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# What's Mine Is Ours, or Is It? A Study of Attitudes about Information Sharing

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As technology for information access improves, people have more opportunities to share information. A theory of information sharing is advanced and we report the results of three experiments on attitudes about sharing technical work and expertise in organizations. Based on research on sensitive topics difficult to study in the field, we derived vignette-based measures of attitudes. Subjects read a description of an employee's encounter with a previously unhelpful coworker who subsequently requested help—in the form of a computer program or computer advice. The influence of prosocial attitudes and organizational norms is inferred from subjects' support of sharing despite the previous unhelpful behavior of the coworker. Experiments 1 and 3 demonstrated that greater self interest reduces support of sharing, but that a belief in organizational ownership of work encourages and mediates attitudes favoring sharing. Work experience and business schooling contribute to these attitudes. The theory asserts that information as expertise belongs to a special category of information that is part of people's identity and is self-expressive. Experiments 2 and 3 demonstrated that subjects felt computer expertise belonged more to its possessor than the computer program did but would share it more than the program. Hence, attitudes about information sharing depend on the form of the information. Sharing tangible information work may depend on prosocial attitudes and norms of organizational ownership; sharing expertise may depend on people's own self-expressive needs.

*Proprietary information—Information sharing—Information exchange—Attitudes—Norms—Organizational citizenship—Ownership—Sharing data*

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Hi there,

May I have a copy of the subscriber tracking program you developed?

Thanks, Bud

This message, and others like it, can be found on computer networks in organizations. Computer-based technologies such as e-mail, networked databases, and group decision support systems vastly increase the potential for information sharing in organizations. Managers, policy makers, and technology developers talk enthusiastically about this potential. Information sharing is a key element of "total quality management" and the "new organization" (Drucker 1988). Increased information sharing could improve organizational efficiency, learning, innovation, flexibility, and understanding of organizational goals (e.g., Walton 1989, Malone and Rockart 1991, Sproull and Kiesler 1991, Nickerson 1992). But will people want to share information across the organization? Will the hopes of managers, policy makers, and technology developers be realized? The success of new technology for information sharing will depend on how people use it. Research already has shown that communications and exchanges among people are heavily influenced by their friendships and personal contacts with others, and by their commitment to the organization more generally (Kraut et al. 1990, O'Reilly and Chatman 1986). Employees may or may not be willing to share information as widely as technology makes possible or as much as managers might desire.

This paper reports an investigation of attitudes about information sharing in a technical context. Our purpose was to better understand the attitudes and norms that will support or constrain information sharing in technologically-advanced organizations. We assumed at the outset that organizational culture and policies as well as personal factors can influence people's attitudes about information sharing. Some organizations discourage information sharing because of the fear of industrial espionage or of diverting people's attention from their own work or of causing role conflict (Zuboff 1988, Grover 1993). Some encourage sharing by promoting a culture of good citizenship and voluntary help. This encouragement typically takes the form of universalistic norms of aid rather than particularistic rules about information sharing because particularistic rules are too hard to specify and to enforce (Heimer 1992). Employment contracts may specify that information gathered or generated at work, or in connection with work, belongs to the organization (and by implication, to all employees). Organizations cannot realistically supervise and sanction universalistic norms and general information sharing policies. Employees must internalize them as attitudes.

Descriptive studies of behavior in computer networks confirm that employees in some organizations do share knowledge and help others, including organizationally-remote strangers they will never meet in person (Finholt and Sproull 1990, Constant et al. in press). Constant et al., in their study of employees' use of broadcast e-mail in an 11,000-person computer firm, identified 208 employees in a six-week period who asked "does anyone know" questions and who received approximately 1,600 answers to those questions, mostly from strangers. Descriptive studies of voluntary exchanges of advice, however, do not tell us about nonparticipants in information exchange and refusals to contribute, the incidence of which is unknown but conceivably significant (Thorn and Connolly 1987).

In developing a theoretical model of information sharing attitudes, it is important to understand the fundamental structure of the exchange situation. Kelley and Thibaut's (1978) interdependence theory distinguishes between exchange between two individuals acting alone and exchange between two individuals who are influenced by their social and organizational context. In the former situation, rational

self interest and simple reciprocity theoretically predict behavior: I help you if you help me; I withhold help if you act destructively. The latter "primitive" reciprocation of negative behavior does not necessarily happen, however. People may rise above their initial impulse to retaliate negative behavior because of the social and organizational context, which affects their concern for such things as their future relationships with others, the balance of power, how others will see them, and the impact of their behavior on other desirable goals. Hence if another employee acts inappropriately towards a coworker, the coworker may set aside his impulse to retaliate and decide that acting constructively is a better response.

An interdependence analysis implies that when Person A behaves positively towards Person B in an organizational culture that ostensibly applauds prosocial behavior, the culture and Person B's personal, "primitive" feelings each lead us to predict that B will respond positively. In this situation, the relative contribution of the organizational context to B's positive response cannot be determined. By contrast, when Person A acts inappropriately or destructively, the organizational context and the primitive response are in theory opposed, so we are better able to infer the strength of the context to support a constructive response. The stronger the organizational context in support of friendship and polite behavior, of altruistic attitudes, and of good citizenship norms, the more likely it is that Person B will ignore his or her "primitive" inclination to reciprocate a negative act and to instead act positively. However in situations that reduce social concern or increase self-interest, Person B should come closer to behaving as he or she self-centeredly wishes to behave.

Although Thibaut and Kelley did not address information exchange or organizational settings explicitly, we can extend the analysis to that domain. One question implied by their interdependence analysis is whether people in work organizations treat information sharing like other exchanges and are disinclined to share information with coworkers who act destructively. Hence our first prediction is that when a coworker has refused a favor in the past, the respondent's basic, self-centered inclination is not to share information with that person. Further, willingness to share information should be lower under any condition that reduces social concern for the information seeker or that increases the costs of sharing or self-interest of the information possessor (Murnighan et al. 1993).

Interdependence theory implies a second question about information sharing. Do people feel sharing information is a social good—a response that may be personally costly or unpleasant (as in the case of a previously unhelpful coworker) but would be beneficial to the organization or to the employee in the long run? If so, what leads people to weigh the social good more than the personal cost? In traditional games research, questions regarding such prosocial transformation processes are addressed by confronting subjects with situations where the available options have numerical or monetary outcomes. If subjects react in ways that differ from what would be expected on the basis of pure self-interest and reciprocity, their behavior is inferred to result from the transformation of motivation. In the domain of organizational work and relationships, where outcomes and goals often cannot be measured in points or cash, it is much more difficult to assess such transformations.

