Chapter 50

FAIRNESS IN ULTIMATUM BARGAINING

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When bargaining winds down to its endgame, one party often makes a 'take it or leave it' offer to the other (e.g., Roth, Murnighan, and Schoumaker, 1988). If this offer is a true ultimatum (i.e., it really means 'take it or leave it') and if it provides the recipient with a positive outcome, game theory's models of subgame perfect equilibrium (Selten, 1965) suggest that the recipient should accept it. Since something is better than nothing, the models suggest that rational respondents should accept any positively valued offer, even if it is very small.

Güth, Schmittberger, and Schwarze (1982) tested this prediction with the first experiment on ultimatums. Their ultimatum offerers controlled a specific amount of money and had complete discretion about how much of it to offer to the respondent, who could either accept or reject the offer. Acceptance led to the respondent receiving the amount offered and the offerer receiving the rest; rejection meant that both parties received nothing. Once an offer had been made, it could not be changed, and the respondent could only accept or reject it.

Güth and van Damme's (1998) original experiment had 21 offerers making a single offer to 21 respondents, dividing from 4 to 10 Deutschmarks. Seven people proposed 50–50 agreements, the average was 65–35, and two offers were rejected. The same participants made offers and responses the next week as well, resulting in three 50–50 offers, an average offer of 69–31, and six rejections. The authors concluded that "subjects often rely on what they consider to be a fair result."

Güth and van Damme's (1998) findings have stimulated considerable research on the underlying causes of larger-than-expected ultimatum offers and of ultimatum rejections. Subsequent empirical findings indicate that average offers typically approach 50–50 divisions of the payoff and, as the value of an offer drops, rejections become more frequent (see Roth, 1995 for a more comprehensive summary of this research). Even in games expanded to two or more periods, with offers alternating between the players, there is a strong pull toward 50–50 offers (e.g., Ochs and Roth, 1989). As a result, other authors have also suggested that fairness drives the results (Güth and Tietz, 1990).

Concerns for fairness can lead offerers to increase their offers to be fair to respondents, and it can lead respondents to reject offers that they feel are unfair. Recent research has investigated both possibilities. Several studies (e.g., Croson, 1993; Harrison and McCabe, 1992; Prasnikar and Roth, 1994) have provided data suggesting that larger-than-expected offers are based on offerers' desires to avoid rejection. We present the results of two additional studies here. The first (Straub and Murnighan, 1995) defined fairness for the first time in the context of ultimatum games; the second (Pillutla

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and Murnighan, 1995) manipulated fairness concerns to more clearly determine their part in the calculation of ultimatum offers.

Several papers have suggested that there may be reasons other than fairness for respondents to reject offers. Binmore, Shaked, and Sutton (1985) suggested that spite might drive rejections; Straub and Murnighan (1995) elaborated on this idea with their wounded pride/spite model. They posited that the receipt of an offer that was less than expected would wound a respondent's pride, make them angry, and generate enough spite to reject positively valued offers. The results of Pillutla and Murnighan's (1996) test of this model are summarized here.

Among the increasing number of experiments on ultimatums, it appears that the strongest evidence for fairness comes from Kahneman, Knetsch, and Thaler (1986): they found that people were willing to sacrifice some of their own outcome (taking $5 rather than $6) to punish someone who had offered an unequal division to another player in a previous game. In sharp contrast, Kravitz and Gunto's (1992) offerers reported that they would make extremely small offers if they knew that respondents would accept any offer. Roth (1995) summarized the research on ultimatums by saying that "the deviations from the equilibrium predictions reflect systematic features of the bargaining environment" (p. 274). As the following data will show, these systematic features seem to have little to do with true concerns for fairness.

1. Defining and Investigating the Impact of Fairness Concerns

Straub and Murnighan's (1995) ultimatum offerers made a series of offers, knowing that only one of them might be put into effect. They also acted as respondents, accepting or rejecting a series of offers, ostensibly from different offerers. Payoffs always depended on the selection of one of their offers or responses in a lottery. Individual payoffs ranged from a matter of cents to as much as $97 for a task that took less than an hour; the expected return, however, tended to be quite small.

Our major addition to ultimatum research methods was the inclusion of a partial information condition, where respondents did not know how much offerers were dividing. Respondents in previous studies almost uniformly knew the amount that the offerer was dividing. By including a condition where respondents did not have this information, we were able to operationally define fairness. That is, we defined identical offers in the partial and complete information conditions as truly fair; we defined consistent 50–50 offers as perfectly fair. Offers that were larger when offerers knew that respondents knew how much they were dividing were operationally defined as strategic. The underlying logic here is that offerers will increase the size of their complete information offers to appear fair to informed respondents; they need not be so careful with uninformed respondents.

The results indicated that complete information offers were significantly larger than partial information offers, indicating that most offerers were strategic rather than truly

Table 1
Frequency of respondents who accepted any offer, and mean and median lowest acceptable offers in complete and partial information conditions; experiment 1; Straub and Murnighan (1993)

