
From Power to Status in Online Exchange

Bogdan State

Sociology Department
Stanford University
Stanford, CA
bstate@stanford.edu

Bruno Abrahao

Computer Science Department
Cornell University
Ithaca, NY
abrahao@cs.cornell.edu

Karen Cook

Sociology Department
Stanford University
Stanford, CA
kcook@stanford.edu

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Abstract

Online social networks where the main purpose of interaction is the acquisition of specific resources of interest represent a promising venue for the study of social exchange. Sociological theories dating back to the 1960's postulate that inequality in resource possession leads to power imbalances. Actors lacking a certain desired resource find themselves in a position of dependence on resource owners. In turn, Power-Dependence Theory predicts that this power-unequal situation induces behavior that may bring relationships closer to a more balanced state. Among the power-balancing mechanisms, *status giving* figures as an internalized way in which a low-power actor may attempt to lessen their dependence on a more powerful partner. This prediction has not been tested in large, real-world contexts, however. To this end, we analyze data from CouchSurfing.org, an international online hospitality exchange network, to test predictions regarding status giving at a massive scale not addressed before in previous work. We explore the power imbalance inherent in the relationship between "hosts" (i.e., resource owners) and "surfers" and use mutual user-reported ratings to quantify status-giving. We demonstrate a statistically-significant tendency for CouchSurfers to give status to their hosts.

Keywords

Exchange Theory, Power, Social Networks, CouchSurfing

ACM Classification Keywords

J.4. Social and Behavioral Sciences: Sociology.

Introduction

In recent years, the Web has witnessed the successful growth of specialized online social networks which allow participants to acquire specific resources through interactions (e.g., the exchange of goods, revenue produced from collaborations, advice giving, etc.). In such processes of *social exchange*, the possession of resources is often non-uniformly distributed across the network, and the heterogeneity of resource endowments leads to power imbalances. Actors deprived of some resources find themselves in a situation of dependence on resource owners. Accordingly, as individuals rely on their peers to achieve their desired goals, resource owners are in a position to grant, deny, or hinder the other's gratification [6]. Power-Dependence Theory has been one of the main frameworks which social scientists have applied to the study of power imbalances [3, 4]. The foundational work outlined by Richard Emerson [5] posited that a fundamental tension emerges in situations where one actor is more dependent on their partner than vice-versa. An essential proposition of Power-Dependence Theory can be summarized as $P_{AB} = D_{BA}$. In other words, A's power over B (P_{AB}) equals B's dependence on A (D_{BA}) in the relationship. Thus, an actor has power over another inasmuch as the other is dependent on them for resources of value, especially when the availability of such resources is low from alternative sources. Because of the inherent tension in relations of mutual dependence, several processes may push the relationship closer to power balance. The low-power actors may reduce their dependence by withdrawing from the relationship, or by seeking other sources of the resource provided by the high-power actor. Alternatively, the dependent actor's power in the relationship may increase when they provide their partner with another (valuable) resource in return.

In this work we focus on *status giving* as an internalized means through which a low-power actor may attempt to lessen their dependence on a more powerful partner [6]. Status giving is a process through which the dependent actor rewards the powerful partner with a higher level of esteem with the goal of bringing the relationship closer to a more balanced state¹. Despite the intuitively prominent role of status giving in everyday exchanges, little has been done to test Emerson's theory empirically. In this article we present a test of Emerson's theory regarding status giving at a scale not addressed in previous work. To this end, we analyze the CouchSurfing.org network, a service which allows its worldwide user base of over 4 million to make contact with the aim of hosting one another. CouchSurfing represents an environment for social exchange in which "couches" (places to spend the night) represent the primary resource of interest. A couch represents a valuable resource to a traveler (henceforth "surfer") in search of a place to stay in a particular city for a determined time period. Not only does opening one's house represent a less-than-universal act of generosity, but even the most committed host's ability to provide others with hospitality is limited. We argue that the intrinsic value of hospitality as well as its scarcity lead to a high valuation of the host's resources by the surfer, making for a power imbalance in the relationship, with surfers being dependent on hosts. As a result, we expect to observe the power-balancing strategies described by Emerson, as the relationship tends towards reducing the extent of power inequality between host and surfer.