We adopted a strategy used in studies of accommodation in close relationships, which also are difficult to assess in terms of points or cash (Rusbult et al. 1991). In these studies it is assumed that in the face of destructive acts by a partner, the "primitive" response is to retaliate but that prosocial transformations may occur as the

result of such considerations as concern for the partner, long-term goals, and social norms. Researchers ask how people fundamentally feel about accommodation and about transformation processes by observing preferences under conditions where the partner acts destructively. Using this strategy, researchers can evaluate the extent to which transformation rather than reciprocation occurs, compare different conditions for transformation (such as more or less commitment to the partner), and ask what leads people to react constructively to hostility.

A difficulty in assessing prosocial transformations in information sharing remains, however, because respondents want to display socially desirable responses. Hence studies that use direct attitude measures (e.g., asking for a judgment about whether it is right to share with another when the other has refused a favor) have been criticized because socially desirable answers are readily apparent and tend to receive stronger endorsements than would be the case outside of the testing situation (Burstin et al. 1980). An alternative technique that elicits more candid answers relies on the "vignette," a short, concrete story to which the subject responds in a variety of formats. For instance, the vignette might depict a character, "John . . . whose coworker in the same project once refused a favor but now requests help from John . . .". Subjects are then asked to evaluate this situation. To further decrease the biasing effects of social desirability in responding, subjects may be asked to assume the role of a person in the story. Instead of answering for themselves (e.g., "What would you do if someone asked you . . .?") the subjects are asked what that other person should do or what they would do if they were a person in the story (e.g., "Should John share with you?"). Vignettes often are used to elicit complex social judgments on subjects that are sensitive and are difficult to observe in the field, such as responses to people of differing social status or reactions to ethical situations in business (e.g., Robertson and Anderson 1993).

We followed this general strategy in this study by presenting to subjects a vignette describing a situation in which a previously unhelpful coworker asks an employee to share a computer program or computer advice. Interdependence theory predicts that because the coworker had previously refused a favor, subjects should have reduced concern for that person and the urge to reciprocate. To investigate this question, i.e., whether there is an impulse to reciprocate and refuse to share, we manipulated the degree of self-interest the respondent would have in not sharing varying the respondent's perspective. That is, subjects were asked to answer from the point of view of the employee who possessed the program or expertise, from the point of view of the (previously unhelpful) employee who needed help, or from the point of view of an observer. We predicted that the subjects taking the perspective of the information possessor would be less inclined to share than subjects in the other two conditions. A significant effect would support the hypothesis that there is a "primitive" tendency to reciprocate negative behavior by refusing to share information.

### **Social Determinants of Information Sharing**

Suppose that people are more likely to share information when they feel inclined to engage in prosocial transformations, that is, when they wish for good outcomes not only for themselves but also for other employees or for the organization more generally. If this is the case, then we should find that people are more willing to share information when they are happier with their coworkers and with the organization. Although the relationship between information sharing and happiness at work has

not been studied specifically, researchers have found that good citizenship (voluntary help or out-of-role help) is positively associated with organizational commitment and with closeness to colleagues (O'Reilly and Chatman 1986). However, if happiness in the organization and liking of one's coworkers were the only issues in understanding information sharing, there probably would be less of it than would be desirable.

Believing that information sharing is usual, correct, and socially expected workplace behavior should increase information sharing, independent of the information possessor's personal feelings about his or her coworkers or organizational commitment. This belief could be acquired from, or reinforced by, organizational norms. Norms consist of shared beliefs about behaviors that people ordinarily do and behaviors that are right. One widespread norm that could contribute to information sharing is the idea that organizations own the labor of their employees. This norm implies that an information outcome of work such as an idea, process, invention, document, or computer program that an employee creates or acquires at work or using organizational resources actually belongs to the employer rather than to the employee. If the outcome is tangible, presumably it belongs to the organization's capital stock rather than to the individual's. If information outcomes of work do belong to the employing organization, and if sharing them would be useful to the work of others in the organization, then it follows that employees should share them with other employees.

We propose that many people learn an organizational ownership norm as they begin to acquire work experience and professional training. They may not learn it earlier, at home or in school, due to the emphasis in those settings on gaining personal skills and knowledge. We predicted that the more work experience or work training people have, the more organizational ownership they will attribute to any employee's information. We also predicted that the attitude that the organization owns information would mediate attitudes favoring information sharing with another employee. That is, to the extent the employing organization owns an employee's idea, invention, computer program, and so forth, that employee should share it with other employees.

The idea that perceived organizational ownership mediates attitudes about sharing moves our model beyond a mere listing of variables that predict sharing. Mediation is a dynamic process whereby information sharing depends on the possession of key attitudes about the nature of sharing as a social (organizational) good rather than purely a personal preference. We believe the attitude that the organization really owns a valuable information outcome (even though the individual employee has physical possession or control of it) is one of the key attitudes underlying the transformation of sharing from a personal preference to a social good. Organizational ownership summarizes the idea that an employee's information work is really not his or hers to give or withhold selfishly, but must be used to satisfy organizational goals.

### **Information as Product Versus Information as Expertise**

Our interdependence analysis thus far assumes that information in different forms and guises has the same basic role in exchanges. That is, ideas, inventions, documents, programs, or information work that are in an employee's physical possession or control are assumed to have essentially the same psychological meaning to him or her, and sharing them is assumed to increase the possessor's psychological costs, for example, his or her effort, unpleasantness if the receiver is undeserving, and so forth. This analysis suggests that sharing anything valued always occurs in the context of a

fundamental individual-oriented, rational-economic exchange. Within this context, we can predict people will be "fundamentally" disinclined to share information with a coworker who previously was unhelpful, although they may in reality share if they hold prosocial attitudes too. However, evidence that people do not, in fact, treat all kinds of information alike suggests we will need to supplement this analysis of the fundamental exchange.

Previous research suggests that people do not view information as an inert commodity whose value is separable from its form, manner of presentation, possessors, or channel of communication (Feldman and March 1981). One major distinction people seem to make is between tangible information such as a written document or computer program, and intangible information embodied as human memory, knowledge, experience, or skill such as ability to type, ride horses, or fix a software bug. The distinction between information as tangible "product" and information as intangible "expertise" admittedly has fuzzy boundaries. For instance, compare an idea presented in a document with an idea proposed in a conversation. The idea-in-document is probably perceived as an information product and the idea-in-talk is probably perceived as expertise. However, these perceptions might be reversed if the document were in pencil rather than printed and the conversation were recorded on a videotape. Despite these subtleties, we believe people make the distinction and that the two forms of information have different meanings to people and different social implications as well. For example, a human resources statistic on a manager's computer printout as compared with the same statistic that the manager just knows is essentially the same statistic. However, the printout may have more influence in the organization than the statistic in the manager's memory because it comes from a "computer" (e.g., Pfeffer 1981). On the other hand, the statistic in memory (especially if mentioned casually in conversation) may reflect better on the manager's unique competence.

