

INFORMATION CONTROL AS A BARGAINING TACTIC  
IN SOCIAL EXCHANGE NETWORKS

by

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## ABSTRACT

This dissertation is concerned with the process by which social actors conceal information about the true level of their profits in exchange interactions, so that they may deviate from a norm of fairness calling for equality of subjective profits to the parties in an exchange. Two factors are posited to act as constraints on the potential advantage of information control -- a preference by social actors for reliable information that allows comparison with exchange partners; and the availability of alternative exchange partners who do not conceal their resources.

In this context, we outline six exchange situations characterized by different distributions of information (symmetric and asymmetric), and by different numbers of alternatives. One case, involving asymmetric information and several alternative exchange partners, is selected as the focus of this study. A theory is constructed to make predictions concerning the nature and direction of initiations of exchange, the perception of advantage in information control, and the likely success of tactics of concealing information about resources from potential exchange partners.

The predictions are subjected to test in an experimental study, involving 336 subjects in 42 experiments. The results are largely supportive of the predictions that: 1) people who can conceal their resources make more attempts to gain advantageous exchanges; 2) people prefer to enter exchange transactions in which they have reliable information about their partners; and 3) people direct more initiations of exchange to others who possess relatively large amounts of desired resources. The few cases in which negative evidence arose are evaluated, and attention is drawn to aspects of the theory and experimental design in need of further investigation.

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## CHAPTER 1

### INTRODUCTION

Most people have expectations that social exchange typically involves a trade of equally valued units. However, as the value assigned to units of goods and services is subjectively determined, this leads to the potential for social actors to conceal and distort the true value to them of what is traded. Can people control information about the resources they possess, and those they wish to possess, to their own advantage? What happens to them if they try? Is such an advantage limited to the case in which the person being taken advantage of has no alternatives? These are the questions with which this study is concerned.

First, we wish to examine the process by which actors conceal information about the true level of their profits in exchange transactions, so that they may deviate from a norm of fairness calling for equality of subjective profits to the parties in the exchange. Second, we are interested in whether social actors display a preference for exchange relationships in which the partner does not control information about his profits, and the consequences of such a preference. To this end, we will construct a set of hypotheses which have their basis in the more general theory of social exchange. We will then see how our ideas stand up when we subject them to test in an experimental representation of a social exchange situation.

In the present chapter, a review will be provided of the social exchange framework, elaborating those concepts from it that are relevant to the present study. These will include the concepts of reciprocity, fairness, social prices, subjective profit, and resources. In this context, the advantages will be considered that might accrue to the actor who can control information about his needs and resources. Attention will be given to the questions of when an actor is likely to desire advantage in exchange, and under what conditions he is likely to succeed, with the use of information control as a tactic for gaining advantage. In outlining this latter issue, we will extend a psychological principle of a 'preference for avoiding uncertainty', to argue for the existence of a preference for exchange relationships in which partners to an exchange know the true level of each other's profits. We shall argue that in the presence of alternatives about whom information is available, this preference places severe constraints on the success of controlling information to gain advantage.

### Social Exchange Theory

#### 1

In the framework of social exchange, interaction between two or more actors is conceptualized as a mutually reinforcing transfer of commodities and behaviours that are valued in specifiable ways by the participants. An actor, Person, engages in goal-directed behaviour, requiring interaction with others who are similarly engaged in meeting their goals. To satisfy his needs, Person must find an Other who has what Person wants, and who is willing to give it up in return for something Person has.

An Example

Consider two students, Peter and Olga. Peter is good at English, but can barely scrape through Math. Olga, on the other hand, is a whiz at Math, but has never done well at English. These two students are in a position to set up an exchange relationship. Peter can write Olga's essays, and Olga can let Peter copy her Math problems, or, if they are more honest, they can help one another study. But how many essays should Peter write in return for a set of Math problems? A lot will depend on how bad Peter perceives Olga to be at English, and on whether she can get help elsewhere. And Peter's perception of these things can vary. If he has never seen Olga in an English class, and does not know her grades, Olga may be able to convince Peter that she needs less help at English than he does at Math, or that it takes her a great deal of effort to help him with Math problems. If, in addition, Olga is sure that Peter is an utter dunce at Math, she may have him at an advantage. Accordingly, she may be able to demand a lot of help in English to make it worth her while, or to demand some additional reward, such as rides to school. Even more than in economic exchange, where prices tend to be standardized, the perceived worth of resources (and these may range from skills and deference to concrete goods) is something that can be influenced by how the actors present themselves, and what information they make available. Let us now review how exchange theory would describe the interaction between actors such as our imaginary students.



### The Actors in Social Exchange

Statements making up an exchange theory of interaction are meant to apply equally to both parties to a relationship, but it is easier to frame the statements in terms of a focal person, whom we shall call P. Although some exchange theorists<sup>2</sup> would question the importance of giving the actor the capacity to calculate rewards, costs, and the probability of receiving both, most researchers would usually employ some model of P as a decision maker (acknowledging that there are many similarities between an exchange and a decision theoretic model of man). Person is assumed to be a maximizer. He has several goals or needs, and pursues things which give maximum satisfaction of these needs. In this context, P is faced with two general problems: which needs shall he try to satisfy, in the near future; and where shall he go to get the things he needs. The first involves the way in which P assigns value to resources, and we shall address this question below. The second involves alternatives, or opportunities for meeting P's needs, and we shall delay this problem to a later point in the chapter.

### Valuation of Resources

For purposes of discussion, we will first consider the actor, P, and two commodities or behaviours X and Y (such as help in Math and help in English). So long as X and Y can satisfy some of P's needs, they constitute resources. Reward refers to resources gained; costs are the resources foregone in obtaining the reward. We designate profit as the net result when costs are subtracted from rewards.<sup>3</sup> Because P is a maximizer, so long as the reward

value of Y exceeds the costs in X lost in obtaining Y (i.e., so long as his profit is positive), P will take actions to obtain Y. Such action indicates a preference for Y over X.

What is the basis for saying that the rewards to P of Y exceed the costs to him of X? The original source of such valuations is that P has learned to need and like certain resources more than others, and can order them according to how much satisfaction they give. We will not be concerned here with how and why P has been socialized to need Y more than X, and thus gets more reward from Y than X (as, for example, when we say P values a career more than marriage, or coffee more than tea). We will assume that although it may be difficult to ascertain what kinds of things P wants, the researcher, and other actors, can find this out by looking at P's past behaviour, to see what he and other people like P have pursued, and by asking P what he values. Peter's bad grades in Math would give us an indication that he would value help in Math, and value it more than help in English. General preference orderings based on a hierarchical ordering of needs are likely to be relatively constant for the short run, and may be regarded as given. We will simply assume that we have discovered a small set of resources that P does value, and that he ranks each about equal in importance. It is then possible to focus on a second sort of value, which hinges on the quantity of a given resource P has received in the recent past, relative to other resources.

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From the psychology of reinforcement, we know that the more P has obtained of resource Y in the immediate past, the less value he will receive from successive equal increments of Y. Our student Peter could not spend

endless hours getting help on Math problems from Olga, as he would eventually become satiated. Thus, the rewards to P of successive increments of Y are assessed relative to the amounts of Y already possessed. Further, if P is giving up X (costs) to get Y, as his store of X diminishes, successive increments of X will constitute higher and higher costs to P. P will reach a point when the costs of what he is giving up will equal the gain of the latest increment of Y. When he reaches this point, he gains nothing in trading X for Y, or vice versa. P has reached an equilibrium, and will stop, or pursue a third resource. <sup>7</sup> It is a hard fact of life that P cannot have all the X, Y, Z, etc., that he wants, because resources are limited. Since P desires several resources, when he has reached a certain level of X, he will gain more by diverting his activities to obtaining another valued resource. Thus, maximum profit is obtained by getting an optimum balance of resources. In the cases of interest to us, he does this by entering <sup>8</sup> into exchanges.

### Interdependence of P and O

Exchange theory makes explicit recognition of the fact that many of the events that affect P's ability to get what he wants depend on the preference and behaviour of another actor. <sup>9</sup> In the case of Peter and Olga, whether Peter gets his desired help in Math, and how much, depends on whether he can mesh his needs and resources with hers. <sup>10</sup> It is generally assumed that an exchange transaction will only take place if both parties perceive that they will be better off after the exchange has taken place than they were before it. In other words, they must both receive a positive profit.

An exchange transaction requires two decisions: P's decision to give up X for Y, and O's decision to give up Y for X. Once P and O decide they can profit from an exchange, the basic problem is to agree on how much profit each should receive. It is obvious that the basis for exchange lies in a difference in the relative valuation<sup>11</sup> of each of two things by each of two parties. We take as given that P and O both want X and Y. The inverse relationship between the amount of a resource possessed (the resource base), and the subjective value of further increments of that resource, describes a value function, mapping one set of values (here, units of resources), into another set (here, subjective rewards and costs to the actors). The particular value function we have described allows us to assume that the same objective amount of X or Y may have a different subjective worth to different actors. If this were not true, there would be no room for an increase in total subjective value through exchange -- P would gain as much from having a lot of X, as from having a balance of X and Y.

If we further assume that the actors are aware of the value function by which rewards and costs are evaluated relative to resource base, we have a means of handling the question of the comparison of profits in exchange. So long as P also knows O's resource base (i.e., in addition to knowing the value function), he is able to take the other person's point of view to assess how much O will value given increments of X and Y in an exchange. This process is sometimes referred to as empathy, or role taking. The process of role taking is made easier for P if he has had experience in a position similar to O's, or if he has had an opportunity to observe similar

actors in similar situations to O's. The simplest case holds if P can assume that O values things in the same way P does (i.e., that O is like P).<sup>12</sup> The more dissimilar O is, the less accurate P is likely to be when he assumes the Other's point of view.<sup>13</sup> It is undoubtedly true that a certain amount of error is usually involved in P's determination of O's value function, but we are more interested in the consequences of P's knowing how O values resources, when he may or may not know O's resource base. P cannot easily use role-taking to determine the latter, as it is more subject to variation in short time periods. Lack of information about someone's resource base interferes with the comparison of profits and the setting of terms in an exchange. Thus, in this study, we will begin with the case in which P's and O's value functions are known to each other, and these value functions are the same, except that there is complementarity of resources possessed. This case lends itself to experimental control. What will vary is the information actors have about resource bases; and therefore, what would be the relative levels of satiation for different resources. It is intended that the theory will eventually be shown to apply to social interactions where P and O do not necessarily value commodities in the same way, and to situations in which P and O must first discover one another's value functions.<sup>14</sup>

Most exchange relationships permit a variety of terms, in which the profit to P and O varies. The terms of the exchange can give equal subjective profit to both, most of the profit to P and little to O, or this may be reversed.<sup>15</sup> It is important for P and O to have information about how

much each has of X and Y, to determine how far the other can be pushed before the transaction collapses (i.e., if P or O receives zero profit). According to Kuhn, P and O will settle at a point mid-way in the overlap of their preferences.<sup>16</sup> This process is captured by the concept of fair, or equitable exchange.

### Fair Exchange is No Robbery

While every actor prefers to gain as much as he can in an exchange, the very fact that both interactants are striving to get as much as possible, means that there are opposing forces on any given P: P's own preferences about his profits lead him to attempt to pay as little as possible to O for as much as he can get, without losing the transaction. Other, however, has the same preference, but with regard to O's own profits, which can be realized only if P gets less than, not more than O. Under full information, we expect the result to be some sort of compromise. This has the net effect of pushing negotiated social prices to a point where each is satisfied that he is doing as well as the other.<sup>17</sup> This point we call 'fairness'. Thus, reciprocity and fairness are not seen as moral obligations on the part of actors, but rather as a prudential realization of what is possible and necessary to accomplish one's goal.<sup>18</sup> We would all like to get something for nothing (as maximizers), but we do not usually act on the expectation that this will occur. In a similar vein, Emerson states:

"What Gouldner calls the norm of reciprocity may be little more than the widespread human recognition of the contingencies intrinsic to all social exchange."<sup>19</sup>

The expectation of fair exchange is well documented in the literature on equity.<sup>20</sup> In addition, studies of bilateral monopoly show that with full information, subjects tend to a stalemate around a fair division of profit.<sup>21</sup> In these studies, subjects had no resource base from which to begin making offers, and therefore no costs.<sup>22</sup> A study by W. Foddy showed that subjects with differing resource bases tended to trade in such a way that both parties to the transaction received equal subjective profits, defined relative to the resources they possessed. Both of these studies lend support to the view taken here that P does not simply assess outcomes on the basis of his own profits, but that a comparison with O's profit also enters into his evaluation.<sup>23</sup> As we have noted, such comparisons will take into account the non-linear relationship between the value of an exchange unit, and the objective amounts of such units.<sup>24</sup> Empirically this means that if P can exchange with  $O_1$ , who has a great deal of Y, and  $O_2$ , who has less Y, P may pay more X to  $O_2$  than to  $O_1$ , yet both transactions could meet the criterion of fairness.

#### Advantageous Exchange

It has been suggested, on the one hand, that P sets out to maximize his profit, and, on the other, that as a prudential person, he is limited by restraints of fairness. We have assumed that exchange is typified by 'antagonistic cooperation',<sup>25</sup> where the actors must exchange to profit, but where the terms of the transaction are in conflict. This structure of rewards in exchange relationships encourages in P a desire to profit more than

O, since this is equivalent to a desire to maximize. (There is evidence that people are more uncomfortable when an unfair exchange favours Other, than when it favours self.)

Given that P will mainly have available exchange relationships which tend toward a balance of profits, what options are open to him to realize his desire to obtain more than would be possible on a strictly fair exchange? One obvious way is to affect real changes in the valuation of behavioural products (e.g., P can decide he really does not need Y), or changes in the scarcity of goods (for example, by limiting Other's sources of X). This topic has been dealt with in detail by other researchers. If such real changes are not possible, are there any other ways that P can obtain more than a fair exchange would allow? Since individuals act on the perceived rates of supply and demand, P may be able to affect the perceived values and the perceived availability of resources. If so, he could affect the perception of what is, in fact, fair. This is possible if he can control information that is used to assess the balance of subjective profits in an exchange.

### Control of Information

The control of information as a tactic for increasing one's outcomes is of interest to symbolic interactionists and exchange theorists alike. Both frameworks are interested in the manner in which Person acts to limit the range of behaviours emitted by O, so that O will do those things P most prefers. P's shaping of O's perception or definition of the situation



figures large among tactics open to the actor. This may involve concealing the 'truth' about oneself from other, while trying to discover as much about other as possible.

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Advantageous exchange means maximization of outcome in terms of the balance of rewards and costs for the individual. Maximization, in turn, is likeliest when the other's outcome values for various acts of yours are known to you, but your rewards and costs are not known to him. (Thibaut and Kelley, 1959). Peer relations provide a good training ground for learning to conceal one's rewards. Others should now know how important it is to you to have a particular baseball card, or that you have a duplicate of the one you are trading. Being too eager can result in the other's demanding higher payment for the resources under his control, so that the ability to keep one's 'cool' comes to have tactical value for the child.<sup>31</sup>

Thus Weinstein argues that in an exchange relationship, if P can conceal his reward and cost levels from Other, then O cannot assess what would constitute a fair exchange, even when O knows how P assigns value to X and Y, when he has certain amounts of X and Y (i.e., even if he knows P's value function). This principle has been accepted by researchers such as Emerson, Thibaut and Kelley, Schelling, and Kuhn, although systematic empirical support for it is lacking. But is concealment always an advantage? How does it actually work? Our purpose in the rest of this chapter will be to explore the process in more detail, in order to delineate the conditions under which tactics involving control of information are likely to succeed. In order to do this, it is first necessary to further develop the following three areas: 1) the mechanics of concealing information about profit in exchange situations; 2) the importance of alternative exchange relationships to the process of arriving at the division of profit in a transaction; and 3) the desire by Other for information about P's profits.

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As we shall see, 2) and 3) can severely limit the advantage claimed for concealing information.

### Concealing Profit in Exchange Transactions

Let us assume that P and O have discovered that their relative valuation of X and Y are such that an exchange will provide positive profit to both, and further, that the overlap of their preferences is large enough to allow more than one set of terms. The more P knows about how O values X and Y, and what amounts of each he has, the better is he able to compare his own gain with O's, to know the value O will attach to increments of X and Y, and to anticipate the sort of terms in a transaction O is likely to consider fair and acceptable. If P can at the same time conceal his true interests, he can argue for a larger share of the total profit, as if it were the fair solution.

In the language of negotiation, we can say that Other would be forced to what Bartos calls a 'soft' bargaining position, because Person knows the point of minimum positive profit to Other. P can limit O to this point, by pretending that he (P) will not profit by any other agreement than the one yielding minimum profit to O. If P is not hampered by Other having reciprocal information, he can adopt a "hard" strategy, involving high initial demands, and small concessions in negotiation. Where there is full symmetric information, of course, a hard bargaining strategy on P's part is likely to be met by an equally intransigent position from O.

Emerson states that if P conceals his profits from O, P will attempt to obtain an advantageous exchange using whatever means are avail-

able, but he claims that "...when the parties make assumptions or have knowledge about X (the profit to be shared), their judgements concerning equity and distributive justice enter, probably operating as restraints upon the use of bargaining power."<sup>34</sup> This argues that deviation from norms of fairness is more likely if there is secrecy, because the possibility of sanction is lower if the deviation is not recognized.

Another aspect of the advantage for P in having asymmetric information is that Other is not aware that P is being a hard bargainer, trying to gain an unfair profit. Cummings, et al., and others<sup>35</sup> have shown that a hard initial bargaining stance by P has the effect of lowering the level of aspiration of his opponent, and of leading to higher payoffs for P than does a fair strategy. Liebert, et al.<sup>36</sup> also found that a bargainer uninformed of P's payoffs for various agreements made use of P's initial bids to decide what was a reasonable agreement. In the absence of factual information about P's resource base, O has to rely on cues emitted by P as to P's profits, and the minimum terms of a transaction that P will find acceptable. Of course, it is even better for P if O simply assumes that P will suggest fair terms, but this is not necessary for P to have an advantage, so long as he is the only exchange partner available to O.

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After Kuhn, we will refer to the concealment of information about resources and profits to gain advantage as 'informational tactics.' Because profit varies with both rewards and costs, this suggests two possibilities for P -- he can conceal his true rewards, his true cost, or both. Let us examine these tactics in more detail.

Concealing true rewards: Weinstein's idea that P should not let O know 'how important it is to him to have a particular baseball card' is related to the idea that if P has very little Y, any small amount more will be highly valued, and will produce a relatively large subjective reward. If he can conceal his lack of Y (and therefore the true value of Y to him), he may be able to get more absolute units of Y by giving the impression that he does not value Y as much, as in fact he does. If O does not know how much reward P gets from a given increment of Y, O may feel that he must give up more Y for a given increment of X, in order to get into interaction with P. P then ends up with more profit than does O -- an advantageous exchange. The typical ploy here is to create the impression of least interest, exemplified by Tom Sawyer's skillful handling of the whitewashing. In this case, P (Tom) actively engaged in deception concerning the reward value of whitewashing. Further, Kelley <sup>38</sup> claims that "concealing information about one's situation has possible advantages of successful deception", because P can delay the decision to deceive, without giving away his true position. In this dissertation, we will focus on the process of withholding information. Both withholding and concealing information are used with the same intent by P -- to manipulate O's perceptions in a manner that serves P's interests.

Concealing true costs: Concealing the subjective value of rewards is not the only way advantageous exchange can occur. P may conceal his true costs. The idea here is that if O thinks P has a lot of X, i.e., the commodity O is asking for, that P therefore assigns relatively low value to an increment of X. <sup>39</sup> O will not feel he has to give up a large amount of Y

(what P wants) to balance the exchange, because P can afford to be generous. The less Y an Other has, the more he will feel free to ask for a greater absolute amount of X relative to the Y he gives up. However, if O does not know that P has a lot of X, or can be led to believe that P has very little X, then even a small increment of X has high subjective cost to P. As a result, Other will feel he cannot ask for as much X for a given amount of Y. P again makes an advantageous exchange. Small boys trading hockey cards<sup>40</sup> will frequently use a tactic called 'begging' -- getting cards from someone who has a lot, and giving none in return. The 'begger' often has as many cards as the person he begs from, but a successful begger knows enough to leave these cards at home.

While the discussion above has implied that parties trade in objectively comparable units (cards for cards, time for time, etc.) in many cases where the units are dissimilar, it is the function of prices to define what can be given in exchange for what, and from this base can be defined what constitutes excessive wealth, poverty, etc.<sup>41</sup>

Having established our description of exchange relationships in which no one has a power advantage, where an expectation of fair exchange exists, and where there is some opportunity for P to manipulate the kinds of exchanges that are perceived to meet the requirement of fairness, we can turn our attention to the tactics that Other can employ. An exchange interaction, as pointed out earlier, cannot be thought of simply as something P does with, and to, Other. Other is at the same time trying to do something with, and to, P. We would like to argue that while people will indeed attempt to work advantageous exchanges when their resources are concealed,

that the failure to provide O with information places limits on the success of P's tactics. This leads us first to the question of how alternatives affect the terms of a transaction.

### Alternative Exchange Relationships

So far we have pictured P and O in an isolated dyad; with the possible exception of romantic love dyads, this is not a very accurate picture of relationships in the real world. Actors usually have more than one potential relationship into which they could enter. Whether a particular Other is chosen by P depends on whether P prefers that relationship to alternate transactions. Since we claim that P assesses exchange relationships in terms of his own profit, and how his profit compares with O's, the principle of maximization of profit says P will prefer the alternative that is most appealing on these two dimensions. In any P-O dyad, P will not have to give any better terms than he would give in his next best alternative. The same limit holds with respect to O's alternatives. If one party in a dyad has more or better alternatives than the other, we say he has a bargaining  
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advantage, or bargaining power. In this dissertation, however, we are not interested in real power that results from an unequal distribution of alternatives. Rather, we wish to ask what will happen when P and O have equal numbers of alternatives (some or none), which differ in the amount of information available concerning the resource bases.

Commenting on the failure to provide alternatives in experimental studies of bargaining, Kelley and Schenitzki note:

It is probably most common in bargaining situations, including the strictly economic ones, that each party has one or more alternative sources with which to deal, should he be unable to reach agreement with the party at hand.<sup>43</sup>

As soon as there is more than one potential partner, we may ask what sorts of people will be preferred as partners, and what effects hiding resources is likely to have.

#### Other's Preference for Information about P

Consider Other, now, as the focal person. What we have said about the importance of alternatives applies with equal force to O. We stipulate that O is unable to conceal information from P. As an initiator (designated  $O_i$ ) Other will want to assess potential transactions in terms of his own profit relative to  $P_r$  (where  $P_r$  is the recipient of an initiation from  $O_i$ ), and in terms of how much it is necessary to offer  $P_r$  to ensure a transaction. As a recipient (call him  $O_r$ ), Other will want to see whether he is being asked for a fair trade, or whether he is paying excessively for a resource. In either role, O will want information about P. As a result, in the context of asymmetric information, where O's position is known to various P's, O may avoid contact with those P's about whom he has little information. If he does, this will surely constrain the advantage P finds in concealment.

If people typically have an expectation of fair exchange, is there any basis for predicting that P will avoid exchange relations in which he does not know P's resource base? If O is unable to assess whether a transaction has been/is fair, he may assume that P is constrained

to act fairly, just as O is; or he may assume that P, whose profits he cannot see, is motivated to deceive him; or he may assume that either guess is equally likely. Or he may assume nothing. In the latter three cases, O is likely to prefer alternate, different exchange relationships, where he can assess the balance of profits. An exchange partner about whom O has no information might turn out to be a better alternative in fact, i.e., he might be willing to pay a better price for Y. However, if the latter were true, O may think that P has no reason to conceal his resources in the first place. While it seems reasonable to posit a preference for information,

we would like to have some evidence that such a preference does exist, because this is the basis on which we argue that information control has limits as a tactical advantage. Studies of bargaining and exchange do not give any hard evidence for a preference for information, though its importance is implicit in the desire to avoid unfair exchanges. However, there are some studies concerning the validity of rationality postulates in decision making that indicate a preference of the sort we have described.

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Research initiated by Daniel Ellsberg has shown that subjects often prefer a bet for which the probabilities of events are known unambiguously (risky bets), to bets for which the probabilities of events and outcomes are completely unknown (uncertain). Typically, subjects in these experiments have to predict which colour would be sampled from either:

- a) an urn with 50 red and 50 black balls (risky)
- b) an urn with a total of 100 red and black balls in unknown proportions (an uncertain bet).



The subject could decide to make either bet a or bet b. He won \$1 if he correctly predicted the colour of a ball that would be drawn. Making the assumption that the best estimate of the proportions for the second urn is .5 black and .5 red, the expected value for a bet on "red" in either a or b is  $.5 \times \$1 = \$0.50$ . (Where the expected value is calculated as the value<sup>47</sup> of an outcome times the probability of the event leading to the outcome.)

Subjects should therefore be indifferent between the two urns. However, Ellsberg and others found that subjects tended to prefer the bet with the urn in a, where the proportions of red and black were known (risky), and<sup>48</sup> would pay up to \$0.36 to avoid the uncertain bet. The preference for the risky alternative held even when its expected value fell a bit below \$0.50, and the expected value of the uncertain bet remained the same. Ellsberg claimed that the ambiguity of information available about outcomes (which varies with the type, quality, amount, and source of information), affected the confidence a person had in his estimates of expected value. The more ambiguous the information used to calculate expected value, the lower the person's confidence in the estimate. This led subjects to devalue in some manner the ambiguous alternative. While such a conservative evaluation may violate rationality principles, it appears to come closer to representing actual choice behaviour in such situations. Ellsberg claimed that ambiguity is a matter of degree, and will vary with how much information P has, whether it is verifiable, whether the source is trusted, and so on. He did not attempt to test the relationship between perceived ambiguity and these other variables.

Ellsberg's study points to a perceived relationship between the quantity and quality of information about alternative courses of action, and O's assessment of how an alternative will further his attempts to maximize his gain. It is not a major extension of the argument to claim that if none of P's alternatives have well-defined probabilities for events (i.e., they are all uncertain), they may vary in the degree of ambiguity, and that P will prefer the least ambiguous alternative, i.e., that for which he has relatively more and better information.

The extension to social interaction is obvious.  $O_i$ 's information about P's resources and value function may certainly vary in both quality and quantity, and reliability of source. Direct information, or information not under P's control, is likely to be considered less ambiguous than cues  
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which P is able to manipulate. The less ambiguous  $O_i$ 's information about P's resources, the more confidence he will have in both his assessment of the fairness (relative profit) of a transaction, and in his estimate of the probability that a given initiation of exchange he makes to P will be accepted. If the quality and quantity of information do affect  $O_i$ 's estimates of the expected value of exchange transactions, it should show in his behaviour, i.e., in his initiations and acceptances of exchange. Under the assumption that  $O_i$  initiates where he anticipates the best profit, then, other things being equal, we expect him to choose an alternative with the least ambiguous information, or to seek more information before he proceeds. O may estimate that a P with concealed resources is as likely to be a better as a worse partner than someone whose resource base is known,

in the sense that an urn is as likely to have more than .5 red balls, or less than .5 red balls. This may make the initial estimate of the desirability of an exchange with an 'unknown' partner equal to that of an exchange with a partner whose resource base is known. Even so, the greater ambiguity of the information about the P with a concealed resource base will depress O's estimate of the expected value of that alternative. If two alternative partners seem to differ only with respect to information available about them, O will prefer the exchange relationship where he knows P's resource base. In sum, it seems that even if we turn out to be wrong in our assumption that people desire information in order to compare profits, there may be a general preference, independent of comparison, that arises from the desire to assess accurately the probabilities of different outcomes. This has clear implications for P if he happens to be busy withholding information from O.

We are now in a position to describe some possible distributions of information across alternative exchange partners, and to make predictions about the fate of informational tactics aimed at obtaining an advantage. While our main interest is in the case of asymmetric information, we will outline the cases of symmetric information and symmetric ignorance as well.

#### The Distribution of Information Across Alternatives

To simplify, let us assume that P is able to conceal or reveal information about his resource base, and O's resource base is always known

unambiguously to others. Then we will conceptualize the two variables of information and alternative relationships as dichotomous: O may have information about P, or he may have none (except for cues controlled by P); and P and O may each have no alternative exchange relationships, or the same number of alternatives. To begin, we will say that if alternatives exist, they vary only in the amount and type of information available about them (i.e., they do not differ in the amount of profit they offer). Six cases can be distinguished. We will list them, making predictions about the probable success of tactics. Where it is relevant, evidence for the predictions will be noted.

## I The Isolated Dyad: No Alternatives

### 1. Symmetric Ignorance

In this case, P and O have no information about how the other profits from a given transaction. On the basis of the posited preference for information about Other, we would expect the lack of information to create suspicion and caution, and that the bargainers would gradually feel their way to a mutually acceptable agreement. This does not mean that P and O will therefore decide to mutually reveal information about their profits. Kelley, Beckman, and Fischer found that even if the subjects in a mixed motive game were given the opportunity to reveal their profit levels and costs, they did not do so, and that bilateral bargaining was characterized by lying and distrust of the information provided by the other person:

Open, honest communication affords one means by which the negotiators can arrive at realistic and equitable goals, but each person's hope for a greater outcome than such communications permit (and his expectations that the other person has the same hope) motivates communication that is not open, honest, or trusted.<sup>51</sup>

The statement by Kelley et al. suggests that exchange has structural characteristics that lead to particular assumptions by P and O about the Other, i.e., that he will want to get more than a fair share, and that he will not necessarily represent his position honestly.

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Fischer required subjects to negotiate for a share of a fixed number of points. Prior to negotiation, the experimenter provided each subject with a 'minimum necessary share', which he had to obtain before he could profit from an agreement. Subjects did not know what the other person's minimum necessary share was, and consequently, could not know for certain whether a particular division of the total payoff was more profitable to other than to self. In this situation, subjects would lie about the minimum level of reward required, and managed to do better than opponents who had a capacity to impose fines for non-agreement. If lying is not possible, it seems that symmetric ignorance will not advantage either party,<sup>53</sup> and will lead to agreements that vary around an equal division of profits. So long as P is limited to exchange with only one other person, his suspicion and desire for information may disrupt or interfere with the exchange, and cause extended or difficult negotiation, but the partners will probably continue to interact. If extended negotiation is allowed, subjects would probably engage in attempts to gain information about the opponent, for example, by observing his reaction to different initiations.

## 2. Symmetric Information

In our previous discussion of how the terms of an exchange are arrived at in a dyad, we noted the tendency to fairness, and cited evidence from bilateral monopoly studies that actors would tend to a stalemate around an even division of profits.<sup>54</sup> Many of these studies show that subjects will remain in dyads, and eventually reach agreement, if they are not given the alternative of quitting,<sup>55</sup> although Kahan found that subjects will make use of a 'no-agreement' option when they cannot find a suitable compromise, and there are no alternative partners.<sup>56</sup> Studies of contractual norm formation in dyads<sup>57</sup> show that, lacking attractive alternatives, subjects will even remain in the relationship where their profit level is below that of their partner. It appears on the basis of such findings, that people prefer some agreement to no agreement, so long as it increases the level of their rewards. However, it would not be wise to accept such a statement unconditionally. The unavailability of alternative partners, and the implicit assumption that the task of bargaining experiments is to reach agreement, probably increase the rates of agreement above what might be found in a 'real world' bargaining task. Even labour negotiators, though they have no alternative bargaining partner, have the no-agreement alternative of striking, and management has the option of lock-outs. Strategies such as these probably prevent large deviation from fairness when power of the participants is equal.

## 3. Asymmetric Information

Weinstein's description of tactics for advantage is most applicable to the context in which P knows how O profits in a transaction, but O is

ignorant of P's gain. Under such circumstances, P is most likely to be able to take advantage of one-sided information. He will be able to 'play hard to get', and to ensure the best possible deal for himself within the limits set by Other's minimum profit. Bilateral monopoly bargaining experiments<sup>58</sup> employing an informed stooge and an ignorant subject, indicate that the former can use his information to formulate a hard bargaining strategy<sup>59</sup> that forces the ignorant person to lower his expectations of profit. If, in addition, P could lie about his profit, as in Fischer's study,<sup>60</sup> an advantage would very likely accrue to the more informed member of the dyad. Nevertheless, he will still have to contend with suspicion on O's part. (It seems paradoxically true that the more O is likely to trust P, as in the case of close friends, or positive correlation of rewards, the less likely P is to want to get an advantage.)

## II Alternatives to the Dyad

### 4. Symmetric Ignorance

The case in which neither P nor O has information about the other's profits, and all alternative relationships are typified by lack of information, is likely to be an aggregate version of Case 1., except that difficulty in finding a mutually acceptable agreement with one O, would be more likely to lead P to engage in sampling other potential partners. The extent to which he will do this will depend on the time he has available, and the possibility of obtaining reliable information about any Others. In a situation such as this, a reverse tactic of giving out information might be

used, i.e., P could distinguish himself as the only person willing to be honest, and thereby secure a transaction. This of course leaves him open to being taken advantage of. There is little empirical evidence concerning Case 4., although it does not seem trivial -- the early stages of interaction, such as the sampling that goes on at parties, is probably of this type.

## 5. Symmetric Information

If P and O have perfect information about each other's resources and preferences, and where there are available substitutable alternatives to the dyad, we approach the economist's model of pure competition.<sup>61</sup> Here, the rates of exchange in all transactions are universally known, there is no time pressure, alternatives are available and substitutable, and there is little room for deviation from the fair or 'consensus' price. If P<sup>62</sup> demands more than a fair price, O simply moves to another alternative. Perfect or full information implies not only initial information about all P's resources, but also an updated intelligence of the terms of transaction<sup>63</sup> between similar P's and O's.

## 6. Asymmetric Information

If we accept the statement that P and O are normally not limited to one exchange relationship, the situation in which P withholds information from O, but in which O has other alternatives to P about whom he does have information, then this sixth case is a crucial one for examining the tactical advantage of information control. If P had discretion over infor-



mation Others receive about him, he can follow three courses of action:

- i) he can withhold information, giving off a minimum of cues.
- ii) he can engage in deliberate misrepresentation -- simply, P can lie about how he values the resources at stake, and how much he has of them.
- iii) he can be selective about the release of information, giving out only those items that advance his aims.

The success of all these tactics relies on O's accepting at face value information that originates from P. (O may find it costly or impossible to test P's claims, or O may not have time to change to another relationship.)

Because of the posited preference actors have for unambiguous information, and the fact that there often are alternatives available to both parties in an exchange, we argue that the success of informational tactics is not ensured in simple exchange situations with asymmetric information. The constant sum nature of exchange also casts a competitive light on transactions, and interactants are more likely to be suspicious of a partner's information when that person's self interest can be furthered by skillful control of information.

The theory and experimental design developed in the rest of this dissertation are addressed to Case 6. outlined above. Although it can be argued that these persons would normally be able to choose occasions for concealment, and that these occasions will depend on the means P has available for manipulating information, for purposes of beginning a study of a largely unexplored area, we will start with a situation where there is either total or no direct information about P, and direct information about

O. In such a case, P's best hope for advantage rests on the presence of other P's whose resources are known to O, and who ask O for terms in exchange that are better than P would get in a fair transaction. (This would occur if these other P's had small amounts of resource X (high costs) and/or relatively large amounts of Y (low rewards).) In this context, we will investigate the extent to which Weinstein's claim that people will utilize concealment to get advantageous exchanges holds, test the strength of a preference for exchanges about which the actor has unambiguous information, and observe the consequences that result from the interaction of the two processes. If we can find support for our conceptualization of processes involved in tactics of exchange for this case, it should also shed light on the other cases.

Of course, most 'real-life' social exchange relationships are not clear-cut examples of any one of the combinations of alternatives and information we listed. Alternatives to a dyad may exist, but it will involve some degree of effort and uncertainty to make the alternatives truly available. People rarely have perfect information about other's values and resources, and even less about the transactions going on between members of other dyads -- the actual rates of exchange may become known over time, as different pairs of actors in a group engage in transaction. We may expect, that in the early stages of interaction, an actor who can conceal his true resource position from others will believe that it is to his advantage to do so, even if there are unconcealed potential partners for O in the group. To make such a prediction, it is not necessary to assume that P is stupid -- the costs to O of 'shopping' for and securing preferred

alternatives may lead him to accept whatever initiations he receives, especially if O is pressed for time, or has few initiations from which to choose. If the terms set in transactions in various dyads are not immediately known, P is not unrealistic if he thinks he may 'get away' with an advantageous exchange.

The connectedness of the group and the availability of information about accumulating, as well as about initial resources, will clearly have an effect on the success of P's tactics.

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Because of the preference for unambiguous information, we predict that a person who conceals his position will learn through experience that the perceived advantage in asymmetric information is not necessarily an advantage at all. Over repeated interaction, as actors come to know more about each others' preferences through their overt behaviour, and as concealed partners get passed over for those who are open about their position, we expect fewer attempts to use information control to gain an advantage. This is what we mean when we claim that fairness is a result of interaction. The process will proceed more quickly if group members discuss the terms of transactions with each other, but we believe that the lack of direct communication does not prevent a gradual diffusion of information through interaction, which in the end will have the same effect.

The theory and experimental design developed in the next two chapters provide a basis for testing these predictions.

## FOOTNOTES FOR CHAPTER 1

1. Major proponents of the exchange approach in a social psychological tradition are: R.M. Emerson, "Exchange theory: Parts I and II", in J. Berger, M. Zelditch, and B. Anderson, Editors, Sociological Theories in Progress, Vol. II, Boston: Houghton Mifflin Co., 1972; J. Thibaut and H.H. Kelley, The Social Psychology of Groups, New York: John Wiley and Sons, 1959; P.M. Blau, Exchange and Power in Social Life, New York: John Wiley and Sons, 1964; G.C. Homans, Social Behaviour; Its Elementary Forms, New York: Harcourt, Brace and World, 1961, (First edition); P. Secord and C. Backman, Social Psychology, New York: McGraw Hill, 1974 (Third edition). A more economic treatment is given by A. Kuhn, The Study of Society: A Unified Approach; London, Tavistock Publications, 1966.
2. See, for example, Homans, op. cit., 1961; and Emerson, op. cit., 1972.
3. The formulation of rewards, costs and profits used in this dissertation most closely follows that of Kuhn, op. cit., 1966, pp. 260-271.
4. Exchange theorists are aware of the tautologous nature of such a definition of rewards or reinforcement. (What does P prefer? Whatever he finds rewarding. What does he find rewarding? What he prefers (chooses).) However, it is argued that the consequences deduced from a set of statements which include such a tautology are not themselves tautologous. Further, we assume independent prior knowledge of what P finds rewarding. For a discussion of this issue, see Kuhn, op. cit., p. 275; Homans, op. cit., 1961, pp. 42-43. Also see R. Burgess and R. Akers, 'Are operant principles tautological?', The Psychological Record, 16, 1966, pp. 305-312.
5. Homans discusses the question of a generalized preference order that transcends momentary states of deprivation in his Social Behaviour. He makes the point that a complete ordering of needs, and of the resources to satisfy them makes little theoretical sense in some cases (thirst cannot be more important than hunger, water is not preferred to food), and little practical sense in others (P does not usually have the opportunity of satisfying all his needs at once, so that an ordering over everything is irrelevant). In addition, many resources are capable of satisfying several needs at once. Homans argues that since P's preference order is relatively stable over the short time periods involved in exchange transactions, and that P must only consider a small set of needs at once, that it is safe to take as given and constant his general preference order, and to examine the variation in value that different amounts of specified resources X and Y bring to P. (See pp. 39-49 in Social Behaviour for a fuller discussion of these points.)

