COGNITIVE ASPECTS OF ORGANIZATIONAL REPORTING

Seymour Sudman, Joan M. Phillips, University of Illinois
Seymour Sudman, Survey Research Laboratory, 909 W. Oregon, Suite 300, Urbana, IL 61801

A series of pilot studies were conducted to operationalize and further develop hypotheses about cognitive aspects of organizational reporting which were formulated based on earlier work related to proxy reporting within households. Since universities and university departments are themselves organizations, although of a special kind, and were easily accessible to us, we started with them.

PRIOR RESEARCH
Cognitive Aspects of Proxy Reporting

In order to gain a better understanding of the processes people use in answering survey questions, researchers are drawing on theories of cognitive psychology and social information processing (Bradburn, Rips and Shevell, 1987; Feldman and Lynch, 1988; Hippler, Schwarz, and Sudman, 1987; Jabine, Straf, Tanur and Tourangeau, 1984; Loftus, Fienberg and Tanur, 1985; Schwarz and Sudman, 1991, 1994). This theoretical work can be used to increase our understanding of proxy reporting. Sudman, Bradburn and Schwarz have summarized much of this work in their new book *Applications of Cognitive Science to Survey Methods* (Jossey-Bass, in press.)

Individuals go through four stages when answering survey questions (Strack and Martin, 1987; Tourangeau, 1987; Tourangeau and Rasinski, 1988). These include (1) interpreting the question, (2) retrieving relevant inputs or a prior judgment from memory, (3) integrating information to form a judgment and (4) reporting a response. Organizational respondents are most likely to differ from self reporters in stages 2 and 3, retrieving information and integrating this information. Retrieval and judgment processes are affected by how information is learned or encoded and how it is stored in memory.

Encoding Processes

The context in which encoding takes place will affect the cues which activate retrieval of information from memory at a later time. One's own behaviors provide a rich set of experiences, including information about what one wanted to do, what one actually did, how one felt while doing it, etc. Thus, the episodic representation is likely to include information relevant to the event, such as the location and emotional responses (Tulving, 1972, 1983).

In contrast, when reporting about organizational events or issues, informants are typically answering questions about reported events, events that may be learned "second-hand." These events are likely to be represented as episodes which relate to the occasion of receiving or learning about the event (Larsen and Plunkett, 1987).

Encoding methods have implications for strategies used to answer questions about organizations. Cues related to the event, itself, will be more effective in enhancing recall for organizational informants who participated in the event than for those who merely heard of it. Since reported events are not necessarily encoded in chronological order, organizational informants who did not participate in the event should be less likely than participants to use a chronological pattern (a backward or forward time search of memory) when reporting about events in a specified period. Finally, this suggests that organizational participants in an event should have similar reporting strategies while non-participants strategies will vary.

There are also several studies that show that information that is relevant to important others receives increased elaboration (Bower and Gilligan, 1979; Kuiper and Rogers, 1979). This suggests that relative accessibility of semantic versus episodic stores of organizational information will be a function of the respondents' positions within the organization as well as involvement in the behavior.

Judgment Processes

Unless they have been heavily involved, respondents are less likely to have stored in memory global judgments and descriptive information about organizations than about themselves. Thus, key informant reports will have to be constructed, rather than retrieved. An important question is what inputs are retrieved to form a judgment.

Hoch (1987) suggests that people use three general inputs in answering a question about other people: (1) their own response, (2) the perceived similarity between themselves and others and (3) other relevant information such as conversations or

observed behavior. People are likely to overweight their own response when reporting about organizations or groups (Schlenker and Miller, 1977; Ross and Sicoly, 1979). Such effects have been attributed to selective attention and encoding, maintaining positive self-esteem and the relative availability of information about oneself versus others. Whatever the underlying cause, this suggests that organizational informants will tend to view their own attitudes toward the organization as being more common than they really are and believe that their own behavior has a greater influence on decisions or outcomes than others report it has.

Summary

People at different organizational levels and in different organizational structures are likely to vary in the extent to which they are involved in decisions and in their perceptions of the importance of those decisions. Thus, an individual's position within an organization should influence the way information is encoded, its organization in memory and the strategy used to integrate inputs into a judgment.