We propose that many forms of work information are perceived to fall in one of two categories, product or expertise, that the categories are often but not necessarily correspondent with tangible and intangible information, and that people attach different meanings to sharing information in each category. We propose that people view information as product mainly as a commodity like other commodities, and that their sharing behavior follows the model of reciprocal exchange and social transformation delineated above. However, people do not view information as expertise as simply a commodity but also (or instead) view it as part of themselves. Hence, expertise more directly reflects on their identity and self-worth. Accordingly, sharing expertise will have not only pragmatic implications but also implications for the expression and consistency of the possessor's identity and value.

A number of theorists have argued and tried to demonstrate empirically the power of self-expression as a motivational force. Self-esteem is based on a sense of competence, power, achievement or ability to cope with and control the environment. In Bandura's social-cognitive theory (1986), both competence standards and social norms are internalized into the self-concept and used in evaluating a person's own behavior. Self-evaluation is an important source of intrinsic motivation: people's self-reactions to their own response to others serve as principal sources of reward and sanction. People also want to express their sense of self-consistency between the past and present and between their self-concept and their behavior (Schlenker 1985). As an expression of self and of self-consistency, sharing expertise could have the

following personal benefits: heightening of self-esteem and pride, increased self-efficacy, increased personal identification with coworkers or the organization, more respect from others and a better reputation, and reduced alienation or stronger feelings of commitment.

Our argument implies that sharing expertise, in addition to (or instead of) imposing personal costs, may produce significant personal benefits to the information provider because it permits self-expression and demonstrates self-consistency. Therefore, even in the absence of strong organizational norms of ownership or prosocial attitudes, people may be inclined to share expertise. Accordingly, we predicted that in response to a coworker who had failed to help in the past, people would be more likely to share computer expertise than a computer program, and further that the mediation effect of organizational ownership attitudes would be relatively weaker for expertise than for the program.

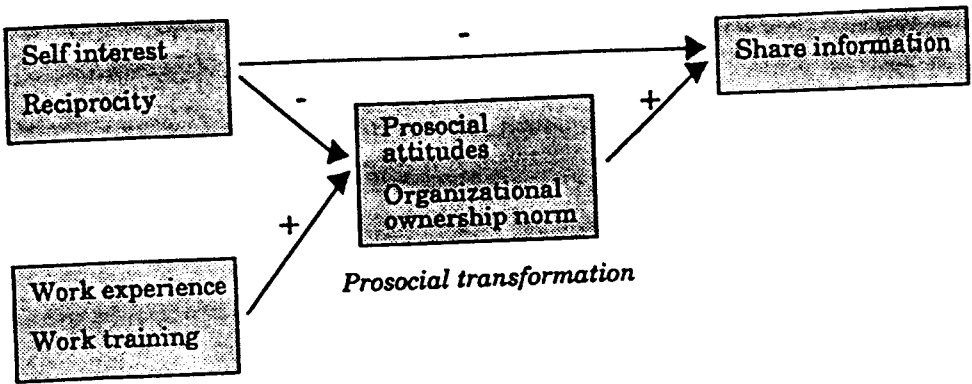
We present a summary of the theoretical argument in Figure 1. Sharing a computer program or computer expertise are dependent variables. Self-interest and reciprocity exert a direct negative influence on sharing. (The negative influence assumes the information seeker previously has behaved negatively and that there is a personal cost to sharing—otherwise all signs would be positive.) However, prosocial attitudes and the organizational ownership norm act as mediators of the independent variables. That is, work experience and training influence sharing through prosocial attitudes and belief in organizational ownership of work. Mediation also causes prosocial transformation of personal motivation. The bottom panel in the figure depicts the process leading to sharing expertise, with self-expression and self-consistency as additional independent factors influencing sharing. Since these forces provide more positive personal reasons to share, the relative role of the mediators is reduced.

To examine the predictions described above, the vignettes always described an employee who requested help from an information possessor who had previously been unhelpful. The information seeker asked the information possessor to share one of two forms of information, a copy of a computer program or advice based on computer expertise. We asked subjects to imagine this situation, to take the role of one of the protagonists, and to tell us who actually owned the information (the information possessor or the company), and whether they thought the information should and would be shared. In the three experiments to be described, we examined perceived organizational ownership and sharing attitudes about a computer program in Experiment 1, about computer expertise in Experiment 2, and both forms of information in Experiment 3.

### Experiment 1

In this experiment we investigated information sharing as an exchange, using predictions derived from interdependence theory. We presented to subjects a vignette in which an employee had written a computer program that another employee now wanted to use. To set up a potential conflict between personal feelings and organizational norms, the vignette explained that the employee who wanted a copy of the computer program had previously refused a favor requested by the programmer. We asked subjects for their opinions on the ownership of the computer program being sought and on the appropriateness and likelihood of the programmer's sharing it. To manipulate self-interest, we asked the subjects to take one of three different perspectives in answering the questions. One-third of the subjects were asked to imagine

Theoretical Process Leading to Sharing a Computer Program  
(Information as Product)



Theoretical Process Leading to Giving Computer Advice  
(Information as Expertise)

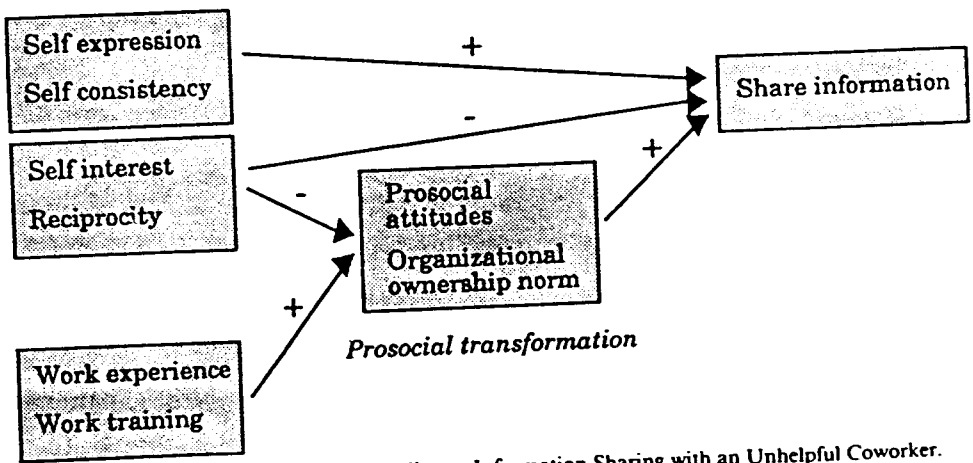


FIGURE 1. Theoretical Process Leading to Information Sharing with an Unhelpful Coworker.