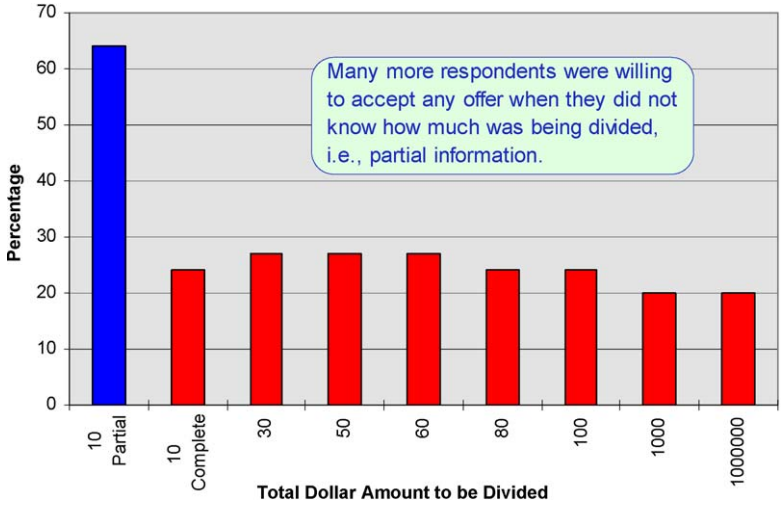
Condition	Number (%) accepting any offer	Mean lowest acceptable offer	Median lowest acceptable offer
Partial information	29/45 (64%)	$1.04	$0.01
Complete information:			
$10	11/46 (24%)	$1.92	$1.00
$30	13/49 (27%)	$6.36	$4.00
$50	13/49 (27%)	$10.38	$7.50
$60	13/49 (27%)	$12.94	$9.00
$80	12/49 (24%)	$17.43	$12.00
$100	12/49 (24%)	$20.21	$15.00
$1,000	10/49 (20%)	$166.68	$100.00
$1,000,000	10/49 (20%)	$104,866.50	$5000.00

Table 2
Expected payoffs to offerers in the complete information conditions; experiment 1; Straub and Murnighan (1995)

Amount to be divided	Optimal offer	Expected payoff from $.01 offer	Expected payoff from median offer	Expected payoff from 50% offer	Expected payoff from optimal offer
$10	$3	$2.39	$5.00	$5.00	$5.33
$30	$5	$7.96	$11.76	$14.69	$15.31
$50	$10	$13.26	$24.49	$24.49	$25.31
$60	$20.30	$15.92	$29.39	$29.39	$29.39
$80	$40	$19.59	$38.37	$38.37	$38.37
$100	$20	$24.49	$43.78	$48.98	$50.61

fair. In addition, respondents indicated that they would accept significantly smaller offers in the partial, compared to the complete information conditions (see Figure 1b). In fact, a majority indicated that, when they did not know how much was being divided, they would accept any offer (even one penny; see Figure 1a).

Our results and those of Harrison and McCabe (1992) also showed that 50–50 offers were actually more effective (in an expected value sense, given our samples of respondents) than small offers and, in many cases, provided offerers with their best possible returns (see Figure 2). More generally, Prasnikar and Roth (1992) suggested that unpredicted, non-equilibrium behavior in ultimatum games is more valuable and effective than equilibrium behavior for offerers. Thus, it appears that expectations of rejection and simple attempts to maximize outcomes can explain the unexpectedly large size of ultimatum offers; norms of fairness need not enter the picture.



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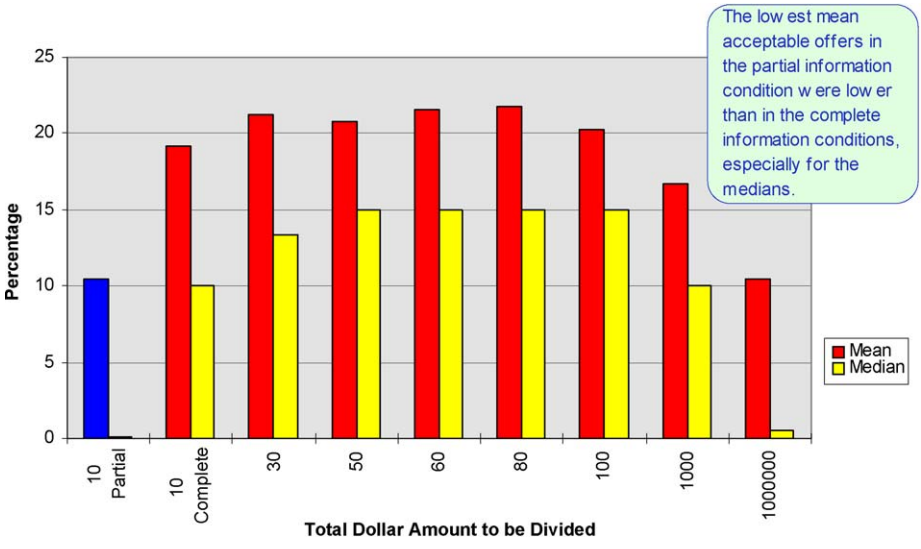


(b)

Figure 1. (a) Frequency of respondents who accepted any offer; partial and complete information conditions (Straub and Murnighan, 1995). (b) Mean and median lowest acceptable offers as a percentage of the total amount to be divided; partial and complete information conditions (Straub and Murnighan, 1995)

Table 3
Mean offers and percentage of the total to be divided (in real dollars) for the information and fairness label conditions; experiment 1; Pillutla and Murnighan (1995)

Amount divided	Information		No label	Cheap talk fair label	Third party fair label
$10	Partial	$\underline{M}$ (%)	3.54 (35%)	2.61 (26%)	4.67 (47%)
	Complete		4.66 (47%)	4.27 (43%)	4.85 (48%)
$30	Partial		7.50 (25%)	5.97 (20%)	13.00 (43%)
	Complete		12.77 (43%)	12.41 (41%)	13.50 (45%)
$50	Partial		10.84 (22%)	8.77 (17%)	21.80 (44%)
	Complete		21.56 (43%)	20.36 (41%)	22.20 (44%)
$70	Partial		14.75 (21%)	12.10 (17%)	29.90 (43%)
	Complete		28.85 (41%)	28.76 (41%)	31.00 (44%)
$100	Partial		19.05 (19%)	14.53 (15%)	41.20 (41%)
	Complete		40.65 (41%)	37.97 (38%)	44.50 (44%)
$1000	Partial		175.72 (18%)	82.20 (8%)	634.80 (63%)
	Complete		498.17 (50%)	353.64 (35%)	652.20 (65%)
$1 m	Partial		63,413 (6%)	61,052 (6%)	240,443 (24%)
	Complete		303,573 (30%)	309,935 (30%)	300,227 (30%)

Note: $n = 66$ in the no labels conditions and 33 in each of the labels conditions.

