The South Carolina Network Exchange Datasets

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Abstract
The article describes datasets from network exchange experiments collected at the University of South Carolina Laboratory for Sociological Research during 1989-1998. These datasets record time stamped negotiations between subjects as they seek to complete exchanges with one another.

Keywords: *Exchange networks, negotiation, structural advantage*

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1. Overview

The South Carolina Network Exchange datasets were collected at the University of South Carolina Laboratory for Sociological Research during 1989-1998 using ExNet, a computer program written by J. Skvoretz that implemented experiments on networks of exchange relations using a local area network of workstations, managing subject-to-subject interaction and experimenter monitoring of interaction. In these experiments, subjects connected by an exchange relation typically bargain in rounds of three to five minutes in length over the division of a pool of 24 resource points. In most cases, if they agree to a division before time runs out in a round and neither of them has exhausted the number of deals each is allowed in a round, an exchange is concluded and the agreed upon points are credited to the respective accounts. Each point earned has monetary value and the total points earned in an experiment determine the overall earnings of a subject. Experiments consist of multiple rounds and the main outcomes of interest are the points earned by a position in exchange with other positions and the frequency of exchange agreements in specific relations.

2. Data Collection

Data collection was supported by the following grants from the National Science Foundation:

- *Collaborative Research On: Fundamental Processes of Network Exchange*. September 1996 - November 1997, SES 9515434.
- *Action in Social Structures: New Research on Social Exchange Networks*. June 1993 - July 1994, SES 9223799.
- *Inclusion as a Basis for Power in Exchange Networks*. June 1991 - July 1993, SES 9109528.
- *Acquisition of Instrumentation for an Advanced Experimental Network*. June 1991 - July 1993, DBI 9016125.
- *Power, Exclusion and Network Exchange Dynamics* September 1990 - October 1991, SES 9010888.

All experiments followed the same basic protocol. Subjects unknown to each other were seated at terminals in individual rooms after completing a consent form. Communication between rooms was only possible through the workstation in the room. Subjects read instructions presented on the monitor and then engaged in a practice session in a simple network against actors

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simulated by an unsophisticated computer algorithm. A lab assistant monitored this training and practice stage to answer any questions. (In some later experimental runs a short quiz was part of the training session). After this stage, the experiment began and usually consisted of a known number of periods divided into a known number of rounds with the understanding that subjects would change positions in the network between periods. In full information conditions, a chart of the network was prominently displayed next to the monitor so that subjects could locate their current position and the positions occupied by partners and third parties. All "moves" in all negotiations were recorded and time stamped. A round ended when the 3 or 5 minutes allocated to a round ran out or a configuration of agreements, that is, exchanges, was completed that meant that no more exchanges could be made in that round. At the conclusion of the experiment subjects were paid based on the total number of points they earned. Subjects were instructed to try to earn as many points as possible.

3. Data Files and Formats

Individual data files are text files with a DAT extension and have the following organization. Each record begins with one of five identifiers: IA, IB, IC, ID, or D. The first four refer to records with initialization information. The fifth signifies a data record. The record identified by IA lists the network name, the id of the run, and the number of ties in the network. The record identified by IB list s the number of subjects and the number of periods. The record identified by IC is a list of elements, each element a list of five items: two positions that are connected to each other in alphabetical order, a number indicating the structural contrast holding between the two positions, a number indicating the presumptive advantage of the first position over the second position (+1 if advantaged, 0 if no advantage, -1 if disadvantaged), and a number indicating the advantage of the second position over the first position (again +1 if advantaged, 0 if no advantage, -1 if disadvantaged). The record identified by ID stipulates the rotation of subjects through positions by periods so if there are k periods, the first k entries are the positions occupied by the first subject in period 1 through period k, the next k entries are the positions occupied by the second subject in period 1 through period k and so on. Records IC and ID end with $$.

Records identified by D have eight elements following D: period (number), round (number), deal-number (number), sender (position letter), receiver (position letter), sender-share (number), action-type (offer/O, counteroffer/C, offer-acceptance/A, offer-rejection/R, exchange/E) and time-of-action-from-round-beginning (seconds). An action is coded as an offer when it is the first action in a negotiation or it follows an action by the same negotiator in a pair before a response is made by the other negotiator in that pair. An action is coded as a counteroffer if it is an offer made in response to an offer by a partner before the partner takes another action. Acceptances and rejections are actions that respond to a particular offer by a partner without offering new terms. In most runs, exchange occurs when an offer made by one partner is accepted by the other partner and then confirmed by the first partner. However, in runs made after August 1996, the protocol was changed so that all offers were bona fide, that is, acceptance by the receiver completed the exchange. The change in protocol was occasioned in part by the increasing size and complexity of the networks investigated.