themselves in the role of the employee who wrote the computer program (the information possessor), and they were asked how that employee would feel about sharing the program. Conceptually, these subjects should feel relatively high self-interest in the program and should be more likely than subjects in the other conditions to reciprocate the previous negative behavior of the employee requesting it by not sharing the program. Another third of the subjects were asked to imagine themselves in the role of the employee who previously refused the favor and who now sought the computer program (the information seeker). These latter subjects should feel self-interested in obtaining the program, hence should be in favor of sharing the computer program. Another third of the subjects were given a neutral observer role. We expected that they would take a more disinterested role than the other two groups and



that their attitudes would generally favor sharing (since they had nothing to lose personally from sharing). Finally, we examined the extent to which information sharing attitudes reflect people's experience in the workplace or work training. The subjects in our sample were college business majors or MBA graduate students with varied amounts of work experience. We tested the relationship of business schooling and work experience to attitudes about organizational ownership of the computer program and sharing the program.

## Method

The subjects were 485 undergraduate business students (61% of the sample) and graduate MBA students (39%) at Boston University's School of Management. Fifty-eight percent were male; 73% were U.S. citizens, 13% were from Asia, and 6% were from Europe. The average subject had 3.5 years of full-time, paid work experience.

We employed a between-subjects experimental design. All subjects were given the following standard vignette in their classrooms.

*Background.* You and John are junior-level computer programmers in a high-tech company. You and John are in the same department and are assigned to the same programming project. About a month ago, John refused to help you fix a program bug.

*Current Situation.* You have just put 40 hours of work into a particularly difficult computer program to be used in your project. Now, John would love to have a copy of the program for his own work and asks you for a copy.

### *Independent Variable*

The above vignette is written from the perspective of the information possessor; one-third of the subjects received that vignette. To create the perspective of the information seeker, the vignette was also written such that "John" and the subject's role in the story were reversed, i.e., ". . . you refused to help John fix a program bug . . . John has just put 40 hours of work into a . . . program . . . Now you would love to have a copy . . ." One-third of the subjects received this version. In the observer condition, the vignette was written as in the first condition but without reference to the subject, such that John was the information possessor and "Steve" was the information seeker.

### *Dependent Variables*

Questions on information sharing were posed using 7-point Likert scales. The following are from the information possessor's point of view:

How appropriate is it of John to ask you for a copy of the program?

How justified would you be in refusing to give John a copy of the program?

All told, what is the likelihood you would give a copy of the program to John?

The same questions were phrased with the roles reversed in the information seeker condition, i.e., "How appropriate is it of you to ask John for a copy . . ." In the observer condition, the questions were phrased without reference to the subject, i.e., "How appropriate is it of John to ask Steve for a copy . . ."

The measure of perceived information ownership was a forced-choice item phrased as follows (in the information possessor condition):

TABLE I  
Means and Correlations among Variables in Studies 1, 2 and 3

Exp. 1: Sharing a program <sup>a</sup>	<i>X</i>	sd.	1	2	3	4
1. Organizational ownership %	49%	32	-			
2. Appropriate to ask (1-7)	3.3	1.8	0.34			
3. Justified in denying (1-7)	4.6	1.8	-0.34	-0.61		
4. Likely to share (1-7)	3.6	1.6	0.23	0.36	-0.43	
5. Work experience in months	42.4	43.2	0.26	0.28	-0.27	0.13
Exp. 2: Sharing expertise <sup>b</sup>	<i>X</i>	sd.	1	2	3	4
1. Organizational ownership %	29%	25				
2. Appropriate to ask	4.2	1.8	0.06			
3. Justified in denying (1-7)	3.7	1.8	-0.21	-0.57		
4. Likely to share (1-7)	5.0	1.6	0.16	0.51	-0.50	
5. Work experience in months	59.2	46.4	0.05	0.21	-0.23	0.20
Experiment 3: Sharing a program; sharing expertise <sup>c</sup>	<i>X</i>	sd.	1	2	3	4
1. Organizational ownership %	52%	33				
2. Motivated to help (1-7)	2.8	1.3	0.11			
3. Justified in denying (1-7)	3.8	1.6	-0.11	-0.39		
4. Likely to share (1-7)	4.2	1.5	0.19	0.51	-0.50	
5. Work experience in months	71.8	32.7	0.20	-0.07	-0.05	0.10
Program vs. expertise:						
1a. Organizational ownership of the computer program				0.22	-0.20	0.32
1b. Organizational ownership of the computer expertise				0.14	-0.09	0.04

<sup>a</sup>  $N = 484$ .  $R_s > 0.09$ ,  $p < 0.05$ .

<sup>b</sup>  $N = 248$ .  $R_s > 0.12$ ,  $p < 0.05$ .

<sup>c</sup>  $N = 157$ .  $R_s > 0.17$ ,  $p < 0.05$ .

Aside from John's request, how much would you feel the program belongs to you personally?

The options presented were, "I would feel the program belongs to me," "I would feel the program belongs to my project," and "I would feel the program belongs to the company." Subjects were permitted to give 0% to 100% to each category as long as all together added to 100%. We presented this item after subjects had indicated their attitudes about sharing so that the item alone would not prompt attitudes.