6. For example, see Burgess and Akers, op. cit., 1966.
7. In economics, this is referred to as the principle of equimarginality.
8. Obviously, exchange is not the only way to obtain resources. P may be able to produce valued goods, alone or in cooperation with others. Such a process often involves investment of resources, as when group members put in effort to produce activities or goods. In this case, there may be an increase in total resources, or what Kuhn calls resource production. The resources produced can then be used in further exchange, or resource transfer. We are confining our interest to the latter case, which involves giving up one resource for another, while total resources remain constant. Kuhn argues that only resource transfer qualifies as exchange, but Homans and Emerson treat both forms. See: Kuhn, op. cit., pp. 268-69; Homans, op. cit., p. 75; and Emerson, op. cit., Part II.
9. This is a major difference between the exchange framework and decision theory. The latter, as Kuhn notes, does not take into account "whether opportunities lie in our own hands, in the natural environment, or in the hands of others". Kuhn, op. cit., 1966, p. 317.
10. See Emerson, op. cit., 1972, p. 59.
11. Kuhn, op. cit., 1966, p. 323.
12. Kelley and Thibaut refer to this as a 'stereotype utility function'. See: H.H. Kelley and J.W. Thibaut, 'Group Problem Solving'; in G. Lindzey and E. Aronson, Editors, The Handbook of Social Psychology, Volume IV, Don Mills: Addison Wesley, 1969.
13. An example of this is a management representative who can arrive at an initial conception of how a union negotiator will value a given agreement, because he can make certain assumptions about the union man's value ordering, even though the union role is not symmetric to his own. Without a reliable intelligence network, however, it would be a more difficult task to infer the current level of strike funds.
14. Over extended interactions, there will frequently arise a social standard that reflects what similar P's and O's have agreed on as a fair price, and P can use this to help his value comparisons. Social standards also make it unnecessary to negotiate the terms for each exchange transaction. Thibaut and Kelley note that an important function of norms is that they can substitute for the use of social power to determine the terms in social exchange. See: Thibaut and Kelley, op. cit., 1959.

15. The range solutions is bounded by the zero profit points of P and O, and the number of possible solutions is restricted by the divisibility of the units exchanged.
16. Kuhn, op. cit., 1966, pp. 325-332. Kuhn goes into more detail about comparability of units in exchange than has been given here, but he does not discuss the importance of 'taking the other person's point of view' for the comparison of profits.
17. See: R.M. Liebert, W.P. Smith, J.H. Hill, and M. Keiffer, 'The effects of information and magnitude of initial offer on interpersonal negotiation', *Journal of Experimental Social Psychology* 4, 1968, pp. 431-444. In this study of negotiation in a bilateral monopoly game, the authors concluded that "...where bargainers considered each other to be equals (in power and/or status) they feel that (equality of profits) is the most they can hope for, but will take more if they can get it."
18. An interesting discussion of moral obligations as 'prudential maxims' and their place in Hobbes' Leviathan is given by T. Nagel, 'Hobbes on Obligation', *Philosophical Review*, 68, 1959, pp. 68-83.
19. Emerson, op. cit., 1972, p. 61.
20. E. Burnstein and S. Katz, 'Group decision involving equitable and optimal distributions of status', Chapter 12 in C.G. McClintock, Experimental Social Psychology, Holt, Rinehart, and Winston, 1972; R.D. Pritchard, 'Equity theory: A review and critique', *Organizational Behaviour and Human Performance*, 4, 1969, pp. 176-211; M. Patchen, 'A conceptual framework and some empirical data regarding comparisons of social rewards', *Sociometry*, 24, 1961, pp. 136-156; R. Burgess and J.D. Gregory, 'Equity and inequity in exchange relations: an experimental re-examination of distributive justice', paper read at the annual meetings of the West Coast Conference for Small Groups Research, Honolulu, Hawaii, 1971; and J.S. Adams, 'Inequity in social exchange', in L. Berkowitz, ed., *Advances in Experimental Social Psychology*, 2, 1965, New York: Academic Press, pp. 267-299.
21. L.E. Fouraker, and S. Siegel, Bargaining Behaviour, McGraw Hill, 1963.
22. W.H. Foddy, 'The formation of cliques in collectivities as a consequence of initial distributions of dimension of wealth', Unpublished Ph.D. dissertation, University of British Columbia, 1972.
23. There are several studies which show that comparison affects a person's evaluation of outcomes, and his subsequent behaviour: K.E. Weick and B. Nasset, 'Preferences among forms of equity', *Organizational Behaviour and Human Performance*, 3, 1968, pp. 400-416; J.P. Sheposh and P.S. Gallo, 'Asymmetry of payoff structure and cooperative behaviour in a Prisoner's Dilemma Game', *Journal of Conflict Resolution*, 17, 1973,

- pp. 321-333; C.G. McClintock, Experimental Social Psychology, Holt, Rinehart and Winston, 1972. In addition, explicit comparison has been shown to enhance competitiveness, i.e., the desire to 'do better than' someone else. This is discussed in the chapter by McClintock, and in M. Shubik, 'Games of Status', Behavioural Science, 16, 1971, pp. 117-129; and in Fouraker and Siegel, op. cit., 1963.
24. It should be noted that a marginal utility function is not the only valuation function that may apply, and the general comments about fairness are not restricted to such a function. So long as P and O know how each other values things, (whatever the function), then information about an actor's current position with respect to this function allows for assessment of fairness. Fischer, for example, used a threshold function, where an actor's level of aspiration (induced by the experimenter) determined the value to the subject of a given division of payoffs. Actors would use information about a particular level of aspiration to assess the fairness of agreements, and without such information they were unable to see who profited most, even though the valuation function was known to both parties. See: C.S. Fischer, 'The effects of threats on an incomplete information game', Sociometry, 32, 1969, pp. 301-314.
  25. O.J. Bartos, Simple Models of Small Group Behaviour, New York: Columbia University Press, 1967, p. 268.
  26. Pritchard, op. cit., 1969; and Burgess and Gregory, op. cit., 1971.
  27. See, for example, R.M. Emerson, 'Power dependence relations', American Sociological Review, 27, 1962, pp. 31-41; and H.A. Michener and R.W. Suchner, 'The tactical use of social power', in J.T. Tedeschi, Ed., The Social Influence Processes, Chicago: Aldine, 1972.
  28. For example, E.A. Weinstein, 'The development of interpersonal competence', Chapter 17, in D. Goslin, Ed., Handbook of Socialization, Rand McNalley, 1968; E. Goffman, The Presentation of Self in Everyday Life, Doubleday Anchor Books, 1959; and P.W. Blumstein, 'Audience, Machiavellianism, and tactics of identity bargaining', Sociometry, 36, 1973, pp. 346-365.
  29. See footnote 1.
  30. Bartos notes that many social interactions have a dual nature -- a 'getting to know you' phase, and a 'taking advantage of you' stage. If P can keep O from succeeding in the first, he may have a decided advantage in the second. Bartos, op. cit., 1967, p. 268.
  31. Weinstein, op. cit., 1968, p. 767.

32. The supposed advantages of one-sided information are argued by many researchers, but are supported by anecdotal rather than systematic empirical tests. Cf. Kuhn, op. cit., pp. 334-337 for a discussion of possible tactics in bargaining; also O. Bartos, 'Towards a rational empirical model of negotiations; Sociological Theories in Progress, Vol. II, in J. Berger, M. Zelditch and B. Anderson, Eds., Houghton Mifflin, Co., 1972; pp. 239-286; and R.E. Walton and R.B. McKersie, A Behavioural Theory of Labour Negotiations, New York, McGraw-Hill, 1965.
33. Bartos, op. cit., 1967, Chapter 12.
34. R.M. Emerson, 'Power and position in exchange networks', Paper presented at national meetings of American Sociological Association, 1971. Emerson has done some experiments concerning the effects of concealment on willingness to use a power advantage, and he notes that when relative profits are not visible, the more powerful person does tend to get more profit (i.e., to use his advantage) than when relative profits are visible. (Personal communication, December 1973).
35. L.L. Cummings, D.L. Harnett, and W.C. Hamner, 'Personality, bargaining style, and payoff in bilateral monopoly bargaining among European managers', Sociometry, 36, 1973, pp. 325-344. G. Yukl, 'Effects of the opponents' initial offer, concession magnitude, and concession frequency on bargaining behaviour', Journal of Personality and Social Psychology, 1974, 30, pp. 323-335; J.M. Chertkoff and M. Conley, 'Opening offer and frequency of concessions as bargaining strategies', Journal of Personality and Social Psychology, 1967, 1, pp. 181-85; H.H. Kelley, L.L. Beckman and C.S. Fischer, 'Negotiating the division of a reward under incomplete information', Journal of Experimental Social Psychology, 3, 1967, pp. 361-98. S. Siegel and L.E. Fouraker, Bargaining and Group Decision Making, New York: McGraw Hill, 1960.
36. Liebert, et al., op. cit., 1968, pp. 431-441.
37. Kuhn, op. cit., 1966, pp. 336-337.
38. H.H. Kelley, 'A classroom study of the dilemmas of interpersonal negotiations', in K. Archibald, Ed., Strategic Interaction and Conflict, University of California Press, Berkeley, 1966, p. 60.
39. In the sense that a dollar is worth less to a millionaire, than to a person on welfare.
40. Cummings and Harnett, op. cit., 1969, found that a subject with a steeply sloping utility curve, which is similar to having a small resource base, conceded less during negotiations than did a person with a less-steep curve, implying that it costs the former more to give up a given increment (absolute amount) of a reward.



41. For example, people may compare the worth of gifts exchanged; the value to P and O of hours spent helping another study (taking into account how much time each has to spare and how much he needs the help); people also seem to be able to assess whether someone has adequately returned a favour, even though the objective units (lawn mowing for baby-sitting, for example), are not the same. Alternately, dissimilar commodities may each be equated to a common unit, and these units compared. Money often serves the function of a 'common unit'.
42. See, for example, the discussion in Emerson, op. cit., 1972, pages 58-59; and H.A. Michener and R.W. Suchner, "The tactical use of social power", in J.T. Tedeschi, Ed., The Social Influence Processes, Chicago: Aldine Publishing Company, 1972, pp. 239-286.
43. H.H. Kelley and D.P. Schenitzki, 'Bargaining', Chapter 10 in C.G. McClintock, Experimental Social Psychology, Toronto: Holt, Reinhart and Winston, 1972.
44. There is some evidence that in competitive situations, people tend to assume that O is trying to get as much as he can, and to limit P's gain. (H.H. Kelley and A. Stahelski, 'Social interaction bases of cooperator's and competitor's beliefs about others', Journal of Personality and Social Psychology, 16, 1970, pp. 66-91.) Harsanyi suggests that the most common belief P will entertain about O is that O has the same motives as P, and will employ similar strategies. See J.C. Harsanyi, 'Bargaining in ignorance of the opponent's utility function', Journal of Conflict Resolution, 6, 1962, pp. 29-38.
45. There could as easily be a bias toward assuming that P is similar to O in terms of resource base as well as value functions.
46. Ellsberg, D., 'Risk, ambiguity, and the Savage axioms', Quarterly Journal of Economics, 75, 1961, pp. 643-669; W. Fellner, 'Distortion of subjective probabilities as a reaction to uncertainty', Quarterly Journal of Economics, 75, 1961, pp. 670-89; J.S. Chipman, 'Stochastic choice and subjective probability', in D. Willner, Ed., Decisions, Values and Groups, New York: Pergamon Press, 1960; and S.W. Becker, and F.O. Brownson, 'What price ambiguity? Or the role of ambiguity in decision making', Journal of Political Economy, 72, 1964, pp. 62-73.
47. Introductions to decision theory abound. One good example: Wayne Lee, Decision Theory and Human Behaviour, New York: John Wiley and Sons, 1971.
48. S.W. Becker and F.O. Brownson, op. cit., 1964.

49. The issue of the credibility of the source of a communication when the source has a vested interest is discussed in: E.E. Jones and J.W. Thibaut, 'Interaction goals as bases of inference in interpersonal perception', in R. Tagiuri and L. Petrullo, Eds., Person Perception and Interpersonal Behaviour, Stanford, 1959; and D. Bramel, 'Determinants of beliefs about other people', Chapter 4 in J. Mills, Experimental Social Psychology, Toronto: Collier MacMillan, 1969. There is evidence that if the recipient of information about P believes that P could profit from distortion or selective release of information about himself, the recipient has less confidence in the information. Thus, information outside P's control is more likely to be regarded by the recipient as yielding a believable picture of P's position. Walton and McKersie, discussing the case of labour negotiations, point out that the use of spies and bugging devices is directed at getting a 'true' picture of the opponent's position, indicating that this sort of information is trusted over P's 'presentation' of it. Although 'direct, verifiable' cues are not immune to distortion, we expect the recipient of such cues to have more faith in them than if P is sending the cues himself. See: R.E. Walton, and R.B. McKersie, A Behavioural Theory of Labour Negotiations, New York: McGraw-Hill, 1965, pp. 62-63.
50. H.H. Kelley, L.L. Beckman and C.S. Fischer, op. cit., 1967; H.H. Kelley and J.W. Thibaut, op. cit., 1969; H.H. Kelley and D.P. Schenitzki, op. cit., 1972.
51. Kelley, Beckman and Fischer, op. cit., 1967, p. 363.
52. C.S. Fischer, 'The effects of threats in an incomplete information game', Sociometry, 32, 1969, pp. 301-314.
53. Fouraker and Siegel, op. cit., 1963.
54. See, for example, Fouraker and Siegel, op. cit., 1963; J.W. Thibaut and C.L. Gruder, 'The formation of contractual agreements between parties of unequal power', Journal of Personality and Social Psychology, 11, 1969, pp. 59-65; R.M. Emerson, 'Power and position in exchange networks', Paper presented at American Sociological Association national meetings, 1971.
55. ~~H.H.~~ Kelley and D. Schenitzki, 'Bargaining', Chapter 10 in C.G. McClintock, Experimental Social Psychology, Toronto: Holt, Rinehart and Winston, 1972.
56. Kahan, J.P., 'Effect of level of aspiration in an experimental bargaining situation', Journal of Personality and Social Psychology, 8, 1968, pp. 154-59.

57. For example, see J.W. Thibaut and C. Faucheux, 'The development of contractual norms in a bargaining situation under two types of stress', Journal of Experimental Social Psychology, Vol. 1, 1965, pp. 89-102; J.W. Thibaut and C.L. Gruder, op. cit., 1969; and P. Murdoch and D. Rosen, 'Norm formation in an interdependent dyad', Sociometry, 33, 1970, pp. 264-276. Also R.L. Burgess and J.D. Gregory, op. cit., 1971.
58. Chertkoff and Conley, op. cit., 1967; Liebert et al., op. cit., 1967; Yukl, op. cit., 1974.
59. Some studies of the role of information in bilateral monopoly bargaining focus on how ignorance or lack of information about what constitutes an equitable or fair agreement can work to a person's advantage by making him cautious about his own profit. Generally, these studies have found that if one person knows what a fair agreement is, and one does not, the knowledgeable person will usually concede more than an ignorant one. While this may seem somewhat contradictory to the argument being made here, the ignorant person in these cases does not seem to have been aware that his profits were known to his partner, and for this reason, is not subject to as great a pressure to be 'fair' as is the knowledgeable player. However, Liebert et al. used a similar paradigm to the bilateral monopoly experiments, and did not conclude that ignorance necessarily leads to bliss -- a knowledgeable player could substantially affect the ignorant Other's expectations as to how high a profit he might achieve. L.L. Cummings and D.L. Harnett, 'Bargaining behaviour in a symmetric triad: the role of information, communication, power and risk-taking propensity', Review of Economic Studies, 36, 1969, pp. 484-499; D.L. Harnett and L.L. Cummings, 'Bargaining behaviour in an asymmetric triad', Chapter 2.5 in B. Lieberman, Ed., Social Choice, Gordon and Breach Science Publishers, 1971; Liebert, et al., op. cit., 1967.
60. Fischer, op. cit., 1969.
61. Kuhn, op. cit., 1966, pp. 375-378.
62. This does not deny the importance of an actor's resource base in determining the price he will pay for Y; what varies when consensus prices prevail is whether or not P will choose to enter transactions.
63. It may be that if the situation is one of perfect or close to perfect competition, then a sample of a small number of O's will provide stereotypical information about all, or almost all, potential O's.
64. An example of how communication and connectedness of group members are necessary for norm enforcement is given in the study of 'revolutionary coalitions', by H.A. Michener and M. Lyons, 'Perceived support and upward mobility as determinants of revolutionary coalition behaviour', Unpublished paper, University of Wisconsin (undated).

## CHAPTER 2

## THEORY

For purposes of constructing a theory based on the arguments presented in Chapter 1, we will conceptualize the social actor, P, as a decision maker. P is seen to choose between alternative actions, which, coupled with events in the environment, will lead to various outcomes, having subjective value to P. The events in the environment occur with probability between 0.0 and 1.0, and such probabilities are estimated by P. To choose between alternatives, P is described as comparing the subjectively expected value of each alternative, where this SEV is some function of the value of outcomes, and the probabilities of events leading to different outcomes. Let us apply this to our exchange situation.

In such a situation, P is faced with a set of decisions concerning:

- which of several alternative partners will allow him to obtain as much reward as possible for as little cost as possible
  - how much of O's resource P can ask for, without reducing the probability of a completed transaction
  - how much information P should reveal about his resources, and the value he puts on others' resources
  - how much P can trust the information he has about potential partners.
- P's alternatives thus involve a range of initiations of exchange that he can make (if he is the initiator) or decide to accept (if he is the recipient),

and these exchange alternatives will vary in the size and type of resources involved, as well as with the characteristics of potential partners. The size of an initiation made by P determines his profit, but in choosing the level of initiation, P will use information available to him about O's values and resources (such as direct knowledge, cues from O, empathy, etc.) to assess how likely a given initiation of exchange is to succeed, and a transaction be completed. P's choice of a target for an initiation will reflect how P has assessed the value to him of transacting with available alternative partners (subject to the limitations of P's cognitive capacity -- he cannot, of course, consider infinite numbers of transactions). If P has discretion over information about his own preferences and resource base, he must also decide whether to withhold or give out such information, and his decision will depend on whether withholding information is perceived to lead to increased expected value.

The possible events in this social context are acts emitted by Other -- O may accept, or reject (or modify) P's initiation of exchange, and O may initiate exchange himself. Unlike a situation in which the decision maker is faced with an indifferent nature, in a social interaction context, the probabilities of events are under the control of another actor, and are also subject to some degree of modification by P. Of particular interest here are the relative profits of P and O, and how they affect the probability that O will accept P's offer of exchange. The critical problem for P is to find ways of getting initiations accepted in the face of the fact that as P's profit increases, O's profit, and therefore the probability of the transaction, will decrease.

The outcomes of any exchange are the absolute and relative profits to the actors. The outcomes usually change the parameters of future exchanges -- the probabilities of initiation and acceptance may increase or decrease as people satisfy their needs for one resource, and the desirability of a given exchange partner may change due to comparative or marginal utility reasons.

The theory presented in this chapter provides a basis for making predictions about the direction and type of initiations of exchange that will be made and accepted in a group of individuals in which there are at least two valued resources distributed across the members of the group, and in which the distribution of resources is not fully known to all members. To provide this basis, the theory draws on three principles:

- 1) maximization of marginal utility
- 2) comparative justice or fairness
- 3) the ability to take the point of view of others.

There are four main sections in this chapter: definition of concepts, scope conditions, assumptions, and a set of hypotheses. Operational hypotheses are presented with the description of the research conducted to test the theory in Chapter 3, and are not detailed in the present chapter.

### Definition of Concepts

Several concepts are defined here which are used in the development of the theory. The list is not exhaustive, but is intended to fix the meaning of the basic units of the theory.

1. Resource: a resource is any behavioural, material or non-material commodity that is valued by individuals in a specifiable manner, and which<sup>1</sup> can be transferred from one individual to another.
2. Initiation of exchange: an initiation of exchange occurs when a person, P, offers an amount of some resource, say X, to another person, O, in return for an amount of some other resource, say Y, from O.
3. Exchange interaction: an exchange interaction occurs when a person P makes an initiation of exchange to another person O and this initiation of exchange is accepted by O. (This is also referred to as a transaction.) Exchange interactions are generally observed when P is short of, or desires, some resource Y, notes that O has some of resource Y, and that O is short of some resource which P possesses.
4. Resource base: the resource base of P is the total amount of resources possessed by P at a given time. (P's wealth.) P's total resource base may include several different resources.
5. Subjective value to P of a resource: the subjective value to P of a resource is the worth or utility that resource has for P. It reflects P's general preference ordering of different resources, and his current level of satiation for these resources. Different individuals may have the same or different preference orderings over a given set of resources, and, of course, they may have different levels of satiation.
6. Value function for a resource: the value function for a resource describes how much subjective value different amounts of a resource provide to P. The subjective values of different resources as calculated by the

value function can be compared, i.e., in some common unit of value such as utility. People may have similar value functions even though they value different resources, that is, even if their preference orders are not the same.

7. Value position of P on resource X: the value position of P on resource X refers to the amount of X which P has at a given time. If the value position is known, the value function can be used to assess the subjective value of a further increment of X to P.
8. Net subjective profit to P: (in an exchange interaction with O): the net subjective profit for P in an exchange interaction with O is the subjective value of what O gives him (reward), minus the subjective value of what he must give to O in return (cost). Net subjective profits will generally be referred to as P's profit, where  $\text{profit} = (\text{subjective reward} - \text{subjective cost})$ .
9. Fair exchange: a fair exchange between P and O is one in which the subjective profit to P is perceived by P and O to be equal to the subjective profit of O.
10. Advantageous exchange for P: (in an exchange with O): P obtains an advantageous exchange with O when the subjective profit to P exceeds the subjective profit to O.
11. Profit overlap of P and O: the profit overlap of P and O refers to the set of possible exchanges between P and O, of resources X and Y, in which P and O are able to gain a positive profit. An exchange of quantities such that P and/or O reach equality of marginal gain and



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marginal cost (i.e., an optimum combination of resources) describes the upper limit of the profit overlap, and the lower limit is the status quo (no exchange). If P and O have no profit overlap, no exchange can occur; if a profit overlap exists, any combination of profits within the overlap gives each a positive profit, though not necessarily an equal profit. Definition 11 is introduced mainly to provide a shorthand way of referring to the fact that both parties must benefit for an exchange to occur, but within this range of agreements, some may favour P more than O, and vice versa.

12. Ambiguity of information: (about O's profit): ambiguity of information refers to a quality of information that varies with the amount, type, reliability, source, and consistency of information, giving rise to P's degree of confidence in his estimate of the expected value of a given transaction. The definitions of ambiguity and confidence are given together because, for purposes of this theory, one is the inverse of the other.

Scope

Scope Conditions

Preliminary Statement

We are interested in simple exchange at a given point in time (early stages of exchange relationships), in which group members are motivated to gain more than others in the group. The scope conditions must provide for a situation in which such motives can exist, and where the means

to realize a desire for advantage exists, but need not be employed. As advantage implies comparison, the opportunity to compare must also be present.

We argued in Chapter 1 that certain structural characteristics of simple exchange enhance the desire for advantage. The constant sum nature of rewards in simple exchange makes it profitable to P to do better than Other. The tendency for simple exchange to occur among people with similar wealth levels (i.e., peers),<sup>4</sup> makes a desire to compare favourably with one's exchange partner likely, as we believe people are most concerned to gauge their success with that of similar others. In short, we do not limit the theory to a set of individuals who have 'competitive' personalities.

Scope condition 1: Two or more valued resources are distributed across more than three members of a group. Each of the members has more of one resource, X, than some other resource, Y, or vice versa, and for each member there exist at least two other members who have complementary value positions on X and Y.

'Valued resources' means that each member values each resource to some extent.<sup>5</sup>

Scope condition 2: Resources are valued according to a marginal utility function. This will generally imply that the resources are of a divisible, material nature, and can be accumulated or stored by individuals,<sup>6</sup> but this is not necessarily the case.

Discussion: The principle of diminishing marginal utility is entered as a scope condition, so that we can ensure the actors are motivated to exchange

some resource of which they have a lot, for one of which they have little or none. As noted in Chapter 1, such a function makes it possible for individuals to gain subjective value via exchange, even though there may be no increase in total resources distributed across a group.

A diminishing marginal utility function implies that successive equal absolute amounts of X have decreasing value to a given P. For present purposes, subjective profit is treated as equivalent to net gain in marginal utility.<sup>7</sup> This implies that members perceive that exchanges of unequal absolute amounts of X and Y between P and O can still yield equal subjective profit (be fair).<sup>8</sup> In the same way, two different exchanges (between P and  $O_1$  and P and  $O_2$ ), involving the same amount of X for different amounts of Y, can both be perceived as 'fair'.

Scope condition 3: Individuals know, or can reasonably infer, the value function describing the way in which all others in the group value different resources, but know only some of the members' current value positions in given resources.

A consequence of Scope condition 3 is that if the value functions of self and other are known, members can interpret what constitutes a fair exchange, assessed relative to the resource positions of these exchange partners. It should be noted, however, that for exchanges to occur, whatever their fairness, P and O must only be aware of some complementarity of resources...it is not necessary for either to know the other's value function or resource base.

Discussion: Scope condition 3 limits the theory to cases where some comparison of subjective profit is possible. While the scope condition makes

an existence statement about knowledge of others' value functions, it is admitted that the determination of such value functions is often problematic, and the question is worthy of study in its own right. However, we assume that it is quite possible for members to obtain estimates of others' value functions, using such means as:

- experience with similar others in similar situations, where value functions are inferred from behaviour.
- if all members have the same reasons for valuing resources (e.g., X and Y are both needed to perform a task), P may assume that others will have a certain value function.
- P learns to associate a given context and structure of rewards with a particular value function (e.g., elections typically involve some sort of threshold function).

On the basis of these considerations, we could anticipate that members with highly idiosyncratic value functions would be more disruptive to smooth exchange relations, at least until other members had had time to learn  
9  
their value function.

Scope condition 4: P thinks that he may have the opportunity in the future to compare his profits with all members of the group, including those for whom P does not currently know value positions on the resources in the group.

Scope condition 5: The total absolute amount of resources in the group is constant.  
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Discussion: This scope condition, together with the stipulation of a marginal utility function, creates the 'antagonistic cooperation' typical of simple exchange. By marginal utility, P can gain subjective utility even as he loses some absolute net increment of a resource (i.e., if he has a lot of X and a little of Y); he can gain even more utility if he both achieves an optimum balance of resources, and adds to his total absolute resource base. To do the latter under a condition of constant total absolute resources means that O must lose some absolute amount. As there is no overall increase in total resources, maximization means that it is 'better' to get more than others in the group. We thus increase the likelihood that persons will be motivated to get a 'status edge', and can therefore observe the tactics they employ to obtain it. Motivation is imposed by the structure of rewards, and does not have to be measured beforehand.<sup>11</sup>

It can be argued that few social situations entail a constant amount of resources -- people are continually producing new goods, skills, receiving returns on investments and regular income, etc., and all of these can then be employed in simple exchange. However, for any given 'slice of time', the total amount of resources is unlikely to vary drastically. We assume that the early stages of an exchange interaction, in which we are interested, can probably be safely approximated as constant sum.<sup>12</sup>

Scope condition 6: While some members of the group can withhold information about their resource levels, they cannot or do not choose to give out false information concerning the exact size of their resource bases.

Discussion: While this may seem an excessively restrictive condition, it is included to limit the theory, temporarily, to the polar case involving discretion over information. When we have seen what happens in this case, it should not be difficult to extend the theory to handle manipulation of information (selectively withholding, distorting, or falsifying).

### Assumptions

Assumption 1: Individuals in the group are motivated to maximize the total subjective value of resources in their possession.

Discussion: Because scope condition 2 imposes a principle of diminishing marginal utility, each individual will assign less subjective value to successive, equal amounts of a given resource. This means that P will often obtain more subjective value for a combination of two valued resources, than if he has only one resource (e.g., a milkshake and a hamburger may be more valued than two milkshakes). As Kuhn says, "maximum satisfaction is achieved if we continue to take additional units of a good until its marginal value just equals its marginal cost," where cost is the value of what P gives up. "This set of relationships is known as the principle of equimarginality, any violation of which will satisfy a smaller want at the opportunity cost of leaving a larger want unsatisfied, and thus prevent maximum satisfaction." <sup>15</sup>

Marginal utility increases for a given P if:

- 1) he obtains an optimal combination of different valued effects, holding the size of P's resource base constant (in the sense of moving to a different position on a utility curve in an Edgeworth box);

- 2) P increases the total amount of resources in his resource base (like moving from one to another higher utility curve in an Edgeworth box).

In a simple exchange situation, Assumption 1 implies that P will want to obtain as much marginal increase in a desired resource (up to the point of equimarginality), for as little cost as possible. However it also assumes that P will enter exchanges so long as he makes a positive profit.

Assumption 2: Holding profit to himself constant, the subjective value of an exchange to P is affected by the subjective profit he perceives his partner receives. P prefers:

- 1) an advantageous exchange in which P's profit is greater than O's profit  
to
- 2) a fair exchange  
to
- 3) an inequitable exchange in which P's profit is less than O's profit.

Discussion: Assumption 2 provides a means for incorporating the idea that P's utility is affected by what he sees O to be getting. By adding the proviso 'holding profit to himself constant', (i.e., for two alternative exchanges in which P gains the same value), it is admitted that comparative gain is a subsidiary concern to P's own profit. Together with the implication of Assumption 1, that P will transact so long as he obtains a positive profit, we admit that P may enter into unfair transactions.

Assumption 3: Holding profit to self constant, the probability that P will make a given initiation of exchange is directly related to how likely P perceives it to be that his initiation will be accepted.

Discussion: From Assumption 1-3, we can tentatively propose that the expected value to P of an exchange with a given  $O_j$  can be represented as a lexicographic function, which gives profit to P pre-eminence over perceived profit to  $O_j$ . A lexicographic function reflects the individual handling a multi-dimensional decision problem one dimension at a time, putting the most important dimension at the top of a list of factors he will consider; only if he is indifferent between two or more alternatives on the most important dimension, does he compare them on the next most important, and so on. Here, a lexicographic function is proposed to capture the idea that P will first consider alternative exchanges to find the class or set which offers the greatest profit to P; if there are more than one in this class, he then selects on the basis of relative profit. As an approximation, let us represent the subjectively expected value of an alternative (SEV) as:

$$\text{SEV to P}_{(O_j, k)} = \text{lex. f (perceived prob. of acceptance, profit to P; d)}$$

where  $O_j$  refers to a given exchange partner, k to the units involved in the exchange, and  $d = +1$  if O gets less than P

$$= 0 \text{ if O gets the same as P}$$

$$= -1 \text{ if O gets more than P.}$$

The value of d as +1, 0 and -1 is a crude approximation, and would have to be refined to handle cases in which P discriminates between how much more  
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of less profit O receives.

Assumption 4: If P has information about the resource positions of other members, each P can adopt each other member's point of view to



estimate how much of one resource  $O_j$  could be induced to give P in return for a given amount of another resource.

Discussion: Assumption 4 provides a basis for comparison of subjective values. This is necessary for the interpretation of 'fair exchange'. Because the scope conditions stipulate: 1) that all members do in fact value the resources in the group, and 2) that the resources are valued according to a marginal utility function, P can assume that each member will assign the same value to a given total amount of it. This means too that members will assign the same worth to an increment of X if they are at the same resource position. The estimation of the marginal worth of an increment is calculated against what Other already has; thus the proviso that P must <sup>16</sup> have some information about O's resource position.

While P can often assume that others have similar value functions to his, or to infer O's value function from the interaction context, he cannot make similar assumptions about the current level of O's resources, as these are much more subject to variation. By taking O's point of view, and utilizing information about the current level of O's resources, P can locate exchange partners with whom he can obtain maximum gain at minimum cost to himself, i.e., he can find Others to whom a given increment of P's resource is valued most, and to whom a given increment of O's resource is <sup>17</sup> valued least (by O).

The converse of Assumption 4 is that if P has no information about O's resources, he cannot estimate O's subjective profit in a given transaction, and cannot judge the limits of profit overlap between his own and Other's preferences.

An implication of Assumption 4 is that each P knows that an exchange transaction which O perceives to be fair is more likely to be entered into by O, than is a transaction in which P profits more than O. This serves to limit the range of transactions that P will bother to propose to O. In addition, it informs P of what O would have to believe about an exchange before O considered it attractive.

A further extension of Assumption 4 is that, so long as O obtains a positive profit in a given initiation of exchange from P, P perceives that there is some positive probability that the initiation will be accepted. This takes account of the fact that, while O is less likely to accept initiations of exchange from P, the lower his profit relative to P, he will nevertheless have some likelihood of entering the transaction, so long as he obtains a profit. The importance of other potential exchange partners is obvious.

Assumption 5: The greater the ambiguity of information that P has about  $O_j$ 's resources, the less confidence P has in his estimate of the expected utility to P of an exchange with  $O_j$ .

Discussion: It is proposed that the function for P's expected utility for a given exchange with  $O_j$  be weighted by a factor, C, representing the confidence P feels about his estimate of expected value (as in Assumption 3), based on the information he has about  $O_j$ . As ambiguity of information increases (depending on the quality, source, reliability, etc.), P's confidence in his assessment or estimate of the value of a given exchange decreases, and has the effect of reducing the estimated expected value. If we represent

total certainty as  $C = 1.0$ , the estimate of expected value will be left basically undistorted; as ambiguity increases, the fraction  $C$  decreases, and  $P$  gives less credence to his estimate of value. (This factor is of interest only if certainty varies across alternatives; otherwise, a uniform reduction of estimated utility would not alter  $P$ 's ordering of alternatives, and would not affect our predictions of which alternative  $P$  would choose.)

On these considerations, we would revise the function giving  $P$ 's expected value for an alternative to the form:

$SEV \text{ to } P_{(O_j, k)} = \text{lex. f. } (C \text{ (perceived prob. of acceptance; profit to } P; d))$   
 where  $C$  takes on values from 0 to 1.0, and  $d$  is defined as for Assumption 3.

It would be more accurate to have:

$SEV \text{ to } P_{(O_j, k)} = \text{lex. f. } (C_1 \cdot \text{perceived prob. of acceptance; profit to } P; C_2 d)$

In this way,  $C_1$  could be equal to 1.0 in cases where  $P$  is the recipient of an initiation of exchange (i.e., he is certain that, if he agrees, the transaction will in fact take place, and he will make the stated profit). We do not wish to dwell on the construction of an appropriate formal model in this dissertation. A lexicographic representation is mentioned as a possible means of linking the process under study to the more rigorous body of theory in decision making studies. It also provides a shorthand notation for the decision situation facing the actors.

Let us consider briefly just what 'ambiguity of information' means in an exchange context. The information at issue is that concerning  $O$ 's resource levels, because this, together with  $P$ 's ability to assume  $O$ 's point of view, is what allows  $P$  to estimate how much profit  $O_j$  makes on a given transaction; this in turn lets  $P$  estimate:

- 1) how likely O is to accept a given initiation by P (probability)
- 2) how much O profits relative to P, (d), and thus, the fairness of an exchange.

With respect to 1): prior to a transaction, P's estimate of whether or not his initiation will be accepted is just an estimate -- P cannot be certain of being accepted, and he does not know the exact probability of acceptance and rejection. He is faced, in essence, with an uncertain situation (probability distribution for events unknown).<sup>19</sup> As Ellsberg argues, even in uncertain situations, P may be able to assign subjective probabilities to alternative events. The dimension of confidence of estimate is additional to the subjective estimate of probability -- after making use of all the information available to him to calculate subjective estimates of probability, P may still feel that he can put more or less faith in these estimates, on account of the quality, source, reliability, and quantity of the information on which it was based. The studies by Ellsberg and others mentioned<sup>20</sup> in Chapter 1 compared preferences for risky and uncertain bets, and found that many subjects chose the former, even when the two bets had equal expected value.<sup>21</sup> Thus, if (value x probability = expected value) does not vary, some additional factor must be operating to create the preference for the risky bet -- this Ellsberg attributed to the lower confidence P has in an estimate of probability based on ignorance of the probability distribution.<sup>22</sup>

We argued in the introduction that these findings could be extended to a social interaction context. There are many social situations

parallel to the uncertain bet -- faced with a human opponent, with whom P has had little or no prior interaction, P must arrive at subjective estimates of  $O_j$ 's probability of accepting P's initiation. P is likely to feel different degrees of confidence in his estimates, depending on the ambiguity of information available to him. The question of what kinds of information are considered more or less ambiguous is both a theoretical and an empirical issue. We do not have a well established set of findings about what kinds of cues P will trust most in social situations, although Jones et al.<sup>23</sup> have shown that information controlled by O (concerning O) is suspect if O could gain by manipulating such information. Studies of the inference of Other's motives<sup>24</sup> may eventually add to our understanding of the relationship between type of information and trust of such information. (Our argument that the structure of rewards affects the motives of actors will be extended to claim that the more competitive the structure of rewards, the more actors will be suspicious of information that comes from O.)

In addition to factors that make P have less confidence in information, we also know that people process only a limited amount of information,<sup>25</sup> and will not seek more so long as they have enough to proceed. If this latter process applies in social interaction, we can expect a further bias towards partners about whom the actor has information at hand (as opposed to those about whom he must first acquire information). The implication is that P will prefer to make use of unambiguous information if it is available; he will, however, use more ambiguous information if that is all that is available.

With respect to 2): Without information about  $O_j$ 's resources, P cannot reliably estimate  $O_j$ 's profit in a given exchange by means of taking O's point of view, as he does not know the base against which X is evaluated. As with an uncertain bet, P may average the possibilities -- he can assume O gains more, less, or the same as P, the 'average' guess being that O gains the same. Such an estimate would have a lower confidence weighting than if P knew unambiguously what O's profit was. A lower weighting would also be indicated if P is conservative, and makes the 'worst possible' assumption.

Assumption 6: P believes O will utilize P's initiations of exchange as cues to O's value position with respect to resources, when O does not have verifiable, unambiguous information about P's resources.

