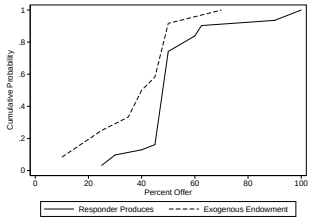
Table 2
Offer and Percent Offer by Treatment and Endowment, Full UG

	Responder Prod.				Exogenous			
	$10	$20	$40	Total	$10	$20	$40	Total
Offer	4.00	10.12	23.85	15.48***	3.33	9.60	15.00	9.83
	(1.15)	(3.15)	(6.51)	(8.72)	(1.78)	(2.48)	(5.16)	(5.62)
	[4]	[32]	[26]	[62]	[12]	[20]	[16]	[48]
% Offer	40.00	50.63	59.62	53.71***	33.33	48.00	37.50	40.83
	(11.55)	(15.75)	(16.27)	(16.53)	(17.75)	(12.40)	(12.91)	(15.14)
	[4]	[32]	[26]	[62]	[12]	[20]	[16]	[48]
% Reject	0	31	0	16	33	0	25	17
	[0]	[10]	[0]	[10]	[12]	[0]	[4]	[8]

Notes: Means are reported. Standard deviations are in parentheses. Frequencies are in brackets. Frequencies count total number of subjects. Significance levels: * 10%, ** 5%, and *** 1% for Mann-Whitney test.

with only 4 in the $10 endowment.[5] Overall, percent offers are considerably higher in the endogenous treatment, averaging 54%. Further, offers at each endowment size are higher than their respective exogenous counterpart. Finally, percent offers increase with the size of the endowment, ranging from a low of 40% for the $10 endowment to a high of 60% for the $40 endowment. This is consistent with what Oxoby and Spraggon (2008) find for the dictator game. Figure 1 confirms what is suggested in Table 2, percent offers in the responder produces treatment are strictly greater than in the exogenous treatment.

Figure 1
Cumulative Distribution of Percent Offers by Treatment, Full UG



The rejection rates in the two treatments are almost identical, at 16% for responder produces and 17% for exogenous endowment, though this hides considerable variation in rejection rates across endowments. In the responder produces treatment, there are zero rejections for both the $10 and the $40 endowment. This makes some sense for the $40 endowment, as the average offer was over 50%, but is more difficult to understand for the $10 endowment. Rejection rates in the exogenous treatment are more intuitive, they are highest for the endowments with the lowest average offer.

[5]Note that subjects only know their own endowment size, they do not know how many subjects have each endowment, so there is no way for a subject to know that the $10 endowment is a rare occurrence.

Table 3
Mini Ultimatum Game Treatments

Endowment	X Offer	Y Offer
Exogenous	80/20	20/80
Endogenous	80/20	20/80

Notes: The X and Y offers delineate the entire choice set available to the proposer. The shares are listed proposer share/responder share.

This result is intuitive, offers go up but rejections stay the same when the responder produces the endowment. On the other hand, percent offers are in the same range as those observed in Oxoby and Spraggon (2008), which is a dictator game where the receiver produces the endowment. There appears to be a fairly close relationship between the preferences of proposers and the responders, respectively, over the distribution of the endowment that the proposer had absolutely no role in producing.

5 Results of the Mini-Ultimatum Game

The full ultimatum game experiment has one key limitation: the range of offers does not allow a good estimation of the probability of rejection for low offers. If producing the endowment has any effect on responder rejection rates, it is most likely to impact the probability of rejecting a low offer. To fill in this gap, we also run a mini-ultimatum game based on Falk, Fehr, and Fischbacher (2003).

In the mini-ultimatum game, proposers are constrained in the possible divisions they can propose. There are two treatments in this experiment: random endowment and responder produces. In both treatments, the proposer can offer 20%, keeping 80% or offer 80%, keeping 20%. The treatment breakdown is in table 3. Subjects play seven rounds, with random rematching in each round, however their respective roles stay the same.

The main results of the mini UG are summarized in Table 4. In the exogenous treatment, the 20/80 split is offered 69% of the time, while it is only offered 53% of the time in the endogenous endowment treatment. Rejection rates also vary considerably between the two treatments, with 31% of offers rejected in the exogenous treatment, but only 17% of offers rejected in the endogenous treatment.

Rejection rates also vary considerably by endowment size both within and across treatments. In the exogenous endowment treatments, rejection rates fall as endowment size rises, demonstrating that subjects are less likely to reject an offer as the absolute payoff increases. For the responder produces treatment, importantly, rejection rates rise with endowment size, indicating that subjects become more willing to reject an offer as endowment size rises. Thus, the larger the endowment the more responders care about distribution when responders produce the endowment, but not enough to raise rejection rates above the exogenous endowment treatment.