### Results

Table 1, top panel, provides descriptive statistics on the dependent measures of organizational ownership and information sharing. Attitudes about information ownership were correlated significantly with attitudes about information sharing. (Analyses are presented only on the organizational ownership ratings, which avoids the linear dependencies among the allocations of percentage ownership to information possessor, project, and company. The results are essentially the same regardless of which ownership rating is examined.) The table shows that the average percent organizational ownership of the computer program was 49% and that perceptions of

TABLE 2  
*Information Sharing and Perceived Ownership of a Computer Program Predicted from Background and Manipulated Subject Perspective (Experiment 1)*

Variables	Approp. to request	Justified in denying	Likely to share	MANCOVA	Organizational ownership
School year	0.191***	-0.191***	0.192***	$p < 0.001$	0.140***
Computer experience	0.028	-0.030	0.104	n.s.	0.048
Work experience	0.007***	-0.007**	0.001	$p < 0.001$	0.002*
Subject perspective	$p < 0.05$	n.s.	n.s.	$p < 0.05$	$p < 0.01$
$R^2$	0.12	0.10	0.07		0.16
$F(5, 474)$	12.35***	10.86***	6.84***		17.65***

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

organizational ownership were significantly correlated with sharing attitudes. However, ratings of organizational ownership were only moderately correlated with attitudes about sharing (0.23 to -0.34), which indicates there is item independence. The three items asking about information sharing were correlated significantly with one another. The correlation between the appropriateness item and the justified in denying item was -0.61 (suggesting these two items may be redundant). However, these latter were only moderately correlated with the item about the actual likelihood of sharing, 0.36 and -0.43, which suggests substantial independence. Finally, the table shows that work experience was positively correlated with the attitude that the company owned the program and with positive attitudes towards sharing. Other subject characteristics examined are not shown in the table. They include subjects' year in school, which was highly correlated with work experience ( $r = 0.51$ ,  $p < 0.001$ ), and computer experience as measured by number of computer languages known, nationality, and gender, none of which were related systematically to other measures.

Analyses of variance were conducted on subjects' responses to the organizational ownership and information sharing items as a function of their experimentally-manipulated perspective, with work experience, schooling and computer experience used as covariates. (We included computer experience as a way of estimating the potential effect of belonging to the "computer subculture" on information sharing attitudes. This variable had little effect in the analyses.) Since the organizational ownership ratings were expressed as percentages, the scores were transformed using the arc sin square root transformation. These analyses are presented in Table 2. There was an overall significant effect of work experience and subject's perspective. Taking the information possessor's perspective led to subjects' saying that the information seeker's request was less appropriate (3.08 in the information possessor condition vs. 3.5 in each other condition) and to their belief that the organization had less claim on ownership of the computer program (41% in the information possessor condition vs. 54% in the information seeker condition and 55% in the observer condition). This result provides some support for our first prediction that self-interest would influence sharing attitudes in a negative direction (against sharing), and suggests that people do have some inclination to reciprocate previously unhelpful behavior of a coworker. On the other hand, information possessor's perspective did not predict subjects' ratings of the likelihood they would share, which suggests substantial prosocial transformation.

TABLE 3  
*Sharing a Computer Program Predicted from Background, Subject Perspective, and Information Ownership (Experiment 1)*

Variables	Approp. to request	Justified in denying	Likely to share	MANCOVA
School year	0.130*	-0.124*	0.147**	$p < 0.01$
Computer experience	0.002	-0.005	0.190	n.s.
Work experience	0.006**	-0.007**	0.001	$p < 0.01$
Subject perspective	n.s.	n.s.	n.s.	$p < 0.05$
Organizational ownership	0.486***	-0.498***	0.308***	$p < 0.001$
$R^2$	0.17	0.16	0.09	
$F(6, 472)$	15.94***	14.51***	7.86***	

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

On all of the items, work experience and years of schooling in the business programs of the university were positively associated with organizational ownership and with positive sharing attitudes. These results are in accord with our proposal that information sharing is learned through work and work-related training.

#### *Ownership as Mediator of Information Sharing*

We argued that the belief in organizational ownership of work outcomes, learned through work experience and training, causes a transformation of motivation in the exchange of information whereby people weigh the social good of sharing more heavily than their personal cost or displeasure at sharing with a previously unhelpful employee. We therefore predicted that a subject's beliefs in organizational ownership would mediate the relationships between work experience or schooling and sharing attitudes, and as well between subject's perspective and sharing attitudes. Mediation means that there is an intervening variable or "mediator" (here, belief in organizational ownership) on which variation in the dependent variable (sharing) depends. To test the mediation effect, we performed a multiple regression mediation analysis (Baron and Kenny 1986). To demonstrate mediation, the analysis requires three regressions to be estimated. First, the dependent variables of sharing attitudes must be predictable from the independent variables (experience, schooling, and perspective). Second, the mediator must be predictable from the independent variables. Third, the dependent variables must be predictable from the combined independent variables and mediator. If mediation is occurring, the mediator will be significant in the third equation.

The results of the analyses are shown in Tables 2 and 3. The first 4 columns of Table 2 show the estimation of the first equation, that is, attitudes about sharing as predicted from experience, schooling, and subjects' perspective. The fifth column of Table 2 shows the regression of organizational ownership (the mediating variable) on experience, schooling and subjects' perspective. Table 3 shows the combined regression of sharing attitudes on all independent variables and organizational ownership. This table shows that the mediator is significant in the combined regression. (Company ownership mediated the effect of schooling more than that of work experience, a result that may or may not be due to some separate effect of business school on ideas about organizational ownership.) Therefore, we find evidence that experience.

schooling, and perspective influenced different perceptions of organizational ownership and affected sharing attitudes through those perceptions, which accords with our theory.

### Discussion

The mediation analyses suggest that people's attitudes about sharing a computer program with another employee who has been previously unhelpful are predicated in large part on their belief about whether or not the organization owns the program. Table 3 supports this inference in that we can switch the roles of the independent and mediating variables. The univariate effect of subjects' perspective disappears in the combined regression, suggesting that the mediation of perspective may be nearly complete. If so, a belief in organizational ownership, acquired through work experience and schooling, strengthens the propensity to share information to such the extent that it overcomes the influence of self-interest in reciprocating the negative behavior.

### Experiment 2

Experiment 2 was intended as a conceptual replication and extension of Experiment 1 to attitudes about sharing intangible information. Rather than a computer program, we asked subjects about sharing computer expertise. The information possessor was depicted as an employee who had attended a technical course, and the information sought by the coworker (who had refused a favor previously) was expertise that the employee had acquired in the course.

In Experiment 2 we directly manipulated perceptions of information ownership, since the belief in organizational ownership is important in our argument. We manipulated three different factors that should directly affect perceptions of organizational information ownership: choice in creating the information (own choice versus manager's directive), resources used to create the information (own time vs. project time), and intended benefits (benefits to self vs. benefits to project). We predicted stronger perceptions of organizational ownership in the manager choice condition (when the manager requested the employee take the course), in the organizational resource condition (when the employee took the course on project time) and when the beneficiary was intended to be the project. We did not manipulate subject perspective in this experiment.