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Discussion: Kuhn argues that people measure the relative goodness or badness of a particular transaction by a) the consensus of what goes on around them, and b) the proposals of the other person. Lacking a consensus in the early stages of interaction, or lacking information about the consensus, the offers of exchange from Other may be the only indication P has of what O considers a reasonable price. Liebert, et al., provided evidence that "the bids of Other are used as cues as to the reasonableness of one's own aspirations"; and indicated that an individual who was ignorant of his opponent's profit was more influenced in his own goal setting by the informed bargainer's offers.

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Assumption 6 provides for the possibility that P will try to influence O's perception of what meets the criterion of a fair exchange, if

information is asymmetric. If P has information about O, he can discern the limits of his and O's profit overlap; so long as P keeps his offers in this region, P can ask for more than a fair exchange would allow, and maintain a positive probability that O will perceive it to be fair.

Assumption 7: Initiations of exchange are subject to principles of reinforcement: 1) acceptance of an initiation acts as a positive reinforcement; 2) positive reinforcement leads to an increase (repetition) of initiations of the same kind, and negative reinforcement will lead to a decrease (failure to repeat, change of initiation).

### Hypotheses

The hypotheses will be presented according to the argument made in the first chapter. There it was argued that in exchange relationships, P and O make comparisons of subjective profits in exchange through a process of taking the other's point of view, and that this process depended on knowing the resource base of Other. Exchanges under full information about resources were argued to approach fairness, or equality of profits assessed in relation to resource bases. P could get the best profit to himself by finding someone who valued highly what P could give him (resource X), and who placed relatively low value on what P wanted (Y). The first hypothesis predicts how P will act if potential partners differ in their need for X and Y. The next two hypotheses make predictions about the possibility that when information is asymmetric, P may perceive an advantage in being able to withhold information about his resources that O needs to assess the fairness of a proposed exchange transaction. P is then ex-

pected to make initiations of exchange that would give him more profit than O (i.e., that are unfair to O). It was argued that, in the presence of alternative P's about whom O had information, O could express his preference for unambiguous information about his partner by avoiding transactions with a partner whose resource base was not known. The fourth and fifth hypotheses make predictions that O will show his preference by a) initiating to persons about whom he has information; and b) accepting or agreeing to initiations from such persons. The last hypothesis claims that the net result of the process outlined above is that Persons who have tried to gain an advantageous exchange through information control will fail to do so, and will decide in time to make available information about their resource bases.

The situation in which the hypotheses apply is one where some people have already revealed their resource base and value positions to other members of the group, and some other members have, by choice or circumstance, discretion over information about their value positions. We consider a situation where there are just two different commodities X and Y, valued in a known and specifiable way, and distributed non-uniformly across the members of the group. Individuals are seen to have an equal number of possible alternative exchange partners, so that no one possesses a power advantage by virtue of a greater number of alternatives.

#### Hypothesis 1

Among those members about whose resource bases and value positions P has unambiguous information, P is most likely to initiate to a person, O<sub>i</sub>, who P perceives to have the greatest amount of resource Y, and the smallest amount of resource X, relative to Y.



Hypothesis 1 is based on the following argument. In Assumption 1 it was argued that P will try to maximize his total marginal utility. In situations specified by the scope conditions, when the actor has a lot of one commodity X, and little of another commodity Y, both of which he values, he can trade some of X for some of Y, to increase the total value to him of the resources he possesses. By definition, the marginal utility of an increment  $\Delta Y$  will be smaller for some O who has a lot of Y; the costs to such an O will be relatively low. By Assumption 4, P can take the point of view of Others whose resource bases are known, and locate an O whose costs  $\Delta Y$  are low, and whose marginal gain from the  $\Delta X$  which P is offering are large. Such a person will not only be willing to give up more Y, but will be anxious to obtain X, as it increases his value. In conjunction with Assumption 3, stating that P will be more likely to make an initiation if it has a good chance of being accepted, this implies that P's subjectively expected profit will be greater for an initiation to an O who has a lot of Y relative to X. Therefore, we predict that members are more likely to make initiations to these Others. The proviso "Among those about whose resource bases and value positions P has unambiguous information....", is made to reflect the argument that without such information, P cannot engage in the role-taking process described by Assumption 4, to assess what he must give O to get an increment Y.

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Discussion: W. Foddy provided evidence that P prefers to initiate to others with a large resource base rather than to those with a small resource base of a given commodity, because the subjective costs for 'wealthy' Others

for giving up resource increments were smaller. Hypothesis 1 is basically a restatement of this principle, except that: 1) in the present context, we shall go on to state a prior preference for exchange partners about whom one has information; and 2) Hypothesis 1 generalizes W. Foddy's claim that P prefers Others with large amounts of resource Y, to include the case in which all members have the same total wealth, but different ratios of one resource to another. In such a case, P will prefer to initiate to Others with a relatively greater imbalance of Y over X. Conversely, P will avoid dealing with someone with a more even balance of resources than P, because this O's prices will be too high.

A further point to note is that if we find empirical support for Hypothesis 1, we will have a basis for predicting the rest of the process of concealing rewards and costs to gain advantage. That is, it will give us confidence in our claim that P does evaluate the relative profits in an exchange in reference to how much he and O already have of the resources being exchanged.

Hypothesis 2: If O has only ambiguous information about P's resource base, and P has unambiguous information about O's resource base, P is more likely to make an initiation of exchange that is advantageous to P, than when O does have information about P's resource base.

Hypothesis 3: In the early stages of interaction, persons who have the opportunity to conceal their resource bases and value positions will perceive such concealment to be an advantage.

Hypotheses 2 and 3 are based on the following argument:

We have assumed (Assumption 1) that members of the group want to obtain as much marginal profit as is possible, and in addition, to gain more profit in an exchange than the partner gains (Assumption 2). However, by

Assumption 4, when P has information about O's resources, P is able to adopt the given Other's point of view to gauge how much O is willing and able to give P. Taking O's point of view makes P realize that O acts according to Assumptions 1 and 2, just as P does. The net result under conditions of full information would tend to equality of subjective profits in exchange, as this will tend to be each actor's estimate of what O is willing and able to give up. By Assumption 3, P is unlikely to initiate an exchange that is unlikely to be completed. Under full symmetric information, exchanges unfair to either party are unlikely to be completed. However, if O has only ambiguous or no information about P's resource base, then by Assumption 6, Other is left in the position of inferring the profit P would make by the kinds of offers P makes. If O receives an offer from P that, for example, asks more than it offers, O cannot know whether P is trying for an advantage, or whether P has a resource base that 'justifies' such an offer. We conclude that if P does, in fact, make an initiation of exchange that is advantageous to himself, O is less likely to reject it than if O could see, on the basis of information about P's resource base, that the offer was unfair. This being the case, P is more likely to make advantageous initiations when O has only ambiguous information about P's resource base and value positions, as there is a greater probability of acceptance. By Assumption 3, the probability of a given initiation being made increases as the probability of acceptance increases.

Discussion: Hypothesis 2 proposes that tactics of concealment and deception are used when others are uncertain about the true conditions of supply

and demand, and when it is costly or impossible to test the cues that P gives out. If one visualizes P's initiations of exchange being motivated by a desire to increase his gain, but subject to forces that prevent him from gaining as much as he wants, we may think of P's ability to withhold information about his resources as removing one force that constrains him from attempting an advantage. The prediction in Hypothesis 2 implies that a greater proportion of members whose resources are concealed will attempt advantageous exchanges than will those whose resource bases are known.

It can be argued, perhaps, that a person would have enough foresight to realize that an offer from a person with concealed resources would be rejected, so that P will not attempt an advantageous exchange. Aside from the counter-argument that the lower probability of acceptance may be balanced by the increase in profit possible, it can be suggested that:

- P is not certain that O will receive any other initiations of exchange, and he may accept P's initiation if it is the only one O receives.
- P also has alternative exchange partners, and if he fails with an advantageous initiation to  $O_j$ , he is not excluded from future exchange.
- P has limited cognitive capacity, and will focus more on his own intentions and acts, than on anticipating all the possible initiations to all the different alternative partners.

Although the prediction made in Hypothesis 3 follows from the same argument as for Hypothesis 2, it differs in making a prediction about perceptions, rather than about types of initiations. Members must first perceive an advantage in concealment before they use it, and it seems reasonable to argue that something which leads to an increased probability of obtaining a

desired outcome is an advantage. However, as we noted in the previous discussion, a person will not necessarily attempt an advantageous exchange when he sees that O is unable to assess the fairness of such an exchange. P might feel that tactics of advantage work only when used sparingly, or P may see more value in establishing a firm exchange relationship in the early stages of interaction. If a member does not choose to make use of the potential advantages of concealment, we are interested in establishing whether it is because he does not perceive the advantage, or whether he recognizes the potential but chooses not to utilize it. We can separate the perception of an advantage and attempts to obtain one, by directly asking group members for their opinions concerning the concealment of information, and by assessing their preferences. Presumably, those who either choose to conceal, or continue to conceal their resource bases if given the opportunity, are indicating that they perceive it to be in their interest. There is the possibility, too, that the perceived advantage of concealment does not lie solely in the increased chances for putting over an unfair offer.

Hypothesis 4: Members of a group are more likely to direct their initiations of exchange to persons whose resource bases and value positions are known (through unambiguous information).<sup>31</sup>

The argument leading to Hypothesis 4 is as follows:

We made the assumption (Assumption 4) that P will be able to adopt Others' (we referred to as the recipient here) points of view to estimate how much a given recipient will give up of one resource Y, in return for a given amount of X, from P. When O is the initiator, then from O's point of view, he can make this kind of assessment only if he has information about

the resource positions of different P's. Lacking such information, O can only guess as to what sort of profit P is obtaining, and what he would find acceptable.

When O compares two alternative exchange partners,  $P_1$ , about whom O has unambiguous information, and  $P_2$ , about whom he has none, O may entertain the hypothesis that  $P_2$  is as good a partner, a better partner, or a worse partner than  $P_1$ , in that  $P_2$  may have more, less, or the same total amount of resources as  $P_1$ . However, by Assumption 5, if O has no information about  $P_2$ 's resource base, he will have less confidence in whatever estimate of the expected value of an exchange with  $P_2$  he arrives at. This has the effect of depressing O's estimates of the expected value of exchanges with partners whose resource bases are not reliably known to him. This does not exclude the possibility that the ambiguity-weighted estimate of SEV with  $P_2$  can exceed the SEV of an exchange with  $P_1$ , if the latter is a very undesirable partner. However, it seems reasonable to predict that O will frame his expectations about these concealed others relative to what he knows about the potential partners about whom he has reliable information.

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(Information under a person's control, including the information contained in the types of initiations that person makes, is considered more ambiguous than direct, verifiable information.) We therefore predict, that other things being equal, the weighted expected value (profit) in an exchange with a partner about whom O has unambiguous information will be greater than the ambiguity-weighted expected profit in an exchange with a partner who withholds information about his resources (as specified in scope

conditions 3 and 6). Together with Assumption 1 that members of the group seek to maximize subjective value of resources, the foregoing argument leads to the prediction in Hypothesis 4.

Hypothesis 5: If a member has a choice of initiations from  $P_1$  and  $P_2$ , and the initiations are identical with respect to absolute amount of resources offered and requested, and if the member has unambiguous information about the value position of  $P_1$ , and ambiguous or no information about the value position of  $P_2$ , then the member will be more likely to accept the initiation from  $P_1$ .

Hypothesis 5 is based on the following argument: ( $P_1$  and  $P_2$  are initiators; 0 is recipient)

If the group member (refer to him simply as 0) receives initiations of exchange that are identical except for information available about the initiator ( $P_1$  or  $P_2$ ), then 0 cannot decide between the offers on the basis of profit to himself. This profit is fixed once the offer is made, and if he accepts an initiation, the transaction goes through with probability 1.0. By the choice function given with Assumption 5, if 0's own profit is the same for both offers, he will then attend to how his profit compares to what the initiator receives in the transaction. Because the only information 0 has about  $P_2$ 's value position must be inferred from  $P_2$ 's initiation, 0 will have less confidence in his assessment of the comparison of his profit with that of  $P_2$ , on the grounds that information under  $P_2$ 's control is more ambiguous. The ambiguity of information about  $P_2$ 's resource base depresses the expected profit of an exchange with  $P_2$ , in respect to the second dimension of the lexicographic choice function; and when two alternatives are in the same payoff class with respect to 0's own profit, he will select the alternative with the greatest expected value on the second dimension -- thus the prediction that 0 will select the offer from  $P_1$ .

Discussion: If a person were indifferent between two such offers, there might well be a sound basis for an actor with concealed resource levels to gain an advantage, especially if his costs happened to be lower than those of  $P_1$ .<sup>33</sup> The fact that  $P_2$ 's concealment destroys O's indifference between otherwise identical initiations limits the advantage in concealment. Thus, hypothesis 5 is crucial to the theory, as it holds constant all factors (size of typical initiation, number of offers to choose from), except that of information, and predicts that people will opt for the alternative with better and more information.

It should be noted that Hypothesis 5 does not deny the possibility that if O gets a generous offer from a person with concealed resources, such that O's net profit is larger than for any other alternative, O will accept it, despite its unknown fairness, because it compares well with at least one other alternative. However, because of the preference by all actors to seek exchanges that profit them most, such generous offers are unlikely. In addition, if an initiation from a source whose resource base is not known to O is the only initiation O receives, he is likely to accept it, so long as he makes a positive profit.

Hypothesis 6: P's perception of the advantage of withholding information about his resource base and value position will decrease over repeated exchange interaction, and P will be more likely to choose to reveal unambiguous information about his value positions and profits, than during the initial stages of interaction.

The argument leading to Hypothesis 6 is given below:

In Assumption 7, it was stated that group members' initiations are subject to principles of reinforcement, such that an acceptance of an initiation acts as a positive reinforcer, making a given P more likely to



to repeat an initiation of a similar sort to a similar person; and such that rejection of an initiation would lead the initiator, P, to change his offers, by going to different targets, and/or by changing the type of offer. In addition, the receipt of initiations should act as a positive reinforcer. In Hypothesis 3, it was predicted that the persons most likely to receive initiations were those whose resource bases and value positions were unambiguously known. In Hypothesis 5, it was predicted that these same persons were more likely to have their initiations of exchange accepted, if they were considered beside an identical offer from a member with concealed resources. In addition, on the basis of Hypothesis 1, members with concealed resources are more likely to make offers unattractive to the recipients, relative to the offers made by a member with a similar but unconcealed resource base. Thus, people who reveal honest information about their resources are more likely to complete transactions, i.e., they will 'succeed' more. This sequence of predicted events, coupled with Assumption 7, implies that a Person who has concealed his resources will notice the pattern of acceptances (if it occurs), and by discrimination, then generalization, he will probably conclude that his failure to provide unambiguous information is behind his low rate of success. P's choice of revealing information is thus more likely after interaction has proceeded for some time than during the early stages. The general idea is that people will not use information control as a tactic if it does not work, but that since a person will initially believe concealment to be an advantage, he must learn through experience.

In the early stages of interaction, people do not have viable, established alternative partners, and P is likely to think there is a chance of having an advantageous initiation of exchange accepted. As interaction proceeds, information about the prices in transactions gets distributed (even without direct communication), and even if O does not know the level of P's resources, he can hold P to the level of established alternative transactions. Thus the person who initially concealed his profit level is forced to pay the going price, or to give information about his value positions, which has the effect of forcing his price down.

No explicit hypotheses are made here concerning the probability that P will make use of concealment to try advantageous exchange, although it was implied in Chapter 1 that P would be least likely to perceive and use information control as a tactic if he was in a large, well-connected group of long standing; and most likely to try to gain an advantage if he was exchanging with someone who had no readily accessible alternatives, and where P could manipulate information without being suspected or checked. (So long as P can control O's accessibility to alternatives, advantageous exchange can occur in groups of long standing -- this moves us into the realm of real power advantage, beyond the scope of the present theory.) The invocation of reinforcement principles might imply that once P has learned his lesson, he will ne'er more wander from the paths of fairness. In the early stages of interaction (with new persons, or new resources), the conditions that enhance advantageous exchange attempts (low connectedness, low information, lack of established partners) are present to some

degree, and we therefore expect advantageous attempts, especially when we acknowledge that P cannot foresee the entire course of interaction.

While the theory could be expanded to follow the interaction process through to the point where social prices reach a consensus level, such an extension would take us beyond the scope of the research paradigm, and so we leave this task for future research.

The next chapter presents the research design used to test the six hypotheses presented above.

## FOOTNOTES FOR CHAPTER 2

1. The specification of what constitutes a resource is not a settled issue in exchange theory, and for present purposes, material resources are used for simplicity. The problem of defining resources is complicated by the fact that different resources appear to have different properties. For example, some resources can be transferred only (e.g., money), while others can be kept and transferred at the same time (e.g., expertise). See S. Rosen, 'The comparative roles of informational and material commodities in interpersonal transactions', *Journal of Experimental Social Psychology*, 2, 1966, pp. 211-226, for a discussion of an investigation to test the thesis that the owner of valuable information would engage in different pricing behaviour than the owner of valuable material commodities.
2. For purposes of this study, the value function is a marginal utility function that states that as P gains more of a given resource X, successive standard increments of X are less and less valuable. Other functions might also describe the manner in which P values X: for example, a linear function would mean that each successive increment of X gave the same added subjective value, regardless of what P had; a threshold function would mean that P did not receive any subjective value for X until he had an amount k of X, after which further amounts of X were not any more valuable (e.g., if k out of N votes were needed to win an election.)
3. The marginal reward/cost of an increment of Y refers to the subjective reward/cost to P of that increment, and is assessed relative to how much Y P already has. See A. Kuhn, The Study of Society. London: Tavistock Publications, 1966, pp. 285-86.
4. See: W.H. Foddy, 'The formation of cliques in collectivities as a consequence of initial distribution of dimensions of wealth', Unpublished Ph.D. Dissertation, University of British Columbia, 1971; and R.K. Leik, R.M. Emerson, and R.L. Burgess, 'The emergence of stratification in exchange networks: An experimental demonstration'; Paper presented at the West Coast Conference for Small Group Research, San Diego, 1968. Institute for Sociological Research, University of Washington, Seattle (Mimeograph).
5. Two different resources are all that is necessary to represent the abstract relationship; more than two complementary resources would not change the nature of the principles of the theory, but introduce complications due to the fact that P might need different exchange networks (groups of people) to meet his needs for different kinds of resources.

6. Blau gives an example of a non-material commodity which may be valued according to a decreasing marginal utility principle in his discussion of the exchange of advice for deference among office workers. In addition, obligation, though non-material, is often thought to be cumulative. See P.M. Blau, Exchange and Power in Social Life, New York: John Wiley and Sons, 1964.
7. If P has no X, but still says he does not value an increment of X at all, we may infer either that it would take a great deal of X to produce any utility for P (positive goods), i.e., his just noticeable difference is very large; or that P has a negative utility for X (negative goods), and will pay to be rid of it. The exchange of goods and behaviour to avoid undesired behaviour from Other is similar to coercion, but can be handled in an exchange framework. See Kuhn, op. cit., pp. 361-370.
8. This condition eliminates situations where individuals feel constrained to give a fixed number of units of X for a fixed number of units of Y, regardless of the situation of the partners to the exchange. Commercial goods are usually sold for the same amount of money, regardless of the buyer's wealth, and are not open to manipulation through informational tactics. (Exceptions do exist: Salvation Army stores reportedly charge according to the customers' means, a policy which has occasioned some interesting examples of well-to-do people getting 'dressed down' in old clothes for a trip to the Sally Ann.)
9. An illustration of such confusion was seen by the author during one Hallowe'en. In recent years, children have begun collecting money for charity instead of candy. As they are instructed not to take both money and candy, an impasse can result when an adult tries to give the child something which he knows all children value (candy) together with money, and the child refuses.
10. This condition could perhaps be replaced by a requirement that if resources are increasing, they do so at a constant rate across members. For example, people regularly receive installments of income (and consume it), but the comparative resource bases among group members does not change. That is, the theory probably does not have to be limited to entirely static situations in which there is no input of resources. Advantageous exchanges could still occur in a given transaction, but would perhaps have a smaller effect on over-all ranking, which is calculated over a longer time.
11. See H.H. Kelley and D. Schenitzki, 'Bargaining', Chapter 10 in C.G. McClintock, Ed., Experimental Social Psychology, Holt, Rinehart and Winston, 1972, for a discussion of the means of measuring and manipulating motivational variables in bargaining experiments.

12. In an experimental context, it is difficult to construct a task that could simultaneously involve resource production and transfer, although there are probably elements of both in enduring social relationships.
13. Kuhn, op. cit., p. 286.
14. P will not initiate an exchange just because it would benefit him a lot, unless he believes there is some non-zero probability of acceptance. The issue of the weight given to value gained as opposed to the probability of gain is treated as an empirical issue here, though perhaps one can make two rough assumptions:
  - 1) the more often P's initiations are rejected, the more salient and therefore the more weight that is given to the probability of an outcome;
  - 2) in the initial stages of exchange, P has little basis on which to infer the probability of acceptance of his offers, and will tend to be optimistic, i.e., inflate the perceived probability of success. Psychological studies on betting behaviour give evidence that people attend more to the probability of gain under some conditions, and more to the size of gain under others; it also appears that there are individual differences with respect to how individuals weight the two factors.

See: P. Slovic and S. Lichtenstein, 'The relative importance of probabilities and payoffs in risk taking', Journal of Experimental Psychology, Monograph Supplement, 1968, No. 3, Part 2, pp. 1-18.
15. A weighted linear function ( $w_1$  Profit to P +  $w_2$  Profit to O) could also be used, but requires a more rigorous level of measurement of utility and probability, and independence of the factors. It would make it possible to assume that P does in fact consider both his own and Other's profit, and chooses an alternative giving the best balance of the two factors (so that P may prefer an exchange giving less profit to self, if it lets him get more than some O, than in a transaction where P gains more himself, but O gets even more).
16. Theoretically, P should be able to take O's point of view even if O does not have the same value function as P, so long as P has an understanding of that function (i.e., through past experience, extended exposure to others with that value function, etc.). An interesting possibility is that P will find it much easier to take O's point of view when it is the same as his own; this may help to account for why people tend to compete and compare with similar Others: the comparisons are more interpretable to P. See P. Hoffman, L. Festinger, and D.H. Lawrence, 'Tendencies toward group comparability in competitive bargaining', Human Relations, 7, 1954, pp. 141-159; and B. Latané, Ed., 'Studies in Social Comparison', Supplement 1, Journal of Experimental Social Psychology, 1966, for a discussion of conditions under which people tend to compare with similar others.

17. While it is assumed that P adopts the point of view of others towards-himself, it is not assumed that he takes the point of view of every other to all possible others. While such a procedure might let P estimate to whom initiations will be made in the group and the nature of the initiations, we assume it is beyond the cognitive capacity of the actors to do so.
18. A lexicographic function requires only that P be able to order his preferences, not assign numerical values to them. While this is an advantage in some ways, it does not necessarily yield values which can be multiplied by a weighting factor. Consideration of the most satisfactory model are premature at this point, as one must first establish the manner in which the process operates, before it can be successfully modelled.
19. D. Ellsberg, 'Risk, ambiguity and the savage axioms', *Quarterly Journal of Economics*, 75, 1961, pp. 643-669.
20. In addition to the Ellsberg article, see also J.S. Chipman, 'Stochastic choice and subjective probability', in D. Willner, Ed., Decisions, Values and Groups, New York: Pergamon Press, 1960; and S.W. Becker and F.O. Brownson, 'What price ambiguity? or the role of ambiguity in decision making', *Journal of Political Economy*, 72, 1964, pp. 62-73. These studies are reviewed by W. Lee in his book Decision Theory and Human Behaviour, New York: John Wiley and Sons, 1971, pp. 119-123.
21. The claim that the risky and the uncertain bets have equal expected value rests on the decision theoretic assumption that if the probability of events in an uncertain bet are completely unknown, P's best estimate of probability is the midpoint of all possible and equally likely probabilities. See Lee, op. cit., p. 121.
22. See Ellsberg, op. cit., p. 664, for his 'ambiguity corrected' payoff -- basically, P makes an estimate of the probability distribution over events, and then steps back and asks himself how confident he feels in his estimate. If his confidence is low, he will give more weight to a pessimistic or conservative estimate of probabilities. Becker and Brownson, op. cit., questioned the appropriateness of Ellsberg's formulations, but their findings support the claim that subjects will pay to avoid an ambiguous course of action when that course of action has an expected value equal to an unambiguous alternative. One could also argue that it is not subjective probability that is revised by P, but rather his estimate of utility -- the main point being that somehow, expected utility is lowered in uncertain bets.
23. E.E. Jones, K.J. Gergen, P. Gumpert, and J.W. Thibaut, 'Some conditions affecting the use of ingratiation to influence personal evaluation', *Journal of Personality and Social Psychology*, 1, 1965, pp. 613-623;

- E.E. Jones and J.W. Thibaut, 'Interaction goals as bases of inference in interpersonal perception', in R. Tagiuri and L. Petrullo, Eds., Person Perception and Interpersonal Behaviour, Stanford: Stanford University Press, 1959; and D. Bramel, 'Determinants of beliefs about other people', Chapter 4 in J. Mills, ed., Experimental Social Psychology, Toronto: Collier MacMillan, 1969.
24. See footnote 23; also H.H. Kelley and A.J. Stahelski, 'The inference of intentions from moves in the Prisoner's Dilemma Game', Journal of Experimental Social Psychology, 6, 1970, pp. 401-419, and H.H. Kelley, 'Attribution theory in social psychology', in D. Levine, Nebraska Symposium on Motivation, University of Nebraska Press, 1967, pp. 192-238.
  25. J.T. Lanzetta and V.T. Kanareff, 'Information cost, amount of payoff, and level of aspiration as determinants of information seeking and decision making', Behavioural Science, 7, 1962, pp. 459-73; S. Lichtenstein, 'Bases for preference among three-outcome bets', Journal of Experimental Psychology, 69, pp. 162-169.
  26. It seems not unreasonable to argue that the initiator of an impression believes the impression will be accepted at face value, even though when the initiator is at the receiving end, he tends to be more suspicious of a discrepancy between the real and the presented self. One seldom hears a person refer to himself as a 'phoney', or as deliberately working a deception on others, though we commonly hear people verbalize suspicions that others do this. Support for the claim that P is likely to believe O will take his offers at face value comes from evidence about the existence of cognitive biases: people tend to think their attempts to exchange will be reciprocated, even if they do not intend to do the same; and they expect others to behave positively toward them even if they feel or are acting negatively toward other. There is a discussion of these findings in E. Burnstein, 'Cognitive factors in behavioural interdependence', in J. Mills, Ed., Experimental Social Psychology, Toronto: Collier MacMillan Co., 1969, pp. 309-340.
  27. Kuhn, op. cit., p. 330.
  28. R.M. Liebert, W.P. Smith, J.H. Hill, and M. Kieffer, 'The effects of information and magnitude of initial offer on interpersonal negotiation', Journal of Experimental Social Psychology, 4, 1968, pp. 432-441.
  29. W.H. Foddy, op. cit., 1971.
  30. Emerson is currently conducting research with 5 man groups, varying the degree of information about profits in bargaining dyads within a larger exchange network. Results to date show that "Under conditions of symbolic payoff and visible equity, trade agreements other than (one for one) were extremely rare, and when they did occur, they were likely to be recipro-



cated." Emerson predicted that when "equity conditions are not visible, (subjects with a power advantage) will tend to use their power in effective bargaining", i.e., will not feel held to equitable exchanges. See R.M. Emerson, 'Power and position in exchange networks', Paper presented at meetings of American Sociological Association, 1971. In a personal communication, Emerson stated that the trend in the data was as predicted, but that subjects frequently opted to make profits visible and to share (December, 1973).

31. Scope condition 6 ensures this is not tautological by requiring that P be able to initiate to O even if he does not know O's value position -- all he needs to know is what resource O wants.
32. See discussion in Chapter 1 of the idea of a P with concealed resources making use of a 'model' transaction with lower costs and higher rewards to P.
33. See discussion of Case 6 -- Asymmetric information; alternatives in Chapter 1.
34. Because the theory does not predict that a person who withholds information about his resources will never have an initiation accepted (e.g., he may be accepted by a person who gets no other initiations), there will be some people who 'succeed' with tactics of information control, and obtain an advantage -- they are likely to repeat their behaviour. It is simply argued that their average rate of successful transactions will be below that of persons whose resource positions and profits are unambiguously known. Those people who fail in their use of informational tactics will be less likely to continue trying them. They need not all conclude that provision of information is necessary -- an alternative to this might be to locate 'unpopular' others, (e.g., other concealed persons). However, if a person is unpopular, it is usually because he makes an undesirable exchange partners.

### CHAPTER 3

#### RESEARCH DESIGN

To test the hypotheses presented in Chapter 2, a modification was made to an experimental paradigm used initially by W. Foddy in a study of clique formation in exchange networks.<sup>1</sup> A description of the experimental situation will be presented first, including a discussion of the operationalization of variables central to the theory. The same basic design was used for two sets of experiments, and a pilot study which is reported in Appendix IV. The two main sets of experiments are described in more detail at the end of this chapter, where attention is drawn to differences in procedure between them. The variations in design were necessary, due to the fact that a satisfactory operationalization of all relevant variables could not be achieved in one design.

#### Description of the Experimental Paradigm

The research design centered on a trading game. Subjects were provided with supplies of red and green plastic bingo buttons, and they exchanged one colour for another colour.

In each experiment, eight subjects sat behind cardboard booths which had been arranged on the top of an octagonal table. (See Figure A.1, Appendix I). The booths eliminated visual contact among subjects, while a mesh-covered window in the front of each booth allowed subjects to see the table in front of each booth. Each subject had a large pile of either red or green buttons on the table in front of him, and a smaller pile of the

other colour. Four of the booths were equipped with covers that concealed the buttons from the view of others; four booths had no covers (Figure A.1, Appendix I). Subjects could reach their buttons through a gap at the bottom of each booth.

A fixed amount of buttons of the two colours were distributed before each experiment, so that four subjects had a large number of red and a smaller number of green. Two of these had covers over the buttons and two did not. Four others had complementary profiles of many green and few red, again with covers on two of the piles of buttons, and no covers on the other two.<sup>2</sup> No further resources were added after the experiment began. The two levels of visibility of resources (covers and no covers), and the different resource profiles were randomly assigned to the eight seating positions, and the subjects were randomly assigned to booths in each experiment.<sup>3</sup> A card pinned inside each booth told the occupant how much he had of each colour (Figure A.4, Appendix I).

During the experiment, the main lights in the room were switched off, and a hanging lamp placed over the center of the table. This caused the subjects to sit in the shadows, but clearly illuminated any piles of buttons that were out in the open. Each person could identify the other group members by means of letters (G, H, ...N)<sup>4</sup> attached to the outside of each booth; an identical tag was pinned inside. Subjects with covers over their resources also had a coloured tag on the outside of their booths, indicating to others the colour of their large pile of buttons.

Each booth contained a set of mimeographed initiation forms (see Figures A.2 and A.3, Appendix I), and a bowl in which to send buttons to

another person. A value chart used to demonstrate that the principle of diminishing marginal utility applied to the buttons was taped to the inside of each booth. (See Figure A.5, Appendix I.) Subjects were provided with pencils and paper to make calculations.

At the beginning of each experiment, subjects were asked to listen to a set of tape recorded instructions.<sup>5</sup> (See Appendices II and III.) The instructions familiarized the subjects with the setting, indicated the manner in which they could make exchanges, and acquainted them with the value table. Subjects were told that they were in the first part of a two part game, and that they would need both colours of buttons for the second part, where the two colours would be used for completely different purposes. (This second part did not take place.)

The instructions included extended examples showing how the worth of a given total of buttons was increased by having some of red and some of green, and how successive equal increments of one given colour were worth less and less, the larger the pile a person had of that colour.

After the instructions were given, subjects could make an offer of buttons to another subject by filling out an initiation form (Figure A.3, Appendix I), indicating:

- who was sending the offer (the subject's identification letter)
- to whom the offer was directed (the letter on someone else's booth)
- the amount of one colour that was being offered in return for a stated amount of the other colour.

Subjects were allowed to make only one initiation at a time, although they were not required to make an initiation if they chose not to. In addition, they could only accept one offer at a time (i.e., one per trial), even if they received more than one. (This rule was necessary to allow a test of subjects' preferences, given certain combinations of offers.) Subjects knew that they did not have to accept any of the offers they received, if they did not want to. They were limited to offering no more than 100 buttons at a time, to reduce extreme variability in the types of offers sent, and to make subjects believe the experiment would take several trials. No limits were placed on what they could ask for, or agree to give in return for an offer. The limit of 100 on offers was uniform for all subjects.

The subjects put the buttons being offered in their bowls, along with a completed initiation form, and the bowls and offers were then picked up by the experimenter. The offers on trial 1 were either delivered to the person they were addressed to or prearranged offers were substituted for the real offers and delivered.

About three feet from the subjects' table, there was a long rectangular table, on which were placed large wooden screens (about 30 inches tall) in a haphazard fashion. Behind the screens the experimenter kept bowls with completed initiation forms, and bowls of buttons made up to match the false initiation forms. These were switched for the real offers after the experimenter had collected all the subjects' offers for a trial. Subjects' attention was diverted from the deception by giving them a questionnaire to fill

out after the initiations were collected; and by telling them that the experimenter was going to record their offers. Only two subjects in all the experiments suspected that their offers had been intercepted; in fact, during the debriefing, it was sometimes difficult to convince a subject that his real offer had never been received by the person to whom he had addressed it.

When subjects received an offer, they could reply to it either by circling the word 'rejected' on the initiation form (Figure A.2, Appendix I), or, by circling the word 'accepted', and then replacing the buttons offered with the requested amount of another colour. One trial, or opportunity for exchange, consisted of the sequence beginning with the sending of an offer, and ending with the return of the bowls to their owners. No experiment was run for more than two trials.

Questionnaires were given to the subjects: 1) after they had made initial offers, but before any were delivered, and 2) after subjects had replied to the first initiations but before their replies had been delivered. (See Appendices II and III for the questionnaires that were used.) The questionnaires probed subjects' reasons for initiations and acceptances of offers, perception of the marginal value of buttons, and their preference for concealment of their own and others' resources. At the end of each experiment, subjects were debriefed and asked not to describe the experiment to anyone.

Communication between subjects was restricted to pre-written forms (Figures A.2 and A.3 in Appendix I). Subjects were instructed that they could not write additional messages, beyond filling in the blanks on

the forms. The experimenter restricted her conversation with subjects to repetition of instructions if clarification was requested, and reminders to the subjects to fill out their initiation forms and questionnaires completely. The subjects did not appear to be concerned that the experimenter could see the offers they made, and it was clear that the experimenter would make no announcements about the proposed terms of transactions.<sup>7</sup>

### Operational Definitions and Scope Conditions

The theory in Chapter 2 deals with two or more valued resources, X and Y, distributed unevenly in a group, such that for each member there are at least two others with complementary value positions on X and Y. (Scope condition 1.) The resources could be behavioural, material, or non-material, but had to be transferable. In addition, they were to be valued according to a marginal utility function (Scope condition 2), and it was specified that group members could know or infer that this value function applied to Others as well as themselves (Scope condition 3). To meet these requirements, two resources were operationally defined as red and green bingo buttons (material commodities). The buttons were given value by instructing the subjects that both colours of buttons would be needed for the second part of the experiment, where the two colours would be used for completely different purposes<sup>8</sup> (see Appendices II and III for instructions). The buttons had the advantage of being free of individualistic associations which might cause each subject to value them according to an unknown function that might vary across subjects.

The requirement that the buttons be valued according to a marginal utility function was met through instructions to the subjects that the worth of different amounts of buttons was to be assessed by reference to the value chart, on which equivalences of buttons and value units had been set according to the function  $a = \sqrt{b/2}$ , where  $a$  is value units, and  $b$  is the number of buttons. The total number of buttons given to a subject constituted his resource base, and the number of each colour defined the value position for each resource. The gain in value units brought by an addition of a number of one colour of buttons could be calculated by comparing the equivalent amounts in value units for the pile of buttons of that colour before and after the addition was made. Costs in value units could be calculated by comparing the worth in value units of a pile before and after an increment of buttons was given up. Net profit was the result of subtracting costs from rewards. These calculations were made clear by means of examples. (Once profit is operationally defined, the definitions of fair and advantageous exchanges follow.)

Subjects were motivated to trade because an increase to their small pile of buttons brought a larger gain than the cost incurred by giving up an equivalent amount from the large pile. It was emphasized in the instructions that a balance of two colours had more worth in the second part of the game. It was also made clear that large balanced piles were worth more than small balanced piles. Given that the total number of buttons in the group was constant, this imposed a competitive orientation; in addition,<sup>9</sup> subjects were told to do as well as they could. The expectation of a second part of the game met the condition that future comparison with others<sup>10</sup> would occur (Scope condition 4).



The value chart had the advantage of standardizing the worth of different numbers of different coloured buttons, without going into detail about the second part of the game. In addition, it met Scope condition 3, specifying that individuals could know the value function by which resources were valued, without having to know the resource base and value positions of any particular Other.<sup>11</sup>

Scope condition 6 stipulated that some members of the group could withhold information about resources, but would be unable to give out false information. The covers over four of the subjects' buttons satisfied this condition. These subjects were not allowed to communicate the size of their resource bases to others. The coloured tags indicating the predominant colour, and the types of offers made by these subjects were the only information available about the profits they were receiving, and this information was ambiguous. Subjects were told that persons with covers might have more,<sup>12</sup> less, or the same as those with visible piles of buttons; this was intended to create doubt about the size and value position of the concealed resources.

On the other hand, the piles of buttons of the four subjects that had no covers gave unambiguous information about the size of the resource bases,<sup>13</sup> especially in the set where the exact numbers of buttons possessed by visible subjects was displayed on a card on the outside of the booths concerned.

During the experiment, these visible subjects had to place additions to their resource bases made through trading out on the table where

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others could see them. Note: For efficiency, we will henceforth refer to subjects with covered buttons as non-visibles; and to those with no covers as visibles.

The task facing each subject, then, involved entering into exchanges with other persons in order to obtain roughly equal sized piles of red and green buttons for use later on in the experiment. The actor has to select from a set of four possible exchange partners, who have resources complementary to his own. The situation calls for a degree of cooperation for anyone to benefit, but in which the terms of the transaction are in conflict. In the experiment, P must decide which of several alternative others to whom he should initiate. He has some information about the resources of 3 or 4 other subjects, but is in the dark about 3 or 4 others. Initially, P has a choice in terms of the number of buttons he will offer for a given return, and the level of profit he offers to O will affect the chance his initiation will be accepted. Subjects would be generally aware of two conflicting tendencies -- as P's own profit increases (and P prefers this), O's profit decreases (and O does not prefer this). Thus, some balance must be struck such that P asks as much as possible, but does not expose himself to certain rejection.