CouchSurfing presents a particularly promising opportunity to test Emerson's predictions regarding status giving as a power-balancing mechanism. In this network, we can analyze the behavior of surfers with respect to status giving as a strategy to balance power in their relationship with the

¹As Emerson(1972a) points out, power-balance should not be construed to mean that power is no longer exercised in the relationship, however.

host. The opportunity for surfers to engage in such a strategy emerges after the hosting interaction is completed, when users typically rate each other on the perceived strength of the tie and the perceived mutual trust. Tie strength ratings are made public and communicated to the partner, whereas trust ratings are collected and stored confidentially in the web service's databases (i.e., they are never reported to any user). We study the relationship between the surfer's dependence on the host and the surfer's status-giving behavior. This situation resembles the exchange of status for advice, the example Peter Blau used for social exchange in an organizational setting [2]. Status-giving is measured here in terms both of public tie strength ratings and of private trust evaluations.

Our results show a greater tendency for surfers to give status to hosts through higher ratings. Our investigation reveals a more pronounced tendency towards status giving in *private*, rather than in public ratings. Since one of the exchange partners' public ratings appear to be anchored to the ratings provided by the other [8], this finding suggests an internalization of the status-giving process by the surfer.

Data and Methods

Even though CouchSurfing has been the object of a number of previous studies [1, 7, 8], to our knowledge no such study has investigated exchange-theoretic predictions.

To observe status giving behavior we analyze a rich source of dyadic data provided by CouchSurfing that comprises tie strength and trust ratings. To establish a tie with other participants in the network, the service presents users with two mandatory rating tasks, included in our dataset: (1) the perceived strength of the tie and (2) the perceived level of mutual trust between the parties. Tie strength becomes vis-

ible to the other party and is broken into six ordered levels, namely "Acquaintance", "Couchsurfing Friend", "Friend", "Good Friend", "Close Friend", and "Best Friend". Conversely, the trust rating is recorded, but never reported to any other user. This rating spans a set of five ordinal values: "Do not Trust", "Trust Somewhat", "Generally Trust", "Highly Trust", and "Would Trust with Life." Among the recorded hospitality interactions in our sample, 92.5% result in a mutual exchange of ratings, and 86.5% of the participants made their ratings within three calendar months of the actual date of the interaction.

The data we analyze consist of 80,194 hospitality interactions drawn from the complete set of interactions recorded in CouchSurfing's database occurring between verified users across the world² and facilitated by CouchSurfing between January 2003 and November 2011. CouchSurfing verification represents a process through which a user allows the organization to confirm their identity. The first step is making a purchasing-power-adjusted payment to the organization from a credit card bearing the same name and address as one's profile. CouchSurfing then mails a postcard with a unique code to the given address. To gain fully-verified status, the CouchSurfer then introduces the code they have received back to the website. We impose a minimum threshold of involvement with CouchSurfing by requiring that all users in our sample have undertaken the time and resource investment necessary to complete the verification process at the time of the interaction.

Empirical Analysis

In our analysis we aim at testing the basic outcome described by Emerson [6] regarding the existence of the status-giving mechanism for balancing power relationships. We compare

²While we do not focus on regional differences in status-giving in this paper, we believe this is a promising direction of future research, in particular concerning normative differences in the guest-host relationship between different regions of the world.

pairs of ratings exchanged between users to test whether surfers give status to their hosts by awarding them higher ratings than the surfers receive from the hosts.

Table 1 plots the value of the friendship ratings traded between the two exchange partners, within the same dyad. Plotted on the diagonal are rating pairs of equal magnitude: above the diagonal we show instances where ratings given by surfers were higher than those given by hosts, and below the diagonal we count cases where ratings given by hosts were higher. We can compare frequency counts between cells symmetrical to the diagonal. There were, for instance, 7,579 cases where the surfer nominated the host as a friend, and the host responded with a counter-nomination as "Couch-Surfing friend," a category closer to the lower end of the scale used by CouchSurfing. This count exceeds by 1,215 cases the 6,364 instances in the reverse pair of host to surfer ratings. As expected, a chi-square test ($\chi^2 = 29136.6$, $df = 25$) reveals a significant level of association between the matched ratings exchanged within a dyad. Furthermore, a one-tailed T-test ($t = 10.885$, $df=75,078$) shows a statistically-significant difference between friendship ratings given by hosts and surfers. Overall 13,432 ratings were higher from surfer to host than vice-versa, whereas 11,458 rating pairs showed higher ratings from host to surfer.

