'Sorry, Pal—What I See is Usually Not What You Get!': The Role of Reciprocity in Information Disclosure

Tom Gross, Christoph Oemig
Faculty of Media, Bauhaus-University Weimar, Germany
({tom.gross, christoph.oemig}(at)medien.uni-weimar.de)

Contact:
Prof. Dr. Tom Gross
Faculty of Media
Bauhaus-University Weimar
Bauhausstr. 11, Room 113
99423 Weimar, Germany

E: tom.gross@medien.uni-weimar.de
T.: (++49-3643) 58-3733
F: (++49-3643) 58-3709
W: http://www.uni-weimar.de/
medien/cscw/

'Sorry, Pal—What I See is Usually Not What You Get!':

The Role of Reciprocity in Information Disclosure

Tom Gross, Christoph Oemig

Faculty of Media, Bauhaus-University Weimar, Germany

({tom.gross, christoph.oemig}(at)medien.uni-weimar.de)

Abstract. For efficient distant cooperation the members of workgroups need information about each other. This need for information disclosure often conflicts with the users' wishes for privacy. In the literature often reciprocity is suggested as a solution to this trade-off. Yet, this conception of reciprocity and its enforcement by systems does not match reality. In this paper we present our study's major findings investigating the role of reciprocity among which we found that participants greatly disregarded the above conception. Additionally we discuss their significant implications for the design of systems seeking to disclose personal information.

Author Keywords. Awareness, information sharing, privacy, reciprocity.

ACM Classification Keywords. H.5.2 [Information Interfaces and Presentation]: User Interfaces — Graphical User Interfaces, User-Centred Design; H.5.3 [Information Interfaces and Presentation]: Group and Organisation Interfaces — Computer-Supported Cooperative Work.

1 Introduction

For efficient distant cooperation the members of workgroups need—group awareness—information about each other's presence, availability, and activities [Gross *et al.* 2003]. This need for sharing this personal information—that is, information disclosure—often conflicts with the users' wishes for privacy [Hudson & Smith 1996]. In the literature often reciprocity is suggested as a solution to this trade-off. Generally, reciprocity describes a vital social norm, which denotes that if somebody gives something to another or helps in any way, then the other is obliged to return the favour [Goulder 1960]. More precisely, reciprocity can be implemented as a policy that 'would allow user 1 to access information concerning user 2 only if user 1 allows user 2 to access the same data about user 1 [Godefroid *et al.* 2000].

This mandatory reciprocity contributes an equilibrium type of notion: senders expect to receive the same information in number and kind in return to what they provide. But

having human-centred design in mind, is this an appropriate way disclosing information while regarding privacy, and does this solution fit to all situations? We tried to investigate the role and impact of reciprocity on people's behaviour while sharing personal information. Our research questions addressed the following issues: Do people regard reciprocity at all or to what extent in information exchanges especially in exchanging personal information? How do people react upon what is provided to them? What are the consequences of information asymmetry, when people ignoring the norm of reciprocity? In the remainder of the paper we describe our study of reciprocity, its design and results. Afterwards we discuss some of its implications for system design and future work.

2   Overview of the Study

We did a study to find out the user's preferences with respect to information disclosure and reciprocity.

The study was conducted in July 2005 at the Cooperative Media Lab (CML) Open House at a midsized university in Germany. 17 participants were chosen among event visitors, mainly students, their parents, officials and staff members. 64% of them were female, 36% male. Participants had an average age of 27 and nearly 11 years of computer experience.

The survey consisted of a five-part questionnaire asking people about their information sharing preferences in particular situations. The *first* part evaluated the participants' trust towards specific groups of people (e.g., family members, work colleagues). The *second* part evaluated factors influencing the participants' information disclosure. The *third* part was the larges section: Here, participants were asked to provide three information entities of different sensitivity (i.e., their current activity; current reachability; and name), and to indicate their preferred precision (i.e., true; vague; none; or free-form) for each of them as a response to varying information disclosure of their counterparts (i.e., (T)rue and detailed information; and (V)ague and partial information (more specifically: no information about activity, vague information about where to be reached and true information concerning the name)). These questions were asked for three different situations (i.e., (P)rivate; (L)eisure; (W)ork; and (G)eneral). Part *four* asked them to rate the sensitivity of named information entities. The *fifth* and final part was used to gather standard socio-demographic data.