Our predictions in this experiment were based on our proposal that expertise contributes to a person's self-identity, and that sharing expertise allows for personal benefits arising from self-expression and self-consistency. Accordingly, we predicted that whereas perceptions of organizational ownership of expertise might emerge from the use of company resources, these perceptions would not mediate sharing attitudes. Instead, we predicted that work experience and schooling would predict sharing directly. The logic here is that employees (and business students) would have learned the *personal* net benefits of sharing expertise (even with a coworker who previously did not help), and employees would not require prosocial attitudes or norms of organizational ownership to encourage them to share expertise. However, perceptions of organizational ownership might independently encourage sharing of expertise.

### Method

The subjects were 252 undergraduate business students (28%) and graduate MBA students (72%), none of whom participated in Experiment 1. Fifty-nine percent were

TABLE 4

*Sharing Expertise Predicted from Background and Information Ownership (Experiment 2)*

Variables	Approp. to request	Justified in denying	Likely to share	MANCOVA
School year	0.244**	-0.143	0.147**	$p < 0.05$
Computer experience	0.057	-0.168**	0.198*	$p < 0.05$
Work experience	0.004	-0.007**	0.004	n.s.
Organizational ownership	0.017	-0.358*	0.209	$p < 0.05$
$R^2$	0.08	0.15	0.10	
$F(4, 224)$	5.04***	9.68***	6.01***	

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

male. Most were U.S. citizens (79%); others were from Asia (9%) and Europe (5%). Most subjects had full time work experience (mean = 4.9 years, std. dev. = 3.9 years).

We used the same procedure as in Experiment 1, except that every vignette was written from the perspective of the information possessor. The vignette went on to say:

On your own initiative [at the request of your manager], you have spent 40 hours of your own time [project time] attending an advanced programming course. You hope [Your manager hopes] this will benefit the quality of your work [your project's work]. Now, John asks you to review some of his work to see if he used correctly the techniques you learned in the course.

### Results

Table 1 (middle panel) contains summary statistics and correlations among dependent measures for Experiment 2. The table shows that subjects, on average, perceived the organization to own only 29% of the employee's expertise (as compared with 49% of the program, in Experiment 1). Perceptions of organizational ownership of expertise were correlated less strongly with positive attitudes about sharing than in Experiment 1, as expected, although two of the correlations reached statistical significance. As in Experiment 1, the three items on sharing attitudes were intercorrelated significantly, with the highest correlation between "appropriateness of sharing" and "justified in denying" (-0.57). Work experience was not significantly related to organizational ownership but it was related to sharing attitudes, as expected. That result suggests that people do not learn through work that the organization owns expertise even though they may acquire attitudes favoring sharing it.

To test the combined effects of the independent variables, we conducted analyses of variance on organizational ownership and sharing attitudes, with work experience, schooling, and computer experience used as covariates. These analyses showed a strong impact of two of the manipulated variables (choice and resources) on ownership attitudes, controlling for experience ( $F(6, 222) = 3.91, p < 0.01$ ). (The effects also are significant when control variables are not used.) When the employee had chosen to take the course and acquire the expertise, the percentage of organizational ownership was less than when the manager had requested that the employee take the course ( $p < 0.05$ ). When the employee had used his own resources the percentage of organizational ownership also was less ( $p < .001$ ). Although these manipulations affected attitudes about organizational ownership, as expected we found only a mod-

est relationship between perceived organizational ownership and sharing attitudes (see Table 4). The weakness of this relationship precluded a mediation analysis (since mediation of a weak effect can only be weak).

### *Discussion*

The results of Experiment 2 support our proposal that the meaning to people of intangible information such as expertise is different than is the meaning of tangible information products such as a computer program. We argued that the former reflects on its possessor's identity and inner qualities, and that sharing it can have direct personal benefits. For instance, people may like to show off their expertise since the expertise can reflect on their value and even on their influence in the organization (although giving away knowledge eventually causes the possessor to lose his or her unique value relative to what others know; Thibaut and Kelley 1959, p. 109). Or, people may like to share expertise because it makes them feel proud or more a part of the organization. Or, in line with self-consistency theory, they may like to share expertise because it bespeaks their past and future competence. None of these benefits would be invalidated if their sharing were with a person who had acted negatively. (Indeed, sharing expertise might be a way of asserting one's relative power over the other and act as a backhanded negative reciprocation.) Indirect evidence for this argument is that work experience and training did contribute to positive attitudes about sharing but these attitudes were not mediated by perceptions of organizational ownership. Further evidence in support of this argument can be made from a comparison of the relationships among the dependent variables found in Experiment 1 and 2 (see Table 1). The table shows that the mean perception of organizational ownership of the computer program (Experiment 1) was higher than was the perception of organizational ownership of the expertise (Experiment 2), but mean attitudes about sharing expertise were more positive in Experiment 2 than were mean attitudes about sharing the program in Experiment 1.

### **Experiment 3**

Since the results of Experiment 1 and Experiment 2 could have diverged due to unmeasured differences in the studies, we conducted Experiment 3, which directly compared attitudes about sharing a computer program and sharing computer expertise. We also wished to replicate the effect of the self-interest manipulation used in Experiment 1; therefore, we manipulated subject perspective by asking subjects either to take the role of the information possessor (who had the program or the expertise) or the role of the information seeker who had refused a favor previously. We employed the same vignettes used in Experiments 1 and 2.

We first predicted that more self-interest (information possessor's perspective rather than information seeker's perspective) would lead to perceptions of less organizational ownership and to weaker inclinations to share. We also predicted an interaction effect such that subjects would think the organization owned the computer program more than the organization owned the expertise, but that subjects would be more favorable towards sharing the expertise than towards sharing the computer program. The logic behind this prediction is that whereas people believe expertise is owned more by its possessor, there are more personal benefits to sharing expertise than to sharing the information product. (At the same time, the organizational benefits of sharing both types of information fundamentally would be the same.) Also, we predicted that the process leading to sharing would be different for the two kinds of

information: Since there are costs to sharing an information product with someone who has acted negatively in the past, we predicted perceptions of organizational ownership would mediate positive attitudes towards sharing the computer program. (That is, a prosocial transformation would be required.) However, since there may be a net personal benefit to sharing expertise, organizational ownership need not mediate positive attitudes towards sharing computer expertise. (The prosocial transformation is not required, though such motivation might add to the effects of personal feelings.)

### *Method*

Our sample did not have a wide range of work experience and schooling, as in the two previous experiments, which constrained our ability to replicate the effects of background variables on sharing attitudes. The subjects who participated in Experiment 3 on average were more experienced and had more schooling in business than the subjects in the previous experiments. All were graduate MBA students at Boston University's School of Management, and all but five were in their first graduate year beyond college. None had been subjects in Experiments 1 or 2. They averaged six years of work experience.