Although P has no control over how many others initiate to him, he does not have to take up an initiation unless it suits him. Since this is true for the targets of his initiations too, the outcomes for a given trial are uncertain, and P can complete a trial with two, one, or no completed transactions. He can have an offer accepted and accept one; either of these events alone can occur; or he may receive no initiations

and have his own rejected. One subject can of course receive as many as four initiations from those with a complementary colour.

### Variations in the Paradigm

The next sections describe the details of two sets of experiments conducted to test the hypotheses developed in Chapter 2. A description of a pilot study is included in Appendix IV. There were fourteen experiments in each set. The research paradigm described in this chapter was used for all sets. The variations resulted as attempts were made to improve the operationalization of theoretical variables, and to eliminate confounding effects. However, the changes cannot be viewed as a developmental sequence moving from bad to good, since it turned out that changes made to strengthen certain aspects of the experiment weakened others. We will comment briefly on three of the problems created by the paradigm.

To test Hypothesis 1, that P will prefer to initiate to an Other with a large amount of Y relative to X, it was necessary to have at least two levels of resource base, or two levels of value position (total numbers of buttons possessed by different visibles; balance of red and green for different visibles). However, this confounded the test of Hypothesis 4, that visibles were the most preferred partners, as it would not be possible to tell if subjects had initiated to a visible Other because he was visible, because he had a lot of buttons, or both. Consequently, it was necessary to have a set with differences in resource bases among visibles, and a set where there were none.

It was necessary to intercept subjects' real offers, and substitute two identical initiations (one each from a visible and non-visible), to check subjects' preferences as predicted in Hypothesis 5. <sup>15</sup> This had to be done on the first trial, before subjects set up obligations with subjects on the basis of first initiations and acceptances. Such intervention, however, prevented us from seeing if the 'natural' sequence outlined in Chapter 1 (i.e., where non-visibles try for advantages, but receive few initiations, fail to have their offers accepted) did in fact lead to the view that withholding information is really no advantage when Others have alternatives.

Scope Condition 3 stipulated that subjects be in doubt about the resource levels of non-visible subjects. It has been argued that the main strategy open to P to obtain advantage in this case is to act 'as if' he could not afford to give up as many buttons as he would in a fair trade. For this to be a realistic strategy, other members must at least entertain the possibility that some of the non-visibles were 'wealthier' or 'poorer' than themselves, so that fair exchanges would not be seen simply as one for one trades of buttons. A problem arose because subjects tended to assume symmetry in the distribution of resource profiles among visibles and non-visibles. Several non-visible subjects mentioned that it was a 'simple matter' to guess that the non-visibles had the same profiles as the visibles, when all the visibles had the same resource profile (and this was a necessary condition for the test of Hypotheses 4 and 5). <sup>16</sup> Unless doubt could be created, Scope condition 3 would not be met. If the experimenter told subjects that non-visibles were different, and it was patently obvious to

each non-visible that he was not different, then the experimenter was lying. Although it would have been better to make all subjects alike for the purpose of testing Hypotheses 4 and 5, the simultaneous testing of Hypothesis 2 made this seem unworkable. It was decided to create differences of resources between visibles and non-visibles, and to explicitly inform the subjects that differences of some sort did exist. It was still possible to set the resource bases and value positions of visibles all equal (excepting complementarity).

With these preliminary considerations in mind, the details of Sets A and B are given in the following section.

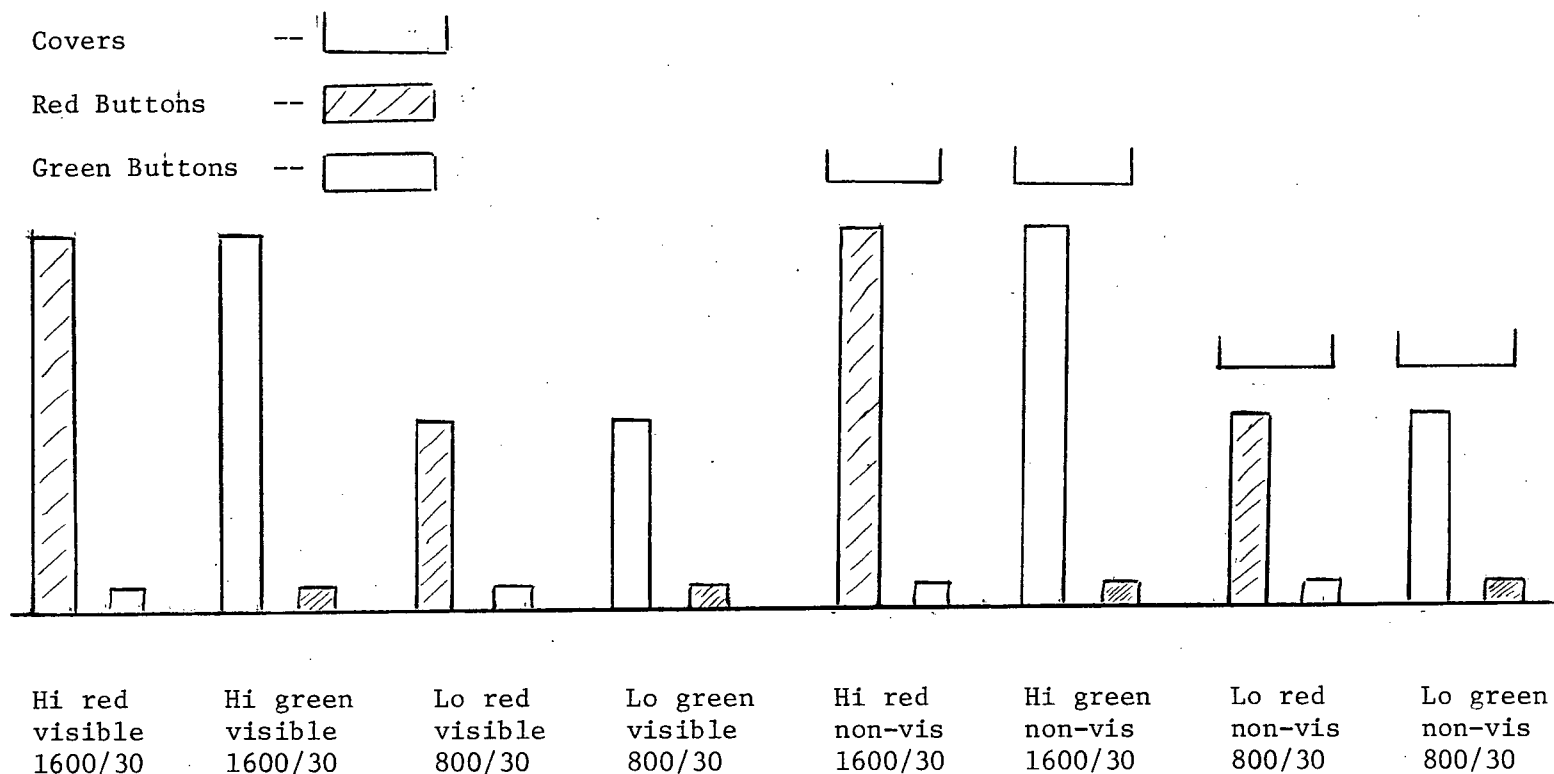
#### Set A

Fourteen experiments were conducted for Set A, with the following distribution of resources and information (see Figure 3.1).

The totals of 1630 and 830 were used, because bingo buttons are quite small, and one needs a pile of over 600 to look noticeably large enough to trade from. Non-visible subjects had somewhat more information than visible subjects, in that they could see that they had an identical profile to one visible subject, and the same size of resource base as two others.

Note that in Set A, subjects did not know the exact size of others' resource bases, but only that some players had more buttons than others. Thus, an advantageous exchange can be defined by the experimenter, but the subjects could not know the exact number of buttons that would satisfy a

Figure 3.1 Distribution of Resources and Information in Set A



Full information about resource base and value positions available to others.

No information about resource base and value positions available to others.

Note: Each subject has 4 possible partners: two visible and two non-visible, with complementary resource profiles.

criterion of fairness. It was expected the actor would consider other players to be of the same resource level, or as having more (or fewer) resources.

In Set A, the first offers were delivered to the booths indicated by the initiator on the form. No offers were delivered until all had been collected, to avoid affecting the offers of subjects who might receive an initiation before sending one. Before delivering the first set of offers, the experimenter had subjects complete the Questionnaire (see Appendix II), holding the bowls at a side table until the subjects had completed the questions. After the trial 1 offers had been processed by the subjects, the experimenter returned the bowls, with buttons and initiation forms to their owners, and instructed the subjects to make their second offer. AAgain the experimenter gave them the same questionnaire to complete, and while the subjects were occupied with it, switched the real offers for false ones, all directed to visible subjects. All false offers asked for 100 buttons of the recipient's predominant resource, in return for 100 buttons of the initiator's predominant resource. High visibles received bogus offers from the other high visible, and from a high non-visible; low visibles received them from the other low visible and from a low non-visible. They did not, of course, know the resource level of the non-visible source. The fake offers were made within resource levels to limit the number of sources of variation.

#### Set B

This set really consisted of two sub-sets of experiments, with seven groups of subjects in each. When it is necessary to differentiate them,

the subsets will be referred to as BI and BII. The resource profiles for the two subsets are shown in Figure 3.2.

While in Set A there were two high and two low non-visibles in each experiment, in Set B there were either four high or four low non-visibles. Since no one knew this, there is no crucial difference between these, and experiments where highs and lows are both present. Visible subjects had signs on the outsides of their booths showing the exact number of buttons. Non-visibles had coloured tags showing whether their predominant resource was red or green.

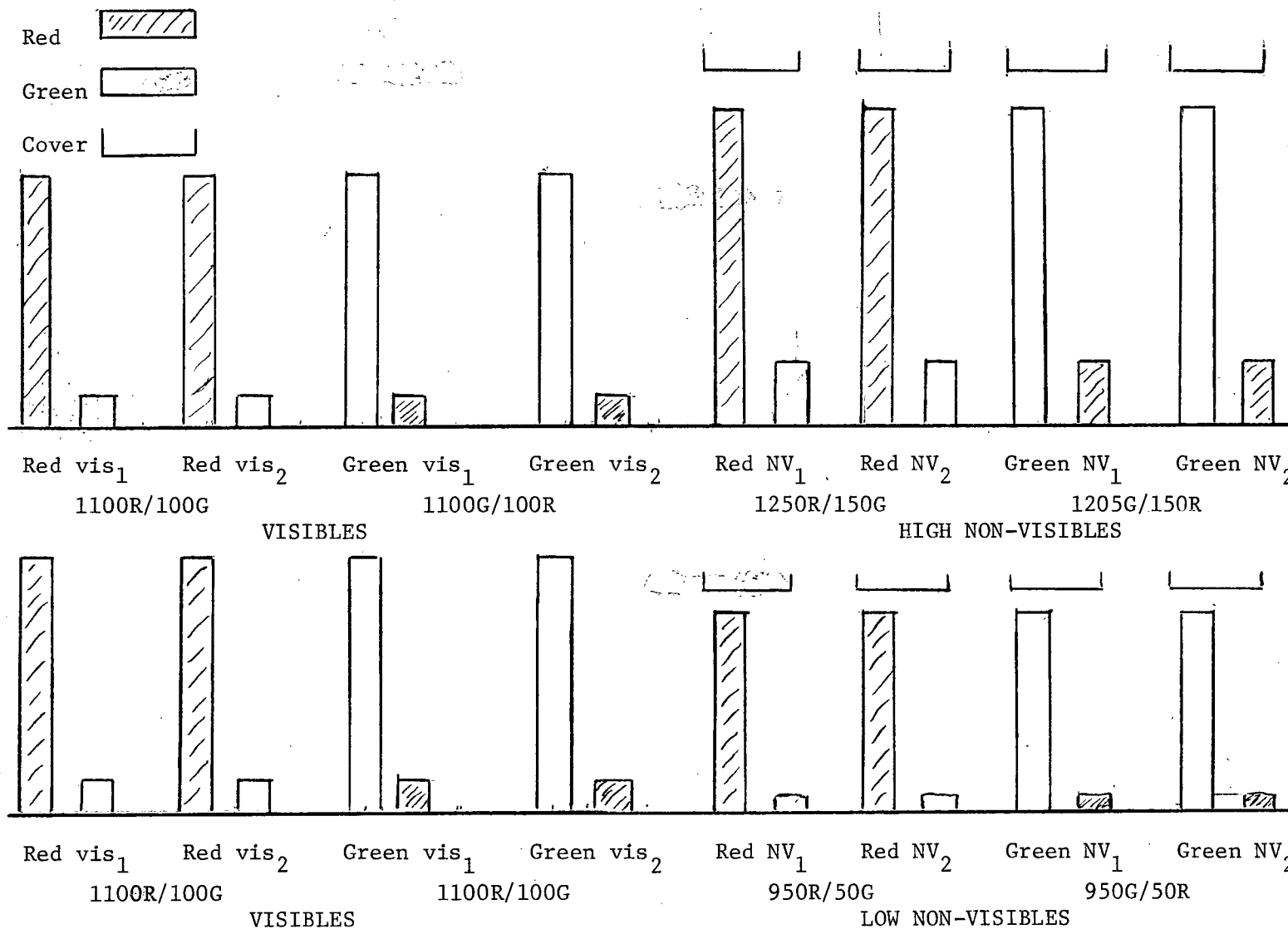
Further differences introduced in Set B were as follows:

- 1) A limit of five trials was stated in the instructions, to attach some cost in time to exploratory offers.
- 2) Only one transaction (one trial) was actually completed (compared with two in Set A).
- 3) Subjects were told there would be four winners, and that these would be the four who had 'done best'.
- 4) False offers asked for 110 buttons in return for 100 offered. While this increases the likelihood of double rejections, it forces subjects to express a preference for the source of an offer which does certainly (in the case of a visible initiator), and may possibly (with the non-visible initiator) be giving the recipient a lower profit than the partner.
- 5) Non-visibles, as well as visibles, received two false offers each.

This interference with the first set of initiations made it impossible



Figure 3.2 Distribution of Resources and Information in Set B



to continue the experiment beyond one trial, without exposing the de-  
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 ception.

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In other respects the procedure was basically the same as for Set A.

More extensive questions were asked concerning subjects' reasons for the size and target of initiations, and reasons for acceptance and rejection of offers.

The data that result from Set B consist of real initiations by subjects on Trial 1; acceptance of pre-written offers (and in Set BI, acceptance of real offers to visibles); and the subjects' written comments about their perception of various aspects of the situation.

It should be emphasized that the strongest test of the preference for a visible exchange partner would come from the data for visible subjects in Set B. They were the only subjects who could see no differentials in resource bases among visible players, and who were truly uncertain about the resource profiles of non-visible others. For both types of non-visible, high and low, a resource differential with the visibles is evident -- non-visible highs have more than visibles, and non-visible lows in Set BII have less.

#### Predictions for Experimental Paradigm

A short description of the data generated from the experimental paradigm which will be relevant to testing each of the hypotheses is given below. Actual results from the experiments will be presented in the next chapter.

Hypothesis 1: The prediction that an actor will prefer to initiate to an Other who has the best prices implies that he will offer to the High resource players or to players with a large imbalance of one commodity over another. As this hypothesis applies only to visible targets Set B is not relevant, since all the visibles in Set B had the same total resource base and value positions. Thus we will use data from Set A, and some results from the pilot study will also be presented. In the latter, subjects all had the same total number of buttons (1200 each), and differed only in the resource positions on each colour. Some subjects were near to balance, some were very unbalanced, and relative to these visibles, the non-visibles had an intermediate level of balance. In both sets, the hypothesis will receive support if the majority of initiations are addressed to the visibles with the best prices.

Hypothesis 2: To test the tendency for non-visibles to make advantageous exchanges, we shall compare the proportions of non-visibles and visibles making advantageous initiations. In addition, the 'typical' offers of the two groups will be compared, on the expectation that non-visibles will make initiations that bring more profit to themselves, if accepted. Visibles should make typical offers that are 'fair'. Fair will be defined relative to the resource base of the exchange part-

ners. Data will mainly be from Set B, where the confounding of wealth level and visibility did not occur, and where subjects knew the exact size of the visible Others' resource bases.

Hypothesis 3: Data relevant to whether or not the non-visibles perceived an advantage in the covers will be responses made by non-visibles on the questionnaire given on Trial 1 in both sets. In particular, questions about the perceived advantages and disadvantages of the covers, and about the desire to retain them, are relevant. Again, data from Set B will be of greatest interest, because subjects' perception of the covers was more systematically probed in this set. Data from both sets will be examined concerning the initial desire to retain the covers. In addition, we can examine subjects' estimates of the probability that their initial offers will be accepted, to see whether the non-visibles anticipate any reduced likelihood of acceptance due to the concealment of their resources.

Hypothesis 4: Set B is the best test of the preference to initiate to someone about whom one has reliable information, as the visibles in Set B are identical in total resource base size, and in balance of resources. In addition, their total resource base is known exactly by cards on the outside of their booths. The relevant data are simply proportions of initiations to

visibles and non-visibles, by both visibles and non-visibles.

The expectation is that significantly more than half of all offers will go to the visibles. Despite the confounding of wealth and visibility in Set A, data from these experiments will also be examined, to see if a significantly greater proportion of initiations continue to be addressed to visibles on Trial 2. Subjects' written reasons for initiations will give supplementary evidence that the subjects responded to visible resources in the manner predicted.

Hypothesis 5: The false offers prepared by the Experimenter to make two identical initiations, one from a visible and one from a non-visible, allow a test of the fifth hypothesis. We expect a preponderance of acceptances of the offers from a source with visible resources. Set B provides the best test of this prediction, as the false offers were given both to visibles and non-visibles, and they were received by players before they had completed any other transactions. If, in addition to a simple preference for visibles, non-visibles actually made worse offers (i.e., offers to P that gave P less profit), then the rate of acceptance of initiations from a non-visible source would be even lower than if a non-visible and a visible made identical offers to a given P. To test this conjecture, offers from Set A, which were delivered on the first trial without interference, will be examined.

Hypothesis 6: If the non-visibles' perception of the advantages in covers decreases over exchange transactions, we expect one possible reaction to their predicted failure to be a desire to reveal information about their resources. Thus, the data relevant to this hypothesis are the subjects' stated preferences (on the Questionnaire) about retaining or removing the covers. Set A must provide the data here, as the non-visibles were questioned 'before' and 'after' engaging in transactions. An increase in the frequency of subjects desiring the covers off can be read as support for the prediction.

### Sample

Subjects for the experiments were male college students at the University of Alberta, Canada, between the ages of 17 and 39 years. The students were all undergraduates, who had volunteered at the request of the experimenter. Over 500 students from introductory chemistry, physics, engineering, agriculture, commerce and business administration, and sociology courses volunteered, and of these, 352 subjects were used. Subjects were assigned to experiments on the basis of free time in their timetables. No assumptions are made about whether the sample is representative of a given population: the position taken here is that the behavioural principles under investigation apply to all people, and that demographic variables are not systematically related to the dependent variables of theoretical interest in this study. No personality measures were used as independent variables,

because the theory presented here is concerned with variables which are assumed to operate in a similar way for all subjects. It is conceivable that personality may influence the development of an individual's preference ordering for resources -- once this is known, however, the principles governing their exchange behaviour are not assumed to be idiosyncratic.

Females were not used as subjects, on the expedient grounds that, although females volunteered at a higher rate than males, past experience with female subjects indicated that they do not actually show up as reliably as males. Since the experiments required eight subjects at once, it was decided to use males to minimize the number of experiments that could not be run for lack of subjects. (As it was, an extra subject was occasionally solicited in the cafeteria, if only seven subjects appeared.)  
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Sex of subjects is thus held constant.

Because both levels of the information variable were run simultaneously, no precautions were necessary to avoid unequal maturation, or fatigue, of the subject pool. Subjects were requested not to describe the experiment to their friends, as knowledge of the hypotheses or the experimental manipulation of offers received during the game would invalidate the results. Subjects appeared to have honoured this request in the main -- only two subjects (in the same experiment) suspected the deception, and the data from this experiment were discarded.

A final comment should be made concerning the comparison of this  
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paradigm with those frequently used in studies of bargaining. To date, most experiments have provided neither alternative exchange opportunities,

nor a resource base against which fairness or equity can be defined in terms other than a 50-50 split of money profits (which really represents equality, not equity). The present experiment attempts to operationalize such factors, which are generally agreed to be important. Because each subject has several alternatives, there is also no need to require subjects to reach a settlement within dyad before they can leave the experiment.<sup>22</sup> Studies of bilateral monopoly bargaining have been able to focus on the sequential adjustment of initiations and expectancies, and on the effects of symmetric<sup>23</sup> and asymmetric information for the bargaining outcomes, but have been unable to study the factors of alternatives, and preferences for certain kinds of partners. Thus, while the present study arose in the context of the social psychology of bargaining and exchange, the method of investigation of the phenomena is different, with the theoretical emphasis on the choice of exchange relationships, and initial tactics, rather than on the internal bargaining in a particular dyad that leads to a single solution and division of a payoff.



Figure 3.3 Summary of Features of the Two Experimental Sets

SET A

14 experiments

Each experiment had:

-visibles-2 highs(1630 buttons)  
-2 lows ( 830 buttons)

-non-visibles

-2 highs(1630 buttons)  
-2 lows ( 830 buttons)

Exact totals of visibles' re-  
sources not displayed.

First initiation not intercepted,  
delivered to real target,  
and returned to initiator  
(Trial 1). Trial 2 initiations  
intercepted, false offers of  
100/100 delivered to visibles  
only, replies collected.

Questionnaires: after initia-  
tions made and picked up but  
prior to delivery on Trial 1;  
during Trial 2, non-visibles  
replied to second question-  
naire.

Experiment terminated after  
Trial 2.

SET B

Set BI -- 7 experiments

Each experiment had:

-visibles-4 mediums(1200 buttons)

-non-visibles

-4 highs (1400 buttons)

Exact totals of visibles' re-  
source piles written on cards on  
subjects' booths.

Real offers delivered to visibles  
only; replies picked up; offers  
of non-visibles intercepted, sub-  
stituted two offers of 100/110  
from visible and non-visible -  
Trial 1.

Questionnaires: after Trial 1  
initiation made; second question-  
naire after replies to Trial 1  
offers collected.

Experiment terminated at end  
of Trial 1.

Set BII -- 7 experiments

Each experiment had:

-visibles-4 mediums(1200 buttons)

-non-visibles

-4 lows (1000 buttons)

Exact totals of visibles' re-  
source piles displayed.

Trial 1: real offers of all sub-  
jects intercepted; two false  
offers to all subjects of  
100/110.

Questionnaires: after Trial 1  
initiation made; second question-  
naire after replies to Trial 1  
offers collected.

Experiment terminated at end  
of Trial 1.

## FOOTNOTES FOR CHAPTER 3

1. W.H. Foddy, 'The formation of cliques in collectivities as a consequence of initial distributions of dimensions of wealth', Unpublished Ph.D. Dissertation, University of British Columbia, 1971.
2. S. Siegel, A.E. Siegel, and J.M. Andrews, Choice, Strategy and Utility, New York: McGraw Hill, 1964. Siegel postulates that the choice of a response in probability learning situations is determined by the utility of a correct response and the utility of varying choice, which Siegel claimed arose out of boredom. In social exchange, more than just the escape from boredom is achieved by choice variability -- people do not like to incur too many obligations with one individual, as it increases dependence on that person.
3. This was to eliminate systematic bias due to greater visual centrality of the person opposite. In W. Foddy's study, there was a tendency for subjects to direct a greater proportion of their initiations to persons directly opposite. See W. Foddy, op. cit., 1971.
4. To avoid alpha preference.
5. For each set of experiments, subjects listened to a tape recording of instructions, and in Set B but not Set A, read a transcript of the tape while it was playing. Subsequent to the first set of experiments, a study conducted by W. Foddy indicated that subjects could recall more information from the dual presentation of instructions, than they could if tape only or transcript only was used. Because the instructions induce some of the main scope conditions and assumptions, and because it was important that subjects understand them in the most uniform and complete manner possible, it was appropriate that Foddy's findings should be applied. Our experiments were all conducted by the author, so that bias due to the sex of the experimenter is held constant, though it is unknown. See: W.H. Foddy, 'On getting through to some of the people some of the time', Unpublished Manuscript, Edmonton: University of Alberta, 1972.
6. Subjects believed the experiment would continue for more than two trials. See description of the two experimental sets for details.
7. It could be objected that non-visible subjects were visible to the experimenter, and may have felt constrained to be 'fair'. Such an objection has less force, if one accepts the conceptualization of norms as 'prudential maxims' rather than moral rules that make one feel guilty if one benefits by breaking them. That is, since non-visible subjects were not trading with the experimenter, the fact that she could see whether or not their offers were equitable, would not have affected the probability that the offer would be accepted by the subject to whom it was directed.

8. The provision of a value chart and the deception regarding a second part were deemed necessary, because previous work with the paradigm suggested that a principle of diminishing marginal utility would only operate when subjects knew why they wanted a resource, and what it was worth to them. See W. Foddy, op. cit., 1972.
9. In the second set, subjects were told there would be four winners. The objection could be made that having only one winner would induce more competition. It was decided to have four winners, so that subjects starting at a less advantaged position in terms of total resource base would still believe that they could 'catch up', and so that these people would not give up and lose interest in comparing with others. Some comments from subjects in Set A, where there were large differences in wealth, and no winners, indicated that some subjects did not try to make comparisons with players at a different wealth level. Hoffman, et al., give evidence that people cease comparison with a person who is doing much better in a game, and cannot be 'caught up'. See: P. Hoffman, L. Festinger, and D.H. Lawrence, 'Tendencies toward group comparability in competitive bargaining', *Human Relations*, 7, 1954, pp. 141-159; see also B. Latané, Editor, 'Studies in social comparison', *Journal of Experimental Social Psychology*, Supplement 1, 1966.
10. There is a possibility that subjects will trade with others with whom they cannot compare, in order to get ahead of someone they can see, someone with whom they are comparing profits. In this sense, comparability refers to similarity of progress towards maximizing total value units (balancing the piles of buttons, rather than to comparison of subjective profits for a given exchange). Hoffman, Festinger and Lawrence (op. cit., 1954), found that subjects preferred to share payoffs with a non-comparison other, as a means of getting ahead of another subject with whom they were competing. It may be the case that visible others were more salient competitors, since their progress toward balanced resource piles could be watched. There might then be an 'end-game' effect, with visible subjects avoiding exchanges with one another, but paying no attention to the possibility that non-visible players might also be nearing optimum balance of resources. The consequence of this would be that the alternatives about which P has reliable information seem so undesirable, that the expected value of the uncertain exchange (with a non-visible) is greater in spite of its greater ambiguity. Such an effect is more likely in the experimental situation with fixed total resources and a clear-cut final tallying of winners and losers. These conditions may give an unrealistic representation of conditions found in ongoing exchange relationships, where people probably attend more to their current exchanges and short-term comparisons. Where total resources in the group are static, end-game effects will occur because it is possible for all to reach equimarginality of resources, and have no further motivation to exchange; if resources are consumed and renewed (as with salaries),

or changing (as with a change in task), people probably attend more to immediate balance of profits. Since experimental groups are short-term, it is difficult to design an experiment where final rankings are not extremely salient.

11. In the end, individualistic associations and values would have to be measured, and provided for in a theory. At this stage of testing general principles, however, it is simpler to control for such variability, than to identify a range of value functions, and try to include all combinations in a study.
12. In the second set, they were told that subjects with covers might have more, or less, but did not have the same numbers as visibles.
13. Bartos says that P has 'reliable knowledge' if there is an unimpeachable authority which guarantees information (i.e., implying that O is not reliable, and a disinterested party will be looked on as a source of trusted information). See O.J. Bartos, 'Towards a rational empirical model of negotiations', in J. Berger, M. Zelditch and B. Anderson, Editors, Sociological Theories in Progress, Houghton, Mifflin, Co., 1972, Vol. II.
14. Some subjects tried to conceal additions to their piles of buttons by keeping them inside their booths.
15. An offer of 100 buttons of one colour for 100 buttons of the other colour was used in Set A. In Set B, the false offers asked 110 in return for 100. To avoid suspicion, the experimenter varied the handwriting on offers going to the same person. An offer of 100 for 100 was chosen as typical, though perhaps an offer asking more than it offered would have forced the subject to express his preference more strongly, as a one for one offer is 'prominent', and may have aroused less suspicion. Because the rules permitted subjects to accept only one offer at a time, their choice between two identical offers from a visible and a non-visible source could be taken as an indicator of their preference. See: T.C. Schelling, The Strategy of Conflict, Cambridge: Harvard University Press, 1960. Schelling discusses the prominence of some solutions in games of coordination, suggesting that if communication is prohibited, subjects choose obvious solutions in the hope that their partners will do likewise (e.g., meeting at a crossroads; dividing a dollar 50-50, etc.)
16. The bias may also exist due to the expectation that much of normal exchange does in fact take place among peers, despite the desire to exchange with those who have a lot of resources. In an experimental paradigm similar to the one used here, W. Foddy demonstrated that although both high and low resource persons made first initiations to high resource persons, there was a tendency for exchange to stratify, with high resource persons trading with each other, and low resource persons by

default becoming trading partners with each other. This was interpreted as the result of high resource persons being able to offer one another a higher profit compared with that offered in initiations from low resource persons. See W.H. Foddy, op. cit., 1972.

17. False offers were distributed on Trial 1. In Set BI, only the non-visibles received false offers. Real offers were delivered to visibles. In Set BII, all subjects received two false offers. It was initially believed to be impossible to trot out 16 bowls when only 8 were supposed to exist. Experience indicated that subjects did not expect to be deceived, and simply did not notice how many bowls the experimenter carried around.
18. The only return possible would have been to reject all the non-visibles' offers in Set BI, and all offers in BII; because the offers were intercepted, the offers subjects responded to could not be given back to the supposed sender. The major purpose of Set B was to separate the effects of differential resource profiles and visibility, and to test Hypothesis 5 concerning acceptances for both visibles and non-visibles.
19. See Figure 3.3 at end of this Chapter.
20. The literature on experimental games provides contradictory evidence about sex differences in game behaviour, especially concerning the issue of whether females are kinder and more cooperative, or more competitive and suspicious. Vinacke found more cooperative behaviour among females in a coalition game, except when cumulative scores or rank considerations were introduced, at which point sex differences in behaviour vanished. Bixenstein, Chambers and Wilson (1964) found males played more cooperatively than females in a Prisoner's Dilemma game; Komorita found females more cooperative than males; and Bixenstein and Wilson (1963), Bixenstein, Potash and Wilson (1963), and Tedeschi, et al. (1969) found no significant sex/choice behaviour correlation. The findings about sex differences are equivocal because sex, which is a global, many-faceted category, has not been linked in a systematic theoretical way to a particular sort of behaviour or behaviours in experimental games. Often, researchers start with a commonsense idea of how boys differ from girls, and see if this difference predicts aspects of game behaviour. In addition, personality and sex differences are not usually good predictors of behaviour unless the statements employing them are conditioned by situational variables. In terms of this research, there is no particular reason to suspect women are governed by different principles in exchange than are men, though they may well assign different values to various resources.

For studies that attempt to relate sex role to game behaviour (mainly in Prisoner's Dilemma), see: D.W. Conrath, 'Sex role and cooperation in the game of Chicken', *Journal of Conflict Resolution*, 16, 1972, pp. 433-442; B. Jones, M. Steele, J. Gahagan, and J. Tedeschi, 'Matrix values

and cooperative behaviour in the Prisoner's Dilemma game', *Journal of Personality and Social Psychology*, 8, 1968, pp. 148-153; S.S. Komorita, 'Cooperative choices in a Prisoner's Dilemma game', *Journal of Personality and Social Psychology*, 2, 1965, pp. 741-45; V.E. Bixenstein, N. Chambers, and K.V. Wilson, 'Effect of asymmetry in payoff on behaviour in a two-person, non-zero-sum game', *Journal of Conflict Resolution*, 8, 1964, pp. 151-59; Bixenstein, Potash and Wilson, 'Effects of level of cooperative choice by the other player on choices in a Prisoner's Dilemma Game, Part 1', *Journal of Abnormal and Social Psychology*, 66, 1963, pp. 308-13; Bixenstein and Wilson, 'Effects of level of cooperative choice by the other player on choices in a Prisoner's Dilemma game, Part 2', same journal, 67, 1963, pp. 139-47; W.E. Vinacke, 'Sex roles in a three person game', *Sociometry*, 22, 1959, pp. 343-59; W.E. Vinacke, 'Negotiations and decisions in a politics game', in B. Lieberman, *Social Choice*, Gordon and Breach Science Publishers, 1971, pp. 51-81; Tedeschi, J.T., et al., 'Start effect and response bias in the Prisoner's Dilemma game', *Psychonomic Science*, 11, 1968, pp. 149-50; S. Oskamp and D. Perlman, 'Factors affecting cooperation in a Prisoner's Dilemma game', *Journal of Conflict Resolution*, 9, pp. 359-74.

Gallo and McClintock sum it up by stating "A large number of studies have failed to demonstrate any relationship between sex of the players and choice behaviour," and they list several other studies that lead them to this conclusion. See P.S. Gallo and C.G. McClintock, 'Cooperative and competitive behaviour in mixed motive games, ' *Journal of Conflict Resolution*, 9, 1965, pp. 68-79.

21. L.E. Fouraker and S. Siegel, *Bargaining Behaviour*, New York: McGraw Hill Book Co., 1963; C.S. Fischer, 'The effects of threats in an incomplete information game', *Sociometry*, 32, 1969, pp. 301-314; H.H. Kelley, 'A classroom study in the dilemmas of interpersonal negotiations', in K. Archibald, Ed., *Strategic Interaction and Conflict*, University of California Press, 1966, pp. 49-73; R.M. Liebert, et al., 'The effects of information and magnitude of initial offer on interpersonal negotiation', *Journal of Experimental Social Psychology*, 4, 1968, pp. 431-444.

For a review of the paradigm most frequently used to study dyadic bargaining, see H.H. Kelley and D. Schenitzki, 'Bargaining', Chapter 10 in C.G. McClintock, Ed., *Experimental Social Psychology*, Holt, Rinehart and Winston, 1972.

22. For a discussion of the implications of requiring subjects to reach agreement before the experiment can terminate, see Kelley and Schenitzki, *ibid.*, pp. 306-307.
23. L.L. Cummings and D.L. Harnett, 'Bargaining behaviour in a symmetric triad: the role of information, communication, power and risk-taking propensity', *Review of Economic Studies*, 36, 1969, pp. 484-499; and D.L. Harnett and L.L. Cummings, 'Bargaining behaviour in an asymmetric triad', Chapter 2.5 in B. Lieberman, *Social Choice*, Gordon and Breach Science Publishers, 1971.

## CHAPTER 4

## RESULTS AND EVALUATION OF RESULTS

Introduction

In the first two chapters, a process was outlined in which P sought to maximize value by obtaining an optimum balance of resources which were valued according to a principle of diminishing marginal utility. In fair exchanges, he could get the best terms in a transaction by locating a partner who placed relatively high value on what P could give him (X), and relatively low value on what P wanted (Y). Beyond seeking terms in fair exchanges which brought him the best possible profit, P was motivated to gain additional profit through advantageous exchanges, by controlling information required by Other to assess the fairness of a transaction. P's success in obtaining advantage was seen to be limited by a preference on the part of P's potential partners for reliable information about the resources of anyone with whom they might agree to trade. As a result, P was expected to learn that withholding information was in fact a disadvantage. To test the predictions, two sets of experiments were developed as described in Chapter 3. The presentation of results from these experiments will follow the same order as the presentation of hypotheses in Chapter 2. The evaluation of each hypothesis will include a restatement of the formal hypothesis, followed by specific experimental predictions; the relevant data will then be given, and conclusions drawn on the basis of the results. An argument for the operational interpretation of the variables has been<sup>1</sup> made in Chapter 3, and will not be repeated here.

Many of the predictions from the theory depend on the prior condition that subjects value the resources according to a marginal utility function. Because the success of the manipulation to build in this value function is so important to the interpretation of results, at appropriate points in the discussion of the results, we will draw attention to evidence that this condition was satisfied. This evidence will be summarized at the end of the chapter.

### Initiations to Persons Perceived to be Willing to Pay the Best Prices

Hypothesis 1: Among those members of the group about whose resource bases and value positions P has unambiguous information, P is most likely to initiate to a person, O, whom P perceives to have the greatest amount of resource Y, and the smallest amount of resource X relative to Y.

In the experiments, differential amounts of resources X and Y (red and green buttons) were operationally defined in two ways:

- 1) In Set A, some subjects had either a total resource base with 1630 of one colour and 30 of the other (high resource subjects), or 800 of one colour and 30 of the other (low resource subjects).
- 2) In the Pilot study, all subjects had the same total resource base of 1200 buttons, in different combinations of red and green (different value positions). These resource profiles are shown in Appendix IV.

Since the experimental predictions for these two sets are different, we will discuss each case separately.

Experimental prediction (Set A): A significantly larger proportion of the initiations made to visibles will be directed to high resource visibles.



On the first trial, 80/112 initiations were directed to visible subjects.<sup>3</sup> The direction of the initiations by both visibles and non-visibles are given in Table 4.1. The test of the hypothesis involves only the initiations sent to visible subjects.

Table 4.1 Frequencies of Initiations by Resource Level and Visibility of Initiator, and Resource Level of Visible Other (Set A, Trial 1)

Initiator	Recipient of Initiation			Total
	High visible	Low visible	Non-visible*	
High visible	18	3	7	28
Low visible	13	8	7	28
High NV	16	3	9	28
Low NV	16	3	9	28
Total	63	17	32	112

$H_0$ : Of total initiations to visibles ( $n = 80$ ), proportion of initiations to high visibles = proportion of initiations to low visibles. Obtained proportion of initiations to highs was .79. Binomial test, one tailed,  $Z = 6.1$  ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

\* High and low non-visibles looked the same to initiators.

Table 4.1 shows that a significantly larger proportion of initiations to visibles were directed to the high resource visibles as predicted. Only in the row for low visible initiators is the difference not significant. Each category of non-visible subject received almost the same number of offers as the low visibles. The fact that some subjects did not initiate to the high resource visibles as expected may simply be due to error, resulting from the failure of the subject to understand the function

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expressed in the value charts. Another possibility is that some subjects may have anticipated the popularity of the high visibles, and preferred to initiate where the unpopularity of low visibles and non-visibles was expected to guarantee a high probability of acceptance. We do not have suitable data to test either of these interpretations. However, the main trend of the results does support Hypothesis 1.

Because the derivation of Hypothesis 1 rested on P's assessment of the value to O of an increment of a resource relative to O's resource base, the support for the first hypothesis gives indirect evidence that the marginal utility manipulation was on the whole effective. Without such a function, there was no reason for subjects to think a high resource person would be any more willing to trade than a low resource person. In addition, 37% of initiations to high visibles asked for more than they offered, compared with only 23% of offers to lows.