It took 30 to 40 minutes to complete the questionnaire, especially the third part required participants to fill out at least 120 precision fields. Yet, besides the high effort only a few people reported difficulties completing the questionnaire. This might be due to the fact that the participants' interest was raised by our system demos and their own exploration of our systems and prototypes during the Open House.

3   Results

In this section we report on some of the major findings especially concerning the role of reciprocity. On a whole the role of reciprocity—here understood as a situation, in which participants and counterparts disclose information of the same kind and precision—turned out to be different than anticipated: We initially expected people to generally follow the norm of reciprocity and that they would adjust their precision settings broadly to the

settings of the respective incoming information bundle. Yet, in most cases studied people did not simply follow the 'what you do to me I do to you' pattern. We will explain details below.

3.1 Participants Disregarded Reciprocity in Most Cases

Due to the study's design it was up to the participants to establish reciprocity as reaction to what was offered in setting T and V—however, in most cases they did not. Only 21% of all cases were reciprocal (i.e., all three information chunks were provided at the same precision by the two parties). The data show that an average of 36% regarded reciprocity in setting T where counterparts provide all information in a true manner. However, this value dropped down to an average of 7% for setting V where only partial information is provided. Table 1 denotes the shares of reciprocity for each of the above-mentioned situations of setting T and V.

Setting	Private	Leisure	Work	General
T	10%	38%	38%	46%
V	4%	14%	6%	4%

Table 1. Probabilities of reciprocity.

The strong decrease is mainly due to the study's choice of settings illustrating two effects: in setting T participants were only able to provide equally or less precise information as their counterpart (we call this ceiling-effect) while in setting V they could additionally provide more or partially more/less information (later referred to as mixed) (cf. Table 4, details are explained below). The similar effect is expected to occur at the lower end of the scale (we call this floor-effect), since people cannot provide less than no information. Thus high shares of reciprocity at the upper (and lower) end of the scale are considered unintentionally reciprocal in their largest part—yet, they occurred.

3.2 Trust Influenced Reciprocity, but Trust and Reciprocity do not Correlate

The previous suggests great differences between settings T and V. However, within these settings the differences between different types of recipients turned out to be even more significant.

More specifically we identified four groups of individuals treated differently by participants. Their kind of trust relationship proved to be a strong influencing factor for this categorisation (for a more detailed analysis of people in information sharing settings see [Olson *et al.* 2005]). We found that there are people of general high trust (GHT), people with specific high trust (SHT) only in certain situations, general medium trust (GMT), and finally general low trust (GLT) individuals. Table 2 denotes characteristics and examples of these individuals.

Name	Characteristics	Example
General high trust (GHT)	General high trust values in all of the tested situations (leading to a high trust average)	Family members, friends
Specific high trust (SHT)	High trust values in specific situations tested and low trust values in the remainder (leading to a medium trust average)	Colleagues
General medium trust (GMT)	General medium trust values in all tested situations (leading to a medium trust average)	Acquaintances
General low trust (GLT)	General low trust values in all tested situations (leading to a low trust average)	Strangers

Table 2. Four trust groups.

Additionally, some study participants made very valuable comments: 'I don't trust all family members the same way, I distinguish them on an trust group basis'. Therefore, for instance, we do not consider family as a whole as GHT trust group but only selected family members.

Table 3 shows the probability of reciprocity per trust group.

Setting	GHT	SHT	GMT	GLT
T	75%	15%	13%	0%
V	7%	10%	10%	3%

Table 3. Probabilities of reciprocity per trust group.

High shares of reciprocity with GHT trust group (75%) in setting T can be explained by the ceiling-effect while setting V denotes a value of 7%. However, there is hardly any reciprocity with GLT trust groups in either setting (T: 0%, V: 3%). We expect this to change in a prospective setting, where the counterparts provide no information at all: due to the general behaviour towards GLT these cases become reciprocal (i.e., no information offered and no information received).

This illustrates that high shares of reciprocity do not correlated with high trust values. GMT and SHT appear to have a stable share within 10 to 15 % of the cases. But how is the counterpart treated if not reciprocally?

3.3   Asymmetry is Clearer for GHT and GLT Trust Groups

Participants who react asymmetrically—that is, do not stick with reciprocity—can basically share information above or below reciprocity level or in mixed ways (i.e., in a single case, which is comprised of three information entities, precisions can be above or below reciprocity level for each information entity). Table 4 presents participants asymmetrical reactions (deviations are indicated as above (+), below (-) or partially above and below (+/-) reciprocity level; columns marked with * are impossible to occur).