We employed a  $2 \times 2$  factorial design, with perspective (information possessor vs. information seeker) and information type (computer program vs. computer expertise) as between factors. Attitudes (organizational ownership and attitudes about sharing) were repeated measures on the same subjects. The procedure was the same as in Experiments 1 and 2.

The dependent measures were the same as in Experiments 1 and 2 with one change. Because in both previous experiments the correlation between "appropriateness of sharing" and "justified in denying" was very high, we deleted the first item. We substituted a question asking the subjects, "How motivated would you be to help John?", or in the information seeker condition, "How motivated would John be to help you?" The purpose of this question was to provide a test of our argument that subjects would be more personally motivated to share expertise than to share the computer program.

### *Results*

Table 1 (bottom panel) shows how the measures used in Experiment 3 correlated with one another and also how organizational ownership was related to sharing separately for the computer program condition (comparable to Experiment 1) and the expertise condition (comparable to Experiment 2). These correlations support our expectation that the relationship between perceptions of organizational ownership and attitudes about sharing differ with the type of information. As predicted, the correlations between organizational ownership and sharing attitudes are strong and significant in the computer program condition, but weak and not significant in the computer expertise condition.

Table 5 shows the means for organizational ownership and sharing in the four cells of the experiment. A multivariate analysis of variance showed a significant effect of the perspective manipulation on attitudes about ownership and sharing (interaction effect,  $F[3, 447] = 5.5, p < 0.01$ ). The perspective of the information possessor reduced the subject's perception of organizational ownership of the program (59% vs. 71%) but not of expertise (34% vs. 38%). The perspective of the information possessor did not affect the subject's professed personal motivation to share the program but it



TABLE 5  
*Effects of Perspective and Information Type on Attitudes about Organizational Ownership and Information Sharing (Experiment 3)*

Information type	Perspective	
	Information possessor	Information seeker
Computer program:		
Organizational ownership	59%	71%
Motivated to share	2.6	2.7
Justified denying	4.1	3.6
Likely to share	4.4	3.9
	<i>n</i> = 43	<i>n</i> = 43
Computer expertise		
Organizational ownership	34%	38%
Motivated to share	3.3	2.5
Justified denying	3.9	3.4
Likely to share	4.6	3.6
	<i>n</i> = 39	<i>n</i> = 32

*Note.* See Table 1, column 1, for means compared across all experiments.

did strengthen attitudes that the possessor would be justified in denying the program (4.1 vs. 3.6). Also, as in Experiment 1, perspective did not significantly affect the likelihood of actually sharing the program. The results for expertise were quite different: The perspective of the information possessor *increased* the subject's professed motivation to share the expertise (3.3 vs. 2.5), confirming our proposal that the personal outcome of sharing expertise may be a net benefit. The perspective of the information possessor did not affect the justification item, but did increase the professed likelihood of sharing (4.6 vs. 3.6), which again supports the theory.

This analysis also confirmed an interaction of information type with the measures of ownership and sharing attitudes ( $F[3, 447] = 5.9, p < 0.01$ ). (The three measures of sharing attitudes did not themselves interact with the independent variables.) Analyses on each sharing measure in turn showed that whereas subjects gave a higher percentage of organizational ownership to the computer program ( $F[1, 150] = 7.6, p < 0.05$ ), they were more motivated to share the expertise ( $F[1, 150] = 22.3, p < 0.01$ ), as predicted. Also they felt that denying the information seeker was less justifiable when he was seeking expertise ( $F[1, 150] = 12.1, p < 0.01$ ).

### *Mediation Analysis*

We conducted a multiple regression mediation analysis to test whether organizational ownership mediated the impact of subject perspective on sharing attitudes. (We also examined the effect of work experience although we anticipated restricted range due to constraints on our sample.) We predicted that a belief in organizational ownership would mediate information sharing if the information sought was a computer program but not if the information sought was expertise. The analyses were conducted separately for the two kinds of information. The analyses are shown in Table 6. The top panel of Table 6 shows that when subjects were asked about sharing a computer program, both experience and perspective had a significant effect on the presumed mediator, organizational ownership (see the middle column of Table 6).

TABLE 6

*Information Sharing Coefficients and F Statistics for the Effects of Experience, Subject Perspective, and Information Ownership for Two Kinds of Information (Experiment 3)*

Variables	Want to share	Justified in denying	Likely to share	Company ownership	Want to share	Justified in denying	Likely to share
	<b>Computer program condition</b>						
Work experience	-0.005 <sup>+</sup>	n.s.	n.s.	0.005 <sup>**</sup>	0.007 <sup>**</sup>	n.s.	n.s.
Subject perspective	-0.204	0.726 <sup>+</sup>	-0.549	0.451 <sup>**</sup>	-0.430	0.974 <sup>*</sup>	-0.907 <sup>**</sup>
Org. ownership					0.500 <sup>**</sup>	-0.619 <sup>*</sup>	0.735 <sup>***</sup>
R <sup>2</sup>	0.05	0.04	0.04	0.16	0.14	0.10	0.18
F(4, 71)	0.88	0.77	0.67	3.2 <sup>*</sup>	2.1 <sup>*</sup>	1.4	2.8 <sup>*</sup>
	<b>Expertise Condition</b>						
Work experience	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Subject perspective	-0.895 <sup>**</sup>	n.s.	-1.16 <sup>**</sup>	n.s.	-0.893 <sup>**</sup>	n.s.	-1.147 <sup>**</sup>
Org. ownership		n.s.			n.s.	n.s.	n.s.
R <sup>2</sup>	0.13	0.08	0.24	0.15	0.14	0.09	0.24
F(4, 51)	1.8	1.0	3.7 <sup>**</sup>	2.0	1.5	0.92	2.9 <sup>*</sup>

<sup>+</sup>  $p < 0.10$ , <sup>\*</sup>  $p < 0.05$ , <sup>\*\*</sup>  $p < 0.01$ , <sup>\*\*\*</sup>  $p < 0.001$ .

Organizational ownership also had a strong effect on sharing when it was included in the prediction equation, and even increased the effect of the independent variables. This finding generally replicates the findings of Experiment 1, and shows people's beliefs about organizational ownership is a key predictor of their attitudes about sharing a computer program in this situation. Table 6 (bottom panel) shows that by contrast, subjects' beliefs about organizational ownership of expertise did not predict their attitudes about sharing the expertise.