Experimental prediction (Pilot Set): A significantly larger proportion of the initiations made to visibles will be directed to those with  
5  
the greatest imbalance of red and green buttons.

On Trial 1, 84/112 offers were directed to visibles. Table 4.2 shows the direction of initiations made to both visibles and non-visibles, but again, the test of the hypothesis involves only the former.

Table 4.2. Frequencies of Initiations by Value Position and Visibility of Initiator, and Value Position of Recipient (Trial 1, Pilot Set)

Initiator	Recipient of Initiation			Total
	Unbalanced Visible	Balanced Visible	Non-Visible	
Unbalanced visible	18	6	4	28
Balanced visible	15	4	9	28
Non-visible*	29	12	15	56
Total	63	22	28	112

$H_0$ : Of total initiations to visibles ( $n = 84$ ), proportion of initiations to unbalanced visibles = proportion of initiations to balanced visibles.

Obtained proportion of initiations to unbalanced visibles was .73. Binomial test, one-tailed,  $Z = 4.8$  ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

\* Non-visibles combined as no differences in value positions.

The significantly greater proportion of offers to visibles with a high imbalance of the two colours of buttons extends the support for Hypothesis 1, to the case where subjects all have the same total resource base, but different relative amounts of X and Y. Those offers which were not made in the predicted direction may again indicate variable success of the marginal utility manipulation, or an anticipation that the popularity of the unbalanced visibles would make the other subjects very anxious to trade.

In addition to the preference shown for the unbalanced visibles, the average number of buttons requested per 100 offered varied with the value position of the recipient and initiator. Subjects who began nearest

to the optimum of equal numbers of each colour (those with 850 red and 350 green), made initiations that on average offered the fewest buttons of one colour (67) for a return of 100 buttons of the other colour, when they made initiations to players with the least balanced resource bases, (those with 1100 green and 100 red). Subjects with a combination of 900 green and 300 red made an average offer of 82 in return for 100 when they addressed initiations to the complementary visible, who had 1000 red and 250 green. Overall, the ordering of the average numbers offered per 100 asked (balanced visible < non-visible < unbalanced visible) was consistent with the assumption that equal amounts of buttons were valued differently depending on the amounts of each colour the initiator possessed. In the comments on the questionnaire, players seemed to anticipate that subjects close to a balance of colours would have higher prices. This was a reasonable expectation in fact, since the players with more balanced resources acted as if they did indeed need more buttons to balance the cost to them of giving some away. (See Appendix IV for other results from the Pilot set.)<sup>7</sup>

#### Advantageous Exchanges

To gain more than would be possible on fair transactions, a non-visible could offer unfair terms, in the hope that the recipient would assume they were fair. A fair exchange was defined in Chapter 3 as one in which both parties gained equal profits in value units. P obtained an advantageous exchange if his profit exceeded O's, and the reverse case gave a generous exchange to O. The means by which subjects could use the value

chart, together with information about the size of resource bases, to calculate profits in value units, was described in Chapter 3.

For purposes of presenting the results, we define an exchange ratio<sup>8</sup> as the number of buttons offered per 100 requested. The fair exchange ratio tells us how many buttons of one colour P had to offer O for their profits to be equal. A fair exchange was equal to a one for one transfer of buttons only if the partners had identical but complementary resource profiles.

Hypothesis 2: If O has only ambiguous information about P's resource base, and P has unambiguous information about O's resource base, then P is more likely to make an initiation of exchange that is advantageous to P, than when O does not have unambiguous information.

#### Fair Exchange Ratios for Set B

At the start of the game, low non-visibles had a small pile of 50 buttons; visibles had 100 in their small piles, and high non-visibles had 150. The marginal value increase of an increment of 100 buttons on the first opportunity for exchange would thus give the low non-visibles more reward than the others. At the same time, the low non-visibles' marginal costs were only slightly higher than for the visibles and non-visibles. Thus, to be fair in an exchange with a visible, a low non-visible had to give up more than he requested (125 for 100); on the other hand, the fair ratio between high non-visibles and visibles was 90 for 100. Between visible partners, an exchange of 100 for 100 was fair.<sup>9</sup> Any ratio with a numerator smaller than that in the fair ratio was advantageous to the initiator.

Experimental prediction: A significantly greater proportion of non-visibles (who present ambiguous information to Other), will attempt advantageous exchanges than will visible subjects.

To see whether this prediction was true in the experiment, subjects' exchange ratios were classified according to whether they were above (generous), equal to, or below (advantageous) the fair ratio. The fair and generous offers were grouped together as non-advantageous. Table 4.3 shows the proportion of advantageous initiations to visible subjects.

Table 4.3 Proportions of Advantageous Initiations to Visibles by Visible and Non-visible Initiators (Trial 1, Set B)

<u>Initiator</u>	<u>(n)</u>
Non-visible	.87 (31)
Visible	.26 (39)

$H_0$ : Proportion of advantageous initiations made by visibles = proportion of advantageous initiations made by non-visibles. Binomial test, one-tailed,  $Z = 5.1$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

On the basis of these data, we would claim strong support for Hypothesis 2.

Because the potential for having an advantageous offer perceived by the recipient as 'fair' differed for the low and high non-visibles, we will separate the results for Sets BI and BII. We have noted that the fair exchange ratio for a transaction with a visible for the low non-visibles and high non-visibles was 125/100, and 90/100, respectively. Did they differ

in their tendency to make initiations which offered less than the fair amount?

Table 4.4 gives the results for the high non-visibles.

Table 4.4 Proportions of High Non-visibles and Visibles Attempting Advantageous Exchanges with Visibles (Trial 1, Set BI)

<u>Initiator</u>	<u>(n)</u>
High non-visible	.67 (12)
Visible	.21 (19)

$H_0$ : proportion of advantageous initiations made by visibles = proportion of advantageous initiations made by high non-visibles. Binomial test, one-tailed,  $Z = 2.55$ ; ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

Hypothesis 2 is supported for high non-visibles. Note, however, that a majority (16/28) of high non-visibles initiated to other non-visibles. Given that these non-visibles had to ask 100 in return for an offer of only 90 to a visible, for the trade to be fair, it is perhaps not surprising that so many offered to other non-visibles. The probability of having an advantageous, or even a fair offer accepted by a visible may not have seemed high enough, especially if the visibles were expected to offer to one another even trades of buttons (the fair ratio in their case). There was no visible model for the high non-visibles to imitate which would yield them more profit than their partner, and this aspect of the design may have depressed the rate of initiation to visibles. Nevertheless, those non-visibles who did direct offers to visibles lend support to the theory, as their exchange ratios went below the comparatively unattractive fair exchange ratio of 90/100.

It is more difficult to draw conclusions on the basis of these results for low non-visibles (see Table 4.5).

Table 4.5 Proportions of Low Non-visibles and Visibles Attempting Advantageous Exchanges with Visibles (Trial 1, Set BII)

<u>Initiator</u>	<u>(n)</u>
Low non-visible	1.00 (19)*
Visible	.30 (20)

$H_0$ : Proportion of advantageous initiations made by visibles = proportion of advantageous initiations made by low non-visibles. Binomial test, one-tailed,  $Z = 4.8$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

\* Includes 10 offers of 100-buttons for 100 buttons.

On the one hand, they were in an ideal position to gain advantage, because the fair rate between visibles was 100 for 100, which provided a model for a trade that was to the low non-visibles' advantage.<sup>12</sup> On the other hand, if the low non-visibles showed an average exchange ratio below 125/100, one cannot uncritically accept this as support for the hypothesis. In a game with 'winners' such as this one, it was very unlikely that any players would have a ratio of 1.25, even if they were visible. It seems there may have been a ceiling on the marginal utility effect, with subjects unwilling to act 'fairly' if it was not in their own favour. This is consistent with the principle that we most dislike inequity if it favours someone else.



### Typical offers by Visible~~s~~ and Non-Visible~~s~~

In addition to the prediction of a greater frequency of advantageous initiations by the non-visible~~s~~, Hypothesis 2 also implies that the 'typical' or average initiation made by them would propose terms of exchange yielding more net profit in value units to the initiator. The typical initiation of the visible~~s~~, on the other hand, should have proposed fair terms. This measure will give us an indication of the degree to which non-visible~~s~~ departed from fairness. Table 4.6 shows the difference between the number that should have been offered in return for 100 buttons on a fair trade, and the number actually offered.<sup>13</sup> (The data for visible~~s~~ in the two sub~~set~~s<sup>s</sup> are combined.)

Table 4.6 Fair Exchange Ratios and Obtained Average Exchange Ratios for Initiations to Visible~~s~~, by All Subjects (Trial 1, Set B)

<u>Initiator</u>	<u>(n)</u>	<u>Mean Number offered/100</u>	<u>Interquartile Range</u>	<u>Fair Number</u>	<u>Difference (Obtained-fair)</u>
High NV	(12)	76	(50-100)	90	-14
Visible	(39)	96	(83-100)	100	- 4
Low NV	(19)	85	(67-100)	125	-40

The largest deviations from fairness were made by the non-visible~~s~~, and their offers showed more variability than those made by visible~~s~~. These figures cannot properly be given a ratio or interval interpretation, but they provide an indication of the magnitude of the deviations involved. The low average exchange ratio of the low non-visible~~s~~ seems consistent with the argument many were attempting to take advantage of the covers, and

making offers that would be assumed to be fair by the recipient. However, it is not possible to know whether the low non-visibles would have offered more than they requested, had their resources been visible, when to do so would have made winning in the game as a whole impossible.<sup>14</sup>

Subjects could not tell what constituted a fair exchange if they initiated to a non-visible. Table 4.7 shows that non-visibles were on average more generous in their initiations to other non-visibles, while the exchange ratios of the visibles were essentially the same as when they initiated to visibles (94/100 to non-visibles, compared with 96/100 to visibles).

Table 4.7 Average Exchange Ratios for Initiations to Non-Visibles (Trial 1, Set B)

<u>Initiator (n)</u>	<u>Mean Number Offered/100</u>	<u>Interquartile Range</u>
High NV (16)	99	( 91-100)
Visible (17)	94	(100-105)
Low NV ( 9)	91	( 74-100)

Note: Results from Set A relevant to Hypothesis 2 are given in Table A.6,  
<sup>15</sup>  
 Appendix V.

Because of the ambiguity of interpretation for the initiations from low non-visibles noted above (i.e., all of them sent technically advantageous offers), it is of interest to know whether they perceived there to be an advantage in having covers over their buttons.

### Perceived Advantage in Concealing Resources

Hypothesis 3: In the early stages of interaction, persons who have the opportunity to conceal their resource bases and value positions will perceive such concealment to be an advantage.

Experimental predictions: We make three experimental predictions for Hypothesis 3:

- 1) More non-visibles will state on questionnaires on Trial 1 that they perceive there to be an advantage in having a cover over their buttons than will perceive covers to be a disadvantage.
- 2) Non-visibles will choose to retain the covers if given the opportunity to remove them.
- 3) Non-visibles will make estimates of the probability of acceptance for their initiations that are not lower than estimates made by visibles. This will indicate that they do not think the covers will interfere with their ability to make exchanges.

In a sense, Hypothesis 3 is a check on the scope conditions of the theory. In addition it does make the prediction that non-visibles will synthesize their desire to maximise again, with the other's inability to gauge non-visibles' prices, and arrive at the conclusion that concealment could be used to advantage. Hypothesis 3 is not 'built in' to the experiment in the same way that the scope conditions and assumptions are. Subjects could just as easily have perceived the covers as a hindrance (as some did).

1. Questionnaire responses describing advantages of covers when  
 subjects had differences in resource base (Set A):<sup>16</sup> In these experiments, only 48 of the 56 subjects were asked if they considered the covers to be an advantage or disadvantage. Of these, 63% (or 30/48) said either that the

covers were an advantage, or that they were more of an advantage than a disadvantage. This proportion is significantly greater than 0.5 ( $Z = 3.22$ ). Comments on the questionnaire mentioned advantages such as: "I can manipulate others by the size of my offers; no one can see that I am hoarding up or getting ahead; other non-visibles are easy to trade with as they get fewer offers; I can offer less for more; I can compete better if the other guy does not know my profits."

A substantial minority saw the covers to be a disadvantage. Some of the reasons cited were: "I have to make good offers to get accepted; others are afraid of covers; people prefer to deal with those they know; others don't trust players with covers; others are attracted to a large pile."

Of the 30 subjects who saw the covers as an advantage, 47% (or 14) made initiations asking for more buttons than they offered. In contrast, only 11% (2/18) of the subjects who saw the covers as a disadvantage made such offers.

It is not possible to decide from the data whether subjects who claimed advantage in covered resources failed to see the disadvantages, or did not feel they were large enough to outweigh the advantages.

When visibles had same resource profiles (Set B): Subjects in these experiments were asked to describe both advantages and disadvantages of covers, so that it is not possible to compare frequencies of subjects who saw mainly one or the other. However, we can summarize the most frequent comments made concerning the covers. (These are listed in Tables A.7 and A.8 in Appendix V.)

Although it was difficult to make an unambiguous classification of the responses to the open-ended question about the covers, there did appear to be two main advantages perceived:

a) Others were unable to assess how 'hard up' the non-visibles were. Others were therefore expected to ask for less, and be forced into giving more to a non-visible than they should in a fair trade. (Subjects used words, like bluffing, fooling others, playing hard to get, forcing up bids.) This advantage focussed on the comparison of profits on a particular exchange.

b) Others were unable to tell how non-visibles stood in terms of progress toward balance. (Subjects referred to their rank in the game, and to the fact that Others could not see a non-visible balancing, and could not stop him.)

While both of these reasons are related to the size of the resource base, some subjects seemed to take a view of the whole experiment in assessing who they could 'beat' (reason b). This focused on end-game aspects of the situation, and to a certain extent, worked in a different way than the advantages cited in reason a. That is, over the entire game, low non-visibles could afford to give up least, being furthest behind in total resources, and high non-visibles could afford more, having a lead in total resources of 200 on their nearest visible opponent. (Only 5/56 non-visibles listed no advantages.)

Of the non-visibles listing disadvantages in covers (approximately 75%) a great many stated that others would 'fear the unknown' and be reluctant to trade with non-visibles. The preference to retain the covers (Table

4.8) would then seem to indicate that the advantages outweighed the disadvantages, at least at this point in the game.

Visibles' views of having their buttons out in the open complemented those of non-visibles. They focused on the negative aspect that others could take advantage of knowing the visibles' need, and that being visible prevented them from bluffing, or 'getting away' with a good deal. The most frequently cited advantage for the visibles was that they were ensured of initiations from others.

In sum, the predicted advantage of covers was reflected in comments of both visible and non-visible subjects. This gives us further confidence that profit was being assessed relative to resource base. Comments to the effect that Others could not assess a fair price with a non-visible, and reference to the ability of those with a lot of buttons to pay more, would not make sense outside the context of a marginal utility function.

2. Preference for retaining the covers: The next measure relevant to the test of Hypothesis 3 is the response to a question asking each non-visible subject whether he would like to have the cover removed from his buttons on Trial 3. If the covers were not seen as an advantage, one would expect a large proportion of subjects to want the covers removed. Table 4.8 shows that this was not the case. Visibles were asked if they would like the covers removed from all the non-visibles.

Table 4.8 Proportion of Visibles and Non-visibles who Preferred to Retain Covers on Resource Piles of Non-visibles (Trial 1, Set B)

<u>Subject</u>	<u>Proportion Wanting Covers Left On</u>	<u>(n)</u>
High NV	.93	(28)
Low NV	.79	(28)
Visible	.41	(56)

( $\chi^2 = 25.26$ , d.f. = 2,  $p < .001$ )

It should be noted that the relatively lower percentage of low non-visibles who wanted to retain their covers (79% versus 93% for high non-visibles) is not consistent with the view that the lows were in the best position to have advantageous offers 'read as fair'. However, the proportion in favour of covers is still very high.

The results from Set A were very similar to those above, except that more non-visibles wanted the covers off. On Trial 1, 8/28 of the high non-visibles, and 9/28 of the low non-visibles said they would choose to have their covers removed if given the opportunity. At that time, no offers had been delivered to anyone.

3. Perceived likelihood of acceptance: Although many non-visibles were aware that visibles would be considered more desirable exchange partners, the non-visibles did not seem to believe they would fail in their initiations. On the first questionnaire, subjects indicated on a five point scale, from 'extremely likely' to 'not at all likely', the perceived probability of acceptance of the offer they had just made. Table 4.9 shows the proportions of subjects who checked each of the five categories.

Table 4.8 Initiators' Evaluation of Likelihood that Their Offers Would be Accepted (Trial 1, Set B)

Likelihood of Offer Being Accepted	All Types of Offers			Advantageous Offers**		
	Visible*	High NV	Low NV	Visible	High NV	Low NV
Extremely likely	.07	.07	.07	.07	0	.09
Quite likely	.52	.61	.57	.23	.69	.50
50-50 chance	.39	.29	.32	.62	.23	.36
Not very likely	.02	.04	.04	.08	.08	.05
Not at all li						
Not at all likely	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total (n)	56	28	28	15	13	22
Median category	2	2	2	3	2	2

\* Visibles from sets BI and BII are combined.

\*\* Advantageous initiations include those defined as advantageous to visibles, and initiations to non-visibles which simply ask for more than they offered.

We can see in the table above that non-visibles were just as optimistic as the visibles that their offers would be accepted. Non-visibles also estimated higher probabilities of acceptance for initiations which asked for more than they offered (median category 2, versus 3 for visibles). There were few differences by target of the initiation (not included in table), except that the high non-visibles tended to give higher probabilities of acceptance by a visible target, than was estimated by other initiators. We do not have for comparison the subjects' estimates for targets they did not choose. Pilot work showed that subjects were unwilling or unable to make serious estimates of the likelihood of acceptance by an Other, unless they chose to initiate to him.

Overall, the evidence from the two sets of experiments is consistent with Hypothesis 3. Although it could be claimed that forcing the



subjects to have covers did not mean they wanted them, their comments, and  
 22  
 desire to retain the covers, gives little support for such a claim.

#### Preference for Information about Exchange Partner

While the non-visibles did not anticipate a smaller chance of having their initiations accepted, the theory predicts that there would be a preference by all subjects for visibles.

Hypothesis 4: Members of a group are more likely to direct their initiations of exchange to persons whose resource bases and value positions are known through unambiguous information.

Experimental predictions: The operationalization of the fourth hypothesis simply implies that visible subjects will receive a significantly greater proportion of initiations of exchange than will the non-  
 23  
 visibles.

#### Results when visibles all have same sized resource base (Set B):

In Set B, all visible subjects had the same resource bases and value positions, two with predominantly red piles, and two with a predominance of green buttons. The proportion of initiations to visibles in these experiments, especially those made by other visibles, allows a test of Hypothesis 4 unconfounded by a preference for high resource players. The proportions of offers to visible and non-visible subjects are shown in Table  
 24  
 4.10.

Table 4.10 Proportions of Initiations to Visibles (Trial 1, Set B)

## SET BI

<u>Initiator</u>		<u>(n)</u>
Visible	.68	(28)
High NV	.43	(28)

$H_0$ : Proportion of initiations received by visibles = proportion of initiations received by high non-visibles. Binomial test, one-tailed: for all initiators,  $Z = .9$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Retain  $H_0$ . For initiations by visibles,  $Z = 1.89$ ,  $p < .05$ ; for high non-visibles,  $Z = .56$ . n.s.

## SET BII

<u>Initiator</u>		<u>(n)</u>
Visible	.71	(28)
Non-visible	.68	(28)

$2H_0$ : Proportion of initiations received by visibles = proportion of initiations received by low non-visibles. Binomial test, one-tailed: for all initiators,  $Z = 2.9$ , ( $Z_{crit} = 1.65$ ). Reject  $2H_0$ .

Hypothesis 4 is supported for all visible initiators, and for low non-visible initiators. High non-visibles, however, did not prefer visibles, and showed a non-significant tendency to choose non-visibles.

It has been noted that the clearest test of Hypothesis 4 was provided by the data for visible initiators. The slight variations in the resource bases and value positions of the non-visibles leads us to suspect that the experimental design was at least partly responsible for the negative results for the high non-visibles.

Recall that the high non-visibles had a small resource pile of 150 buttons. In a one for one trade of buttons (which was the fair price in a trade between two visibles), the high non-visibles received a lower profit than their partners, due to their larger marginal reward. In terms of the choice model, the value of an offer acceptable to a visible would have had lower expected profit for the non-visible than he would like; but for the non-visible to get a reasonable profit, he would have had to ask for more than he offered, and risk a higher probability of rejection. Either way, the expected value of such an exchange would compare poorly with the uncertain non-visible partners, who were not known certainly to be undesirable.<sup>25</sup> Although unexpected, the results for the initiations of these non-visibles lend support to the claim that subjects calculated profits relative to their resource bases.

Low non-visibles in these experiments were in a different position due to their very small non-predominant resource pile. From the point of view of the theory, they were in an ideal position to gain advantage by trading with visibles. A one for one swap of buttons with a visible gave the low non-visible a higher profit than his partner, and yet would seem likely to be accepted, because it would compare well with offers between visibles. With this attractive potential transaction available, the low non-visibles would have little reason to risk the uncertainty of a trade with a non-visible.

The preference of visibles for other visibles is encouraging support for the theory, because, in their case, visible and non-visible

targets were most likely to be considered equivalent, except for the ambiguity of information available about their resources. (The visibles were told some visibles had more, and some less, but there was no way of telling which players had which.)

Overall, in experiments with this paradigm (Sets A and B, the Pilot work, and more recent work conducted in Australia),<sup>26</sup> it has been found that the proportions of initiations to visibles on the initial exchange opportunity fall consistently between 68% and 75%, with the sole exception of the high non-visibles in Set BI.<sup>27</sup>

#### Initiations to Visibles when they have Different Sized Resource Bases

The results from Set A relevant to Hypothesis 4 were very similar to those from Set B. Although preference for visibles was confounded with the preference for high resource persons, we give the results from Set A here, to show that the visible initiators maintained a preference for visibles from the first to the second trial, even though they tended to change from partners of one resource level to another.

The gross categories of initiations on Trials 1 and 2 are given in Table 4.11 below.

Table 4.11 Proportions of Offers to Visibles Made by Visibles and Non-visibles (Trials 1 and 2, Set A)

<u>Initiator</u>	<u>Trial 1</u>	<u>(n)</u>	<u>Trial 2</u>	<u>(n)</u>
Visible	.75	( 56)	.75	( 56)
Non-visible	.68	( 56)	.45	( 57)*
Total	.71	(112)	.60	(111)

Table 4.11 (Continued)

\* One non-visible made no offer on Trial 2.

$H_0$ : Proportion of initiations to visibles = proportions of initiations to non-visibles. One-tailed test for difference of proportions, Trial 1:

$Z = 4.54$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

The initiations made on the second trial were not independent of the offers and acceptances on Trial 1. It is clear, however, that while the visibles continued to direct the majority of their offers to the visib-  
28  
bles, non-visibles made a change to other non-visibles.

We noted in the discussion of Hypothesis 1 that the majority of initiations to visibles on Trial 1 in Set A were sent to high resource visibles. Due to the rule that each person could accept only one offer/trial, some subjects were bound to have their offers turned down. Though these data are more relevant to a consideration of Hypothesis 5, we will show the pattern of acceptances on Trial 1, as they help to explain the direction of Trial 2 initiations. Table 4.12 shows that initiations made by visibles had a higher rate of acceptance.

Table 4.12 Acceptance of Real Offers (Trial 1, Set A)

<u>Initiator</u>	<u>Recipient (Proportion of Initia- tions Accepted of Number Received)</u>				<u>Total</u>
	<u>N = 62</u>				
Visible	.62	(26/42)	.86	(12/14)	.68 (38/56)
Non-visible	.26	(10/38)	.77	(14/18)	.43 (24/56)

Table 4.12 (Continued)

$1H_0$ : Proportions of initiations from visibles accepted by visibles = proportion of initiations from non-visibles accepted by visibles. One-tailed test for difference of proportions,  $Z = 3.3$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $1H_0$ .

$2H_0$ : Proportions of initiations from visibles accepted by non-visibles = proportions of initiations from non-visibles accepted by non-visibles. One-tailed test for difference of proportions gives non-significant difference.

How did the more frequent rejection of non-visibles' initiations affect their next offers? Table 4.13 shows the different pattern of initiations on Trial 2 in more detail.

Table 4.13 Frequency of Initiations to Visibles and Non-visibles, by Visible and Non-visible Initiators (Trial 2, Set A)

Initiator	Recipient		
	High Visible	Low Visible	Non-visible*
High visible	8	12	8
Low visible	15	7	6
High NV	6	7	15
Low NV**	<u>8</u>	<u>4</u>	<u>15</u>
Total	37	30	44

\* Non-visible recipients could not be distinguished in terms of resource level.

\*\* One low non-visible made no offer on Trial 2.

The fact that the visibles did not restrict themselves to exchange within their own resource levels by Trial 2 would indicate that visibility was a more important factor to them than resource level. Of those visibles whose offers to visibles were accepted on Trial 1, and who continued to initiate to visibles, twice as many switched to a different visible, as stayed with the same person. Most of those who were rejected by visibles on Trial 1, but still continued to initiate to a visible, changed to the other visible.

The data from the first trial, and for the visibles on Trial 2, support Hypothesis 4. The failure of non-visibles to initiate as predicted to visibles on the second trial seemed to be due to their failure to complete transactions with visibles on trial 1. We will return to this point below.

Did the preference to accept initiations from visibles hold when a subject had two identical initiations, one from a visible, and one from a non-visible source?

Hypothesis 5: If a member has a choice of initiations from two others,  $P_1$  and  $P_2$ , and the initiations are identical with respect to the absolute amount of resources offered and requested, then if the recipient has unambiguous information about  $P_1$ 's resource base, and ambiguous information about  $P_2$ 's resource base, he will be more likely to accept the initiation from  $P_1$ .

Experimental prediction: If Hypothesis 5 is valid, then a significantly greater proportion of the false offers which are believed to come from visibles will be accepted, in preference to the identical offer which the recipient thinks has come from a non-visible.

Acceptance of offers when size and source of offer controlled:

(Set B): In Set BI, only non-visible subjects received two bogus initiations on Trial 1. In Set BII, all subjects received two false offers. For clarity of discussion, the two subjects will be dealt with separately. All false initiations asked for 110 buttons, in return for 100 offered.

Table 4.14 shows the proportions of offers from visibles and non-visibles accepted by the high non-visibles. To calculate significance, subjects who rejected both offers were divided equally between the visible and non-visible categories, as there was no evidence of a preference between the two in the case of double rejections.

Table 4.14 Acceptance of False Offers by High Non-visibles (Set BI)

<u>Offer Accepted From</u>	<u>Proportion Accepted</u>
Visible	.46
Non-visible	.39
Neither	.15
Total (n)	(28)

$H_0$ : Proportion accepting visibles = proportion accepting non-visibles.

Binomial test,  $Z = .19$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Retain  $H_0$ .

The negative results for the high non-visibles could be seen in the same light as the data for Hypothesis 4, in which a majority of high non-visibles initiated to non-visibles. To obtain a fair deal with a visible, non-visibles had to receive more from the visible than they gave up,



and the false initiations asked them to do the reverse of this. 6/11 high non-visibles who rejected visibles referred to a desire not to let the visibles have an advantage. However, the fact that the proportions of acceptance of both visible and non-visibles is so similar, does not allow a clear interpretation.

In Table 4.15, we see that the pattern of acceptances of the false initiations by low non-visible recipients was different. Again, the double rejections were treated as giving no information for or against the hypothesis.

Table 4.15 Acceptance of False Offers by Visibles and Low Non-visibles (Set BII)

<u>Offer Accepted From</u>	<u>Proportion Accepted By</u>	
	<u>Visible</u>	<u>Low Non-visible</u>
Visible	.54	.61
Low non-visible	.18	.14
Neither	.28	.25

$1H_0$ : Proportion of visibles accepting visibles = proportion accepting non-visibles.

$2H_0$ : Proportion of low non-visibles accepting visibles = proportion accepting non-visibles. One-tailed binomial test; for  $1H_0$ ,  $Z = 2.05$ ; for  $2H_0$ ,  $Z = 2.17$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject both null hypotheses.

The high rates of double rejections shown in Table 4.15 gives an indication that there is a limit to the assumption that P will enter into an exchange so long as he makes a positive profit. (In this case, the limit arises both from the anticipation that there will be winners, and that it is

not necessary to settle for transactions that offered fewer buttons than were requested.) Nevertheless, a majority of subjects did accept one of the false initiations. Because an offer of 100 for 110 from a visible was reasonable in terms of the fair exchange ratio between visibles and low non-visibles, the latter had no reason to risk accepting an offer from a non-visible source, which might be giving them less profit than their partner. For these subjects, the proportion of offers accepted from visibles was the highest in Set B.

Acceptance of offers when size and source of initiation not controlled: (Set A and Set BI); Real offers were given to the intended recipient in Set A on Trial 1, and to the visibles in Set BI.

Hypothesis 2 claimed that non-visibles would make more offers that asked for greater profit to themselves; in conjunction with the preference for visibles, it was expected that both visible and non-visible subjects would accept more real offers from visible initiators than from non-visibles.

1. In Set A, where visible subjects received 71% of initiations, a significantly larger proportion of visible initiators were accepted by  
<sup>31</sup>  
 visibles, but not by non-visibles, who accepted most of the offers they received (26/32). This was shown previously in Table 4.12. The pattern of acceptance is shown in more detail in the table below.

Table 4.16 Number of Real Offers Accepted Per Number Received by Visibility and Resource Level of Recipient (Trial 1, Set A)

<u>Offer Accepted From</u>	<u>Recipient</u>			
	<u>High visible</u>	<u>Low visible</u>	<u>High NV</u>	<u>Low NV</u>
High visible	11/16	2/3	3/3	3/4
Low visible	7/13	6/8	3/3	3/4
Non-visible	7/32	3/6	4/5	10/13
Total	25/63	11/17	10/11	16/21

In general, it seemed that only if one had a range of choice, did<sup>32</sup> the preference for visibles exhibit itself. This is consistent with the choice model presented in Chapter 2, in which it was claimed that P would attend to O's profit only if he could not decide between two or more alter-<sup>33</sup>natives on the basis of profit to himself. Non-visible subjects accepted 87% of the offers they got; of the 6 offers they rejected, 5 cases involved the receipt of two offers at once, and in one case, the non-visible was asked for greatly more than he was offered. Over all subjects who received only one offer on the first exchange opportunity, 91% accepted that offer.

2. Visibles in Set BI also received initiations as they were truly directed. It can be seen in Table 4.17 that they accepted a larger proportion of initiations from visibles.

Table 4.17 Acceptance of Real Offers to Visibles (Trial 1, Set BI)

<u>Initiator</u>	<u>Number of Offers Received</u>	<u>Proportion Accepted</u>
Visible	19	.63
Non-visible	12	.41

Table 4.17 (Continued)

$H_0$ : Proportion accepting visibles = proportion accepting non-visibles.

One-tailed test for difference of proportions:  $Z = 1.22$ ; ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Retain  $H_0$ .

The higher rate of acceptance of non-visibles in this set reflects the smaller number of offers they had to choose from, as a result of the tendency for non-visibles to initiate to other non-visibles. The proportion of offers from visibles that were accepted is similar to that in Set A. Here again, the acceptances seemed to be a function of type of offer, preference for visibility, and the number of alternative offers from which the recipient could choose. For the seven rejections of non-visibles, the visible always had another offer from a visible, and usually it was a better one in profit to the recipient.

Acceptance of controlled offers after one set of transactions has been completed:(Set A): False offers were directed to visible subjects in Set A on the second trial. The pattern of acceptances is shown in Table 4.18.

Table 4.18 Acceptance of false Offers by Visibles (Trial 2, Set A)

<u>Initiator</u>	<u>Recipient</u>		<u>Total</u>
	<u>High visible</u>	<u>Low visible</u>	
Visible	.64 (18/28)	.60 (17/28)	(35/56)
Non-visible	.36 (10/28)	.36 (10/28)	(20/56)
Reject both	.00 ( 0/28)	.04 ( 1/28)	( 1/56)

$H_0$ : Proportion accepting visible = proportion accepting non-visible. One-tailed binomial test for differences of proportions gives  $Z = 1.87$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

The table shows that when the recipient could choose between identical offers from a visible and a non-visible, the proportion of offers accepted from visibles was again significantly greater than the proportion accepted from non-visibles. Since the false offers controlled for the greater tendency for the non-visibles to make offers more favourable to the initiator, this is encouraging support for Hypothesis 5.

It must be kept in mind, however, that the Trial 2 acceptances, like the Trial 2 real offers, would have been affected by the pattern of offers and acceptances on the first opportunity for exchange. For example, visibles who were accepted on Trial 1 by the same visible who supposedly 'offers' to them on the second trial, may have accepted that person as an act of reciprocity. A total of 11/35 acceptance on Trial 2 involved this sort of reciprocity.

Of the subjects who accepted non-visibles on the second trial (20 in all), only one case involved acceptance of someone who had accepted the subject on Trial 1. There was no observable tendency for subjects who accepted non-visibles on Trial 2 to be those who were rejected by a visible on the first trial, and no clear tendency for the people who accepted non-visibles to be those who had offered to a non-visible previously (12/20 had initiated to non-visibles on Trial 1, Trial 2, or both.)

In sum, over the two sets of experiments, Hypothesis 5 receives support, except in the case of the high non-visibles in Set BI.

#### Non-visibles' Reaction to the Preference for Visibles

The prediction in the last hypothesis depends on the validity of the previous hypotheses -- if non-visibles did not receive many initiations, and had few accepted, they should have reached a point when they wanted the covers removed.

Hypothesis 6: P's perception of the advantage of withholding information about his resource base and value position will decrease over repeated exchange transactions, and P will be more likely to choose to reveal unambiguous information about his value position and profits, than during the initial stages of interaction.

Experimental prediction: By the end of Trial 2, a significantly greater proportion of non-visibles will state that they would like the covers removed, than the proportion on Trial 1.

Results for subjects who completed two exchange transactions: We know that non-visible subjects were not very successful in Set A -- they were unpopular on Trial 1, and the experimenter intercepted offers to them on Trial 2. Table 4.19 compares the non-visibles' wishes about the covers on Trials 1 and 2.

Table 4.19 Non-visibles' Preference for Removing Covers on First and Second Trials (Set A)

<u>Subject</u>	<u>Number Who Want Cover OFF</u>	
	<u>Trial 1</u>	<u>Trial 2</u>
High non-visible	8/28	14/28
Low non-visible	9/28	14/28

Table 4.19 (Continued)

$H_0$ : Proportion of non-visibles wanting covers off on Trial 1 = proportion wanting covers off on Trial 2. One-tailed test for difference of proportions,  $Z = 1.54$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Retain  $H_0$  ( $p = .06$ ).

Although the change in proportions is not statistically significant, the proportion wanting the covers removed does increase from the first to the second trial. An examination of the past exchanges of those subjects wanting the covers off showed they were only slightly more likely to have been rejected, or to have received no offers, than were those voting to retain the covers. Two trials may have been too short a time for subjects to learn that the covers were not to their advantage.

Removal of the covers is, of course, not the only response to failure to enter into transactions on the first opportunity. Although no specific predictions were made concerning the adjustment of subjects to rejection on Trial 1, the propensity to repeat an offer to the same sort of target was contingent on the response to the first initiation. This is shown in the table below.

Table 4.20 Proportions of Subjects Making the Same Type of Choice (Visibles versus Non-visibles) on Trials 1 and 2 (Set A)

	<u>Response to Initiation on Trial 1</u>	
	<u>Accepted</u>	<u>Rejected</u>
<u>To Visible on Trial 1</u>	<u>(n)</u>	<u>(n)</u>
Visible initiator	.92 (26)	.56 (16)
NV initiator	.60 (10)	.36 (28)

Table 4.20 (Continued)

	Response to Initiation on Trial 1	
	<u>Accepted</u>	<u>Rejected</u>
<u>To NV on Trial 1</u>	<u>(n)</u>	<u>(n)</u>
Visible initiator	.17 (14)	.50 ( 2)
NV initiator	.50 (14)	.50 ( 4)

\* The numbers indicate the proportion of subjects repeating a given sort of initiation.

These results show that visible subjects did indeed appear to respond to acceptance by repeating the reinforced behaviour, but only when the reinforcement was acceptance by a visible. Visibles who had been accepted by a non-visible on Trial 1 did not repeat an offer to a non-visible: .83 of them switched to a visible. They may have been encouraged by their success with a non-visible. Acceptance of offers to visibles on the first trial did not have such a pronounced effect on the non-visibles (only .60 repeated to a visible).

Rejection on the first trial led to more frequent changes from visible to non-visible targets, and vice versa. In general, it seemed that the NV subjects were more likely to respond to failure of an initiation by changing the visibility of the target. It seems plausible that the non-visibles would generalize about the cause of their unpopularity, and adopt remedies that related to the covers. Visibles would not have inferred that rejection was due to anything but how well their offers compared with others received by the person they had initiated to.



### Evaluation of the Effectiveness of the Manipulation of the Value Function

We have drawn attention to several pieces of indirect evidence that subjects in the experiments assessed profit in value units, i.e., that they took into account their own and other's resource bases in calculating the value of additions and losses of buttons. The main points were that:

- 1) A majority of initiations were made to subjects with relatively large amounts of the colour desired by the initiator;
- 2) exchange ratios in the Pilot set varied according to resource profile of initiator and recipient;
- 3) perceived advantages of the covers were described in terms of determining prices in a transaction relative to need, and to ability to give up buttons (i.e., size of large resource pile);
- 4) high non-visibles in SSet B, whose fair exchange ratio with visibles was below the fair ratio for two visible partners, were the only subjects in all the experiments who did not show an initial preference for visibles. The most plausible explanation for such a result is that non-visibles would have had to ask for much much more than they offered in order to get an advantageous exchange. The probability of acceptance of such offers would probably be anticipated to be low, and consequently, initiations to non-visibles may have had higher expected value.

In sum, it seems there is sufficient evidence that the marginal utility manipulation was effective. There were undoubtedly exceptions, and the most reasonable explanation for data that did not conform to the hypo-

theses may be that they can be considered as error resulting from the variable success in satisfying the scope conditions about the subjects' value function.

### Summary

Let us briefly summarize the findings reported in this chapter. The predictions in the hypotheses were made largely in terms of expected departures from a chance distribution of the types and directions of initiations made and accepted. Support for an hypothesis has been claimed when the data depart significantly from a chance result, but no predictions were made concerning the strength of the relationships expected, and it is recognized that a good deal of variability remains unaccounted for. Nevertheless, the pattern of results is generally in line with predictions.