Pillutla and Murnighan (1995) focused more explicitly on the fairness explanation by inducing fairness norms prior to ultimatum offers. Their study used the experimental method to directly test whether fairness concerns can explain large ultimatum offers.

2. "My Offer is Fair"

Pillutla and Murnighan (1995) attempted to activate fairness norms by providing offerers or independent third parties with the opportunity to add fairness labels prior to presenting the offers to respondents. Offerers in some conditions attached "This is fair" to some of their offers; offerers in others conditions knew that third parties would evaluate their offers and label them fair or unfair before they were transmitted to a respondent. These manipulations were designed to activate offerers' concerns for fairness. They also allowed us to expand Straub and Murnighan's (1995) definition for fairness by suggesting that fair offers should be unaffected by the presence of third parties: offerers who wanted to appear fair rather than be fair would increase their offers when they knew that a third party would be evaluating them.

In the offerer label condition, offerers added a "This is fair" label to a specified half of their offers: they knew which offers would carry the fairness label and which would not. In the third party conditions, offerers were told that an independent third party would evaluate half of their offers and would attach a fair or unfair label (or no label) before

Table 4
Frequencies and percentages of offer rejections (acceptances in parentheses)

Amount divided	Outside options	The offer		Knowledge				
				Partial information		Complete information		
				NotComm Column 1	Common Column 2	NotComm Column 3	Common Column 4	Totals Column 5
\$20	\$0	\$1	Row 1	7 (64) 9.9%	5 (42) 10.6%	12 (59) 16.9%	18 (29) 38.3%	42 (194) 17.8%
		\$2	Row 2	4 (67) 5.6%	0 (47) 0%	8 (63) 11.2%	11 (36) 23.4%	23 (213) 9.7%
	\$1	\$1	Row 3	37 (34) 52.1%	26 (21) 55.3%	50 (21) 70.4%	34 (13) 72.3%	147 (89) 62.3%
		\$2	Row 4	10 (61) 14.1%	4 (43) 8.5%	19 (52) 26.8%	18 (29) 38.3%	51 (185) 21.6%
	\$2	\$1	Row 5	66 (5) 93.0%	44 (3) 93.6%	66 (5) 93.0%	43 (4) 91.5%	219 (17) 92.8%
		\$2	Row 6	34 (37) 47.9%	25 (22) 53.2%	47 (24) 66.2%	34 (13) 72.3%	140 (96) 59.3%
\$2	\$1	\$1	Row 7			18 (53) 25.4%	6 (40) 13.1%	24 (93) 20.5%
\$4	\$2	\$2	Row 8			19 (52) 26.8%	5 (41) 10.9%	24 (93) 20.5%
Totals in exptl. conditions (excluding rows 5, 7, +8)				92 (263) 25.9%	60 (175) 25.1%	136 (219) 38.4%	115 (120) 48.9%	403 (777) 34.2%

a respondent received it; they knew which half the third party would see. The other half of their offers would not be evaluated and would have no label. Everyone made four offers (complete or partial information *x* label/no label) for each of seven amounts: [\$10, \$30, \$50, \$70, and \$100 (for real), \$1000 and \$1,000,000 (hypothetically)] in either the offerer or the third party condition. Participants were told that the two high amounts were hypothetical; actual payoffs were always \$100 or less.

The design gave strategic offerers the opportunity to not only use the partial information condition strategically; it also gave them the opportunity to be more strategic by using fairness claims to reduce their offers even further. In so doing they could take advantage of information asymmetries and a potentially persuasive message. This strategy is the antithesis of fairness.

The results are shown in Figure 3. The data were remarkably consistent: for each of the amounts, offerers made relatively large offers in the complete information and third party label conditions; they made significantly smaller offers in the no label, partial