The Reliability of Reports about Organizations

Several studies have attempted to measure the reliability and validity of informant reports about organizations (e.g. Campbell 1955; Houston and Sudman 1975; John and Reve 1982; Knoke et al. 1989; Kumar et al. 1993; Pennings 1973; Phillips 1981; Seidler 1974). There are essentially two methods that have been used: (1) the use of multiple informants and (2) comparison of data from documents to informant reports. The results of these studies seem to show consistently that "softer" subjective data are less reliable than factual data on size, products, etc. They also show that the role of the respondent is generally important, and especially so for subjective data. These results are useful and make sense, but they are limited. To our knowledge, there have been no studies that attempt to use cognitive procedures to determine why organizational respondents differ.

METHOD

The first two pilot studies were conducted with the Departments of Business Administration and Economics at the University of Illinois, Urbana-Champaign. Interviews were conducted with six persons, the Department Head, senior faculty members and in one department, the department's Administrative Assistant. The third pilot test was conducted with a university administrative unit, the Office of Records, a component of The Office of Admissions and Records. Interviews were conducted

with the Associate Director of Admissions and Records who directs the Records Office, the Director of Admissions and Records, and two supervisors in the Records Office.

It may be seen that we selected a range of questions of the types that are often asked in organizational surveys. These ranged from completely factual questions about the size of the department to subjective questions about departmental rankings and challenges facing the department. The major topics covered were:
   a. Key Departmental decisions in past few years
   b. Departmental innovations
   c. Departmental goals
   d. Challenges facing the Department
   e. Changes in the university and society that would impact Department
   f. Departmental rankings
   g. Size of faculty and staff
   h. Number of undergraduate and graduate students
   i. Departmental budget
   j. Student (client) and staff satisfaction
   k. Classifying information about informant.

We asked all respondents to think out loud as they answered the questions, and to tell us all the thoughts that came to their minds. As prompts, we asked them "How did you come up with that answer?" and whether they had used documents or talked about this topic with others. All interviews were taped and transcribed and we developed a set of codes for the thinkalouds.

As may be noted, the thinkaloud answers fall into two major categories. Some of the responses relate to how the informant found out information used to formulate an answer. These are responses that indicate that the informant had talked about an issue at a meeting or simply in conversations with others in and outside of the unit or the university, or had thought about it as part of his/her job, or read about it in a document or in the media.

The other thinkaloud responses indicated how informants came up with a specific answer. Thus, for example, most informants counted the number of part-time employees they could remember, but for total size estimates of faculty or students, they either retrieved an answer from memory or estimated on some basis.

Agreement Measures

Both numerical and categorical data were obtained in this pilot test. Numerical data such as

size of faculty or student satisfaction yield a distribution of numbers from the various informants from which means and variances can be computed. To compare across items, it seems useful to use the relative error, i.e., the standard deviation of the responses divided by the mean since means and variances are not independent.

Measuring agreement for categorical items such as "what were the key departmental decisions in the last few years?" is not as clear cut when there are multiple items listed by one or more informants. Obviously, if all informants mentioned only the same item there would be perfect agreement. If each informant mentioned something different, there would be no agreement. We defined agreement for a specific answer as $(m-1)/(n-1)$ where m was the number of mentions received by the item and n was the number of respondents (typically 5 or 6, but sometimes less if one or more respondents did not answer the question). Note that this measure equals zero if there is no agreement and one if all informants agree.

To obtain agreement measures for the question as a whole, the agreement measures for each answer were averaged. This measure is shown in the tables below along with the agreement index for the answer on which there was maximum agreement.

RESULTS

The results are presented in three parts. In the first part we present information on agreement between informants. In the second part, we describe sources of information used by informants, and in the final section, the cognitive methods used to answer the questions.

Agreement Measures

Table 1 presents the agreement measures for the continuous variables, and Table 2 the agreement measures for the categorical variables. Some specific comments on the results in the tables may be useful. One of the first things one notes is that there are large differences between the three units in relative errors for some of the same variables. Some of these differences have clear situational explanations. Thus, the number of Master's students in Department 1 has been widely documented and discussed recently, while this has not been the case in Department 2. The number of Doctoral students in Department 2 has changed sharply in the past year, while the number of Ph.D. students in Department 1 has been fairly stable. These examples are a reminder that within individual organizations there will be unique situations that affect levels of agreements between respondents.