The most striking result is the consistently high proportion of subjects who both initiated to, and accepted from, players with visible resources. With the single exception of high non-visibles in Set BI, between  $2/3$  and  $3/4$  of first initiations were addressed to visibles, and approximately  $2/3$  of offers accepted were from visibles, if a subject received two identical offers from a visible and non-visible source. This preference held whether visible subjects all had the same sized resource bases (Set B), different ratios of resources but equal totals (Pilot set), or different total resource bases (Set A). It must be kept in mind, however, that there was also a consistent minority who we infer had a preference for non-visibles, by virtue of their choice of non-visibles. While a desire for information about the exchange partner appears, as the theory

predicts, to be an important determinant of initial choice of partner, it is clear that other factors were operating, such as differential abilities of the subjects to strategize, and to anticipate where the majority of initiations would go in the group; differential interest in comparison with others; and to some extent, differential fascination with the 'mystery' of an uncertain alternative. (With this latter factor, one suspects that if the stakes were higher, fewer people would exhibit a preference for mystery.) As in many social situations, the experiment was not a perfect abstraction, and contained conflicting forces which made it impossible to predict accurately for all individuals which factors will be overriding. Nevertheless, the behaviour and comments of the subjects gave support to the conviction that the theory was addressing an aspect of interaction that was meaningful to the subjects. They tended to see the covers in terms of providing a means of bluffing, forcing prices, and for getting ahead of others.

The statistically significant tendency of non-visibles to make more advantageous initiations than visibles is consistent with the results concerning perceived advantage in covers. A conservative evaluation of these results seems warranted, however, in light of: the lower proportion of high non-visibles in Set B who offered to visibles; the constraints against subjects offering more than they requested because they were in a game; and the marginal support for Hypothesis 2 in Set A (see Appendix V).

## FOOTNOTES FOR CHAPTER 4

1. In Chapter 3, it was noted that the two sets were not equally good tests of all six hypotheses. For this reason, we will present data for each hypothesis from the set which bears most directly on that hypothesis. We will discuss relevant data from the other set where it gives further information, or where the results of one set conflict with those of the other. Some results from the Pilot set described in Appendix IV are given, when the problems of design for that set do not affect the result.
2. Hypothesis 1 refers to initiations to visibles only; subjects could not see if non-visibles had a large or small pile of buttons.
3. The proportions of initiations to high visibles on Trial 2 will be given with the discussion of Hypothesis 4, as they shed light on the relative importance of visibility of partner and the size of his resource base.
4. A few subjects noted during debriefing that they had not noticed the two different sizes of resource bases.
5. There were two unbalanced visibles in each experiment: one had 1100 green, 100 red; the other 1000 red, 200 green. Balanced visibles had 900 green, 300 red; or 850 red, 350 green.
6. Not all subjects framed their offers in terms of 100 buttons. Proposed terms ranged from 10 for 20, to a hopeful 100 for 780 in return (Set A).
7. Note: Results from the Pilot Set are given here, because Sets A and B did not provide an opportunity to test whether subjects with an imbalance in value position were as popular as those with large resource bases. The Pilot Set was also the only one in which it was possible to observe whether the terms of proposed exchanges varied with the value positions of partners.
8. The rules did not permit subjects to offer more than 100 buttons at a time. However, the numerator of the exchange ratio will sometimes exceed 100, and this indicates an initiation offering more buttons than were requested, standardized on the denominator of 100.
9. The profit in value units to each type of subject in a trade of 100 buttons of one colour for 100 of the other is shown in the Table below:

Subjective Gain and Costs\* to P for a 100/100 Exchange on  
Trial 1, Set B

<u>Subject</u>	<u># of buttons in small and large piles</u>	<u>increase in value units</u>	<u>costs in value units</u>	<u>net profit in value units</u>
Hi NV	150/1250	250	87.5	162.5
Visible	100/1100	290	100	190
Low NV	50/9500	370	113	257

\* Calculated from the value chart, Appendix 1.

It can be seen from this table that the low non-visibles made considerably more profit in value units from a one for one trade of buttons, than did the visibles or the high non-visibles (257 versus 190 and 162.5, respectively). Thus, to be fair in an exchange with a visible, a low non-visible would have to give up more than he requested.

10. Only initiations to visibles were considered, because fairness was not defined from the initiator's point of view, in an offer to a non-visible.
11. The advantage to high non-visibles may have lain elsewhere than in advantageous initiations in visibles. In Set BI, the high non-visibles could infer from the instructions that so long as they kept ahead of the visibles, they would most likely be among the four winners at the end. As they were told that some non-visibles had more than visibles, and some less, they might, on symmetry grounds, think only one other non-visible was a high. To win, they could either make the sort of deals with visibles that would not let the visible improve his total wealth, or they could deal with a non-visible who might be the same, or greatly behind in total resources. Since they had no information about non-visibles, they could not make use of it to decide what price was reasonable; however, so long as they traded even amounts of buttons with non-visibles, they were likely to maintain their position vis-a-vis the visibles, simply because they started with more buttons. In a way, high non-visibles had all the information they needed to play a winning strategy -- they believed only one other visible had as much as they did. If a person had enough information to feel secure that no one would do better than he, he would also feel freer to take risks, e.g., by trading with the non-visibles, or by trying to trade with the visibles in such a way that it gave an advantage to the non-visibles.
12. See Footnote 9.
13. Offers were standardized to a ratio of  $X/100$ , and the mean over all ratios for a group of  $N$  subjects was calculated:  $\frac{n}{\sum_{i=1}^n} \frac{(X/100)}{(X/100)} \frac{1}{i/n}$ , where  $i$  is the initiator  $i=1, 2 \dots n$ .

14. In the Pilot work described in Appendix IV, where some visibles had 'fair' exchange ratios greater than 100/100, the actual ratios were lower than the fair ratio. The average departure from the fair ratio in these cases was  $-.30$  (below the fair ratio), contrasted with an average departure of  $+.066$  (above the fair ratio), when fairness called on subjects to offer less than they requested. If low non-visibles in Set B had followed the pattern of the subjects in the Pilot set, their average exchange ratio would have been 95/100, compared with their actual obtained average ratio of 85/100.
15. In Set A, subjects did not know the exact number of buttons the visibles had, although the high resource visibles had physically larger piles of buttons. The results from these subjects did not support Hypothesis 2. However, only 63% of the non-visibles stated that they perceived the covers to be an advantage: of these, 47% made initiations which asked for more than they offered. (See discussion of Hypothesis 3.)
16. See Appendix II, Questionnaire for non-visibles.
17. See Appendix III, Questionnaire 3.
18. See Appendix III, Questionnaire 3. Note that although non-visibles had received false offers by the time the questionnaire was administered, they had not received replies to their own offers.
19. Non-visibles' reasons for wanting the covers left on were basically the same as their reasons for perceiving the covers to be an advantage. They focussed on the ability to keep one's progress in the game a secret, so that no one would try to 'thwart' them, and on being able to force more out of another player whose need was apparent. The importance of the two senses of advantage -- over the game as a whole, and in setting the terms for individual transactions -- is again in evidence. Both high and low non-visibles gave similar reasons for wanting to retain the covers. Of the lows who wanted the covers off, the main reason appeared to be the belief that if others saw how poor they were, they would be perceived to be justified in asking for a larger return.
20. Note: All 56 non-visibles in Set A were asked about retaining the covers on Trial 1, and 17 of these wanted them removed if they were given the choice on Trial 3. For the 48 subjects asked about what they saw the advantages to be, 2/30 claiming advantages in covers said they wanted them off; 12/16 who saw covers as a disadvantage wanted them off.
21. See Appendix III, Questionnaire 1.
22. The data from Set A followed essentially the same pattern, and are given in Appendix V, Table A.10.

23. Players were not completely certain that any initiation they made would lead to a completed transaction. However, expected values of exchanges with visibles could be calculated on the basis of the least ambiguous sort of information available.
24. Some results from Set A will also be given, as they demonstrate that the preference for visibles continued beyond the first trial, even when the strong preference for the high visibles had declined.
25. In addition, if non-visibles anticipated that other non-visibles might receive fewer offers than visibles, then an initiation to a non-visible might have seemed more likely to be accepted. Subjects' reasons for initiating to visibles and non-visibles are listed in Appendix V, Table A.11 through A.14. Approximately one-third of subjects who sent offers to non-visibles gave the anticipated unpopularity of non-visibles as the reasons.
26. A set of ten experiments with 12 subjects in each (i.e., six visibles and six non-visibles) all with the same total resource bases and ratios of red to green or green to red, was conducted for purposes outside the scope of this dissertation. In this set, 71% of Trial 1 initiations went to visibles. It is interesting to note that females directed 77% of their Trial 1 initiations to visibles, compared to 65% for males.
27. Some plausible explanations of these results will be discussed in the next Chapter.
28. Binomial test gives  $Z = 3.63$  for initiations made by visibles. The non-visibles did not direct significantly more initiations to visibles on Trial 2.
29. Real offers were delivered to visibles.
30. An  $\chi^2$  test for the table gives  $\chi^2 = 9.6$ , d.f. = 1,  $p < .01$ .
31. The rejection of non-visibles by visibles, by type of offer, is shown in the table below:

<u>Person Rejecting Offer</u>	<u>Number Rejected per Number Received</u>		
	<u>asks same as offer</u>	<u>asks more than offer</u>	<u>asks less than offer</u>
High visible	10/13	13/15	2/3
Low visible	0/2	2/2	1/2

From this table, it is not clear that non-visibles could have entered into trades if they gave up the idea of advantageous exchanges, and made fair or generous offers, as even fair offers were frequently rejected.

32. See H.H. Kelley and D.P. Schenitzki, 'Bargaining', Chapter 10 in C.G. McClintock, Editor, Experimental Social Psychology, Holt, Rinehart and Winston, 1972, pp. 299-307, for a discussion of the experimental paradigm most frequently used for studies of bilateral monopoly bargaining.
33. Of the 7 offers from non-visibles accepted by the visibles, either no offer was received from a visible, or the offer from the visible asked for more than it offered, i.e., was worse in terms of absolute profit to P than the one accepted. One person said he had made a mistake in accepting a non-visible (he rejected two offers of 100 for 100, and gave up 150 for 100). Two out of three low visibles accepting a non-visible received only that one offer.



## CHAPTER 5

## EVALUATION AND SUGGESTIONS FOR FUTURE RESEARCH

This dissertation has been concerned with the use of information control as a tactic for obtaining advantage in exchange relationships, and the limitations on the successful use of such a tactic imposed by a posited preference for reliable information about exchange partners. A theory was constructed to explain the processes operating in such a situation, and an experiment was designed to test a set of six hypotheses derived from the theory. As the test and results have been presented in some detail, there is no need to repeat them here. Given that the results on the whole gave support for the theory in the experimental context, it is appropriate at this point to make a different evaluation of the theory, based on other criteria.

At the conclusion of an experimental study, someone usually asks: "Well, what does this tell us about the real world?" This question essentially refers to the generalization from the study to similar situations outside the laboratory. If the interrogator wishes to know where else we can find groups of people sitting around dimly lit tables trading coloured tokens, our answer must be not "In poker halls", nor "At children's parties", but "Nowhere". It should be clear from the way this study has been constructed that we do not expect to generalize from the concrete experimental setting directly to another concrete singular situation with similar characteristics. The view taken here is similar to that expressed by Webster<sup>1</sup> and Kervin:

The connection between the laboratory and the natural setting, we claim, is the theory. Without the theory there is, and in fact there can be, no link. Specifically, the link is the set of abstract scope conditions which tell whether the theory can be used to make predictions for a particular setting. If there is no theory, and if there are, therefore, no explicit scope conditions, then no generalization of the results of a laboratory study is permissible. Strictly speaking, this is also true of any study, laboratory or other.

We construct theories with general statements involving abstract variables. As indicated above, these are made predictive in particular instances by a set of initial conditions which, together with the abstract assumptions, are used to deduce hypotheses. In any concrete situation, experiment or otherwise, where it can be shown that the relevant conditions are met, and that the assumptions of the theory apply, predictions can be made. <sup>2</sup> Thus, the findings of a particular experiment are generalizable through the theory to other settings, not by direct extrapolation from an experiment to the real world.

In this view, the scope conditions both provide generality and impose limitations. Let us look at the implications of such a view for the work reported in this study.

Any empirical scientist, of course, wants to devise theories with antecedent conditions that have a variety of concrete instances, but no theory can encompass all the world, or for that matter, all of social behaviour. Our concern has been what part of social behaviour that can be conceptualized as social exchange. We further limited our interest to exchange situations in which:

- 1) People could obtain complementary commodities from at least two others (Scope condition 1).
- 2) The resources were valued according to a marginal utility function (Scope condition 2).
- 3) The value functions of individuals could be known or inferred, though information about current resource holdings of others might be incomplete (Scope condition 3).
- 4) People could compare profits at some stage (Scope condition 4).
- 5) Total resources in the group did not increase (Scope condition 5).
- 6) Some people could control but not falsify information about their current resource holdings (Scope condition 6).

This admittedly typifies only a part of social interaction, but certainly not so small a part as groups of students trading red and green buttons according to a value chart. Support for the experimental predictions based on the theory gives us more confidence in predictions to other situations that meet the initial conditions. We will briefly consider some possible situations to which the theory could be shown to be relevant, and at the same time, suggest where further work is needed to spell out the applicability of the theory.

1. Valued complementary resources distributed in groups of four or more.

This condition requires little comment, if one accepts a model of social behaviour as exchange, because almost any service, good, or sentiment can be seen as a resource. <sup>3</sup> Thus, a father who takes his son skiing, if the son washes the car, can be seen as similar in relevant respects to students who help one another study, or children who trade hockey cards. Pro-

bably the most difficult problem to resolve concerning the applicability of this condition is to work out how many different resources are involved in a relationship -- for example, do students exchange only help, or is companionship also a reason for the relationship? In addition, it is not sufficient to note that a group has four or more members, but that the alternative exchange partners are in fact available to enter exchange transactions.

## 2. Marginal utility function

It is a simple matter to note that the more we get of a resource, the less we value even more of it. Intuitively, this principle seems to apply to help, deference, approval, and in reverse, to time and effort given up.<sup>4</sup> It is much less simple to specify the periods of time over which satiation and deprivation will take place, and the units in which resources will be obtained or given up. Without being able to specify the units, even arbitrarily, it is difficult to know whether this initial condition is met or not. In addition, some resources, such as money, or votes, that can be used as resources in exchange, are not always valued according to a marginal utility function. This seems to imply that the second initial condition could be generalized to specify only that there be a differential valuation of resources, to provide a basis for exchange.

## 3. The condition that individuals know or be able to infer the value functions of others seems at once a very limited and a widely applicable statement.

There is a vast array of people in the world whose value functions we do not know, but at the same time, we are not so likely to enter into

exchanges with them. Continuing interaction in exchange relationships builds up a store of information about the outcomes that Other has pursued most enthusiastically, the transactions that have given him the most satisfaction, and the terms of transactions he has agreed to with oneself and with others. In addition, people can generalize this kind of information to similar others in similar situations. The second part of Scope condition 3, that people do not know how much of a resource some others have, limits the applicability of the theory to a narrower range of situations. People in close contact are likely to know what each other has; some relationships probably demand full information, such as is found in families. Nevertheless, actors often have discretion over the information available about them, and particularly in the early stages of interaction involving new resources, people will often not be certain about the resource bases of potential partners. (Even in extended interactions such as the family, husbands have been known to conceal from other members the size of their incomes.)

#### 4. Opportunity to compare profits

The opportunity to compare profits in exchanges is a consequence of the distribution of information, which can change over time. It may often occur that exchange partners do not know how the other gains at the time of the transaction, and that comparison later becomes possible when one is able to observe the other's subsequent reaction (e.g., his satisfaction, what he does with the profit, or what he tells others). Again, this points to the early stages of exchange relationships that will continue, or to established ones in which different commodities are introduced. If ex-

change networks are well connected, and have existed over a long period of time, it is less likely that members would be unable to compare profits at the time of the exchange. There are exceptions, of course, such as labour-union negotiations, in which comparison, or at least, honest comparison of outcomes at the time of bargaining is deliberately avoided by both parties. The desire to compare profits seems to typify a great many relationships, and may lead to information-gathering where there is inadequate information to allow comparison.

#### 5. Total resources in the group constant

For short periods of time, most simple exchange relationships can be typified as constant-sum situations. Even if resources increase at regular intervals, as in the case of income, consumption usually ensures that the resource bases of members do not alter dramatically, and if they do, it occurs in a predictable fashion. However, the fifth scope condition rules out the many interactions in which people jointly produce new resources, or when additional amounts of resources are injected into the group from an external source. In such cases, there are often enough rewards to satisfy everyone, and cooperation and trust are more likely to prevail. Where rewards of P and O are positively correlated, the sharing of information is more typical, since it increases both parties' ability to coordinate,<sup>5</sup> and obtain further rewards. In such cases, problems of fairness tend to involve questions of proportional returns on investments, and these questions are not handled by the assumptions of the theory presented in this study.<sup>6</sup>

6. Some members can withhold information, but not give out false information

It might at first seem that in any situation where P can control information, he will, in addition, give out false information that construes the situation to his advantage, rather than risk the chance that Other will make assumptions unfavourable to P. However, there are many constraints against falsification, not the least of which are sanctions meted out for lying, but which are not applied for saying nothing. One can also be selective in the release of information, so that only that serving one's interest is made available.<sup>7</sup> If P simply withholds information, the assumptions made by O will often be favourable to P, as when O believes everyone will act fairly, or if there are norms against suspecting other people's motives. The key to obtaining an advantage probably lies in selecting occasions where the right assumptions will be made.<sup>8</sup> Once again, Scope condition 6 is more likely to be applicable to the early stages of interaction, such as the fencing that occurs at cocktail parties, the early stages of dating, or in relationships where the members cannot obtain an immediate independent verification of the cues given by P. (For example, little brothers and sisters who tell secrets undermine the control of crucial information in relationships as diverse as the swapping of hockey cards, and impressing a new boyfriend.)

Our interrogator may now object that to provide instances for each of the scope conditions separately does not ensure they will all hold in any given situation. There are two replies that may be made to such an objection.

1. First, we would argue that the assessment of the relevance of an abstract theoretical formulation such as this one does not rest solely on the ability to go out and count up a large number of concrete cases that meet the assumptions and scope conditions of the theory. The history of the natural sciences contains many instances of seemingly irrelevant theoretical formulations which later proved to have important applications. One reason for this seems to be that until a particular interpretive framework is developed for a set of events, we do not characterize or recognize the events as instances that fit that framework.

In addition, processes that occur infrequently (or not at all) in the 'real world' are not necessarily unimportant by virtue of being infrequent for they may provide the occasion for testing predictions about underlying principles which are usually confounded with other processes. One of the strongest arguments in favour of artificiality in laboratory experimentation is that it allows us to eliminate factors not specified in the theory. Then the results will bear unequivocally on the soundness of the propositions, making difficult the prevarication that 'other factors' may have prevented us finding support for our predictions. The results in the present study, for example, make it clear that our propositions are not adequate to account for the behaviour of all our subjects, and that further refinement of the assumptions and operationalization are necessary.

A further justification for studying processes which may occur only infrequently is that these processes can have important and long term consequences. In our case, for example, the process of establishing the terms of transactions to favour oneself may occur rarely, because we tend



to let most of exchange proceed by habit, according to standard terms. Nevertheless, if an actor can influence the initial expectations about acceptable terms in transactions, it can exercise an influence on routine interaction well into the future.

2) The second reply to the question of whether all our scope conditions are ever met together in concrete situations is that the set of initial conditions are not mutually exclusive, and there is logically no reason to expect they will not occur together. We have suggested that several of the scope conditions typify the early stages of exchange interactions, either when a new set of actors are establishing relationships, or are negotiating the prices of a new set of resources for which there are no standard valuations. We believe the scope conditions may be shown to be typical of several different kinds of exchange contexts. For example, the theory might be used to predict that employees would be more willing to accept wage restraint (lower profit) in a company in which the employees share in decision making and have access to information about the true costs borne by the organization, than would workers who must infer management's true costs on the ambiguous basis of wage offers presented to the employees. Again, in organizations, the theory would predict that the success of 'gamesmanship' (in which people engage in the selective release of information that puts them in a favourable light) would be severely constrained if there were also 'honest players' in the group, who typically released all relevant information. Unpleasant feelings might arise toward a person who had benefitted from the selective release of information, if he did not also continue to conceal the satisfaction he had obtained from the advantage. The reciprocal

trading of votes on issues of different importance to different people in political spheres could also be an area in which the theory could be made predictive. For example, much effort is probably spent in concealing true cost and reward levels in such cases, while the desire for reliable information about the Other is very high. Other examples in informal relationships such as dating networks, people in cooperative houses where costs are assessed relative to wealth, students engaging in reciprocal help, could probably be shown to satisfy the complete set of scope conditions of the theory.<sup>10</sup>

We will not continue with a list of possible instances of situations that could possibly be accounted for by the theory, but will now mention some issues which this study suggests would merit further research.

### Suggestions for Future Research

The support for the hypotheses described in Chapter 4 gives us a degree of confidence in the assumptions on which they were based, but there was still a good deal of error in the predictions. We cannot be certain the assumptions, the hypotheses, or the operationalization are responsible for the failure, but it is possible to make some reasonable guesses.<sup>11</sup>

It was assumed that people are not only concerned with their own profits in exchange, but also with a comparison of profits. We argued that people preferred to gain more than others, particularly where the total resources are constant, since a gain to O is a loss to P. It seemed clear in the experiments, however, that not all subjects were interested in comparison of profits, and that individual differences in orientation to others may

be an important factor needing investigation. People are all likely to be motivated to compare with others in some situations, but the motivation to do so varies across individuals and across situations, in a manner that needs much more specification.

We argued that comparison is salient for peers who can observe others' gains and losses, but it is clear that no one can systematically compare how well he does in relation to all possible partners, due to limited cognitive capacity, and the increasing costs of doing so. It would be of great interest to be able to predict the subset of others with whom P will choose to compare. Recent studies in social comparison theory could possibly provide principles that might be integrated into our theory.<sup>12</sup>

A further question arising from the comparison of profits is the soundness of the assumption that P can take the point of view of others, if he knows their resource bases, to assess how others value outcomes. In the experiments, this process was made very easy for subjects by the provision of the value chart. Even so, some subjects did not appear to process information in the manner predicted, and some commented that it was 'too much trouble'. It must be admitted that people often find it simpler to proceed through a process of trial and error, making adjustments if something goes wrong, or if P does not manage to obtain a level of reward that is adequate.

In addition, terms of exchange are often a matter of habit and history, and do not involve (regular) and continuous negotiation. One of the functions of social standards of fairness is to relieve the actor of the chore of negotiating each encounter afresh, and any decisions he makes about

entering transactions may relate to selecting those whose standard terms are attractive.

In spite of the fact that role-taking may not occur in a routine way, in most interaction, we would argue that: 1) if the rewards are important to P, or if 'something goes wrong', and his normal level of rewards is disrupted, it will be worth his while to take the point of view of other to re-assess what terms he is able to get in an exchange, and 2) when new or unique relationships are first established, some negotiation of terms for the relationship is required.<sup>13</sup>

The widespread perception of advantage in concealed resources in the experiment leads us to believe that we are addressing a meaningful aspect of exchange relationships. Apart from a vague sense that it is 'good to keep one's affairs private', many subjects were very articulate about the manner in which asymmetric information could be used to give O the impression that P required good terms to agree to a transaction, at the same time that O was kept to terms reflecting his true needs. The fact that more people perceived an advantage, than made advantageous offers, may mean that the advantage can operate in different ways. (For example, in the experiment, one advantage lay in preventing others from knowing that P had made several transactions.) It is also likely that tactics work only if used sparingly:

Tactics are highly personal, subtle, and evanescent; their outcome depends on the correct (or incorrect) interpretation of any one or more of many behavioural cues, which may themselves be genuine or pretended; and the net effect often involves such complex interactions as what A thinks B thinks about what A is thinking.<sup>14</sup>

While it may be true that tactics are not used regularly, our formulation of how P takes O's point of view provides a rationale for this process that goes beyond the simple assumption by many researchers that asymmetric information is somehow a tactical advantage. If we agree that tactics are 'evanescent', it would be desirable to devise indices of the use of tactics which are more sensitive than the simple proportions of advantageous initiations that were used in the present research. In addition, we would expect that tactics of advantage will only be used until the advantage is obtained -- if it is only necessary to do better than Other once in order for the advantage to continue, then tactics will occur infrequently. If the situation requires that the advantage be renewed, we expect tactics to be used with greater frequency.

The process of taking the point of view of Other also helps us to understand why information about P's outcomes is so important to O -- without information, he cannot make comparisons. The support for the experimental predictions concerning the preference for others about whom P has information gives us confidence in the assumption that ambiguity of information about an alternative leads to uncertainty, and that this reduces the expected value of an alternative.

We argued that subjects would prefer to have unambiguous information about a partner's resources, and that if such information was available about some Others, this information would be processed to make inferences about the probability of acceptance of offers, and the fairness of different exchanges. Subjects in the experiments seemed to have believed that they could discover the non-visibles' true profits by means of the types of offers the latter made and accepted. However, given that such inferences might be unreliable, they preferred alternatives for which more certain

information was already available. The extension of findings concerning a preference for risk over uncertainty, to the case of degrees of uncertainty in social situations, seems a promising area of inquiry. If we can eventually delineate the factors in a situation which lead to a greater or lesser degree of uncertainty, then a social choice model incorporating uncertainty as suggested in this thesis, would be a contribution. Factors that could be investigated include P's beliefs about O's self-interest, (for example, the tendency of powerless people to attribute negative intentions to others); the variability of information, (for example, if it comes from several different sources); the credibility of different people, (for example, is information from high status persons more credible than from low status persons?).<sup>15</sup> A model which specified the antecedent factors influencing uncertainty would also provide a framework for predicting the conditions under which withholding information could succeed as a tactic, (for example, when no alternatives provide reliable information, or when alternatives about whom there is reliable information are undesirable on other grounds).

The six cases of information and alternatives described at the end of Chapter 1 could be assimilated into the theory by making alterations in the scope conditions concerning the number of alternative partners, and the amount of information available about them. It would then be possible to use the assumptions in the theory to make predictions for the six cases. This would have the advantage of integrating a somewhat atheoretical body of work concerning information in negotiation into a single framework and

extend the conceptualization of bargaining to include the effects of a resource base against which profits are calculated.

The consistent minority of subjects who did not display a preference for visibles in the experiments requires some comment. The data do not permit an unambiguous ad hoc explanation of initiations to players with hidden resources, and at least three ways of accounting for the negative cases could be pursued:

- 1) There may be individual differences in the avoidance of uncertainty.

Ellsberg, and MacCrimmon, note that only some subjects display a preference for risky over uncertain bets, when the bets have equal expected value.<sup>16</sup> Individual differences in the ability to anticipate the likelihood of having an offer accepted might have led some subjects to direct offers to the less popular non-visibles; and there may well be individual differences in the desire to compare profits with others. These factors relate to different components of the decision function given in Assumption 5. Initiations to non-visibles were taken to indicate that the subjectively expected value of an exchange with a non-visible was greater than that with a visible, but it is not clear which part of the function was affected, i.e., the probability of acceptance, the weighting of uncertainty, or the value to  $P$  of comparison with 0.

- 2) Future work could explore the possibility of developing a model that conceives of the actor as randomly considering one of three possibilities -- that a non-visible is better, as good, or worse than available visible partners. This might then lead to the two-thirds of the subjects

who on average made offers to visibles, i.e., this proportion would represent those who believed the visibles were as good or better than the non-visibles. This would be in accordance with Ellsberg's suggestion that subjects will prefer risk to uncertainty, if the risky alternative is estimated to be as good or better than the uncertain one. The remaining one-third of the subjects who hold the belief that the non-visibles would make better partners would then account for the proportion of subjects who did not act according to the theory as it now stands. Such a model would require a more detailed description of the factors the actor takes into account in deciding that one alternative is 'as good' as another, and more sensitive methods of measuring the subjects' decision processes during interaction.

- 3) We can also conceive of the subjects as assigning positive expected value to exchanges with both visibles and non-visibles, but a higher value to the former. Offers may be directed in proportion to the relative expected value, i.e.,

$$\text{frequency of initiation}/n = \frac{\text{expected value (visible partner)}}{\text{EV (visible) + EV (non-visible)}}$$

In such a model, a certain smaller proportion of offers would be expected to go to non-visibles, and some of these might be sent on the first opportunity for exchange. Studies of choice in probability matching tasks never show a 100% choice of the alternatives with the highest expected value, if subjects are given a series of choices.

In all these conceptualizations, the difficult problem of assessing expected value is compounded by the fact that probability and utility interact --



the more desirable a transaction to P, the less likely it is to occur, because it is undesirable to O. The lexicographic representation of the choice process, though imprecise, seems plausible in light of the data. It seems clear that subjects did in fact consider profit to self as the most important factor, indicated in the acceptance of offers giving the largest profit, regardless of source (e.g., Set A, Trial 1). When profit to P was held constant, by delivering falsified offers, the ability to compare profits with the partner seemed to lead a majority of subjects to accept the visibles.

In spite of the negative cases, the evidence for the predicted preference for partners with known resource levels gives up more confidence in our explanation of the process by which concealment of information does not turn out to be a sufficient tactic to ensure advantageous exchanges. The preference for information and the inferences made about those who withhold information, appear to limit the success of such a tactic when alternative partners are available. It has already been noted that the theory could be extended to make predictions for cases when there are no alternatives, and information is differently distributed, and future work could involve a systematic test of the different cases.

The paradigm used in this study lends itself to further research in the use of informational tactics. In particular, discretion over the release of information about resources could be simply varied, by equipping the booths with indicators of the numbers of different coloured buttons. These indicators could be controlled by the experimenter or by the subjects.

It is not necessary that buttons change hands in the experiment, and many more trials could be run if indicators were used to record, honestly or dishonestly, successive changes in resource bases through exchange. It would also be possible to vary the type of value function across subjects, so that deception could occur concerning both the size of the base, and the value function.

The foregoing discussion should make it clear that there is scope for further research based on the theory, even within the present experimental paradigm. It should also be possible to design different experiments that overcome some of the weaknesses in the paradigm used in this study, such as the confounding of long- and short-term gain, and the difficulty of creating doubt about the resource bases of concealed subjects. Computer terminals offer a lot of potential for both recording the subjects' reactions throughout an experimental exchange situation, and for simulating the other members of a 'group'. Because attempts at advantageous exchange seem more likely to succeed if tried only occasionally, it may be that field studies would further aid in the delineation of conditions antecedent to attempts by social actors to obtain advantage, and the mechanisms involved in carrying it off.

## FOOTNOTES FOR CHAPTER 5

1. M. Webster, Jr., and J.B. Kervin, 'Artificiality in experimental sociology', *Canadian Review of Sociology and Anthropology*, 8, 1971, p. 268.
2. The process of prediction is not so simple, of course, because one theory does not include propositions about all the factors in a particular concrete situation that may contribute to and change the values that the variables assume in that situation.
3. See: A. Kuhn, The Study of Society: A Unified Approach, London: Tavistock Publications, 1966, pp. 260-61.
4. For example, the variety of occasions on which the expression 'carrying coals to Newcastle' is used, is testimony to this fact.
5. Friends probably select activities that are characterized by positively correlated rewards, or in which those aspects can be emphasized. In addition, such activities also would generate positive sentiment and feelings of friendship.
6. The issue of proportional return for investments is usually referred to as distributive justice or equity. See, for example, G.C. Homans, Social Behaviour: Its Elementary Forms, New York: Harcourt, Brace and World, 1961, pp. 232-264.
7. Press censorship is based on the selective release of information that supposedly reinforces a particular definition of the situation. Its effectiveness is probably dependent on whether readers suspect they are being given only part of the facts.
8. Paradoxically, the desire for advantage is likely to be lower when conditions are most favourable for its success, as when trust exists between the parties. P would risk a loss over the long run if he violated trust, because it would disrupt the relationship.
9. A further advantage of making a controlled test of predictions from explicit assumptions and scope conditions is that we then have a better idea of where the weaknesses lie. Factors which have been controlled or eliminated cannot be blamed for negative findings, and this narrows the range of directions to take in revising predictions.
10. Zelditch makes the point that disputes about the applicability of a theory depend for their ultimate resolution on descriptive knowledge of a particular situation. However, experimental investigation can be useful for studying the effect of processes that were neglected or held constant in the earlier tests of the theory, but which seem to be important in a given application. M. Zelditch, Jr., 'Can you really study an army in a laboratory?', in A. Etzioni, Ed., A Sociological Reader in Complex Organizations, New York: Holt, Rinehart and Winston, 1969, Second edition, pp. 528-539.

11. In Chapter 3, we addressed the issue of whether we had successfully induced a marginal utility function for the buttons, and suggested that some errors in prediction could probably be attributed to a failure of the manipulation for some subjects. Our design did not allow us to locate those subjects who were unaffected by the manipulation.
12. See, for example, Bibb Latané, Editor, 'Studies in Social Comparison', Supplement 1, Journal of Experimental Social Psychology, 1966.
13. A mundane example of this is the agreement required about payment when one engages a new babysitter. While there appears to be a social standard for the range of pay acceptable to both parties, terms can vary according to ability to pay, perceived need of the sitter, and alternatives available.
14. Kuhn, op. cit., 1966, p. 337.
15. See, for example, E.E. Jones, K.J. Gergen, P. Gumpert and J.W. Thibaut, 'Some conditions affecting the use of ingratiation to influence personal evaluation', Journal of Personality and Social Psychology, 1, 1965, pp. 613-623; and D. Bramel, 'Determinants of beliefs about other people', Chapter 4 in J. Mills, Editor, Experimental Social Psychology, Toronto: Collier-MacMillan, 1969; H.H. Kelley and A. Stahelski, 'Social interaction bases of cooperators' and competitors' beliefs about others', Journal of Personality and Social Psychology, 16, 1970, pp. 664-91; and W. Thorngate, 'Predictions, Attributions and Evaluations of Behaviour in Decomposed Games', Unpublished manuscript, University of Alberta, Department of Psychology, 1974.
16. D. Ellsberg, 'Risk, ambiguity, and the Savage axioms', Quarterly Journal of Economics, 6, 1961, pp. 643-669; K.R. MacCrimmon, 'Descriptive and normative implications of the decision-theory postulates', in K. Borch and J. Mossin, Editors, Risk and Uncertainty, London: Macmillan, 1968.
17. Examples of probabilistic choice experiments are: those of Siegel, and of Ofshe and Ofshe. See: S. Siegel, A.E. Siegel, and J.J. Andrews, Choice, Strategy and Utility, New York: McGraw Hill, 1964. L. Ofshe, and R. Ofshe, Utility and Choice in Social Interaction, Englewood Cliffs: Prentice-Hall, 1970.

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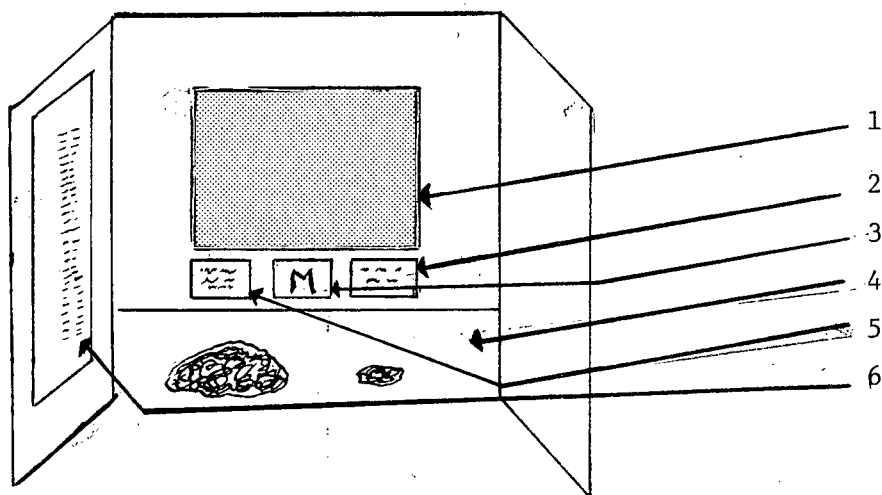
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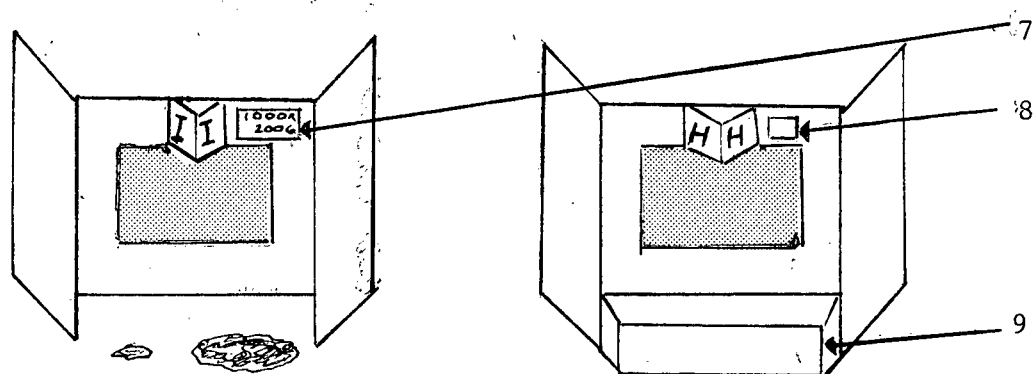
APPENDIX I  
LABORATORY SET-UP

A diagram of the booths is shown in Figure A.1

Figure A.1 Main features of booths used in experiments



View from inside a visible or non-visible subject's booth



View from outside a visible's booth

View from outside a non-visible's booth

1. Window covered with loudspeaker mesh. When room was illuminated from the center, subjects could see through their own screen to the center of the tables, but could not see through both their own and another booth's windows.
2. Card telling subject what he had to begin with (numbers of each colour of buttons).
3. Subject's identification letter (also on front of booth).
4. A four inch gap allowed subjects to reach his buttons piled in front of the booth.
5. Card telling subject he could not offer more than 100 buttons at a time, although he could ask for more than 100, and give more than 100.
6. Table indicating the worth of different numbers of buttons for the second part of the game. The instructions drew attention to the fact that the table implies a principle of diminishing marginal utility.
7. Card on outside of visible subjects' booth, telling the exact number of buttons of each colour that subject started with (this could be seen by all other subjects around the table).
8. Coloured tag on the outside of non-visibility booths; the colour was the same as the colour of buttons in that person's predominant resource pile.
9. An illustration of the covers that were placed over the resources of non-visible subjects.