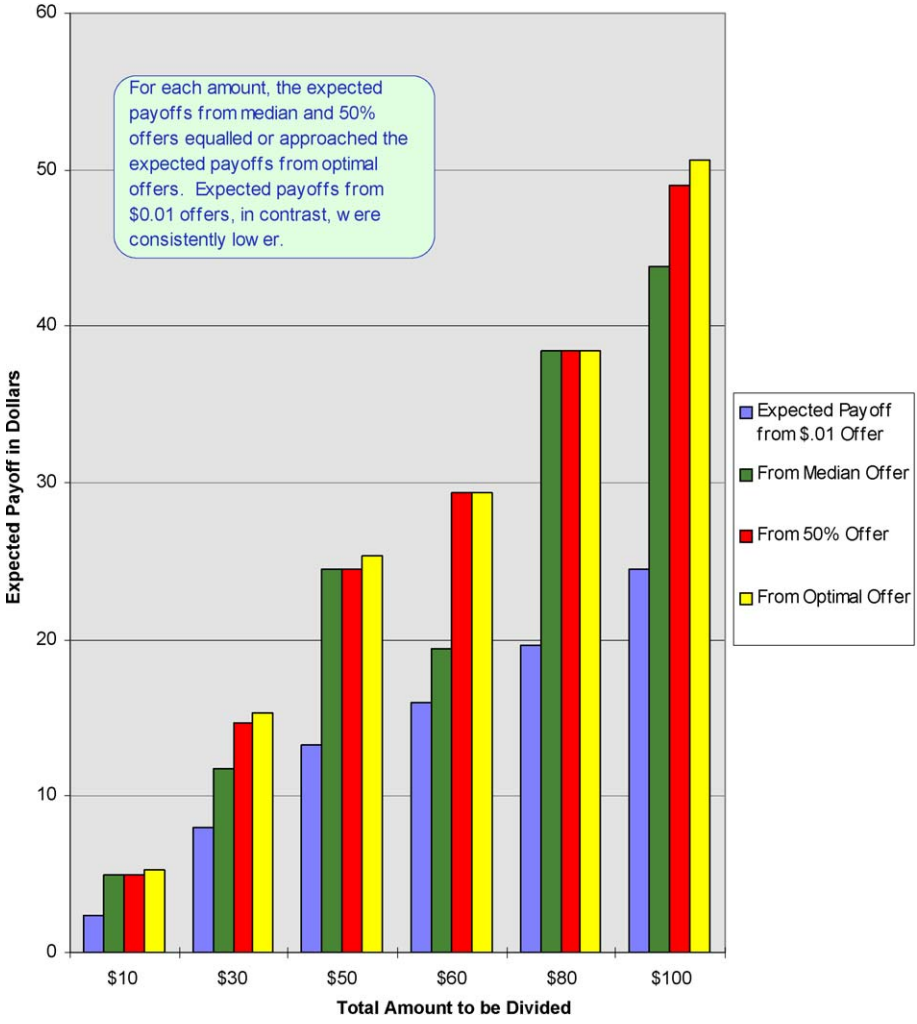


Figure 2. Expected payoffs to offerers in complete information conditions (Straub and Murnighan, 1995).

information conditions; and their offers in the partial information conditions were even smaller (significantly) when they labeled them "This is fair." The same pattern of results surfaced for a frequency count of 50–50 offers.

Only two of 66 offerers made identical offers in the information and/or the third party conditions. When a third party was evaluating offers, almost everyone increased their offers, especially in partial information. When they added their own fairness labels, most offerers took advantage of both the information conditions and the addition of fairness labels: they were about as strategic as possible. Offerers did not treat fairness labels as

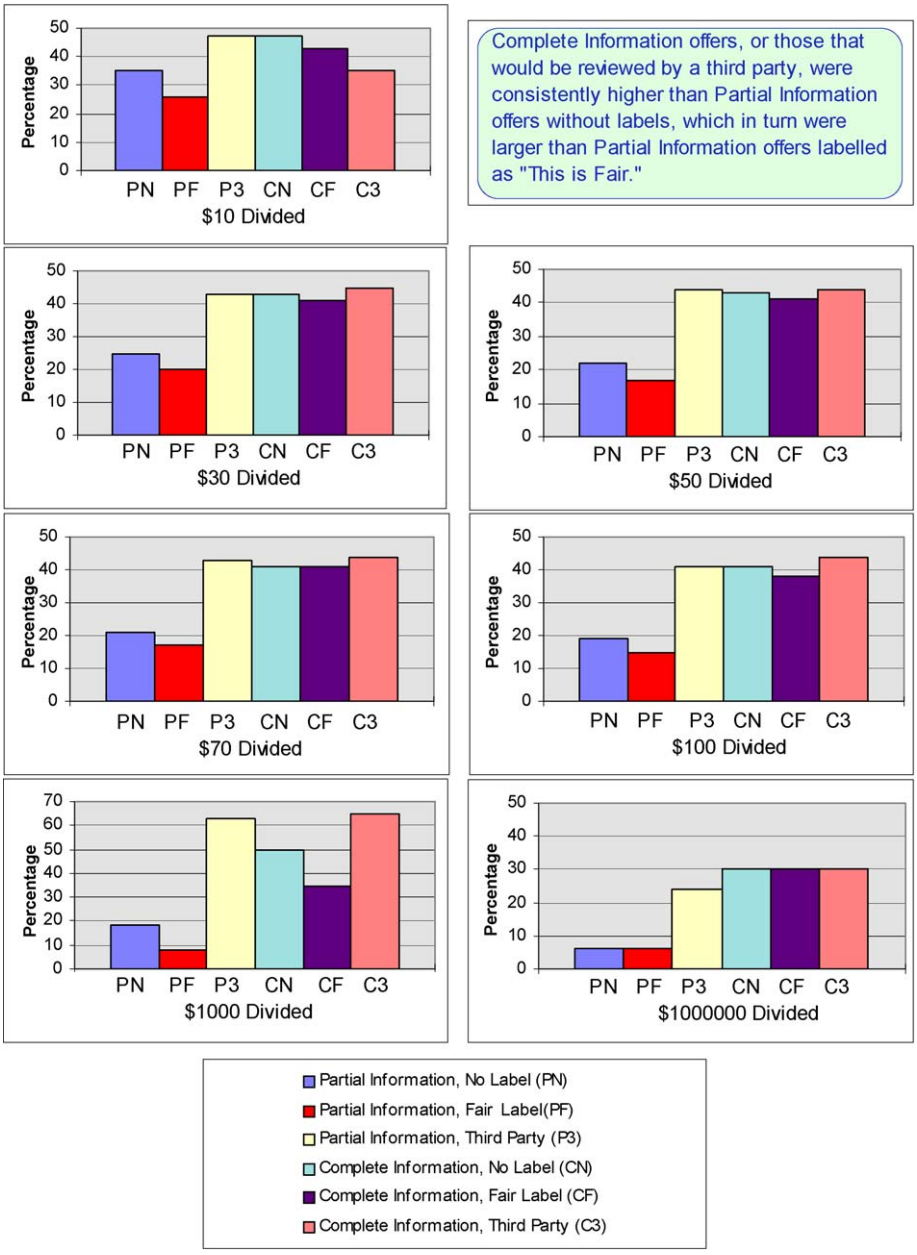


Figure 3. Offers as a percentage of the total to be divided, for information and fairness label conditions (Pillutla and Murnighan, 1995).