In the academic departments, there was high agreement on measures of faculty and undergraduate and doctoral student satisfaction, but low agreement on MBA satisfaction. All the satisfaction measures except the MBA ones were collected as part of the University's periodic evaluation of the Department, and informants had either seen the evaluation document or talked about it. No documents were available to the informants that showed MBA satisfaction, but estimates were based on more casual discussions. Interestingly, the same kind of periodic evaluation of satisfaction was not available for the administrative unit, but the relative errors for satisfaction variables were low because the unit staff had frequent discussions about satisfying clients.

There was high agreement in both academic departments on number of tenured faculty where the estimates were based on documents and departmental discussions. There was lower agreement in all units on the number of part-time faculty or staff. Most informants counted the ones they could remember and then made an adjustment to account for those they did not know or could not remember. In the administrative unit, which consists primarily of clerical staff, there was better agreement between respondents on clerical staff size than in the academic departments, where clerical staff are a small subgroup of the department. It appears that size measure accuracy is affected by the degree of contact and salience of a group to the informant.

For the categorical data, there was relatively high agreement on the key departmental decisions and the staff who were involved in these decisions. These issues are fairly concrete. There was lower agreement on the major innovations and goals of the department, and on what university and societal changes would affect the department. These are broader, more subjective issues. Here, documents did not play a major role since they were generally not available to informants. Although informants reported some discussion of these topics, most of the answers were based on outside media and were simply retrieved from memory or constructed on the spot.

How Information Was Obtained

The data in Table 3, limited as they are, suggest that organizational informants use a wide range of sources for obtaining information about the organization. The sources used depend on the subject matter of the questions, the informants's role in the organization, and the networks with whom the informant communicates. It should not be surprising that agreement between different informants will be strongly affected by their use of sources. If similar

sources are used, one would expect to find significantly greater consensus than if different sources are used.

One obvious source of consensus is the use of the same written document, but this is not the only source of information. Oral communications with others in the organization, especially other informants, either in formal settings such as committee or departmental meetings or in informal conversations should also increase consensus. Note that this will especially be the case when conversations are based on documents that at least some, if not all those involved, have seen. Conversations with others outside the organization, on the other hand, or self-cues such as previous education or experience should lead to reduced consensus.

Some of the specific findings of Table 3 are interesting. Informants in the administrative unit are much more likely to respond in terms of their own job to questions about key decisions, innovations, goals, etc. than are the professors who were the informants in the academic departments. If the same result is observed in future work, it would confirm the role of organizational structure in determining the methods informants use to respond.

The size measures of the organizations, as well as measures of client and staff satisfaction were typically retrieved from documents when available, and observation and discussion otherwise. It is evident that documents provide the most reliable data source.

Cognitive Processes Used

Table 4 shows the cognitive processes used by informants to provide information on size and satisfaction measures of the organization. There were five main methods used. The first method was simply to retrieve the answer from memory. The second method used for small groups was simply to count. For larger groups, methods included estimation, anchoring on another group and extrapolation. Thus, respondents who were asked about graduate student satisfaction after being asked about undergraduate satisfaction would often respond with a judgment such as " well, they are more (less) satisfied than are the undergraduates so I'd rate them as...." Extrapolation occurred when an informant said something like "our group has n students, and we are about a quarter of the department, so the total in the department must be around 4n." It may be seen that anchoring and extrapolation while used are relatively uncommon, and the other methods are used about equally, depending on whether the information can or cannot be directly retrieved, and on the sizes of the groups.

DISCUSSION

The data are suggestive, and based on the tables plus our earlier results and review of the literature, the following new set of hypotheses are generated for further testing.

1. Objective information about the organization such as number of employees will typically be reported by informants using documents or physical cues (number of offices, desks, mailboxes, etc.) Consensus should be relatively high between informants, although there will be some measurement error caused by forgetting or mis-counting. Different understanding of the question may also lead to greater variance in response.

2. More subjective information such as organizational goals and job satisfaction will rely primarily on communication cues, self cues, and observation, although available documents will also be used. Which source will be used will depend more on accessibility than on perceived accuracy. That is, information from a recent conversation will be more likely to be retrieved than documentary information that has been received and filed, but not studied.

2a. A corollary to this hypothesis is that greater consensus will be obtained if informants are specifically requested to retrieve and use appropriate documents. Since this is most easily done on mail surveys, and least easily done on telephone surveys, one would expect differences in consensus by mode of interview for subjective questions.