Here is one example.

```
IA L4EIIE   021694B     3
IB  4  1
IC A B 1 -1  1 B C 1    0 0 C D 1 1 -1 $$
ID A B C D $$
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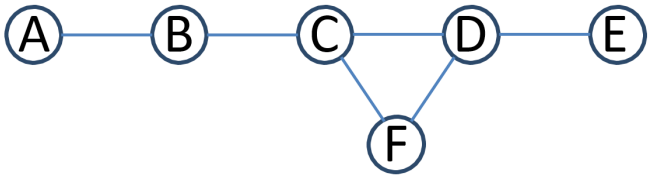
D	1	1	1	D	C	16	O	3.24
D	1	1	1	A	B	15	O	3.35
D	1	1	1	B	A	22	C	5.43
D	1	1	1	B	A	23	O	9.55
D	1	1	1	A	B	14	C	11.09

The network name is L4EIIE, and its entry in the "Guide" describes it as a network of four positions connected as depicted below with experienced actors in the A and D positions and inexperienced actors in the B and C positions. The run-id is 021694B which is the date of the run (February 16, 1994) with B signifying that it was the second run of that day. There are three ties in the structure, four actors and only one period. Positions A and B are structurally distinct and A is disadvantaged over B while B is advantaged over A with respect to the first (1) and only structural contrast. Positions B and C are not structurally distinct with respect to the first (or any) structural contrast and so B is coded as having 0 advantage over C and C as having 0 advantage over B. Positions C and D are structurally distinct (in the same way that A and B are) with respect to the first structural contrast with C having advantage over D and D being disadvantaged over C. Since there is only one period there is no rotation so subject 1 occupies position A throughout the run, subject 2 occupies position B, etc. The first data record says that in period 1, round 1, deal-number 1, the

subject in position D sent an offer to C in which the share to D was 16 points (and so the share to C was 24-16=8 points) at the 3.25 second mark. The second data record says that in period 1, round 1, deal-number 1, A sent an offer to B for a share of 15 to A (and so 9 to B) at the 3.35 second mark. The third data record says that B sent a counteroffer to A for a share of 22 to B (and so 2 to A) at the 5.43 second mark. The fourth record says that B revised his/her offer upward at the 9.55 second mark to A for a share of 23 to B (and so 1 to A).

The network name is BORG, and its entry in the "Guide" describes it as a network of six positions connected as in the figure below. The run-id is 041994B which is the date of the run (April 19, 1994) with B signifying that it was the second run of that day. There are six ties in the structure, six actors and six periods. All pairs of positions are structurally distinct from one another so there are a total of 6 structural contrasts. Positions A and B are in the first structural contrast and A is disadvantaged over B while B is advantaged over A. Positions B and C are in the second structural contrast with B advantaged over C and C disadvantaged over B. Positions C and D are in the third structural contrast with C advantaged over D and D disadvantaged over C and so on. The ID record stipulates the rotation: subject1 starts in position F in period 1, moves to position C in period 2, then A in period 3, then E in period 4, then B in period 5, and ends in position D in period 6, while subject2 starts in position C, moves to F, then B, then D, then A, and ends in E and so on. The first data record says that in period 1, round 1, deal-number 1, the subject in position B sent an offer to A in which the share to B was 20 points (and so 4 to A) at the 7.36 second mark.



Here is another example.

```
IA BORG      041994B      6
IB 6 6
IC A B 1 -1 1 B C 2 1 -1 C D 3 1 -1 C F 4 1 -1 D E 5 1 -1 D F 6 1 -1 $$
ID F C A E B D C F B D A E A E F C D B B D C F E A E A D B F C D B E A C F $$
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D	1	1	1	B	A	20	O	7.36
D	1	1	1	C	B	14	O	9.72
D	1	1	1	B	C	21	C	10.93
D	1	1	1	E	D	8	O	12.96

4. Data Details

Response Rate	N/A
Non-Respondent Bias	N/A
Theoretical Grouping	Network Exchange Theory, Core Theory, Expected Value Theory, Power Dependence Theory
Publications Using These Data	Lovaglia, M.J., J. Skvoretz, B. Markovsky, and D. Willer. (1996). "Automated Theoretical Analysis of Exchange Networks: Prerequisites and Prospects." Connections 19:38-52. Lovaglia, M., J. Skvoretz, B. Markovsky, and D. Willer. (1995). "Assessing Fundamental Power Differences in Exchange Networks: Iterative GPI." Current Research in *Social Psychology* 1: 8-15. Lovaglia, M., J. Skvoretz, D. Willer, and B. Markovsky. (1995). "Negotiated Exchanges in Social Networks." Social Forces 75: 123-155. (Reprinted in Network Exchange Theory edited by D. Willer. Westport, CT: Praeger, pp. 157-184, 1999.) Markovsky, B., J. Skvoretz, D. Willer, M. Lovaglia and J. Erger. (1993). "The Seeds of Weak Power: An Extension of Network Exchange Theory." *American Sociological Review* 58: 197-209. Skvoretz, J. and T. Burkett. (1994). "Information and the Distribution of Power in Exchange Networks." *Journal of Mathematical Sociology* 19: 263-278. Skvoretz, J. and M. Lovaglia. (1995). "Who Exchanges with Whom: Structural Determinants of Exchange Frequency in Negotiated Exchange Networks." *Social Psychology Quarterly* 58: 163-177. Skvoretz, J. and D. Willer. (1993). "Exclusion and Power: A Test of Four Theories of Power in Exchange Networks." *American Sociological Review* 58: 801-818. (Reprinted in Network Exchange Theory edited by D. Willer. Westport, CT: Praeger, pp. 129- 154, 1999.) Skvoretz, J. and D. Willer. (1991). "Power in Exchange Networks: Setting and Structural Variations." *Social Psychology Quarterly* 54: 224-238. Skvoretz, J., D. Willer and T.J. Fararo. (1993). "Toward Models of Power Development in Exchange Networks." *Sociological Perspectives* 36: 95-115. Skvoretz, J. and P. Zhang. (1997). "Actors' Responses to Outcomes in Exchange Networks: The Process of Power Development." Sociological Perspectives 40: 183-197. Willer, D. 1999. Editor. *Network Exchange Theory*. Westport, CT: Praeger Willer, D. and J. Skvoretz. (1997). "Network Connection and Exchange Ratios: Theory, Predictions, and Experimental Tests." Advances in Group Processes 14: 199-234. (Reprinted in Network Exchange Theory edited by D. Willer. Westport, CT: Praeger, pp. 195-226, 1999.)
Data Context	Experimental studies
Respondents	Undergraduate students
Longitudinal	Networks are fixed but negotiation moves are time stamped
Temporality	None
Analytical or Pedagogical Utility	Illustrates how structural position impacts behavior and outcome
Known Issues	None