Table 5
Monetary offers (in percentages of the amount divided) for the gender and information conditions; Murnighan and Saxon (1994)

Grades	Information			
	Females		Males	
	Partial	Complete	Partial	Complete
3rd/6th[a]				
M	40.4%	42.3%	34.3%	42.2%
Median	50%	50%	42.5%	50%
6th/9th/College[a]				
M	38.3%	42.4%	31.3%	42.6%
Median	42.3%	50%	32.9%	49.1%

[a]Third and sixth grade offerers were dividing $1 in each case, face-to-face; sixth and ninth grade and college offerers were dividing amounts ranging from $1 to $1 million in their responses to a lengthy questionnaire.

if they were cheap talk: they acted as if adding a fairness claim would lead respondents to accept smaller offers, even in the complete information condition. This suggests that people's greed may have overwhelmed their ability to predict their respondents' reactions, a finding that is consistent with Bazerman and Carroll's (1987) and Lawler's (1989) arguments that negotiators rarely put themselves in their counterparts' shoes.

These results go considerably farther than previous studies (e.g., Kahn and Murnighan, 1993; Straub and Murnighan, 1993) by providing almost no basis for thinking that ultimatum offerers are trying to be truly fair. Instead, they seem to be blatantly strategic, trying to look fair when they need to serve their own self-interest.

Pillutla and Murnighan (1995) also included a second experiment that focused on respondents rather than offerers. The results indicated that undergraduate respondents generally accepted offers of $3 or more, even when a third party had labeled them as unfair. More importantly, offerers' fairness claims were essentially ignored; respondents reacted as if an offerer's labels were cheap talk. Finally, the results suggested that fairness did have an impact in respondents' accept/reject decisions: even when they could evaluate their offers in relation to the offerers' likely outcome (i.e., the complete information condition), their choices were still affected by the third party's evaluation.

As in previous studies, respondents invoked fairness as an explanation for rejecting offers. But Straub and Murnighan's (1995) respondents had also acted strategically when they were ultimatum offerers, leading to questions of their consistency if not their honesty. Straub and Murnighan (1995) noted that, in addition to citing fairness, respondents often reacted to small offers emotionally. They proposed that a more complete explanation for the rejection of small ultimatum offers may be wounded pride, and that people invoke fairness as a post hoc, socially acceptable rationalization of their essentially spiteful behavior. The data we report next tested this prediction directly.

3. Fairness, Anger, and Spite

The wounded pride/spite hypothesis states that respondents will look for an offer that they feel is fair; if the offer is smaller than expected, their reaction will be personal (wounded pride and even anger) and they may take personal action (spite) to punish the offerer.

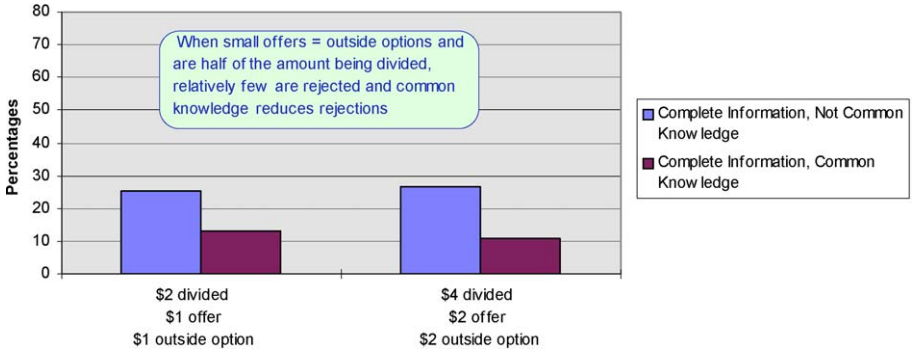
To investigate these phenomena, we needed to create conditions that would generate more than the 15–20% rejections that have been observed in previous research. To do so, this study boosted the amount that offerers were dividing (to $20), gave respondents small offers (either $1 or $2), and gave them an outside option which they allowed them to make clear outcome comparisons. We also gave respondents information about whether offerers knew the value of their outside options. In this way, we created conditions that not only allowed for perceptions of unfairness, but that also gave respondents a reason to be angry.

Surprisingly, many respondents perceive that an offer is unfair even when they do not know how much an offerer is dividing. Croson (1993) reports that a lack of information leads to widely varying expectations: many respondents use the value of the offer to make self-serving but incorrect conclusions about the amount being divided. Respondents who know how much is being divided can use the offerer's outcome as a basis for comparison with their own. We expected that a specific outside option (0, $1, or $2 in this study) would give respondents an even stronger basis for evaluating their offers.

In the common knowledge condition in this study, respondents knew that offerers knew the value of their outside option prior to making offers; with not common knowledge, they knew that offerers did not have this knowledge. We also included two control conditions: offers ($1 or $2) stayed the same but were now 50% of the amount being divided ($2 or $4). The control conditions allowed us to check whether people might reject small offers that were fair (i.e., 50%); rejections would indicate that something other than fairness as the reason for rejecting. In general, we expected that people would accept these offers, even when they had equivalent outside options.