Figure A.2 Initiation forms used in Set A

Initiator's letter _____	Offer directed to _____ (letter)
(circle one)	
Will give (No.) _____	red      green      buttons
for (No.) _____	red      green      buttons
(circle one)	
Receiver circles one	
accepted	
rejected	

Figure A.3 Initiation forms used in Set B and in pilot study

Initiator's letter _____	Offer directed to _____
(circle one)	
Will give (No.) _____	red      green      buttons
for (No.) _____	red      green      buttons
(circle one)	
RECEIVER CIRCLES ONE	
Accepted	Rejected
	_____ offer not good enough
	_____ don't want to deal with you

Figure A.4 illustrates the card pinned inside a subject's booth, indicating the number of buttons he had to begin with.

Figure A.4 Card showing to subject his resource base.

1600 Red  30 Green
--------------------------

The following page shows the value chart that was pinned inside each booth. A somewhat different chart was used in Set A, in which the exact values for the function

$$Y = 100 \cdot \sqrt{X/2} \quad (Y \text{ is value, } X \text{ is number of buttons})$$

was used. These values were rounded off to the nearest number for use in Set A. In Set B and in the pilot study, the numbers in the left column were further rounded, so that the smallest increment would be 5 value units.

Figure A.5 Value chart used for Set B and Pilot

	1400	2590	
	1380	2575	
	1360	2560	
	1340	2545	
	1320	2530	
	1300	2515	
	1280	2500	
	1260	2480	
	1240	2460	
	1220	2440	
	1200	2420	
	1180	2400	
	1160	2380	
	1140	2360	
	1120	2340	
	1100	2320	
	1080	2300	
	1060	2280	
	1040	2260	
	1020	2240	
	1000	2220	
	980	2200	
Total number of	960	2180	Net worth of total
buttons of a	940	2160	number of buttons of
given colour.	920	2140	a given colour in
(Notice that	900	2120	<u>value units</u> for the
the increments	880	2095	second phase of the
on this side	860	2070	experiment.
are all equal)	840	2045	(Notice that the
	820	2020	increments on this side
	800	1995	are smaller at the top
	780	1970	than at the bottom)
	760	1945	
	740	1920	
	720	1895	
	700	1870	
	680	1845	
	660	1820	
	640	1790	
	620	1760	
	600	1730	
	580	1700	
	560	1670	
	540	1640	
	520	1610	
	500	1580	
	480	1550	

Figure A.5 (Continued)

	460	1520	
	440	1485	
	420	1450	
	400	1415	
	380	1380	
	360	1340	
Total number of	340	1300	Net worth of total
buttons of a	320	1260	number of buttons of
given colour.	300	1220	a given colour in
(Notice that	280	1180	<u>value units</u> for the
the increments	260	1140	second phase of the
on this side	240	1100	experiment.
are all equal)	220	1050	(Notice that the
	200	1000	increments on this side
	180	950	are smaller at the top
	160	900	than at the bottom)
	140	840	
	120	775	
	100	710	
	80	630	
	60	550	
	40	450	
	20	320	
Base line zero	0	-	Base line zero



APPENDIX II

EXPERIMENTAL INSTRUCTIONS AND

QUESTIONNAIRES, SET A

The instructions for Set A were administered by means of cassette tape recorder. The following is a transcript of the instructions employed.

"Hi there. Thanks for turning up to take part in the experiment.

You're going to play a game called "Exchange and Build", and as the name suggests, there will be two parts to it. The instructions I'll give you now will only be concerned with the first part, and we'll forget about the second part until later.

During this part of the game, you are going to be trading, or exchanging buttons with one another, and the object of the first part of the game is to build up the small pile of buttons in front of you, without losing too many buttons from the large pile you have. In other words, the object is to increase the number of buttons of which you have the least at the moment without losing too many buttons of the colour of which you have the most.

Now, you'll need to do this because in the next part of the game the two colours are used for completely different purposes. You will need buttons of both colours, red and green, in the next part; that is, both colours are valuable.

You will probably have noticed that half of you have your piles of buttons out where everyone can see them, while half of you have covers over the buttons. Now the covers have been placed there so that some of you will not know how many buttons some others have. This does not mean that the people with covers have no buttons -- they do. And you can tell which colour they have most of by the ticket on the upper right hand corner of their booths -- for example, a green ticket means that person has a predominant pile of green buttons, and a smaller pile of red ones.

If you'll look at the table on the side of your screen, you will notice that there are two columns of figures there. The column of figures on the left refers to different sized piles of buttons of a given colour. The column of figures on the right tells you how much these different sized piles of buttons of a given colour will be worth in the next part of the game. So the column on the left tells you how many buttons, and the column on the right indicates values. O.K.?

Now if you look closely at the figures in the columns, you will notice that the figures on the left increase by 20 at a time -- so they go: 20, 40, 60, 80, and so on right up to 1,600. The figures on the right, however, increase in big jumps to begin with, and the jumps get smaller and smaller as you go from the bottom to the top of this column.

Because the figures in the two columns increase in different ways, the table tells us two very important things. The first thing it tells you is that if you've already got a lot of buttons of a given colour, 20 more would be worth less to you than if you only had a few buttons of that given colour. Let me show you how this works.

Say you had a pile of 1,580 green buttons. You can see that a pile of 1,580 green buttons would be worth 2,806 value units in the next part of the game. Now, if you got 20 more buttons (green ones), this would bring you up to 1,600, and a pile of 1,600 buttons is worth 2,826; so that you would have gained 20 value units. In other words, 20 more green buttons when you've already got 1,580 would be worth 20 value units. If you only had a pile of 200 green buttons to begin with, though, and you got 20 more, you'd find that 200 green buttons (what you started with) would be worth 1,000 value units in the next part of the game, and a pile of 220, that is, the 200 plus 20 more, is worth 1,049. So the 20 extra in this case would be worth 49 value units. Remember, when you had 1,580, 20 extra are worth 20, but when you've only got 200, 20 extra are worth 49.

Once again, the first point is that the more buttons you have of a given colour, the less worth 20 extra would be. This is like saying that \$20 is worth less to a millionaire than, say, to a person on welfare.

The second thing the table tells you is that if you have a lot of buttons of one colour, and only a few of the other colour, you will actually increase the total worth of your buttons every time you exchange some of the buttons of which you have most, for some of the buttons of which you have the least. Let me show you how that works.

If, say, you had 1,600 green buttons; you find they are worth 2,826 value units in the next part of the game. O.K.? And if that was all you had, you decide to exchange some of the green buttons for some of the red buttons, so that you would end up with 800 green buttons, and perhaps 800 red buttons. And you find that a pile of 800 green buttons would be worth -- well, have a look at it on your table -- 2,000 value units. So your buttons

would now be worth 2,000 value units for the green pile, and 2,000 value units for the red pile, so that the total worth of your red and green buttons would be worth 4,000 value units. Whereas the pile of 1,600 green buttons alone was worth 2,826 value units -- two piles -- one of green and one of red, 800 each, would be worth 4,000 value units. To emphasize this second point then, you actually increase the value of your buttons by exchanging. In addition, since big piles are of course better than small piles, you'll even be better off if you can pick up a few buttons while you are exchanging -- that is, if you can get the others to give you a few more in return than you have given them. Of course, you may find this difficult to do as the others might not like the idea.

The table doesn't contain enough detail for you to make precise calculations. It's rather intended to give you an idea of how the buttons are valued. If you look through your screen you will notice a letter printed on the inside of your own screen. This is to identify you.

I'll just run through the steps involved in the single opportunity for exchange now, to give you a better idea of what you're going to do during each opportunity for exchange. Remember, you are going to have a number of these opportunities for exchange.

First of all, you'll look through your screens to see what the others have, or what their predominant colour is, and decide whether you want to send an offer to one of the others. Now, you do not have to send an offer if you don't want to, O.K.?

So that if you decide that you want to send an offer, then you'd fill out one of the forms in front of you, remembering one thing, that you cannot send an offer of more than the limit that is written on the card on the lower bar of your screen. While you are not allowed to send an offer of more than 100 buttons, you may request more than this from others, and should you be asked for more than 100 buttons, you may agree to do so. You simply cannot initiate, or begin by offering more than the 100 button limit. You can of course ask for less than or up to the limit from the person you send your offer to, and give less than or more than the limit in return. Once you've done this, fill out the forms, count out the buttons, and put both the form and the buttons in the bowl in front of you. When everyone has done this who wants to, I deliver all the bowls to the people they are addressed to -- that is, to the booth they are addressed to. It is clear that while your bowl is around at someone else's booth, either one or more bowls may come around to you. You can accept one but only one. If you accept an offer, circle 'Accepted' on

the form that came with the bowl. Any other offers that you receive and decide not to accept, circle 'Rejected' on the form that came with them. When everyone has done this, I'll ask those who have circled 'Accepted' on an offer to take the buttons that came with that offer, and to count up the buttons that they were requested to give in return. Put these buttons in the bowl. I will then return the bowls to their owners. And we will then be ready to begin the next opportunity for exchange.

I would just like to be clear on one point: during each opportunity for exchange, two things are happening. Somebody might be accepting or rejecting an offer from you, and at the same time you may be accepting an offer from someone else, or rejecting offers. O.K.?

Now, those people whose buttons are out in the open should leave them there -- do not try to hide them, or haul them off behind your screens. There is some yellow scratch paper in front of you, if you want to keep track of how many buttons you have. The numbers you are beginning with, that is, the size of your piles, are written on a small card on the lower part of your screen.

The first part of the game will take more time than the second, and you will have plenty of time to make all the exchanges you want.

I'd like to ask you too, please not to cheat. Count out any buttons you are offering accurately and observe the limits in making your offers. O.K.?

If you would just like to look through your screens now, decide if you want to send an offer to any of the others during the first opportunity to exchange, we can begin.

Verbal addition, not included in tape:

You should note that some of you have large piles of buttons, and some of you have very large piles. If you cannot see this, perhaps if you lean out closer to your screens, you will get a better view of the piles in front of the others' booth. Be careful that you do not lean back and look around at the person on either side of you.

Any further questions?"

End of Instructions.

## Appendix II: Set A

Questionnaire given twice to subjects with visible resource piles, after S's had made offers on Trial 1 and on Trial 2, but prior to delivery of offers.

Your letter \_\_\_\_\_

1. Who did you just make an offer to? G H I J K L M N (circle one)
2. What was the offer? \_\_\_\_\_ buttons offered for \_\_\_\_\_ buttons  
red red  
green green
3. What are your reasons for the size of offer you made?
4. How likely do you think he is to accept your offer? (Circle the position on the line below that shows how likely it is your offer will be accepted)

/	/	/	/	/
extremely likely	quite likely	50-50 chance	not very likely	not at all likely

What are your reasons for thinking this?

Do you think the person you made the offer to is more likely than any of the others to accept your offer? Yes No (circle one)

If you said NO, who do you think is more likely to accept? \_\_\_\_\_

Why do you think this?

Questionnaire given twice to subjects with non-visible resource piles, after S's had made offers on Trial 1 and on Trial 2: prior to delivery of offers.

Your letter \_\_\_\_\_

1. Who did you just make an offer to? G H I J K L M N (circle one)
2. What was the offer? \_\_\_\_\_ buttons offered for \_\_\_\_\_ buttons  
red red  
green green

3. What are your reasons for the size of offer you made?
4. How likely do you think he is to accept your offer? (Circle the position on the line below that shows how likely it is your offer will be accepted)

/	/	/	/	/
extremely	quite	50-50	not very	not at all
likely	likely	chance	likely	likely

What are your reasons for thinking this?

Do you think the person you made the offer to is more likely than any of the others to accept your offer? Yes No (circle one)

If you said NO, who do you think is more likely to accept? \_\_\_\_\_

Why do you think this?

For those of you who have covers over your buttons: If you are given the opportunity on the third trial to remove the covers from your buttons, would you choose to do so? Yes No (circle one)

Questionnaire given to subjects with non-visible resources, after false offers had been given to visibles, Trial 2.

1. Did you see any advantage or disadvantage (circle one) in having covers over your buttons? What kind of advantage or disadvantage?
2. What do you think would be the long term effects of having covers on your buttons, if you continued to play for several trials?

Note: On the questionnaires given to subjects, there were no references to identify the questionnaires as being for visibles only, or for non-visibles only. Sufficient space was provided for replies.

APPENDIX III

EXPERIMENTAL INSTRUCTIONS AND

QUESTIONNAIRES USED IN SET B

The instructions used for Set B were administered by means of a cassette tape recorder, while subjects read a transcript of the tape.

Below is a copy of the transcript given to each subject in Set B.

Thanks for turning up to take part in the experiment.

You are going to play a game called "Exchange and Build", and as the name suggests, there will be two parts to it. The instructions I'll give you now will only be concerned with the first part, and we'll forget about the second part until later.

Exchange and Build is the sort of game in which some of you may do better than others. You should try to do as well as you can. At the end of the second part of the game, the four players who have done the best will be declared the winners. While you may find it a bit difficult to see how well you are doing during this first part of the game, you will be able to see this more clearly during the second part.

During this part of the game, you are going to be trading, or exchanging buttons with one another, and the objects of the first part is to build up the small pile of buttons in front of you, without losing too many buttons from the large pile you have. In other words, the object is to increase the number of buttons of which you have the least at the moment, but not lose too many of the colour of which you have the most.

Now, you'll need to do this because in the next part of the game the two colours are used for completely different purposes. You will need buttons of both colours, red and green, in the next part; that is, both colours are valuable. You are all beginning with some red and some green buttons. How many you have of each colour is written on a small card on the lower bar of your screen (inside).

As you can see, half of you have your buttons out where everyone can see them, while half of you have covers over your buttons. I'll stop for a few seconds while you look through your screens. The players out in the open have a sign on the outside top of their screens, that shows you exactly how many red and how many

green buttons they have. The covers have been placed on four other booths so that you will not know how many buttons these players have. I can tell you that none of these players has a total wealth of 1,200 buttons. That is, one of them has the same number of buttons as the players without covers -- some of them have a larger total number of buttons (more than 1,200), and some have a smaller total number (less than 1,200). You can, however, tell which colour players with covers have most of, by the ticket on the upper right hand corner of their booths -- for example, a red ticket means that player has more red buttons than green ones.

If you'll look at the table on the side of your screen, you will notice that there are two columns of figures there. The column of figures on the left refers to different sized piles of buttons of a given colour. The column of figures on the right tells you how much these different sized piles of buttons of a given colour will be worth in the next part of the game. So the column of figures on the left tells you how many buttons, and the column on the right indicates values. O.K.?

Now if you look closely at the figures in the columns, you will notice that the figures on the left increase by 20 at a time -- so they go 20, 40, 60, 80, and so on right up to 1,600. The figures on the right, however, increase in big jumps to begin with, and the jumps get smaller and smaller as you go from the bottom to the top of this column.

Because the figures in the two columns increase in different ways, the table tells us two very important things. The first thing it tells you is that if you've already got a lot of buttons of a given colour, 20 more would be worth less to you than if you only had a few buttons of that given colour. Let me show you how this works.

Say you had a pile of 1,080 green buttons. You can see that a pile of 1,080 green buttons would be worth 2,300 value units in the next part of the game. Now, if you got 20 more buttons (green ones), this would bring you up to 1,100, and a pile of 1,100 buttons is worth 2,320; so that you would have gained 20 value units. If you only had a pile of 200 green buttons to begin with though, and you got 20 more, you'd find that 200 green buttons (what you started with) is worth 1,000 value units in the next part of the game, and a pile of 220, that is, the 200 plus 20 more, is worth 1,050. So the 20 extra in this case would be worth 50 value units.

Once again, the first point is that the more buttons you have of a given colour, the less worth 20 extra would be. This is like saying that \$20 is worth less to a millionaire than, say, to a person on welfare.



The second thing the table tells you is that if you have a lot of buttons of one colour, and only a few of the other colour, you will actually increase the total worth of your buttons every time you exchange some of the buttons of which you have most, for some of the buttons of which you have the least. Let me show you how that works.

If, say, you had 1,200 green buttons: you find they are worth 2,420 value units in the next part of the game. O.K.? And if that was all you had, you decide to exchange some of the green buttons for some of the red ones, so you might end up with perhaps, 600 green buttons, and 600 red ones. And you find that a pile of 600 buttons would be worth -- well, have a look on your table -- 1,730 value units. So your buttons would be worth 1,730 for, the green pile, and 1,730 for the red, so that the total worth of your red and green buttons would be 3,460 value units. Whereas the pile of 1,200 green buttons alone was worth 2,420, two piles, one of green and one of red (600 each) would be worth 3,460.

To emphasize this second point then, you actually increase the total worth of your buttons by exchanging. As I will explain in a minute, there is nothing in the rules that says you have to trade an equal number of buttons of one colour for an equal number of the other colour. Depending on who you are trying to trade with, you may choose to offer more, or less than you want in return.

I'll just run through the steps involved in the single opportunity for exchange now, to give you a better idea of what you are going to be doing during each opportunity for exchange. You will have just five of these opportunities -- I'll repeat that -- five opportunities, to make trades.

First of all, you'll look through your screens to remind yourselves what others have, or what their predominant colour is, and decide who you want to send an offer to. You do not have to send an offer during each opportunity for exchange if you do not want to. The letters printed at the top of your screens are to identify you.

If you decide that you want to send an offer, then fill out one of the forms in front of you, remembering one thing: you cannot send an offer of more than the limit that is written on the card on the lower bar of your screen. This means that you can offer anything up to but not over 100 at a time. There is, however, no limit on what you can give in return for an offer someone makes to you. There is only a limit on how many you can offer at a time. x give

Once you have decided what you want to do, fill out a form, count out the buttons, and put both the form and the buttons in the bowl in front of you. When everyone has done this who wants to, I will deliver all the bowls to the players they are addressed to -- that is, to the booth they are addressed to. It is clear that while your bowl is around at someone else's booth, either one or more bowls can come around to you, or perhaps none will. You can accept one but only one. Let me emphasize that -- if you receive more than one offer at a time, you cannot accept them all -- you must choose one. If you accept an offer, circle 'Accepted' on the form that came with the bowl. Any other offers that you receive and decide not to accept, circle 'Rejected' on the forms that came with them. There is also a place for you to check a reason for rejecting an offer. This lets you tell the person who sent the offer whether you would accept a better offer, or whether you have decided not to deal with him. You may check one of these reasons if you wish. Please do not write any other messages on the forms. You may reject all the offers you get if you choose to do so. If you happen to get an offer from the same person you sent one to, remember that they are separate and independent -- reply to the offer you received, and don't worry about the one you sent.

When everyone has checked their forms, I'll ask those who have circled 'Accepted' on an offer to take the buttons that came with that offer, and to count out the buttons that they were requested to give in return. Put these buttons in the bowl. I will then return the bowls to their owners. And we will then be ready to begin the next opportunity for exchange.

This first part of the game will take more time than the second, and you will have enough time to make up to five exchanges.

I'd like to ask you too, please not to cheat when you are counting out the buttons, and to observe the limit of 100 on what you can offer.

If you would like to look through your screens now, decide if you want to send an offer to any of the others during the first opportunity to exchange, we can begin.

End of instructions, Set B.

Appendix III: Set B

Questionnaire given to all subjects after they had made Trial 1 offers.

Questionnaire No. 1

Your letter \_\_\_\_\_

1. Who did you just make an offer to? G H I J K L M N (circle one)
2. What was the offer? \_\_\_\_\_ buttons offered for \_\_\_\_\_ buttons  
red red  
green green
3. Did you offer to a person with a cover or without a cover on his buttons? no cover cover (circle one)
4. Why did you choose the person you did?
5. What is the main reason for the size of offer that you made?
6. How likely do you think he is to accept your offer? (Circle the position on the line below that shows how likely you feel it is that your offer will be accepted)

/	/	/	/	/
Extremely	quite	50-50	not very	not at all
likely	likely	chance	likely	likely

What are your reasons for thinking this?

7. Do you know anyone else who would be more likely to accept your offer?  
YES NO

If you said YES, who do you think is more likely to accept? \_\_\_\_\_

Why do you think this?

Questionnaire for subjects with visible resource piles, delivered after replies to false offers on Trial 1 were collected.

Questionnaire No. 2: Visibles

Your letter \_\_\_\_\_

1. If you accepted an offer on the first trading opportunity: What was your main reason for accepting the offer you did?

2. If you rejected an offer(s) on the first opportunity, what was your main reason for doing so?
3. There are probably advantages and disadvantages to having your buttons out in the open.  
What do you see to be the advantages?  
What do you see to be the disadvantages?
5. If you are given a choice after the second exchange opportunity, of having the covers removed from those players who have them, would you choose to have this done?      YES      NO      (circle one)

Why?

Questionnaire for subjects with non-visible piles, given after replies to false offers on Trial 1 were collected.

Questionnaire No. 2: Non-Visibles

Your letter \_\_\_\_\_

1. If you accepted an offer on the first exchange opportunity: What is the main reason for accepting the offer you did?
2. If you rejected an offer(s) on the first opportunity, what was your main reason for doing so.
3. There are probably advantages and disadvantages to having covers over your buttons.  
What do you see to be the advantages?  
What do you see to be the disadvantages?
4. If you are given a choice after the second exchange opportunity in this game to remove the covers from your buttons, would you choose to do so?      YES      NO      (circle one)

Why?

Note: On the questionnaires given to subjects, there were no references to identify the questionnaires as being for visibles only, or for non-visibles only. Sufficient space was provided for replies.

X

## APPENDIX IV

## PILOT WORK

The results and analysis of Set A indicated that changes in the paradigm were necessary to eliminate the confounding of wealth and visibility, so that the effects of visibility alone could be examined. It also seemed desirable to ensure more consistent motivation in subjects concerning advantageous exchanges. The variability in motives in Set A seemed at least partly due to the complexity of the instructions, which were important for the induction of scope conditions, assumptions and independent variables.

A first attempt to remedy the problems of Set A will be described briefly in this Appendix. A second and more successful attempt was presented as Set B.

The revision of the paradigm in this Pilot work unfortunately introduced added factors that made it an inadequate test for the theory. These factors will be discussed in the context of the results. The data from the Pilot study are given here because they were informative in terms of the limits of the theory, and suggested further revisions that led to Set B.

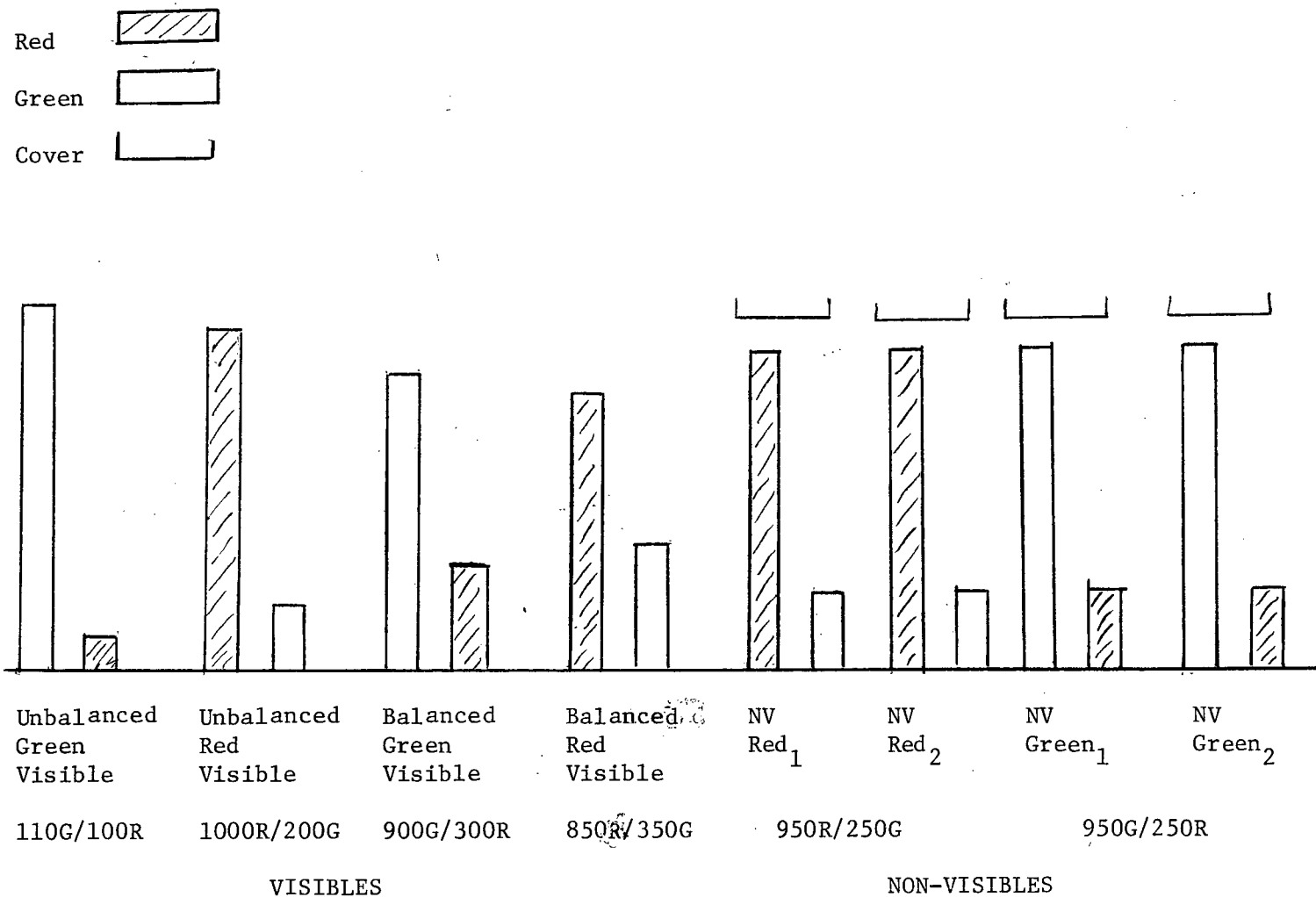
Description of the Experiments

The same physical set up was used as in Set A. This time, instead of different resource bases, all subjects had equal sized total resource bases (1,200 buttons). The ratios of red to green varied across subjects, so that their value positions on the two resources were not the same, as shown in Figure A.6.

Note that the value positions of non-visibles were different from those of visibles. If the non-visibles knew they were unlike any visible, it was expected they would also be uncertain about the numbers and ratios of red and green possessed by other non-visibles. Their value positions on the red and green buttons were set between those of the unbalanced and the balanced visibles. If non-visibles did use their concealment to 'act like' the visibles, they would have a model, in the balanced visibles, of a fair offer that asked for more buttons in return for less. In addition, the experimenter could compare offers of non-visibles with those of the balanced visibles, to see if the concealed players acted 'as if' they were balanced visibles.

A value chart similar to that used in Set A was employed (see Appendix I).

Figure A.6 Distribution of resources and information in Pilot Set



Visible subjects had cards on the outside of their booths, showing the exact amount of each colour in their possession; subjects were told that the coloured tags on the non-visibles' booths indicated those persons' predominant colour, and that the non-visible players might have more, or less, or the same, as visibles.

Instructions were tape recorded and subjects were given a transcript of the tape to read as the tape was playing. The instructions were essentially the same as in Set B.

In addition to the elimination of differences in total resource bases, described above, the major differences of this Set from Set A were:

- 1) A time limit was imposed. Subjects were told they had only four opportunities (trials) on which to make trades, so that they would not feel free to spend too much time 'exploring', (to reflect the fact that in the 'real world', wasted initiations are costly). In fact, the time limit gave subjects close to balance (balanced red visibles and balanced green visibles) a game advantage.
- 2) The addition of a paragraph in the instructions that told subjects that four winners would be declared at the end of the second part of the game, and these winners would be the four 'who had done best'. These instructions were intended to increase the importance of outranking others, and to make the definition of the situation more uniform.
- 3) False offers were switched for the real ones after subjects had filled out their first initiations on Trial 1. Only visibles received phoney offers, in the following form:
  - each balanced visible received an offer of 100 for 100 from the other balanced visible, and from a non-visible with the complementary resource.
  - each unbalanced visible received an offer of 100 for 100 from the other unbalanced visible, and from a non-visible with the complementary resource.

Thus, each visible received two false offers that differed only in the visibility of the sender.

- 4) While subjects were responding to these false offers, the experimenter checked the word 'rejected' on all offers made on Trial 1. In addition, the phrase 'offer not good enough' was ticked on initiation forms of the visible subjects, and the phrase 'don't want to deal with you' was checked on the non-visibles' offers (see Appendix I, Figure A.3 for an illustration of the initiation form). It was intended that non-visibles should be encouraged to interpret their rejection as the result of their concealment, to see what behavioural adjustments they

would make in later initiations, and to compare their reaction to such a rejection with the reaction made by visibles. (A more informative procedure would have been to make some non-visibles believe they were being rejected on the basis of concealment, and some because of the types of offers they made.) After the responses to the phoney offers were collected, the experimenter switched back to the real offers, delivering rejection slips to all subjects. Players then made a second initiation, which was delivered as addressed, the recipients replied to them, and the replies were collected. The experiment then ended with a debriefing.

During the experiment, three questionnaires were administered (see the end of this Appendix), asking why subjects chose a particular target, why they accepted the offers they did, their perception of the advantages of concealment and lack of concealment, and their preference for retaining covers over the buttons. In retrospect, it seems that the written questions were excessive, and interrupted the flow of the exchange transactions.

### Results and Discussion of Results

The results for Hypothesis 1 were presented in the main text, and will not be repeated.

#### 1. Tendency to make advantageous exchanges: Hypothesis 2.

As with Set B, it is first necessary to define what constituted a fair exchange in terms of value units. In this set, those subjects with highly unbalanced resource piles gained more net value units in an exchange of  $k$  for  $k$  buttons on the first one or two exchanges, because an addition to their very small resource pile rapidly increased their marginal utility; the marginal cost of a decrease in their large pile was relatively much smaller than for players with more equal value positions on each resource. The unbalanced players should therefore have been willing to give more for less in the initial exchanges. For example, because the unbalanced green profile was the most uneven, and the balanced red profile was most even, a trade between these two would be fair only if the balanced red player received many more buttons than did the unbalanced green player.

A fair exchange was, of course, only definable if the target person had visible resource piles. In the table below, we will list the exchange ratios (number of buttons asked per 100 in return) that would have led to equality of profit in value units, and the obtained ratios for this set of experiments. The difference between the two ratios is included to give an indication of the size of deviations.



Table A.1 Fair Exchange Ratios and Average Exchange Ratios, for Initiations to Visibles  
(Pilot Set, Trial 1)  
(Figures give number offered per 100 asked)

<u>Initiator</u>	<u>(n)</u>	<u>Recipient</u>	<u>Fair Ratio</u>	<u>Average Obtained Ratio</u>	<u>Difference (Obtained-Fair)</u>
<u>1. Visibles</u>					
Unbalanced Green	10	Unbalanced Red	125	92	-33
	2	Balanced Red	200	103	-97
Unbalanced Red	8	Unbalanced Green	80	78	- 2
	4	Balanced Green	125	97	-28*
Balanced Green	7	Unbalanced Green	80	82	+ 2
	2	Balanced Red	105	105	0
Balanced Red	8	Unbalanced Green	50	74	+24
	2	Balanced Green	95	83	-12
<u>2. Non-visibles</u>					
Green	15	Unbalanced Red	85	87	+ 2
	5	Balanced Red	117	96	-21
Red	14	Unbalanced Green	60	83	+23
	7	Balanced Green	110	88	-22

While the subjects' offers did not uniformly meet the definition of fairness, in terms of equal profit in value units for trading partners, neither were they uniformly following a prominent rule of 'one button for one button' as indicated in the deviations of the ratios from the ratio of 100/100. In the case of the balanced visibles, in particular, the ratios of the number offered to number asked seems to reflect their lower marginal gain for a given increment of buttons, (due to their more balanced resource piles). The nearness of the unbalanced green visibles' ratios to 100/100 probably reflects a reluctance to give up more than one gives away, given the game urges them to 'do well'. In addition, such a result is not inconsistent with studies of equity, indicating that people are less likely to restore an exchange relationship to balance when Other should get more, and P must give up rewards, than if P is the one who will benefit from equity. The unbalanced visibles may have perceived that so generous an offer as two for one was not necessary to ensure a transaction. Conversely, the balanced red visibles undoubtedly realized they would be unlikely to obtain two for one from the unbalanced green visibles. Their exchange ratio is lower than 100/100, which seems to indicate a tendency for P to consider what O had when deciding how much to offer and request in return. Initiations to the balanced subjects showed a higher exchange ratio (were more generous) than to most others, indicating that other players recognized the 'right' of the balanced players to demand more. (Both unbalanced visibles and other subjects mentioned in written comments that the unbalanced players were the most 'desperate'.)

In Table A.1, the overall exchange ratios are ordered according to the ordering if all were 'fair': balanced visible < non-visible < unbalanced visible ( $81 < 87 < 89$ ).

However, it is also clear from Table A.1 that non-visible subjects did not try to ask for an advantageous exchange more than did the visibles. They were expected to send offers that would lead the recipient to think they were similar in resource profiles to the balanced visibles. Only the ratio of offers to balanced visibles looks advantageous (less than the 'fair' ratio), and this is probably due in part to the low frequency of any ratios greater than 1.0. The results do not support Hypothesis 1. Possible reasons for this will be discussed after the results for the other hypotheses have been given.

It should be noted that while subjects seemed to pay attention to marginal value of buttons in assessing the fairness of an exchange, there is a confounding of fairness in a single exchange, and in the entire game. Subjects in the experiment, being all of equal total wealth, may have seen their exchanges in terms of the final outcome when everyone had balanced their piles of buttons. Recall that balancing, or trading until a total resource base of  $k$  units had  $k/2$  red and  $k/2$  green buttons (i.e., equal value positions on each resource) would maximize the value of a fixed resource base. In addition, an absolute increase in the size of the total resource base (i.e.,

making it more than 1200) also increased total utility, while a loss of buttons (leading to less than 1200) decreased total value units. Thus, to give up more than one received reduced one's chance of being a 'winner' at the end. Consequently, any offer asking for more than it offered could, in a game sense, but not in a single exchange sense, be seen as an attempt at advantageous exchange.

While this tension between a strategy appropriate for a single exchange and for the entire game existed in all the sets, it was particularly acute in this set, due to the small number of opportunities for exchange, the closeness of some subjects to balance, and the length of the experiment. (The added time spent on the lengthy questionnaires may have made subjects perceive it unlikely they would even have time for four trials.) The presence of the balanced visibles focussed attention on the end-game, and probably interfered with comparisons of profit.

## 2. Direction of Initiations: Hypothesis 4.

Hypothesis 4 predicts that more initiations will be directed to visible subjects than to non-visible subjects. The data relevant to the fourth hypothesis are given in the table below.

Table A.2 Direction of Initiations on Trial 1, by Visibility of Initiator and Target  
(Pilot Set)

<u>Initiator</u>	<u>Recipient</u>		<u>Total</u>
	<u>Visible</u>	<u>Non-Visible</u>	
Visible	43 (.77)	13 (.23)	56
Non-visible	<u>41 (.73)</u>	<u>15 (.27)</u>	<u>56</u>
Total	84 (.75)	28 (.25)	112

$H_0$ : Visible and non-visible receive equal proportions of offers. Binomial test, one-tailed,  $Z = 5.1$ , ( $Z_{crit} = 1.65$ ,  $p = .05$ ). Reject  $H_0$ .

On the basis of these data, we may reject the null hypothesis that non-visibles are as likely as visibles to receive offers.

The Trial 1 offers met with artificial but universal rejection, and by the second Trial, the direction of offers changed dramatically. This result is shown in Table A.3 which gives the overall direction of initiations by visibility.

Table A.3 Direction of Initiations on Trial 2, by Visibility of Initiator and Target  
(Pilot Set)

<u>Initiator</u>	<u>Recipient</u>		<u>Total</u>
	<u>Visible</u>	<u>Non-visible</u>	
Visible	24 (.43)	31 (.57)	55*
Non-visible	<u>21 (.37)</u>	<u>35 (.63)</u>	<u>56</u>
Total	45 (.40)	66 (.60)	111

\* One balanced visible made no offer on Trial 2.

To test whether .60 is significantly greater than .50, binomial test gives  $Z = 2.17$ , ( $Z_{crit} = 1.96$ ,  $p = .05$ , two tailed.)

(Note: Strictly speaking, the events in Trial 2 are not independent of those on Trial 1, and if one argues that initiations to visibles are affected by the expectation of many offers going to visibles on the second as on the past trial, then a binomial test is not justified here.)

More visibles changed to a non-visible after rejection than in Set A, but this is probably partly due to the fact that the visible who had not been initiated to on Trial 1 was usually the balanced visible, who was undesirable because of his game advantage. The change from Trial 1 to Trial 2 was dramatic -- a drop of 35% in the initiations to visibles. The preference for dealing with a player whose resources could be seen, seemed in large degree to depend on the success of such initiations. In Set A, we noticed a similar shift by the non-visibles away from visibles when they were rejected, while the visibles maintained a high level of initiations to visibles, when the real offers had been delivered on Trial 1, and the majority of acceptances went to visibles. Rejection, especially of a fair offer, probably lowered the perceived probability of acceptance enough to make the previously uncertain deal with a non-visible seem more desirable in this Set. In the experimental context, arranging an exchange with a partner about whom one has no information was preferred to no exchange at all. This is consistent with the theory. The rapidity of the shift is somewhat surprising.

### 3. Acceptance of False Offers

Hypothesis 5 predicts that, all other things equal, subjects will prefer to accept an offer from a visible, rather than an offer from a non-visible.

The false initiations of 100 for 100 were delivered after subjects had made their offers on Trial 1. Table A.4 shows that, unlike the results for Sets A and B, there is not a strong preference for offers from visibles in this case.

Table A.4 Acceptance of False Offers by Visibles, Trial 1  
(Pilot Set N=56)

<u>Accepts Offer From</u>	<u>Recipient</u>	
	<u>Unbalanced Visible</u>	<u>Balanced Visible</u>
Visible	15 (.53)	10 (.36)
Non-Visible	13 (.47)	15 (.53)
Neither	0	3 (.11)

The most frequently mentioned reasons for deliberately rejecting visibles were that the balanced visibles wanted to hinder the progress of the other balanced visible (6/15). Unbalanced visibles seemed less concerned with how the person they accepted was doing, except that when unbalanced visibles accepted visibles, then they referred to a preference for knowing how Other was doing (6/15). Some unbalanced resource players also mentioned that they did not accept the same person they had initiated to (usually a visible), because they wanted to set up as many partners as they could -- that is, if they offered to one and accepted another, they had two instead of one partnership to draw on for future exchanges.

The data for acceptance of false offers do not lead to an unambiguous interpretation. The similar proportions of acceptances of visibles and non-visibles may reflect indifference on the part of subjects; or it may indicate individual differences in attitude to uncertainty. Subjects' comments never mentioned indifference, as they sometimes did in Set B. However, for the 26 visibles whose comments referred only to their own gain or benefit as the reason for accepting one of the phoney offers, 19 had accepted non-visibles. Acceptance of a visible offer tended to be accompanied by more references to Other's profit.