Missing data suggests another status-giving process at work. In 3,295 cases hosts did not award any ratings at all to their partners, a value 78% higher than the 1,852 instances where surfers neglected to give any ratings. Given that rating other users on CouchSurfing requires at least a few minutes to answer the 9 mandatory questions asked on the form used on the website, we would expect surfers to be more likely than hosts to go to the length of giving a rating to their partner³. Thus, the host is not only more likely to rate the surfer lower on the friendship scale, but they are also more likely to not

³Furthermore, surfers are traveling and are less likely to have access to the Internet after an interaction. Given that most ratings are given shortly after the interaction, this makes the prevalence of missing host ratings even more surprising.

give any rating at all. These findings are consistent with the status-giving hypothesis.

Figure 1: Host and Surfer's Reports of Friendship Strength.

| Host to Surfer | Surfer to Host | | | | | | | Total |
|----------------|----------------|---------------|--------------|--------------|------------|------------|-------|--------|
| | Acq. | CS Friend | Friend | Good | Close | Best | N.A. | |
| Acq. | 33 | 576 | 62 | 31 | 2 | 0 | 25 | 729 |
| CS Friend | 403 | 43,804 | 7,579 | 2,736 | 362 | 65 | 1,384 | 56,333 |
| Friend | 51 | 6,364 | 3,844 | 1,312 | 229 | 31 | 250 | 12,081 |
| Good | 4 | 2,359 | 1,244 | 1,945 | 335 | 56 | 120 | 6,063 |
| Close | 2 | 327 | 203 | 282 | 432 | 56 | 27 | 1,329 |
| Best | 1 | 78 | 40 | 57 | 43 | 131 | 14 | 364 |
| N.A. | 47 | 2,535 | 424 | 208 | 41 | 8 | 32 | 3,295 |
| Total | 541 | 56,043 | 13,396 | 6,571 | 1,444 | 347 | 1,852 | 80,194 |

$\chi^2 = 29136.6$, $df = 25$. T-stat(H_a : Surfer > Host) = 10.885, $df=75078$.

Figure 2: Host and Surfer's Reports of Trust.

| Host to Surfer | Surfer to Host | | | | | | Total |
|------------------|----------------|--------------|---------------|---------------|------------|-------|--------|
| | Do Not | Somewhat | Generally | Highly | Life | N.A. | |
| Do Not Trust | 0 | 23 | 70 | 42 | 13 | 12 | 160 |
| Somewhat | 39 | 1,218 | 4,595 | 3,003 | 269 | 548 | 9,672 |
| Generally | 76 | 3,732 | 17,023 | 14,415 | 1,326 | 1,588 | 38,160 |
| Highly with Life | 44 | 1,564 | 9,189 | 11,325 | 1,573 | 792 | 24,487 |
| N.A. | 4 | 111 | 679 | 1,121 | 358 | 74 | 2,347 |
| Total | 193 | 639 | 2,533 | 1,772 | 186 | 208 | 5,368 |
| Total | 193 | 7,287 | 34,089 | 31,678 | 3,725 | 3,222 | 80,194 |

$\chi^2 = 2190.05$, $df = 16$. T-stat(H_a : Surfer > Host) = 44.131, $df=71811$.

Hosts and surfers exchange not only public evaluations, such as friendship ratings, but they also produce ratings of each other that are unreported to the other party. Comparing the frequencies of public with unreported ratings will help us determine to what extent status-giving persists when ratings are not shown to the recipient. In Table 2 we perform a bi-

variate analysis of trust ratings exchanged between host and surfer, using the same conventions as before. In this case the results are even more striking: surfers say they trust hosts more than hosts declare they trust surfers in 25,329 of cases, 53% higher than the 16,559 cases when the reverse happens. As in the case of friendship ratings, the association is significant ($\chi^2 = 2,190.05$, $df = 16$), and surfers rate their partners higher than hosts ($t = 44.131$, $df=71,811$). As in the case of friendship evaluations, missing entries prove to be more prevalent in the data containing ratings given by hosts.

Discussion

Our investigation represents only a first basic foray into the applications of Exchange Theory to the emerging wealth of data produced by online social networks, especially by communities emerging in the "sharing economy", a model of trust-mediated peer-to-peer exchange. We document the flow of status from dependent surfers to powerful hosts in the context of hospitality exchanges mediated by the online organization CouchSurfing. Another insight emerging from our study concerns the role of privately-reported trust ratings in the flow of status between surfer and host. Even when asked privately, surfers seem to hold their hosts in genuinely higher esteem than is the case in the reverse direction. This suggests that at least part of status-giving is the result of a private conviction rather than of public performance.