The analyses focused primarily on offers that were identical to a respondent's outside option. In these conditions, we might expect respondents to be most affected by their knowledge of what the offerers knew before making their offers. When offerers did not know the value of their outside option (the not common knowledge condition), respondents might forgive small offers. But when offerers knew their outside option, respondents could then attribute malicious greed to offerers who made small offers, making it easy, at least theoretically, to respond spitefully.

We expected, then, that partial information/not common knowledge would lead most people to accept any offer that was at least as large as their outside option. In contrast, the complete information/common knowledge condition should have generated the most spite and the most rejections. Here, all the blame can be leveled at the offerer. In particular, increased rejections from not common to common knowledge were taken as support for the wounded pride/spite hypothesis.



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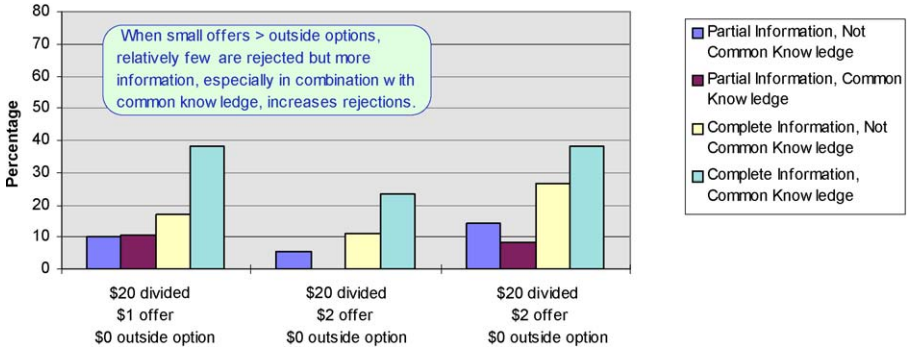

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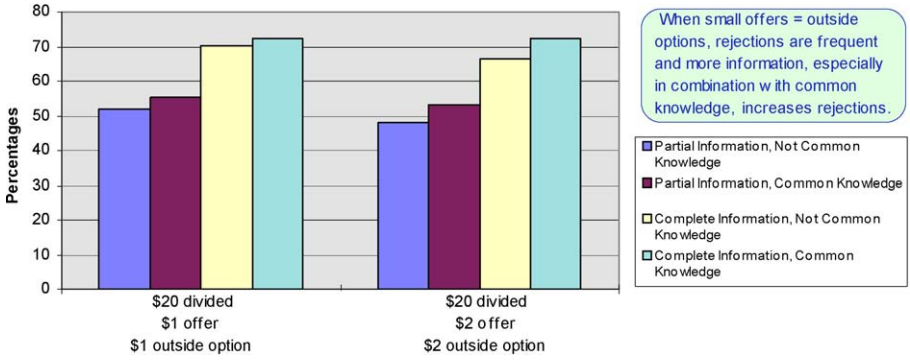

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Figure 4. (a) Frequencies of offer rejections in control conditions (complete information); outside option equal to offer. (b) Frequencies of offer rejections in information and knowledge conditions; outside option less than offer. (c) Frequencies of offer rejections in information and knowledge conditions; outside option equal to offer.

Figure 4 displays the results. Less than 20% of the respondents rejected the control condition offers, suggesting that most of the other rejections depended to a great degree on concerns for fairness (see Figure 4a). Acceptances in comparable experimental conditions ($1 offers with outside options of $1 or $2 offers with outside options of $2) dropped to 44% and 22% with partial and complete information, respectively. We attribute this decrease to concerns for fairness and spite.

Respondents without outside options understandably accepted almost all $2 offers in the partial information condition; they rejected only a few $1 offers (accepting 92.4%). With complete information, rejections increased slightly: 83.7% of the $2 and 73.9% of the $1 offers were accepted. Rejections increased further when respondents knew that offerers knew their outside options.

Overall, partial information offers with no common knowledge led to 23% rejections (excluding $1 offers with outside options of $2); adding complete information increased rejections to 37%; adding common knowledge increased them to 52.8% (see Figures 4b and 4c). This larger increase is directly attributable to spite. The effects of common knowledge were strongest in the complete information condition, i.e., increases in rejections occurred most in the common knowledge–complete information conditions, providing additional support for the wounded pride/spite hypothesis. None of these many rejections are predicted by subgame perfect equilibrium models.

A simple unfairness hypothesis can explain the effect for information, i.e., people who know that the offerer is dividing $20 and can easily determine that offerers will do much better than they do if they accept their small offer reject offers that they perceive as unfair. This supports Bolton's (1991) notion that respondents are interested in both their absolute and their relative outcomes. But a simple fairness hypothesis cannot explain the significant knowledge effect: people reject more offers when they know that offerers knew their outside option. This knowledge allows respondents to surmise that the offerer is taking advantage of them.

The results suggest that fairness concerns are a necessary but incomplete explanation of why people reject ultimatum offers. A more complete explanation is that people reject offers when they are angered by the offer and the offerer. In other words, perceptions of unfairness alone led to many rejections; adding anger seemed to cause spiteful reactions that increased rejections even more.

Also, in the control condition, knowledge had no effect on acceptance rates. This strengthens the conclusion that unfair offers are necessary before people make attributions and get angry. In the control condition, there is no reason for respondents to attribute unfairness to offerers, and acceptances actually increased (not significantly) rather than decreased with common knowledge.

In conjunction with the findings on offerers (e.g., Pillutla and Murnighan, 1995), the picture of the two sides of ultimatum bargaining now looks like this: ultimatum

offerers in games like these have considerable power; they are the first mover and have considerable discretion in the offers they can choose. They seem to recognize their strength, and their apparently automatic reaction is to be strategic and look for ways to increase their own outcomes. They take advantage of fairness labels when they can, and they guard against unfairness labels (and the greater chance of a rejection) when faced with either a third party or a respondent knowing how much they are dividing.