		GHT			SHT			GMT			GLT		
		+	+/-	-	+	+/-	-	+	+/-	-	+	+/-	-
T		*		25	*		85	*		87	*		100
V		**72**	13	10	**48**	10	33	33	17	**40**	5	15	**78**

Table 4. Probabilities of asymmetry per trust levels, incl. types of deviations.

It reveals that the GHT trust group are mostly treated above reciprocity level (72%) in setting V (i.e., they receive more precise information than they offer) whereas they are treated at reciprocity level in setting T (mainly due to the ceiling-effect). The GLT trust group are usually treated below (T: 100%, V: 78%).

For the GMT and SHT trust groups the situation is less clear. Table 5 takes a closer look at their cases in situations p, l, w, and g in both settings.

		SHT				GMT			
		+	=	+/-	-	+	=	+/-	-
T	P	0	0	0	**100**	0	0	0	**100**
	L	0	0	0	**100**	0	20	0	**80**
	W	0	**50**	0	**50**	0	10	0	**90**
	G	0	10	0	**90**	0	20	0	**80**
V	P	30	10	0	**60**	20	0	20	**60**
	L	**40**	20	10	30	**50**	20	10	20
	W	40	10	**30**	20	20	0	**40**	**40**
	G	**80**	0	0	20	**40**	20	10	30

Table 5. Probabilities of asymmetry per trust level and situation, incl. types of deviation.

The majority of both are treated above and below reciprocity level in setting V though the SHT trust group had tendencies to be treated above (48%) and GMT below (40%) the line. In setting T SHT (85%) and GMT (87%) were clearly treated below reciprocity level. It can be seen that both kind of trust groups are excluded from private situations (P). The leisure situation (L) appear to be very similar for both groups especially in setting V with slightly higher values for the GMT trust group. However, while SHT is treated at or above reciprocity level in the work situation (W), the GMT trust group is kept out here as well.

3.4 Participants Regarded Incoming Information, yet Ignored It Between Medium and Low Trust Groups.

What we have learned this far suggests that participants distinguish recipients and situations. As [Lederer *et al.* 2003] we also found the recipient to be a stronger determinant than the situation. However, participants did not adhere to reciprocity to the extent expected. In this section we analyse the intensity of the participants' reactions to changes of their counterparts information disclosure behaviour. It can be inferred from the difference between the absolute precision values of setting T compared to setting V. Little or no change in absolute values indicates the maintenance of a certain level while greater changes indicate a distinguished treatment (cf. Table 6).

Information	GHT	SHT	GMT	GLT	Change
Current activities	-20%	-26%	-28%	+4%	-100%
Where to be reached	-14	-4%	-25%	+2%	-25%
Name	-1%	+4%	-15%	+1%	0%

Table 6. Difference in absolute precision values changing from setting T to V.

Incoming information is regarded as reciprocal if the participants' changes follow their counterparts' directions of changes. When switching from setting T and V the assumption was that counterparts still provide their name, but provide no information concerning their current activities (-100%); and only vague information about where they can be reached (-25%).

The results were only little changes for the GLT trust group. However, the behaviour towards the other trust groups shows that participants reacted to the type and precision of the incoming information. The strongest decrease was measured for information reduced the most, however, not at such high levels—that is, although current activities are not exposed at all anymore (-100%) in setting V, the participants only reacted by a maximum of -28% in the case of the GMT trust group. The latter suffered the greatest losses in precision compared to other groups, while the GLT trust group's incoming information was ignored. This suggests a transition from regard to ignorance between medium and low trust groups.

3.5 Although Absolute Values Decreased, Relative Precision Increased

In order to determine whether counterparts are rewarded, penalised or treated unchanged, we defined the following: a counterpart c is rewarded when her level for an information entity i in setting V (below, at, or above reciprocity level) is higher than in setting T. She is penalised if her new level in setting V is below the one of setting T. With p representing the participant this yields: $x = \text{Level}_{iV} - \text{Level}_{iT} = (\text{info}_{ipV} - \text{info}_{icV}) - (\text{info}_{ipT} - \text{info}_{icT})$ with $x>0$ meaning reward (i.e., receiving more precise information than before), $x=0$ meaning no change and $x<0$ representing the recipient being penalised (i.e., receiving less precise information than before) on a scale from -6 to 6. Table 7 depicts the results.