3. Consensus on subjective issues will depend on the similarity of the sources used by informants as well as the concreteness of the issue, but will generally be lower than consensus on more objective topics.

4. Greater consensus will generally be found between informants whose job responsibilities are more similar than between job informants with differing job responsibilities.

4a. Differences in organizational structure between flat and pyramidic organizations will lead to differences in sources of information. In pyramidic organizations, informants will be more likely to respond relative to their own job responsibilities.

5. Consensus between informants will be positively correlated with the overlap of their informal networks within the firm.

6. In the absence of documents, anchor and adjust procedures may be used by informants for making subjective judgments. The use of these procedures will generally lead to low levels of agreement since different informants will use different anchors as well as different adjustment procedures.

These hypotheses will be tested and refined in

additional pilot tests using both academic and non-academic organizations.

REFERENCES

Bower, G.H. and S.G. Gilligan (1979), "Remembering Information Related to One's Self," *Journal of Research in Personality*, 13, 420-432.

Bradburn, N.M., L.J. Rips, and S.K. Shevell (1987), "Answering Autobiographical Questions: The Impact of Memory and Inference on Surveys," *Science*, 2136, 157-161.

Campbell, D.T. (1955), The Informant in Quantitative Research," *American Journal of Sociology*, 60 (January) 339-342.

Feldman, J.M. and J.G. Lynch, Jr. (1988), "Self-Generated Validity: Effects of Measurement on Belief, Attitude, Intention, and Behavior," *Journal of Applied Psychology*, 73 (August), 421-435.

Hippler, H.J., N. Schwarz, and S. Sudman (Eds.) (1987), *Social Information Processing and Survey Methodology*, New York: Springer-Verlag.

Hoch, S.J. (1987), "Perceived Consensus and Predictive Accuracy: The Pros and Cons of Projection," *Journal of Personality and Social Psychology*, 53 (2), 221-234.

Houston, M.J. and S. Sudman (1975), "A Methodological Assessment of the Use of Key Informants," *Social Science Research*, 4 (2), 151-164.

Jabine, T.B., M.L. Straf, J.M. Tanur, and R. Tourangeau (Eds.) (1984), *Cognitive Aspects of Survey Methods: Building a Bridge Between Disciplines*, Washington, D.C.: National Academy Press.

John, G. and T. Reve (1982), "The Reliability and Validity of Key Informant Data from Dyadic Relationships in Marketing Channels," *Journal of Marketing Research*, 19 (November), 517-524.

Knoke, D., P.D. Reynolds, B. Miller, and N. Kaufman (1989), "The Reliability of Organizational Measures from Informant Reports," Working Paper, Department of Sociology, University of Minnesota.

Kuiper, N.A. and T.B. Rogers (1979), "Encoding of Personal Information: Self-Other Differences," *Journal of Personality and Social Psychology*, 37, 499-514.

Kumar, N. L.W. Stern, and J.C. Anderson (1993), "Conducting Interorganizational Research Using Key Informants," *Academy of Management Journal*, 36, (6) 1633-1651.

Larsen, S.F. and K. Plunkett (1987), "Remembering Experienced and Reported Events," *Applied Cognitive Psychology*, 1, 15-26.

Loftus, E.F., S.E. Fienberg, and J.M. Tanur (1985), "Cognitive Psychology Meets the National Survey," *American Psychologist*, 40 (February), 175-180.

Pennings, J. (1973), "Measures of Organizational Structure: A Methodological Note," *American Journal of Sociology*, 79 (November), 686-704.

Phillips, L.W. (1981), "The Reliability and Validity of Key Informant Reports: A Methodological Note on Organizational Analysis in Marketing," *Journal of Marketing Research*, 18 (November), 395-415.

Ross, M. and F. Sicoly (1979), "Egocentric Biases in Availability and Attribution," *Journal of Personality and Social Psychology*, 37 (3), 322-336.

Schlenker, B.R. and R.S. Miller (1977), "Egocentrism in Groups: Self-Serving Biases or Logical Information Processing," *Journal of Personality and Social Psychology*, 35 (10), 755-764.

Schwarz, N. and S. Sudman (Eds.) (1991), *Context Effects in Social and Psychological Research*. New York: Springer-Verlag.