While CouchSurfing represents an excellent source of data for observing interpersonal interactions more generally, we find it important to acknowledge that CouchSurfing relies on an Internet platform, and that our findings may have particularly interesting consequences for other similar services. Indeed, many Web-based platforms have emerged to facilitate peer-to-peer exchange - monetized or not - of products and services. While the often-fundamental role of material incen-

tives should remain in sight, our contribution argues for the need to consider alternative exchange mechanisms - such as status giving - through which economies may function, be they online or offline.

The operation of a status-giving mechanism to balance a power-unequal relationship is an intuitive principle of social life. As our inquiry suggests, the mechanism operates in relatively minute ways. The fact that CouchSurfers can receive more status by playing the role of host rather than by being the surfer suggests one possible explanation for a popular dilemma regarding CouchSurfing: its very existence. Seen from a pure economic point of view, it would appear as if there were no barrier to continuously exploiting the organization's hospitality resources and never giving anything back to the common pool of "couches" by hosting other users. Similarly puzzling is the behavior of hosts, who do not usually receive anything tangible in return from their guests. If CouchSurfers were to follow their material incentives entirely, the network would unravel: surfers would take advantage of the host's generosity, without ever wishing to contribute to the common resource pool. Conversely, hosts' incentives would guide them to withhold contributing, as they (seemingly) receive nothing in return.

Status-giving comes into play as a possible explanation for why such "freeloading" behavior has not become prevalent as a dominant strategy: even though few material benefits accrue to the host from their generosity, hosts receive status in the organization instead. Conversely, surfers receive hospitality, but they have to contend with a (statistically) lower-status position. We advance this explanation as an instance in which status-giving may serve to maintain a seemingly-tenuous process of social exchange.

In addition to providing future opportunities for the study of the structural implications of status-giving, the richness of CouchSurfing data enables us to test the mediating effect of resource scarcity and of the availability of alternatives. In

particular, our broader research agenda includes a test of Thibaut and Kelley's argument [9], according to which the existence of readily available alternatives should weaken the host's power position, thus yielding less status giving. A natural follow-up question concerns the causal framing of status giving actions on CouchSurfing. It may be, for instance, that surfers internalize a norm associated with the role of surfer, which dictates gratitude towards one's benefactor. Conversely, it may be that status-giving is an ad-hoc reaction, ungoverned by any normative structure. Our current investigation, however, presents a confirmation of power imbalance and status giving in real-world exchange networks, the relevance of which is extrinsic to the root cause of the behavior. Establishing that different roles are associated with different behaviors sheds insight into and redefines our expectations about the function and the evolution of such networks. These are only some of the fascinating new research directions that the CouchSurfing dataset has opened for inquiry.

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References

[1] P. Bialski and D. Batorski. From Online Familiarity to Offline Trust: How a Virtual Community Creates Familiarity

and Trust between Strangers. In C. S. Ang and P. Zaphyrus, editors, *Social Computing and Virtual Communities*. Chapman and Hall/CRC, 2009.

- [2] P. M. Blau. *Exchange and Power in Social Life*. Wiley, New York, 1964.
- [3] K. S. Cook and R. M. Emerson. Power, equity, and commitment in exchange networks. *American Sociological Review*, 43(5):721–739, 1978.
- [4] K. S. Cook, R. M. Emerson, M. R. Gillmore, and T. Yamagishi. The Distribution of Power in Exchange Networks: Theory and Experimental Results. *American Journal of Sociology*, 89(2):275–305, 1983.
- [5] R. Emerson. Power-dependence relations. *American sociological review*, 27(1):31–41, 1962.
- [6] R. M. Emerson. Exchange Theory Part II: Exchange Relations and Network Structures. In J. Berger, M. Zelditch, and B. Anderson, editors, *Sociological Theories in Progress*, pages 58–87. Houghton Mifflin, Boston, 1972b.
- [7] D. Lauterbach, H. Truong, T. Shah, and L. Adamic. Surfing a Web of Trust: Reputation and Reciprocity on CouchSurfing.com. *2009 International Conference on Computational Science and Engineering*, pages 346–353, 2009.
- [8] C. Teng, D. Lauterbach, and L. Adamic. I rate you. You rate me. Should we do so publicly? In *Proceedings of the 3rd conference on Online social networks*. USENIX Association, 2010.
- [9] J. W. Thibaut and H. H. Kelley. *The Social Psychology of Groups*. John Wiley, 1959.