	GHT	SHT	GMT	GLT
Current activities	2.4	2.2	2.2	3.1
Where to be reached	0.6	0.9	0.3	1.0
Name	-0.0	0.1	**-0.5**	0.0

Table 7. Difference in relative precision values changing from setting T to V.

As it shows GMT recipients are penalised in the case of the name's disclosure. However, all other cases indicate that recipients were rather rewarded than penalised—that is, they improved their level receiving relatively more precise information in setting V than in setting T. Theoretically stepping from setting V to T inverts these figures, yet our study only examined the step from T to V, thus this cannot be confirmed. However for now, from a relative perspective Table 7 suggest a relative precision level increase for all counterparts, although Table 6 indicates decreases in absolute precision values.

4   Discussion

With our study we took a first glimpse at how the norm of reciprocity affects people's habits in information disclosure. We found people mostly disregarding reciprocity. Trust determined participants' (reciprocal) behaviour but trust values and reciprocity do not correlate. Participants regarded incoming information yet shifted from regard to ignorance between medium and low trust trust groups. Though receiving less in absolute values counterparts experienced an increase in relative precision (since they reduced their information precisions more than the participants). For us, this has the following major implications on the human-centred design of systems supporting group awareness and information disclosure:

Mandatory reciprocity as described in the beginning does not seem to be the silver bullet for all cooperative settings. *Therefore, systems should provide alternative mechanisms for mutual information disclosure.* They should also take into account that reciprocity is sometimes easy to measure—especially in situations where users exchange different, yet equivalent, types of information. Goulder noted that, 'reciprocity will [not] operate in every case; its occurrence must, instead, be documented empirically' [Goulder 1960]. He also suggests a rather quantitative view of reciprocity: returning a favour does not mean to answer it by equal means in equal ways. Thus people accept more or less in return as equivalent or reciprocal. A great favour can be returned a smile. That is, what people obviously did: they returned something considered appropriate and adequate in that given situation. Applying that notion all of the above cases are indeed reciprocal when both, sender and recipient, perceive them that way. Thus a future study ought to include the counterparts' opinion as well.

Trust towards the counterpart strongly influences the way of disclosure. Connected to a certain trust group (SHT) or across many trust groups (GHT, GMT, GLT) it acts as a reliable determinant in order to predict precision values. *Therefore, systems should provide mechanisms for trust building—particularly, when the user are spread in time and space.*

Incoming information has a great impact. This information needs to be considered when determining the precision of information to be disclosed. *Therefore, systems should provide mechanisms for presenting users with feedback on the information they receive from others in order to ease their own information disclosure.*

Acknowledgements

References

Godefroid, P., Herbsleb, J.D., Jagadeesany, L.J. and Li, D. Ensuring Privacy in Presence Awareness: An Automated Verification Approach. In *Proceedings of the ACM 2000 Conference on Computer-Supported Cooperative Work - CSCW 2000* (Dec. 2-6, Philadelphia, PE). ACM, N.Y., 2000. pp. 59-68.

Goulder, A.W. The Norm of Reciprocity: A Preliminary Statement. *American Sociological Review 25* (1960). pp. 161-178.

Gross, T., Wirsam, W. and Graether, W. AwarenessMaps: Visualising Awareness in Shared Workspaces. In *Extended Abstracts of the Conference on Human Factors in Computing Systems - CHI 2003* (Apr. 5-10, Fort Lauderdale, Florida). ACM, N.Y., 2003. pp. 784-785.

Hudson, S.E. and Smith, I. Techniques for Addressing Fundamental Privacy and Disruption Tradeoffs in Awareness Support Systems. In *Proceedings of the ACM 1996 Conference on Computer-Supported Cooperative Work - CSCW'96* (Nov. 16-20, Boston, MA). ACM, N.Y., 1996. pp. 248-257.

Lederer, S., Mankoff, J. and Dey, A.K. Short Talk: Who Wants to Know What When? Privacy Preference Determinants in Ubiquitous Computing. In *Extended Abstracts of the Conference on Human Factors in Computing Systems - CHI 2003* (Apr. 5-10, Fort Lauderdale, Florida). ACM, N.Y., 2003. pp. 724-725.

Olson, J.S., Grudin, J. and Horvitz, E. Late Breaking Result: A Study of Preferences for Sharing and Privacy. In *Extended Abstracts of the Conference on Human Factors in Computing Systems - CHI 2005* (Apr. 2-7, Portland, OR). ACM, 2005. pp. 1958-1988.