In contrast, respondents are in a much weaker position: they can only accept or reject the offers they receive; they cannot negotiate a better deal. At the same time, they seem to hope and sometimes expect a fair offer (although not necessarily 50–50). When their offer is not as good as they expected, they perceive it as unfair and may react with anger and spite and reject an offer that is otherwise beneficial.

The asymmetry of the two parties' outlooks is particularly striking. Offerers are strategic: if they calculate well, their offers are accepted and they get at least half of the total; if they calculate badly and appear greedy, respondents may reject them, spitefully. Offerers do have fairness concerns, but only in terms of predicting the fairness concerns of their respondents, because this may determine respondents' reactions. Offerers show little concern for the fairness of the outcomes that respondents actually receive.

In addition to the notion that anger may be necessary to stimulate respondents to reject ultimatum offers, Güth and van Damme's (1994) research suggests that, while they may cite fairness as a reason for rejecting an offer, respondents tend to be concerned for fairness only for themselves rather than for fairness in general. Güth and van Damme round that, when respondents received offers with reasonable outcomes and knew that another recipient, whose outcome depended on their decision, received a small, unfair offer, they tended to accept the offers. They were essentially unaffected by the others' outcomes: whether they accepted or rejected an offer depended on their own outcome rather than others'. In this sense, then, it does not appear that respondents are interested in true fairness either. Instead, they seem to use fairness as a rationale to support their spiteful reactions to small offers.

Although these results suggest that fairness concerns play only a small part in ultimatum behavior, at least as we have observed it in our studies, this research has left out one element that has also been neglected in bargaining research in general: that is the development of bargaining strategies. What this research has not addressed is why ultimatum offerers respond to this game strategically, and why reports of a concern for fairness and feelings of wounded pride, anger, and spite characterize respondents.

To try to address these questions, we used ultimatums – a very simple form of negotiation – to investigate how children bargain (Murnighan and Saxon, 1997). In particular, we gave kindergartners, third, sixth, and ninth graders and college students the opportunity to make and respond to a series of ultimatum offers, with complete and partial information, for money and M&Ms. We hoped to find easily identifiable patterns in the development of their bargaining reactions.

4. Ultimatum Bargaining by Children

Anecdotal evidence (Murnighan, 1991) suggests that young children commonly experience ultimatums and other threats; they often react to negotiations with strong, tenacious stands, leading to either a successful outcome or a disagreement. Older children, in contrast, may be able to handle more complex negotiations, but they also tend to lose the younger child's dogmatic tenacity, possibly due to increasing self-consciousness (Elkind, 1980). To date, the research related to children's bargaining has focused almost exclusively on their allocation norms (e.g., Streater and Chertkoff, 1976) or their competitiveness in a matrix game (e.g., Toda et al., 1978) rather than on their bargaining behavior.

Findings consistently show that younger children are own-gain oriented (e.g., Keil, 1986; McClintock, Moskowitz, and McClintock, 1977) and that they become increasingly fair with age (e.g., Avermaet and McClintock, 1988). Research on generosity suggests that children become more generous as they get older (e.g., Zarbatany, Hartmann, and Gelfand, 1985) and that girls are more generous than boys. Research on children's competitiveness also shows that children become increasingly competitive with age across several cultural groups (e.g., Kagan and Madsen, 1972; Toda et al., 1978). An extrapolation of these results to ultimatum bargaining suggests that younger children will be more selfish, less generous, less fair, but less competitive than older children, and that girls will be more generous than boys.

Ironically, these findings suggest that younger children may be particularly likely to make as well as accept very small offers. In other words, studying younger children not only provides an opportunity to map the development of bargaining strategies and behaviors, but younger children may also provide subgame perfect equilibrium predictions with their strongest support.

5. Ultimatums Dividing Money and M&Ms

The younger children in our experiment made and responded to offers of money and M&Ms to anonymous other children. Older children followed the same questionnaire procedures used in our other research. Restrictions by the children's school administrations made paying them impossible.

Respondents received offers of 1, 2, 3, 5, 10, 25, and 50 cents and from 1 to 10 M&Ms, one at a time, until they had accepted three consecutive offers. (Since many of the kindergartners did not know the difference between a nickel and a quarter, their monetary responses were not analyzed.) As offerers, children made partial information offers, dividing 1 and 4, 5, 10, and 11 M&Ms (small and large amounts of an even and an odd number of M&Ms) before making complete information offers using the same amounts. During the experiment, the complete or partial information nature of the situation was frequently reemphasized. We often asked children why they had chosen a particular action; we tape recorded all of their responses.

The results showed that, first, kindergartners exhibited no guile and no inclination toward strategic behavior. As offerers, they usually separated the coins into two roughly equal piles and pushed one of the two piles across the desk as their offer. As respondents, they rarely refused the offer of one penny; they refused the offer of one M&M even less often.

The most striking result for the kindergartners was that 12% of them gave the other child all of the coins and all of the M&Ms. We did not see this behavior in any of the other children.

Unlike some kindergartners, third graders understood the value of money. They also showed the first signs of strategic behavior. In particular, many shaded their partial information offers.

The most noteworthy results for third graders centered around how they dealt with the issue of equality. When they were asked to make an offer dividing 5 (or 11) M&Ms, many asked if they could cut one in half. When we told them that they could not, girls tended to offer more than half (3 and 6), keeping less than half for themselves, while boys did the reverse. At the same time, more than half of the third graders offered 2, 3, 5, and 6 M&Ms (or some slight variation of this pattern) when they were dividing 4, 5, 10, and 11, in both the complete and partial information conditions.