Table 4
Rates of 20% Offers and Rejections by Endowment and Treatment, Mini UG

	Exogenous	Resp. Prod.
$10		
20% Offer	67	-
Rejection	47	-
$20 Endowment		
20% Offer	60	52
Rejection	30	15*
$40 Endowment		
20% Offer	80	57***
Rejection	10	24†
Total		
20% Offer	69	53***
Rejection	31	17***
N	70	140

Notes: Results based on Mann-Whitney tests of equality of rejection rates by treatment and endowment. There are no $10 endowments in the responder produces treatment. † 20%, * 10%, ** 5%, and *** 1%.

6 Conclusion

There are four key results from this experiment. First, the average percent offer is higher when the responder produces the output. Further, the increase in average offers represents a shift in the entire offer distribution to the right in the full ultimatum game. Second, in the full ultimatum game percent offers increase monotonically with endowment size in the responder produces treatment, while in the exogenous endowment treatment the percent offer has an inverted U-shape. Third, offers between 25% and 40% are frequently rejected in the standard ultimatum game. Here, only 1 offer in this range was rejected. Fourth, in the mini-ultimatum game the incidence of the 20% offer increases with endowment size while rejection rates decrease in the exogenous endowment treatment. In the responder produces treatment, on the other hand, rejection rates increase with the size of the endowment.

These results suggest that both proposer and responder behavior is a function of both the source and the size of the endowment. The fact that the size matters is interesting in and of itself, given previous work that shows that endowment size doesn't affect distributional choices in the UG. Similar to Oxoby and Spraggon (2008), where dictator offers vary with endowment size, the variation seen here in the exogenous endowment treatments is likely due to knowing that there are alternative endowment sizes available. Further, the fact that percent offers vary with endowment size shows that both proposers and responders care about both the distribution of the endowment and the size of the endowment. This balancing act is particularly prominent in the exogenous endowment Full UG, where proposers offer a smaller percentage for both small endowments and large endowments than for the middle sized

endowment, strongly suggesting the proposers care about their absolute earnings. Similar behavior is evident from responders, and percent offers are about the same for the $10 and $40 endowments, but the rejection rate is 8 percentage points higher for the $10 endowment.

A similar size and source interact in a complicated way, yielding a result that suggests that preferences over distribution are themselves a function of the source of the endowment. This is most evident in the the mini UG, where as the endowment size gets bigger, the incidence of the 20% offer and rejection rates move in the opposite direction in the exogenous endowment treatment, but move in the same direction in the responder produces treatment. Put simply, in the exogenous treatment absolute earnings matter to both the proposer and the responder, and more importantly, the responder correctly anticipates this to be the case. This explains why rejections rates decrease even though the percent of 20% offers increases.

In the responder produces treatment the opposite is true. This is an extremely interesting result for two reasons. First, it shows that distributional preferences weigh more heavily in responder decision making in the responder produces treatment than in the exogenous endowment treatment. Second, it shows that proposers as a whole do not anticipate this effect. Instead of offering more to proposers – in the form of more 80% offers – for the $40 endowment, proposers offer less, and they are punished for it.

There are a number of possibilities that explain why this shift occurs. First, it may be that producers form an affective bond with the value they produce, resulting in a decreased willingness to destroy the value simply because an offer is unfair (an endowment effect working in reverse Thaler (1980). If this were the case, one would expect that responders would state ex post that they deemed the division unfair even though they accepted the offer. Second, responders may feel as though the proposer is entitled to a portion of the surplus by virtue of being the proposer, this is consistent with an implicit principal-agent relationship where the proposer is viewed as the owner and is therefore entitled to a portion of the value produced. Third, it may also be possible that it has nothing to do with fairness or entitlement, and that subjects want to be the type of person who produces more value than they are paid to produce it. Finally, a massive literature in social and cognitive psychology in the obedience paradigm suggests that workers may develop a set of beliefs where they are supposed to be subordinate, obedient, and respectful of authority because it is a social requirement of the role (as a worker) that they are following. This rich (and controversial) literature has been almost completely ignored by experimental and behavioral economists.[6]

Whatever the specific motivation behind the results, the results suggest that descriptive theories of fairness should take into account more than just distribution as two most prominent models do (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000). Theories of fairness need to incorporate the effect of both absolute earnings and the source of earnings in line with Charness and Rabin (2002). Further, the results suggest that the importance of distribution in decision making is itself a function of both absolute earnings and the source of the earnings. In other words, the results imply that distributional preferences are endogenous.

[6]For example, see the seminal works by (Lind and Tyler, 1988) on the social psychology of procedural justice in organizations and (Rousseau, 1995) on psychological contracts.

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