On Trial 2, acceptances favoured non-visibles, both because they made more generous offers (these were not intercepted), and because subjects were unwilling to accept subjects who had rejected them on Trial 1 (mainly visibles). The average exchange ratio for non-visibles on Trial 2 was 105 (111 for offers to visibles), compared with a ratio of 87 for offers made by balanced visibles, and 92 for those made by unbalanced visibles. By the beginning of Trial 2, no non-visible had either received an offer or had one accepted, and the improved ratios probably showed an increased concern with getting

into exchanges during the remaining three trials. Table A.5 shows the pattern of acceptances on Trial 2.

Table A.5 Relative Frequencies of Acceptance of Real Offers on Trial 2, by Value Position and Visibility of Initiator and Target (Pilot Set' N = 111\*)

<u>Initiator</u>	<u>Recipient</u>			<u>Total</u>
	<u>Unbalanced Visible</u>	<u>Balanced Visible</u>	<u>Non-Visible</u>	
Unbalanced Vis	4/8	1/4	10/16	15/28 (.54)
Balanced Vis	2/9	1/3	7/15	10/27*(.37)
Non-Visible	8/12	6/9	24/35	38/56 (.68)

\* One balanced visible made no offer on Trial 2.

If these acceptances are compared with Trial 1 in Set A (which also ran naturally), we see that the balanced visibles have about as large a proportion of offers accepted as the non-visibles in Set A.

#### 4. Discussion

Why did the changes in the paradigm produce results so different from those of Sets A and B? Let us try to imagine how the players saw the game in this set. Since all had equal resource bases (1200 buttons), subjects were basically all peers -- all comparable, with an equal 'right' and equal chance at winning. However, two players, the balanced visibles, had been given a head start in reaching the stated game goal of balanced resource piles. In two respects, they were undesirable exchange partners: because their initial prices were high relative to what the unbalanced players could demand; and because any trade they arranged would move them even further ahead of the others. (Balanced visibles did in fact ask for more than they offered, as shown in Table A.1.) While there is nothing in principle wrong with having some visibles who were relatively less desirable partners (see Hypothesis 1), the position of the balanced visibles made them not second most preferred, but least preferred, especially in light of the sorts of offers they made. As a result, though the experimental design was intended to make subjects differ only in the ambiguity of the information available about them, the nearness of some players to balance tipped the assessment of expected value of an exchange in favour of the non-visibles over the balanced visibles.

Balanced visibles could, by trading at a fair rate in terms of value units, quickly balance their resource piles, and finish with more than the other players. With the small number of trading opportunities, the only way the balanced visibles would not win was if no one traded with them. While unbalanced and non-visible players could refuse to go along with the advantageous (in a game sense) offers made by balanced visibles, and to make offers to them that did not give them an increase in total resources, this was to some extent a violation of how they saw the social prices in the game. An even more effective strategy was to refuse to initiate to or to accept from a balanced visible at all. In addition, fellow balanced visibles seemed to single each other out as the man to beat, and they competed not only by rejecting each others' offers, but also by refusing to initiate to each other. As a result, initiations to non-visibles increased, contrary to prediction.

If trading continued for several trials, one would have expected that the less advantaged players would trade until they were in a similar position (value position) to the balanced visibles; only then would the original balanced visibles be acceptable partners. At this point, the theory would probably make better predictions, because then no one could see exactly where the non-visibles stood, and would want to avoid trading with them. Non-visibles might, at this stage, be avoided 1) to avoid unfair exchanges (i.e., one would be aware that resource positions had been moving toward balance, and be even more uncertain as to whether a non-visible was demanding a fair price; and 2) to avoid situations in which a trade gives a non-visible a further lead. The nearness of a visible to balancing could be monitored, and even a generous offer refused if it seemed the initiator might win as a result of the transaction.

But why did subjects not fear that the non-visibles were balanced to begin with? The main cue was in the type of offer received from non-visibles:

- Trial 1: a 100/100 offer (phoney) was probably not read by subjects as indicative of a player with balanced resources, especially if subjects compared it with offers they themselves had sent.
- Trial 2: non-visibles actually did make the most generous offers (average ratio of advantage was 105 overall, versus 92 for unbalanced visibles, and 87 for balanced visibles).

Given the time limit, unbalanced visibles and non-visibles had to concern themselves initially with 'getting going'; that is, they may have been more concerned with the probability of acceptance, which was evidenced by their more generous offers. This concern, and the tendency to focus on the balanced S's as competition, drew attention away from comparison with others. As a result, scope condition 4 may not have been met.

The theory predicted that when the non-visibles were rejected because Other 'did not want to deal with them', they would want to reveal information about their resources. Before they could get to thinking this, they received a deluge of offers in reaction to the Trial 1 rejections, so that they had fewer reasons to reveal information, especially since they perceived the covers would hide their progress toward balancing.

Given equal total wealth, and caution on the part of the players, no strategy was likely to advance anyone very far ahead of others in this game. In fact, the situation was a vivid illustration of norms as a 'coalition of actors', as Emerson argues.<sup>2</sup> Fairness will be maintained because no one will put up with the loss involved in yielding to an attempt to gain advantage, as long as there are alternatives available. While the theory argues along these lines, the experiment failed to anticipate who would be perceived to have the advantage.

In terms of the predictions made about attempts at advantageous exchange, it is probably reasonable to say that the present theory is most applicable to the initial phases of exchange interactions -- to the initial attempts made at impression management, when P attempts to limit the range of alternative responses open to Other. The more accurate the information P has about O, but not vice versa, the more P will believe he can have an effect on the definition of the situation. As interaction continues, or if we 'cut in' on interaction at a later stage (as it seems the Pilot set design does), the real bargaining and power advantages, if they exist, will have become more apparent, and have a greater effect on the course of interaction.

To summarize: The Pilot set was considered an inadequate test because: the short time limit made players overly conscious of end-game effects. This interfered with and operated in opposition to a comparison of relative marginal gain. Focus on the balanced visible as the man nearest winning may have led to a greater frequency of initiations to, and acceptance of, non-visibles, as a strategy for thwarting the leader until he could be caught up. It probably led the non-visibles to be more concerned with ensuring transactions, as they could not risk missing transactions, with the balanced visible nearing equalization of his resources. Thus, the opportunity to choose between more and less uncertain alternatives with equal expected utility was not provided adequately, and the predictions about preference between such alternatives could not be properly tested.



## FOOTNOTES: APPENDIX IV

1. Ellsberg, and MacCrimmon found that only a minority of subjects seem to prefer the less ambiguous alternative when rationality postulates indicate they should be indifferent between a risky and an uncertain alternative. The proportion avoiding uncertainty seems much larger in this experiment, perhaps because the source of the uncertain information is less reliable in the present study. See: D. Ellsberg, 'Risk, Ambiguity, and the Savage Axioms', *Quarterly Journal of Economics*, 75, 1961, pp. 643-69; and K.R. MacCrimmon, 'Descriptive and Normative Implications of the Decision-Theory Postulates', in K. Borch and J. Mossin, Editors, Risk and Uncertainty, London: MacMillan, 1968.
2. R.M. Emerson, 'Exchange Theory: Part II', in J. Berger, M. Zelditch, and B. Anderson, Editors, Sociological Theories in Progress, Volume II, Houghton-Mifflin, 1972, pp. 85-86.



2. There are probably advantages and disadvantages to having your buttons out in the open.  
What do you see to be the advantages?  
What do you see to be the disadvantages?
3. If you could begin the game again, would you prefer a game in which everyone had their buttons out in the open, or where everyone had covers over their buttons?      open \_\_\_\_\_ covers \_\_\_\_\_  
  
Why?
4. Which players do you think have the best chance of doing well in this part of the game? G H I J K L M N don't know

\*Note: Questionnaire #2 for non-visibles was the same, except for one extra question asking the non-visibles if they would choose to remove their covers.

Questionnaire given to visibles after reply to Trial 2 offers.

Questionnaire #3

Your letter \_\_\_\_\_

1. If you accepted an offer on the second trading opportunity: What was your main reason for accepting the offer you did?
2. Do you still see the same advantages in having your buttons out in the open?                      YES                      NO

What other advantages do you see?

Do you see the same disadvantages still?                      YES                      NO

What other disadvantages do you see?

3. If, after the second exchange opportunity, you were given the choice of having the covers removed from those players who have them, would you choose to have this done?                      YES                      NO

Why?

Questionnaire given to non-visibles after reply to Trial 2 offers.

Questionnaire #3

Your letter \_\_\_\_\_

1. If you accepted an offer on the second trading opportunity: What was your main reason for accepting the offer you did?

2. Do you still see the same advantages in having covers over your buttons?                      YES                      NO

Do you see any other advantages? What are they?

Do you still see the same disadvantages in having covers?

YES                      NO

What other disadvantages do you see?

3. If you are given a choice after the second exchange opportunity in this game to remove the covers from your buttons, would you choose to do so?

YES                      NO

Why?

Note: On the questionnaires given to subjects, there were no references to identify the questionnaires as being for visibles only, or for non-visibles only. Sufficient space was provided for replies.

## APPENDIX V

## DATA REFERRED TO BUT NOT INCLUDED IN MAIN TEXT

Table A.6 Types of Offers by Resource Level and Visibility of Initiator, Set A (reference: Hypothesis 1)

TRIAL I

N = 112 for all resource levels

N for highs = 56

<u>Initiator</u>	<u>Asks same as offers</u>	<u>Asks more than offers</u>	<u>Asks less than offers</u>
High visible	18	5	5
High NV	<u>14</u>	<u>8</u>	<u>6</u>
Total	32	13	11

$$\chi^2 = 1.28 \text{ df} = 2, \text{ n.s.}$$

Collapsing first and third categories (equal and less), for comparison with offers asking more than is offered, Z for differences of proportions is .21, n.s.

N for lows = 56

<u>Initiator</u>	<u>Asks same as offers</u>	<u>Asks more than offers</u>	<u>Asks less than offers</u>
Low visible	14	8	6
Low NV	<u>12</u>	<u>12</u>	<u>4</u>
Total	26	20	10

$$\chi^2 = 1.35 \text{ df} = 2, \text{ n.s.}$$

Collapsing first and third categories for comparison with offers asking more than is offered, test for difference of proportions, Z = 1.2, significant at .11 level.

Comments on Table A.6

As noted in Chapter 3, subjects did not know the exact size of the visibles' resource bases, so could not precisely define a 'fair' exchange. Still, we expect low resource persons to have offered less for a given return than did highs. Because low non-visibles are entitled by virtue of a small resource base to ask for more buttons than they offered, it is of more interest to Hypothesis 1 if the offers of the high non-visibles resembled most those of the low visibles, or the high visibles. By modeling their offers on what would be a fair transaction between a low and a high, the high non-visibles could potentially gain much more than a high visible partner.

Although the results were in the predicted direction, fewer subjects made advantageous offers than did subjects in W. Foddy's experiments, in which all subjects were visibles. Because the results in Set B generally supported the theory, it seems likely that part of the failure of Hypothesis 1 is due to operationalization failure. More specifically, the uneven effectiveness of the marginal utility manipulation, an inability to make exact comparison of profits, and a variable desire to do better than others, probably contributed to an incomplete fulfillment of the scope conditions, making Set A an inadequate test for Hypothesis 2.

Table A.7 Raw Data from Questionnaire Given after Subjects had Replied to False Offers (See Appendix III Questionnaire 2 for Questions) (Reference: Hypothesis 3)

SET BI - HIGH NON-VISIBLES' PERCEPTION  
OF COVERS AFTER TRIAL 1

I. ADVANTAGES (n = 27)\*

Subjects' comments:

- others can't see if I'll give more for less
- can bluff and draw up a bid
- fool others into bidding higher
- others make better offers, can't see how likely I am to accept
- bargaining power
- others can't see I'm rich and trying to get an advantageous trade
- people take chance on you, don't ask too much
- no one knows how badly I want buttons
- keeps others guessing
- see visibles' weaknesses, hide my strength
- others can't see how badly I want to get rid of red so I don't have to give up so much
- I know more, easier to decide
- if other unsure, he may offer more than he asks, I have the edge of uncertainty
- no one knows how many you have
- see where visibles stand, they can't see me
- no one sees your hand, gain security
- no one sure I have more than 1,200
- no one sees my total - like to keep it secret
- others can't tell how large a surplus I'm maintaining
- no one can stop non-visibles from obtaining a high score
- others don't know actual numbers I have
- others don't know my amounts
- others can't see me balance
- no one can see how many chips I have
- others can't see what I have and will trade as visibles balance
- others may try us if they think we have a lot
- people who are hard up will offer.

\* Note: One subject gave no answer.

Table A.7 (Continued)

## II. DISADVANTAGES (n = 21)\*

Subjects' Comments

- people like to make offers knowing relative amounts of buttons
- others are suspicious
- others are afraid to exchange
- others may not trade
- others reluctant to trade if they can't see
- not enough interest in trading with me
- may get fewer offers
- others more likely to deal with visibles
- others won't offer to covereds
- others unsure about trading with you
- others may be unwilling to offer
- others may be less willing to deal
- may get fewer offers due to uncertainty with respect to what I'll accept
- can't see how far other covered ones will go in trades
- may get fooled by a non-visible
- can't see non-visibles
- non-visibles may have less than 1,200 and won't be seen
- can't tell if offer will work if don't know what opposition has
- can't make sure offers
- confusion over covert, undefined deals
- others can't see how much I want to trade.

\* Note: 7 subjects gave no answer, or said "none".



Table A.8 Raw Data from Questionnaire Given after Subjects had Replied to False Offers (See Appendix III Questionnaire 2, for Questions) (Reference: Hypothesis 3)

SET BII - LOW NON-VISIBLES' PERCEPTION  
OF COVERS AFTER TRIAL 1

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I. ADVANTAGES (n = 24)\*

Subjects' Comments

- others will offer better deals if they can't see me
- others can't see what I gain, and they may be curious
- no one knows what would be fair to get from me
- no one knows how desperate you are
- visible players may lose in speculation with ones they can't see
- can see what visible players will trade, they can't see me
- people can't see how you profit each round
- others think you are anxious to trade
- no one is sure about me
- others don't know what buttons are worth to me
- others can't tell my vulnerability
- others may make better offers
- no one sees what I have, so will make better offers
- see how others do; they don't know my rank
- others can't see how I do; don't know my wealth
- people can't see how much I have
- no one knows my position
- no one knows how close you are to them
- others can't see how you're doing
- others can't see how I've traded; I like to be independent of others' knowledge
- no one knows my true position, I can gain in secrecy
- others can't see if I balance
- people may trade if competing with visibles
- get more offers, can pick and choose.

\* Note: 4 subjects gave no answer, or said "none".

Table A.8 (Continued)

## II. DISADVANTAGES (n = 20)\*

Subjects' Comments

- others reluctant to deal
- others may think I'm doing too well
- others don't know what to ask and offer
- others may not deal; visibles have more choice
- uncertainty
- others scared to deal with me
- people reluctant to deal
- others may think I'm doing too well - no offers
- others less likely to deal with covered person
- others may suspect I'm a threat
- others unwilling to deal
- get fewer offers
- don't know how covered players are doing
- can't see bargaining power of non-visible
- I can't see how covered players are doing
- unsure about hidden players
- can't see what hidden players have and so I must be aggressive
- can't tell what invisible ones have
- if you have less than 1,200, have nothing to hide -- people think I'm cheap, not poor
- others may feel I'm not anxious to trade.

\* Note: 8 subjects gave no answer, or said "none".

Table A.9 Raw Data from Questionnaire Given after Subjects had Replied to Offers (See Appendix III, Questionnaire 2, for Questions)  
(Reference: Hypothesis 3)

SET B (I AND II): VISIBLES' PERCEPTION OF  
HAVING NO COVERS AFTER TRIAL 1

---

I. ADVANTAGES (n = 52)\*

Subjects' Comments

- get more offers if known
- people trade more willingly
- more likely to get offers
- everyone will deal
- people more likely to trade
- should get more offers
- others see what you have and may be more willing to trade
- others trade if they know where you stand
- visual enticement to trade
- others willing to offer if they see me
- others are freer to deal with me
- get offers
- people will trade
- more people will trade with uncovered ones
- people prefer known partners, afraid of covers
- get more offers
- others trade, see I'm willing
- more offers
- others more willing to trade
- get more offers
- people more willing to trade if they see what you have
- others are likely to offer
- others trade if they can see how I compare
- others will trade
- others prefer visibles
- others can see what to offer
- others know how much to ask for
- get more reasonable offers
- others have an idea of what is a mutually beneficial offer
- others see what you have to trade
- others know there is no risk in dealing with open ones -- prefer an open market

Table A.9 (Continued)

## I. ADVANTAGES (Continued)

Subjects' Comments

- others can tell what to offer
- others know what to ask
- others see my ratios
- others see I'm a potential partner
- others will trade as know what I'm doing
- people know what to offer
- people see what you have to trade
- others know my position, can assess mutual gain
- people know what trades I'll make
- I can see who is likely to trade
- if you watch, can see how other visibles have traded
- see what others in the open value, and when trade more profitable<sup>e</sup>
- see trading possibilities and who needs buttons most
- offer from a position of knowledge; can be more calculating
- know who to offer to in the open
- can see what others have
- can see how visible players do
- can see who will mutually benefit
- see open ones' need for buttons
- can see who is likely to trade
- can see who is in same position as I

\* Note: 4 subjects gave no answer, or said "none".

## II. DISADVANTAGES (n = 49)\*

Subjects' Comments

- others see my need, what I'll accept
- others will reject me, thinking I'll pay more
- others know what I'm doing and thinking
- others see how badly I need a colour
- others see how much I have of everything
- partners know what they can expect
- everyone knows what you have
- shows my wealth so I can't bid

Table A.9 (Continued)

## II. DISADVANTAGES (Continued)

Subjects' Comments

- others see what kind of deal I'll make
- covered ones can take advantage of me
- everyone sees what I need, no secrecy
- hidden ones can press visibles into a poor deal
- covered players can be more calculating
- others will ask too much and I'll accept
- can't conceal a trading advantage
- others know I have lots, can afford to pay
- others may get more than they offer
- others can adjust their bids if they see me
- can't bluff, have to trade even
- others know what I have
- covered players know more
- others ask too much
- others know how likely I am to trade
- hidden others can take advantage of my blindness
- can't make advantageous trade - others will refuse
- others try to take advantage of my need
- others see my need, offer less
- others know what I'll accept and take advantage
- others may exploit you
- other people know what you have
- others can see my rank and limit my chances
- can't see where the competition stands
- others see where I stand
- others won't deal as I balance
- fewer offers as I balance
- people see when I balance
- others see how you are doing
- others can block you if they see you do well
- covered players can keep open ones from winning
- others see my rank - unwilling to lower their position
- others know when to stop trading with you
- hidden ones can see to compete with me
- others avoid you as you balance
- competition can see you
- others see my success and try to hinder it
- no sense of mystery
- unknown is interesting
- no guesswork

\* Note: 7 subjects gave no answer, or said "none".

Table A.10 Set A - Perceived Probability That Trial 1 Offer will be Accepted  
Reference: Hypothesis 3)

N = 112

<u>Probability of Acceptance</u>	<u>Initiator</u>			
	<u>Visible</u>		<u>Non-Visible</u>	
	<u>all offers</u>	<u>advantageous offers only</u>	<u>all offers</u>	<u>advantageous offers only</u>
Extremely likely	11	3	12	11
Quite likely	31	4	27	6
50-50 chance	12	6	12	8
Not very likely	2	0	4	3
Not at all likely	0	0	1	0

For initiations asking for more than is offered, the modal category for both visibles and non-visibles is '50-50 chance'; the mode is one step higher over all offers. It would seem, then, that non-visibles are not more likely to anticipate a low probability of acceptance on the first trial, as predicted. The non-visibles have a slightly more pessimistic view about the possible success of an offer that asks more than it offers, but they make more of these offers, and when they ask for more, they tend to ask for a greater number more than do visibles.

Table A.11 Written Reasons Given by High Non-Visibles, Set BI, for Initiations to Visibles and Non-Visibles (See Questionnaire 1, Question 4, Appendix III)  
(Reference: Hypothesis 4)

I. High non-visibles' reasons for initiating to visible other (n = 12)

- can see his relative amounts of red and green
- his lot is uncovered - any visible would do
- felt no one else would choose him
- he will be willing to deal cheaply
- he wants red - can see what he will consider reasonable
- he will probably accept
- he has surplus of what I need - it benefits both
- he has excess - don't want to deal with covered
- he will be willing to trade
- prefer visible partner
- know he wants to trade some
- he has excess of red

II. Reasons for initiating to a non-visible other (n = 16)

- covered ones won't get so many offers so will accept mine
- he won't get offers but he can see what's going on
- might get a partner - he may deal
- he won't get bids so he is likely to accept
- he may have more than 1,200 and be willing to trade
- gamble: he may have more than visibles do
- felt he wouldn't get another offer
- everyone else will offer to a person in the open
- guessing what he has, and he will give me lots
- straight across from me
- feel he will get fewer offers
- chance he has more than 1,200 and will be receptive
- he has a red tag
- we each have what the other needs
- won't be on the defensive and will be willing to trade
- he has excess of red

Table A.12 Written Reasons Given by Low Non-Visibles, Set BII, for Initiations to Visibles and Non-Visibles (See Questionnaire 1, Question 3, Appendix III)  
(Reference: Hypothesis 4)

- I. Low non-visibles' reasons for initiating to visible other (n = 19)
- he has a lot, is likely to accept
  - he has a surplus, may accept uneven offer
  - I know he has red and how much
  - don't want to deal with covered
  - open ones probably have more than covered; he doesn't know what is fair
  - I can see how he gains, he has more
  - no answer
  - prefer to deal with visibles, he has lots; won't deal with covered
  - can see his excess
  - only one I can clearly see the wealth of
  - prefer to deal with open one - can see how he's doing
  - he has lots, and prefer to deal with visible
  - he can afford it
  - can't see how covered one does - impulse
  - can tell what he has
  - he has a lot; unsure what invisibles have
  - he won't get many offers
  - prefer to deal with person in the open
  - less risk, and he has an excess
- II. Low non-visibles' reasons for initiating to non-visible (n = 9)
- feeling him out
  - he may have the same as me and be willing to trade
  - he won't get offers, will trade
  - taking a chance he has a large number
  - directly across, in same spot as I am
  - testing to see if he is one of the players with a lot
  - he may have more than the visibles and be willing to trade
  - he will get few offers; high chance of accepting
  - hoping no one else will offer to him



Table A.13 Written Reasons Given by Visible Subjects, Set BI, for Initiations to Visibles and Non-Visibles (See Questionnaire 1, Question 4, Appendix III)  
(Reference: Hypothesis 4)

- I. Visibles' reasons for initiating to visible other ( $\bar{n} = 19$ )
- he has lots of green
  - complementary piles, know what to offer
  - we have what each other needs
  - he has a lot of ~~what~~ I want
  - we have what each other needs
  - he has a large number of green
  - he will gain as much as me; likely to accept
  - prefer open one - covered players may do too well
  - we both benefit; he has surplus
  - he has what I want
  - no risk; complementary profiles
  - he has an excess of what I need
  - large number of exposed buttons
  - we have what each other wants; prefer to act from knowledge
  - his numbers of buttons was known
  - closest to me, and visual enticement
  - he has a surplus and will part with some
  - he has red, needs green, will accept
  - complementary piles
- II. Visibles' reasons for initiating to non-visible other ( $n = 9$ )
- he may have too many
  - covered ones won't get offers, very likely to accept
  - he has an excess, and we both gain
  - can take a chance on first round
  - to see if he has more than 1,100
  - he will get few offers
  - see what he has; if he refuses, he has less
  - felt others would not offer to a non-visible
  - he has mostly green, likely to accept

Table A.14 Written Reasons Given by Visibles, Set BII, for Initiations to Visibles and Non-Visibles (See Questionnaire 1, Question 4, Appendix III)  
(Reference: Hypothesis 4)

I. Visibles' reasons for initiating to visible other (n = 20)

- he has excess and will trade
- he has less of what I have
- his position is like mine - I can see what will appeal to him
- could see his buttons
- see what he has, know how he benefits
- he needs what I have
- no risk - can see what he has
- can see he has excess
- certain of his amount - probability of acceptance high
- most visible to me; he has a lot
- prefer ones in open; mutually beneficial
- deal benefits us both
- visibles are more likely to trade
- same profile as me
- he gains same as I do; will accept
- same profile as me
- I know what he has and vice versa
- I like him, and he has green
- less risk; he needs red and will accept
- ones in the open will trade together; don't like covered ones

II. Visibles' reasons for initiating to non-visible other (n = 8)

- find out how even his piles are
- find out his position; see what he is like
- covered ones won't get offers, will accept
- taking chance; likely to be accepted
- he is likely to accept
- too much competition for visibles; see if covered one is good trader
- he may have a large number
- he may have more than visibles.

## APPENDIX VI

## RAW DATA

I. Set A. Initiations and Transactions

Key to notation: hrv: High red visible (1,600 red, 30 green)  
 hgv: High green visible (1,600 green, 30 red)  
 lrv: Low red visible (800 red, 30 green)  
 lgv: Low green visible (800 green, 30 red)

Corresponding non-visibles are denoted by hrnv, hgnv,  
 lrvn, lgnv

Example lhgv-lrvn100g120rr = In experiment 1, the high  
 green visible made an offer of 100 green buttons  
 for 120 red buttons which was rejected.

## A. SET A: FIRST EXCHANGE OPPORTUNITY (TRIAL 1)

1hrv-hgv102r100ga	2hrv	2hrv-hgv90r90ga
1hgv-hrv100g100raq		2hgv-hrv100g100ra
1lrv-lgnv100r100ga		2lrv-lgv100r100ga
1lgv-lrvn100g150ra		2lgv-lrv50g60rr
1hrnv-hgv80r110gr		2hrnv-lgnv100r100ga
1hgnv-lrvn100g100rr		2hgnv-hrv100g200rr
1lrvn-hgv100r100gr		2lrvn-lgv60r60gr
1lgv-hrv70g90rr		2lgv-lrv90g65rr
3hrv-lgv50r50ga		4hrv-lgv100r100ga
3hgv-hrv100g100rr		4hgv-hrvn25g30ra
3lrv-lgnv100r120gr		4lrv-hgnv75r65ga
3lgv-hrv100g100ra		4lgv-hrv100g90ra
3hrnv-lgnv99r99ga		4hrnv-hgv100r75ga
3hgnv-lrv100g90ra		4hgnv-hrv100g780rr
3lrvn-lgnv50r50gr		4lrvn-hgv50r70gr
3lgv-hrv100g100rr		4lgv-hrv100g200rr
5hrv-hgv60r100gr		6hrv-lgnv20r15ga
5hgv-hrv100g110rr		6hgv-lrvn100g100rr
5lrv-hgv100r99ga		6lrv-lgv90r100ga
5lgv-hrv60g100rr		6lgv-lrv100g100rr
5hrnv-hgv80r80gr		6hrnv-hgv100r100ga
5hgnv-lrvn100g100ra		6hgnv-lrvn100g98ra
5lrvn-lgnv100r125gr		6lrvn-hgv100r100gr
5lgv-hrv100g100ra		6lgv-lrv100g100ra

7hrv-hgv100r100gr  
 7hgv-hrnl100g60ra  
 7lrv-hgv90r100ga  
 7lrv-hrv100g100ra  
 7hrnl-hgv100r100gr  
 7hgnv-hrv100g100rr  
 7lrv-hgv75r75ga  
 7lgnv-hrv50g60rr

9hrv-hgv100r95ga  
 9hgv-hrnl100g100ra  
 9lrv-hgv100r100gr  
 9lrv-hrv30g20rr  
 9hrnl-hgv60r70gr  
 9hgnv-hrv80g55ra  
 9lrv-hgv100r100ga  
 9lgnv-hrv80g60rr

11hrv-hgv100r100ga  
 11hgv-hrv100g100ra  
 11lrv-hgv100r100ga  
 11lrv-hrnl40g20ra  
 11hrnl-hgv60r100gr  
 11hgnv-hrnl100g80rr  
 11lrv-hgv100r150gr  
 11lgnv-hrv100g75rr

13hrv-hgv60r60ga  
 13hgv-hrv100g100ra  
 13lrv-hgv50r75gr  
 13lrv-hrv100g100rr  
 13hrnl-hgv50r50ga  
 13hgnv-hrv100g150rr  
 13lrv-hgv100r100ga  
 13lgnv-hrv100g200rr

8hrv-hgv60r60ga  
 8hgv-hrv100g100rr  
 8lrv-hgv50r50ga  
 8lrv-hrv100g150ra  
 8hrnl-hgv50r100gr  
 8hgnv-hrv60g60rr  
 8lrv-hgv80r70ga  
 8lgnv-hrnl100g100ra

10hrv-hgv75r50ga  
 10hgv-hrv100g100ra  
 10lrv-hgv100r100gr  
 10lrv-hrv100g100ra  
 10hrnl-hgv100r100ga  
 10hgnv-hrv100g100rr  
 10lrv-hgv50r50gr  
 10lgnv-hrnl100g125ra

12hrv-hgv100r100gr  
 12hgv-hrv100g200rr  
 12lrv-hgv100r100ga  
 12lrv-hrv100g100ra  
 12hrnl-hgv100r100gr  
 12hgnv-hrnl100g80ra  
 12lrv-hgv100r150ga  
 12lgnv-hrv20g30ra

14hrv-hgv50r100gr  
 14hgv-hrv100g100ra  
 14lrv-hgv100r100ga  
 14lrv-hrnl100g95ra  
 14hrnl-hgv100r100ga  
 14hgnv-hrv100g110rr  
 14lrv-hgv100r100ga  
 14lgnv-hrnl90g100ra

## B. SET A: SECOND EXCHANGE OPPORTUNITY (TRIAL 2)

(Note: Initiations from Trial 2 were intercepted and replaced with false offers; therefore, the data have no entry for 'accepted' or 'rejected'.)

1hrv-lgv90r90g	2hrv-lgv100r100g
1hgv-hrv102g100r	2hgv-hrv100g100r
1lrv-hgv50r100g	2lrv-hgv90r100g
1lgv-hrv100g150r	2lgv-hrv90g100r
1hrnv-hgnv100r100g	2hrnv-hgnv100r100g
1hgnv-hrv100g119r	2hgnv-hrv100g200r
1lrvn-hgnv50r75g	2lrvn-hgv100r100g
1lgv-hrv60g60r	2lgv-hrv100g100r
3hrv-hgv90r100g	4hrv-hgv100r110g
3hgv-lrv100g80r	4hgv-lrv75g100r
3lrv-lgv100r100g	4lrv-hgv50r60g
3lgv-lrv100g100r	4lgv-lrv100g100r
3hrnv-lgv90r99g	4hrnv-lgv100r90g
3hgnv-hrv80g80r	4hgnv-lrv100g100r
3lrvn-hgv50r50g	4lrvn-lgv50r70g
3lgv-hrv100g100r	4hgnv-hrv100g200r
5hrv-lgv70r80g	6hrv-hgv45r45g
5hgv-hrv100g98r	6hgv-hrv100g100r
5lrv-lgv100r99g	6lrv-hgv50r70g
5lgv-hrv80g100r	6lgv-hrv100g100r
5hrnv-lgv100r100g	6hrnv-hgv100r100g
5hgnv-lrv100g100r	6hgnv-hrv100g98r
5lrvn-hgnv100r100g	6lrvn-lgv100r98g
5lgv-hrv100g100r	6lgv-hrv100g125r
7hrv-lgv100r100g	8hrv-lgv100r110g
7hgv-lrv90g100r	8hgv-hrv100g100r
7lrv-hgnv90r100g	8lrv-hgv100r150g
7lgv-hrv100g95r	8lgv-lrv50g60r
7hrnv-hgnv100r100g	8hrnv-hgv80r100g
7hgnv-lrv100g100r	8hgnv-lrv100g90r
7lrvn-lgv100r100g	8lrvn-hgv100r80g
7lgv-lrv75g75r	8lgv-lrv100g100r
9hrv-lgv100r90g	10hrv-hgv100r100g
9hgv-lrv100g95r	10hgv-lrv100g100r
9lrv-lgv100r100g	10lrv-lgv100r100g
9lgv-hrv100g110r	10lgv-hrv100g100r
9hrnv-lgv70r70g	10hrnv-lrv100r200g
9hgnv-lrv100g100r	10hgnv-lrv100g100r
9lrvn-lgv100r100g	10lrvn-hgnv100r90g
9lgv-lrv100g100r	10lgv-lrv100g150r

11hrv-lgv100r100g  
 11hgv-hrnl100g100r  
 11lrv-hgv100r100g  
 11lgv-hrv40g30r  
 11hrnv-lgv50r100g  
 11hgnv-hrv100g300r  
 11lrv-hgnv100r100g  
 11lgv-hrnl100g100r

13hrv-lgv60r60g  
 13hgv-hrv100g100r  
 13lrv-hgnv100r100g  
 13lgv-hrnl100g100r  
 13hrnv-hgnv100r100g  
 13hgnv-hrnl100g130r  
 13lrv-----  
 13lgv-hrv100g110r

12hrv-hgnv60r50g  
 12hgv-lrv100g100r  
 12lrv-hgv100r100g  
 12lgv-hrv50g50r  
 12hrnv-hgnv100r80g  
 12hgnv-lrv80g90r  
 12hrnv-hgnv100r150g  
 12lgv-lrv40g50r

14hrv-lgv50r75g  
 14hgv-lrv65g50r  
 14lrv-hgv100r150g  
 14lgv-hrv100g95r  
 14hrnv-hgv100r100g  
 14hgnv-lrv100g100r  
 14lrv-hgnv100r100g  
 14lgv-hrv80g100r

## II. Set B. Initiations on First Exchange Opportunity (Trial 11)

Key to notation:

rv:	Red visible 1	
gv:	Green visible 1	
hrnv:	High red non-visible 1	) Set BI
hgnv:	High green non-visible 1	)
lrnv:	Low red non-visible 1	) Set BII
lgnv:	Low green non-visible 1	)

As there were two identical subjects in each experiment, they will be differentiated in the following manner:

rv1  
rv2  
etc.

First digit in entry refers to number of experiment, 1-14.

Note: The initiations on Trial 1 from high non-visibles in Set BI, and from all subjects in Set BII were intercepted, and false offers substituted. Therefore, there is no entry for 'Accepted' or 'Rejected', except for visibles in Set BI, who received real offers.

Example: lhrnv1-gv1 100r110ga:

In Experiment I, one of the high red non-visibles made an offer of 100 red in return for 110 green to one of the green visibles, and this offer was accepted (visibles in Set BI received real offers).

### A. SET BI: FIRST EXCHANGE OPPORTUNITY

1rv1-gv150r100gr	2rv1-gv150r50ga
1gv1-rv2100g100ra	2gv1-rv240g100rr
1rv2-hgnv210r20g	2rv2-gv1100r100gr
1gv2-rv1100g100ra	2gv2-hrnv250g50r
1hrnv1-gv2100r100ga	2hrnv1-hgnv2100r60g
1hgnv1-rv1100g200rr	2hgnv1-rv1100g300rr
1hrnv2-hgnv1100r100g	2hrnv2-hgnv1100r100g
1hgnv2-rv270g100rr	2hgnv2-rv175g100ra

3rv1-gv1100r100ga  
 3gv1-rv1100g100ra  
 3rv2-hgnav1100r100g  
 3gv2-hrnav2100g175r  
 3hrnv1-hgnav175r80g  
 3hgnav1-hrnav1100g100r  
 3hrnv2-gv150r100ga  
 3hgnav2-hrnav2100g110r

5rv1-hgnav150r100g  
 5gv1-hrnav130g30r  
 5rv2-gv2100r100ga  
 5gv2-rv2100g100ra  
 5hrnv1-hgnav1100r300g  
 5hgnav1-hrnav1100g75r  
 5hrnv2-hgnav2100r100g  
 5hgnav2-hrnav2100g120r

7rv1-9v2100r100gr  
 7gv1-rv1100g100rr  
 7rv2-hgnav250r50g  
 7gv2-rv1100g100ra  
 \* 7hrnv1-rv2100r125gr  
 7hgnav1-hrnav150g50r  
 7hrnv2-gv2100r80ga  
 7hgnav2-rv250g75ra

\* Sent to wrong colour.

4rv1-gv1100r100gr  
 4gv1-rv180g75ra  
 4rv2-hgnav1100r95g  
 4gv2-rv2100g125ra  
 4hrnv1-hgnav2100r120g  
 4hgnav1-rv1100g100rr  
 4hrnv2-gv150r75gr  
 4hgnav2-h4nv1100g100r

6rv1-gv2100r100ga  
 6gv1-rv1140g140ra  
 6rv2-hgnav1100r90g  
 6gv2-rv2100g120rr  
 6hrnv1-gv2100r100gr  
 6hgnav1-hrnav250g50r  
 6hrnv2-hgnav2100r90g  
 6hgnav2-hrnav150g50r



## B. SET BII: FIRST EXCHANGE OPPORTUNITY (No real offers delivered)

8rv1-lgnv190r90g	9rv1-gv2100r180g
8gv1-rv1100g200r	9gv1-lrnv1100g100r
8rv2-lgnv2100r100g	9rv2-lgnv2100r80g
8gv2-rv250g20r	9gv2-lrnv2100g100r
8lrnv1-gv1100r100g	9lrnv1-gv1100r200g
8lgnv1-rv1100g150r	9lgnv1-rv1100g100r
8lrnv2-gv2100r100g	9lrnv2-lgnv180r75g
8lgnv2-rv1100g100r	9lgnv2-lrnv2100g100r
10rv1-lgnv1100r75g	11rv1-gv2100r100g
10gv1-rv180g80r	11gv1-rv280g60r
10rv2-gv2100r100g	11rv2-gv1100r100g
10gv2-rv1100g150r	11gv2-rv1100g100r
10lrnv1-gv160r100g	11lrnv1-gv1100r300g
10lgnv1-lrnv1100g100r	11lgnv1-lrnv2100g100r
10lrnv2-gv2100r100g	11lrnv2-lgnv250r70g
10lgnv2-lrnv1100g180r	11lgnv2-rv2100g125r
12rv1-lgnv280r110g	13rv1-gv1100r100g
12gv1-rv1100g75r	13gv1-rv160g60r
12rv2-gv1100r200g	13rv2-gv2100r100g
12gv2-rv2100g100r	13gv2-rv2110g100r
12lrnv1-lgnv2100r100g	13lrnv1-gv1100r100g
12lgnv1-rv1100g100r	13lgnv1-rv2100g100r
12lrnv2-gv1100r100g	13lrnv2-lgnv2100r110g
12lgnv2-rv280g100r	13lgnv2-rv2100g250r
14rv1-gv2100r200g	
14gv1-lrnv1100g100r	
14rv2-gv250r60g	
14gv2-rv1100g100r	
14lrnv1-gv2100r100g	
14lgnv1-rv280g70r	
14lrnv2-gv190r90g	
14lgnv1-lrnv1100g100r	