Even more strikingly, when they responded to M&M offers from another child and knew that 10 M&Ms were being divided (the complete information condition), 13 of 40 third graders (7 girls and 6 boys) rejected 1, 2, 3, and 4 M&Ms, accepted 5, and rejected 6, 7, 8, 9, and 10. A lack of equality, for them or for the other child, was the reason given for the rejections. These third graders exhibited what we have called "extreme fairness."

Overall, younger children offered more but accepted less than older children. Girls' offers were equal to or larger than boys', over all age groups. They were also less strategic than boys: they shaded their offers as often as boys, but less severely (see Figure 5). This dichotomy in the sexes appeared among third graders and continued for all older ages in this sample.

Finally, we observed qualitative differences between money and M&Ms. For every age group, more children accepted offers of 1 M&M than 1 cent, in both the complete and partial information conditions: 41% accepted 1 cent in the partial information conditions; 56% accepted 1 M&M; for complete information, 26% accepted 1 cent; 43% accepted 1 M&M.

The only adults in this sample, college students, offered less and were willing to accept less than younger respondents, suggesting a distinct relaxation of the stringent fairness criteria exercised by the younger children. With increasing age, people may be willing to accept much less than half, especially as amounts increase. Other explanations might include the possibility that college students may be less affected by and less prone to quick emotional reactions. Research by Frank, Gilovich, and Regan (1993) also suggests that college students have had the chance to study economics and, as a result, may have become more consistent in their bargaining strategies.

Like adults, children rejected small complete information offers and offered more than small amounts. A third grade boy explained why. When he made a partial infor-

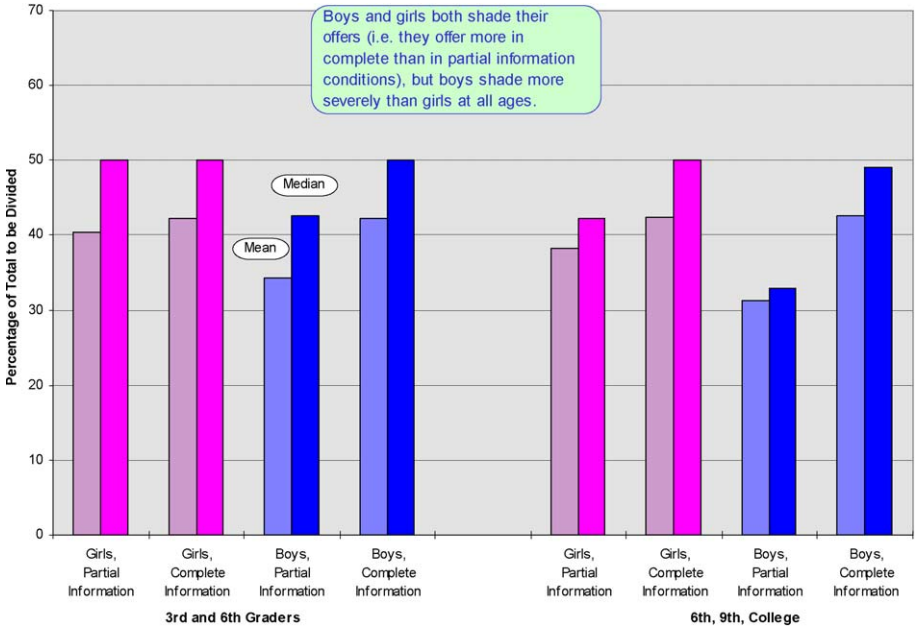

Figure 5. Mean and median offers made by 3rd, 6th, 9th grade and college aged boys and girls (Murnighan and Saxon, 1994).

mation offer dividing $1, he offered 50 cents and explained: "Then it would be 50–50. Both of us would have 50 cents." When he made a similar, complete information offer, he said, "25 cents. No, 60 cents, because sometimes I like to give people some more than I got. Some I let them have all of it, and I just keep what I have. Sometimes money doesn't matter; it depends on what I feel." This quote suggests that young children understand some of the psychological concepts that might be effectively incorporated into economic models. (See Roth and Erev, 1995, for a notable, related example.)

6. Conclusions

Previous ultimatum bargaining researchers tended to conclude that unpredicted outcomes resulted from fairness concerns. In a series of studies, we operationally defined fairness and tested its effects. The accumulated data from our projects document quite clearly that concerns for fairness provide little explanatory value for offerers and only a small part of the explanation for respondents' rejections: the simple cognitive reactions associated with fairness concerns may explain some idiosyncratic rejections; additional, emotional reactions make wounded pride and spite a more compelling explanation for unexpected rejections.

Although fairness concerns may be relevant, they appear to be too simple an explanation for why game theory's strong predictions for ultimatum games are so rarely supported. Self interested offerers want to avoid rejections; unpredicted, non-equilibrium behavior is more valuable and effective than equilibrium behavior (Prasnikar and Roth, 1992). Respondents do not support the theoretical predictions for essentially psychological reasons. In particular, it appears that offerers' and respondents' actions are based on different motivations. Most offerers define the situation as an opportunity for monetary gain; they tend to be blatantly strategic. Many respondents, on the other hand, due to their relatively powerless position, define the situation personally. This asymmetry can lead to disagreement and unhappiness for both parties – for the offerer, following a rejection, or for the respondent, if they accept an offer that they feel is unfair. From a strictly utilitarian perspective, these reactions can lead to considerable inefficiencies. From a social perspective, they can sour negotiations and make future interactions particularly problematic.

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