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Editor's Note

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"Four Kinds of Social Dilemmas within Exchange Networks"

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ABSTRACT

Exchange networks implicitly contain four types of social dilemmas: prisoner's dilemmas, assurance games, chicken games, and coordination games. People in powerless positions can potentially agree on a common strategy with respect to their exploiters, generating a prisoner's dilemma. In unstable exchange networks, people may agree to form a stably exchanging pair, providing assurances for themselves. People in relatively equal positions can bargain cooperatively or aggressively, engaging in a chicken game. Or people may choose their partners in an uncoordinated manner, causing suboptimal patterns to arise. Yet, by not including any type of communication other than the presentation and acceptance of offers, experimental research on exchange networks has been particularly inauthentic. The study of power within exchange networks can, therefore, be enriched by recognizing this deficiency and by compensating for it through the incorporation of concepts like trust, which have in the past proven useful in the study of social dilemmas.

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INTRODUCTION

Communication plays an especially important role in the resolution of social dilemmas (Dawes et al, 1977). It is a

limitation of existing experimental work on power within social exchange networks that the only communication permitted is that between positions involving exchange offers and acceptances. For in fact there are many types of networks that connect positions apart from such exchanges, networks that may overlap and influence the interaction.

Experiments on power within exchange networks allow for the creation of binding agreements between players. Thus, when two players accept a division of points, the division that they accept is accomplished. Hence, the complete transparency of agreements guaranteed by the experimenter makes trust between the positions unnecessary. It has been discovered, however, that allowing for nonbinding agreements would create the conditions necessary for the development of trust (Kollock 1993).

The study of social dilemmas was initially the almost exclusive domain of economists (Olson, 1965). Their conclusion was that cooperation was impossible, or that it could occur only in the presence of "selective incentives" for cooperation. More recently, social processes that facilitate cooperation have become more prominent, especially processes like trust (Marwell and Oliver, 1988; Kollock, 1994). Yet, most of the existing theories of power in exchange networks are either based on rational choice or have a strong rational choice inclination. Thus, it seems only proper to begin to "open up" exchange networks to other phenomena.

Four kinds of two-person social dilemmas have already been examined (the N-person versions are similar):

I The Prisoner's Dilemma (PD)

In the PD game, each player has a cooperative and uncooperative choice. In the symmetric case, the rewards can be represented by the following diagram.

		Player B	
		Cooperation	Non-cooperation
Player A	Cooperation	b,b	d,a
	Non-cooperation	a,d	c,c

The values are ordered such that $a > b > c > d$ and $(a + d) < 2b$. Because of this ordering, non-cooperation uniformly "dominates" cooperation; each player is better off off choosing not to cooperate no matter what the other player has chosen.

II The Assurance Game

In an assurance game, each player wants to cooperate if his/her partner cooperates, but will balk if s/he thinks his/her partner

is defecting. In such a scenario, the values are ordered such that b > c > d, but b > a.

III The Chicken Game

The game of chicken, like the PD, offers each player a cooperative and non-cooperative choice. The difference, however, is that non-cooperation does not dominate cooperation. That is, if one's partner cooperates, one is better off not cooperating. Likewise, if one's partner does not cooperate, one is better off cooperating. The values in such a game, then, are ordered such that a > b > c, but d > c.

IV The Coordination Game

In a pure coordination game, each player is motivated to match the other's behavior. Thus, there is no distinctive "cooperative" or "non-cooperative" choice. Rather, all choices are equally valuable if both actors behave in an identical fashion. In the absence of communication between the players, however, this coordination can be difficult to achieve. Hence, in this game, the values are ordered such that b > a, c > d, and b = c.

THE EXCHANGE SITUATION

In social exchange network experiments, subjects negotiate with each other on the division of a certain number of points, usually twenty-four. Pairs of subjects who can agree with each other divide the points, the points being convertible into money at the end of the experiment. Subjects who do not exchange receive nothing. Further, not all pairs of subjects can negotiate with one another. But the pairs that are able to negotiate form a network, within which each position is allowed to conclude an agreement with at most one other position per game.

It is my claim that, in such exchange networks, four kinds of social dilemmas become implicit. To facilitate understanding, I will illustrate each of these dilemmas via a simple network. However, my use of such an illustration should in no way suggest that these dilemmas cannot occur in a wide variety of exchange networks.

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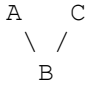
I Solidarity of the weak against the strong - a prisoner's dilemma



In such a network, A and C are likely to bargain against one other, giving B an opportunity to wield a great deal of power in negotiations. However, should A and C come to an agreement concerning the offers they give and accept from B, then, as a pair, they will exert power equal to B. Nevertheless, B can

attempt to vitiate this agreement by making high offers to A or to C and then by playing them off against each other. Yet, in such a scenario, A and C are better off resisting these offers, which prove detrimental in the long run, despite their immediate appeal.