Schwarz, N. and S. Sudman (Eds.) (1994), *Autobiographical Memory and the Validity of Retrospective Reports*. New York: Springer-Verlag.

Seidler, J. (1974), "On Using Informants: A Technique for Collecting Quantitative Data and Controlling for Measurement Error in Organization Analysis," *American Sociological Review*, 39 (December) 816-31.

Strack, F., and L.L. Martin (1987), "Thinking, Judging, and Communication: A Process Account of Context Effects in Attitude Surveys," in H.J. Hippler, N. Schwarz, and S. Sudman (Eds.), *Social Information Processing and Survey Methodology*. New York: Springer-Verlag.

Sudman, S., N. Bradburn, and N. Schwarz *Applications of Cognitive Science to Survey Methodology*. San Francisco, CA: Jossey-Bass, forthcoming.

Tourangeau, R. (1987), "Attitude Measurement: A Cognitive Perspective," in H.J. Hippler, N. Schwarz, and S. Sudman (Eds.), *Social Information Processing and Survey Methodology*. New York: Springer-Verlag.

Tourangeau, R. and K.A. Rasinski (1988), "Cognitive Processes Underlying Context Effects in Attitude Measurement," *Psychological Bulletin*, 103, 199-314.

Tulving, E. (1972), "Episodic and Semantic Memory," in E. Tulving and W. Donaldson (Eds.), *Organization of Memory*, New York: Academic Press.

Tulving, E. (1983), *Elements of Episodic Memory*, New York: Oxford University Press.

TABLE 1: RELATIVE ERRORS FOR CONTINUOUS VARIABLES

Variable		Dept. 1	Dept. 2	Records Office
A.	Tenure track faculty	.05	.04	
	Untenured faculty	.19	.18	
	Part-time faculty/staff	.35	1.00	.64
	Teaching assistants	.32	.27	
	Undergraduates	.35	.32	
	Maters students	.02	.46	
	Ph.D. students	.19	.78	
	Clerical staff	.11	.31	.09
B.	Annual budget	.30	.45	.45
C.	Ranking	.14	.60	
D.	Undergraduate satisfaction	.10	.19	.13
	Masters student satisfaction	.52	.18	.11
	Ph.D. student satisfaction	.05	.17	
	Junior faculty satisfaction	.05	.14	
	Senior faculty/University administrator satisfaction	.12	.20	.22
	Clerical staff satisfaction	.30	.32	.17
	Self satisfaction	.13	.38	.08

TABLE 2: MAXIMUM AND AVERAGE AGREEMENT CATEGORICAL VARIABLES

	Dept. 1		Dept. 2		Records Office	
Variables	Max.	Av.	Max.	Av.	Max.	Av.
Key decisions	.75	.25	.50	.12	1.00	.54
Involvement in key decisions	.60	.21	1.00	.72	1.00	.69
Innovations	.25	.06	.75	.25	.33	.11
Goals	.20	.07	.60	.20	.33	.07
Major challenges facing department	.40	.12	.50	.21	.67	.67
University changes affecting department	.50	.12	.33	.09	.67	.25
Societal changes affecting department			.20	.02	1.00	1.00

TABLE 3: SOURCES USED TO ANSWER (*1,2,3 indicate the three units respectively)

			Oral Communication		
Topic	Self/job	Documents	Inside unit	Outside unit	Observation
Key decisions	3	1,2	1,2,3*	3	
Innovations	1,3	2	2,3	2,3	2,3
Goals	3	2	1,3		
Major challenges	3		1	1,2,3	
University/societal changes	1,3	2	1,2,3	1,2,3	
Faculty size		1,2	1		2
Clerical staff (full and part-time)		3			1,2,3
TA's/RA's		1,2	2		2
Undergraduates					1,2
Masters students		1,2	1,2	2	2
Ph.D's		1,2			
Budget/Ranking		1,2	1		
Student (clients) satisfaction		1,2,3		3	1
Staff satisfaction		1	2,3		1,3

TABLE 4: COGNITIVE METHODS USED TO MAKE JUDGMENTS

Size	Retrieval	Anchoring	Extrapolation	Counting	Estimation
Faculty/staff	1,2,3*	2		1,2,3	1,2
Undergraduates	1	2	2		1,2
Graduates	1,2		2		2
Budget	1	2	2,3		
Staff/student(client) satisfaction	1	2		1,2,3	2,3
Rankings	1,2				