## General Discussion

This research serves as a preliminary step towards understanding attitudes about information sharing in organizations. Although many researchers have studied the technological and organizational conditions for communication and information sharing in organizations, with a few exceptions (e.g., Thorn and Connolly 1987) investigators have not addressed the role of employee's attitudes and norms, and have not examined how people perceive different forms of information. This study provides some support for an exchange and expressive theory of information sharing. We obtained inferential support for the sometimes-negative role of self-interest and reciprocity in Experiment 1 and 3, for prosocial transformation and the mediating influence of organizational ownership beliefs in Experiments 1 and 3, for the positive role of work experience and business schooling on organizational ownership beliefs in Experiments 1 and 2 (and partial support in Experiment 3), and for the positive meaning of sharing expertise in Experiments 2 and 3.

This study has a number of limitations. The study was a survey of attitudes; we did not observe sharing behavior. Moreover, we asked people about hypothetical situations they may have never encountered. The results are presented as comparisons of experimental conditions, and we have no way of calibrating the weight that would be given to different manifestations of the underlying variables in real settings. A variety

of alternative explanations could be advanced for the findings, especially the argument that subjects were giving us their theories of how people share information rather than reflecting their own attitudes. It is also possible our findings were influenced by demand characteristics or stereotypes of employees (e.g., programmers) or organizational settings. We also have no way of knowing whether our results are due ultimately to differences in perceptions as compared with differences in the motivation to share. For instance, people might perceive the prior actions of an unhelpful coworker differently in the context of a request for a computer program than in the context of a request for advice. We note that it would have been exceedingly difficult if not impossible to find opportunities to study the variables we investigated in a field setting. Our data, at the very least, demonstrate that people indicate an unwillingness to share with all coworkers under all circumstances and that they respond differently to requests for sharing different forms of information. Thus, it seems sharing different forms of information entails different social costs and benefits, and this finding is in itself an important one. Our work suggests that field-based studies of information sharing (or not sharing) should measure employees' perspectives on information sharing, not simply managers' or developers' perspectives. (See Orlikowski 1992, for one good example.)

Despite their limitations, our results have one implication for understanding information sharing in organizations—that, psychologically, information is not a monolithic, undifferentiated “information resource.” The organizational and information systems literatures often refer to information as a general desirable resource and information sharing as a general desirable behavior. Organizations themselves often have general, abstract norms and policies about helping others and information sharing (e.g., Bateman and Organ 1983, Brief and Motowidlo 1986). Employees control and create information goods and services but organizations own these information products and management usually expects them to be used for the good of the organization. Organizations do not own employees, of course, and since expertise is a part of a person, ownership of expertise is more problematic. Unless a contract states otherwise, a person can quit a job and apply his or her expertise elsewhere. Nonetheless, managers probably expect that expertise gained at work or with organizational resources should be shared with other employees and used for the benefit of the organization, just as other kinds of information should be shared and used. Our experiments suggest that people actually think about information products and expertise differently, and that sharing each has a different basis. Whereas people would share a computer program because the work organization has a right to it, they would share expertise because doing so has personal benefits. Subjects across experiments and levels of experience actually seemed more ready to share expertise than a program, even with a previously unhelpful coworker. (Those in the information possessor role also were more ready to share expertise than those in the information seeker role thought they would be.) But they were not ready to share expertise because the company owned the expertise.

If our analysis is correct, different organizational approaches and technologies should be used to support different kinds of information sharing. To encourage sharing of work information, organizations need a clear policy about their rights to employee work, and mechanisms such as “show and tell” meetings and patent disclosures for identifying valuable information. Cialdini et al.'s (199) research on conformity implies that sharing behavior can be highly dependent on the cues available in

work situations and on the information employees have about the behavior of others. If so, publicity about, and visibility of, sharing information work, such as public databases and other public resources that identify contributors (providing there are some) would encourage the actual enactment of sharing norms.

The exchange of information products can be considered a form of public goods problem. That is, it is to the benefit of employees and the organization for people to share their work with others, but those especially productive might be inundated with requests and eventually refuse help. Such a process could eventually end in a deteriorating pool of sharers—whereby only those having “nothing better to do” help others (Thorn and Connolly 1987). However, a potential solution can be derived from the literature of public goods (Marwell et al. 1988, Macy 1990). That is, the organization can develop a culture of good citizenship. In such a culture, a “critical mass” of employees would learn to contribute work, not because they are required to do so or because they gain something for themselves, but because sharing is a valuable community institution they wish to support. Even a small number of helpful employees then can sustain the organizational norm of sharing.

People may want to share expertise naturally, and the best organizational policy may be simply to create occasions for people to talk and exchange knowledge, opinions, and advice. Hence, interdisciplinary and interorganizational meetings and conventions, and technology for people to exchange expertise through electronic networks, should increase sharing. However, our analysis of the role of self-expression and self-consistency in information sharing implies that experts will want to contribute to coworkers who need them, who will hear them, who will respect them, and who may even thank them. Large standing electronic distribution lists and bulletin boards that allow people to post “Does anyone know . . . ?” questions and receive answers to these questions permit self-expression, both public and private. We speculate that this may be why these facilities have outlasted more elaborate but less sociable computer facilities for sharing information.

Several directions for future research, beyond the questions we have already raised, seem promising. First, we have not addressed the consequences of differences among employees within organizations. Our analysis thus far assumes symmetry in people's feelings about sharing, but employees with different backgrounds and competencies may feel very differently about how they and others should behave. Macy (1990) and others argue that a small number of contributors can sustain prosocial behavior, but this proposal needs to be tested empirically. It is possible a small number of noncontributors or hostile coworkers can undercut prosocial norms; they might create a norm of noncontribution.

We also have not addressed the stability over time of information sharing behavior, nor various causality issues. Does information sharing increase happiness and organizational commitment? Or, do people tire of sharing unless they already feel happy and fulfilled at work? How do people teach one another to share information? Does Employee A's increased willingness to share with Employee B cause Employee B to share in turn (with A or others), or does Employee B become more dependent on Employee A and more likely to become a free rider? Addressing such questions requires longitudinal studies of employee interdependencies and information sharing behavior.

We and others generally have assumed that information sharing has positive consequences for organizations, their customers, and their individual employees. This

assumption should be tested. What, exactly, does information exchange contribute to an organization? Weenig and Midden's (1991) research implies that the information contributed by strong ties has more influence but information contributed by weak ties is disseminated more widely. Is the information itself of value, or is the principle value the flexibility that out-of-role, voluntary contributions reinforce? What costs are entailed? To date, there is no evidence regarding the effect of information sharing on individuals. Our analysis implies that information providers may gain psychological benefits from sharing expertise. However, those who frequently provide many kinds of help, including their time, effort or information products may carry a heavy burden. The present research provides only a start towards answering such questions.\*

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