The following table is meant to illustrate this situation. The entries refer to the probabilities of being included in an exchange multiplied by the expected proportion of the returns from that exchange. So, for example, if players A and C agree to accept not less than 50% from B, each might expect to be included in half the exchanges, averaging .50 x .50, or .25 in reward. If C accepts no offer less than .50, but A accepts lower offers, A will be included in all the exchanges, even if A does not earn as much as B (e.g., .40). But, should both A and C compete against one another, they would each earn almost nothing (.10).

		Player C: Cooperation	Player C: Non-cooperation
Player A	Cooperation	.25,.25	0,.40
Player A	Non-cooperation	.4,0	.1,.1

If free communication were permitted between the positions so that agreements on common strategies with respect to other positions were allowed, we might expect power differences within exchange networks to be reduced. Moreover, if agreements between weak players vis-a-vis strong players were unenforceable, then we might expect affective and trusting relations to develop between successful coalition partners.

II Solidarity of exchange partners - an assurance game

Supposing that A and B have come to a tentative agreement to exchange and that C is faced with the possibility of having no partner, no matter what the terms of the agreement are between A and B, C can always make an offer to A or to B or to both that results in his inclusion. For example, if A and B have agreed to a 12-12 split, C can offer 14 to either A or B, resulting in 10 for C.

The following table is meant to illustrate the hypothetical, yet plausible, long-term probabilities of being included in an agreement when two players maintain their agreement to exchange and when one accepts the higher offer from an excluded other. In the latter instance, each participant may calculate that s/he has an equal chance (2/3) of being included in an agreement. Moreover, if in such a scenario one player maintains a preference for

his/her partner while the others bargain freely, the loyal partner will be excluded from agreements with C while the disloyal partner will continue to be included in all exchanges. S/he may not lose by not cooperating, but neither will s/he gain.

		Player B: Cooperation	Player B: Non-cooperation
Player A	Cooperation	1,1	1/2,1
	Non-cooperation	1,1/2	2/3,2/3

This type of social dilemma is particularly likely to arise when exchange patterns are unstable, when sheer self-interest does not drive positions into stably exchanging pairs. Using simulations and experiments, Bonacich and Bienenstock (1995a) have demonstrated that networks without game-theoretic "cores" are inherently unstable in their exchange patterns. Yet, these are the very networks that would be affected greatly if free communication between positions were permitted since pairs of positions could develop affective bonds, cementing their stable trading relations. Instability in trading patterns would therefore be reduced.

III Bargaining failures - a chicken game

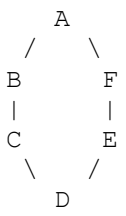
A - B

If either A or B employs a tough bargaining strategy, buffaloing the other with high demands, the result may be advantageous for the tough bargainer. However, if both attempt to use this strategy, there may be no agreement at all. This problem is particularly likely to occur when there is a time limit placed on negotiations. Players may attempt to bluff others by making high demands until just before the time runs out, but time may run out before an agreement is reached.

The following table represents hypothetically this situation. If both players are willing to compromise, they agree on an equal split (.5). If one player employs a tough bargaining strategy and the other is willing to compromise, the tough bargainer earns more (.9). However, if both participants employ uncompromising strategies, they will fail to conclude an agreement and earn nothing.

		Player B: Cooperation	Player B: Non-cooperation
Player A	Cooperation	.5, .5	.1, .9
	Non-cooperation	.9, .1	0, 0

IV Irrational Patterns - a coordination game



In this scenario, five different patterns can result in completed exchanges, wherein no further exchanges can occur because there are no connected players who are not already involved in an exchange. The five patterns are AB/CD/EF, BC/DE/FA, AB/DE, BC/EF, and CD/AF. The latter three patterns, involving only two trades, are suboptimal from every position's point of view; for no matter what the terms of trade between the two pairs might be, there is always a trade involving three pairs in which some players will be better off, but none will be worse. For example, suppose the pairs AB and DE both divide the profits from their exchange evenly. Alternatively, suppose that B and C trade (B earning 60% of the profits), A and F trade (A earning 60% of the profits), and D and E trade evenly. Four of the players are strictly better off, but the other two are not in a worse position.

This type of suboptimality is different from the others in that it does not so clearly result from short-term self-interest. The important group problem is to coordinate so that one of the two optimal patterns occurs. In that respect, this exchange is much like a coordination game. The suboptimal patterns may occur if subjects concerned about the possibility of exclusion are too eager to accept suboptimal agreements. As such, open and unrestricted communication between positions might reduce the frequency of suboptimal exchange patterns.

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CONCLUSION

What is the advantage of conceiving exchange networks as rife with potential social dilemmas? One implication is that social exchange networks might be richer and more interesting if we allowed more open communication between subjects and if we allowed for nonbinding agreements between positions. Under such conditions, some of the phenomena that have interested psychologists recently could be studied within exchange networks. In addition, allowing more open communication between positions would positively affect distributions of power, exchanges, and the stability of exchange patterns.

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