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Journal

Journal of Applied Psychology, 76(6)

ISSN

0021-9010

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Publication Date

1991

DOI

10.1037/0021-9010.76.6.838

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Peer reviewed

Task Interdependence and Extrarole Behavior: A Test of the Mediating Effects of Felt Responsibility

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A model hypothesizing that task interdependence affects supervisor-reported extrarole behavior indirectly through employee felt responsibility was tested in this study. The model was supported by path analysis in a sample of 290 health-care and administrative employees in two hospitals. The results (a) demonstrate the importance of asymmetric felt responsibility to extrarole behavior and (b) show the need to include mediating psychological states when testing the effects of workplace structures on extrarole behaviors. New scales for measured employee-perceived task interdependence are introduced.

There has been a long-standing interest in discretionary prosocial employee behaviors—those actions that are not enforceable requirements of the job but on which many organizations depend (Brief & Motowidlo, 1986; Organ, 1988). Barnard (1938) emphasized the executive's role in developing subordinates' devotion to service and citizenship (p. 269). Follett (1926) noted that genuine cooperation could not be coerced, and two decades ago Katz and Kahn (1966) distinguished between in-role and extrarole behaviors and suggested that organizations depend on both kinds of employee actions. Despite this history of scholarly inquiry, only recently have these discretionary employee behaviors attracted significant empirical attention (O'Reilly & Chatman, 1986; Organ & Konovsky, 1989; Puffer, 1987; Scholl, 1979; Smith, Organ, & Near, 1983), as well as renewed theoretical interest (Brief & Motowidlo, 1986; Organ, 1988).

Using largely similar concepts, recent researchers have referred to these discretionary behaviors in different ways. For example, Organ (1988) called *citizenship behaviors* those employee contributions not inherent in formal role obligations. Brief and Motowidlo (1986) used the term *prosocial behavior* to refer to positive social acts carried out to produce and maintain the well-being and integrity of others. In the present work, we use Katz and Kahn's (1966) term, *extrarole behavior*, because it emphasizes the proactive as well as organization-welfare features of these overlapping concepts.

Organ (1988) argued that interest in extrarole behavior is in part a function of researchers' attempts to understand the attitude-performance relationship. Performance, as measured in most satisfaction-performance studies, has been confined to easily measurable components, such as production quantity

(i.e., Katz & Kahn's, 1966, in-role performance). Because in-role behaviors are mandated by the organization, one would not expect an employee's individual cognitive or affective state to explain much of the variance in these employee behaviors, which are more likely to be constrained by the technology and control systems of the organization (Mowday, Porter & Steers, 1982). The potential importance of this facet of employee performance is reflected in the increasing theory-grounded empirical research on why employees might engage in extrarole behavior. In this study, we focused on developing and testing a (partial) theory of why employees might engage in extrarole behavior.

Determinants of Extrarole Behavior

Organ (1988) provided the most comprehensive review of organizational and social psychological research on the determinants of extrarole behavior. He suggested that mood state is an antecedent with the most extensive empirical support in the social psychological literature on prosocial behaviors. That is, individuals who are in a positive mood are more likely to engage in prosocial acts than are those in a negative mood. Organ suggested that job satisfaction may be a good representative of a relatively stable mood regarding the organization. In fact, he reported substantial empirical evidence that job satisfaction and similar employee attitudes are positively, if weakly, associated with supervisor-rated organizational citizenship behaviors (Bateman & Organ, 1983; Graham, 1986; Puffer, 1987; Smith, Organ, & Near, 1983).

Organ and Konovsky (1989) presented empirical evidence suggesting that citizenship behaviors are not solely expressive responses to temporary mood states but are carried out for calculative reasons as well. If citizenship or extrarole behaviors are calculated, then it is important to ask why individuals might engage in them. If they expect a benefit from extrarole behaviors, what leads them to decide that these organizationally beneficial actions should be done? Organ (1988) suggested that fairness or justice is a primary reason. He argued that, as long as employees trust in the long-term fairness of the organization,

We wish to thank Dan McAllister and Anne Tsui for their comments on earlier drafts of this article.

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they do not worry about direct compensation for a particular act of citizenship. If, however, they feel that the organization is exploitive or unfair, they will confine their actions to narrow formal job definitions. In contrast, employees who feel that they have been treated prosocially will reciprocate in kind (Smith et al., 1983).

Thus, reciprocity becomes a key mediating mechanism in Organ's model of the determinants of citizenship behavior. For example, reciprocity is central to Smith et al.'s (1983) study of the features of the workplace environment that lead to citizenship behaviors; they argued that leader supportiveness would result in citizenship behaviors because supportiveness is a kind of prosocial behavior toward subordinates and would produce reciprocation in kind. Similarly, Smith et al. argued that reciprocal task interdependence would also be a determinant of employees' citizenship behaviors toward one another because interdependent employees realize that their co-workers can retaliate.

While not denying the importance of reciprocation in leading employees to engage in extrarole behaviors, we here suggest that employees may also engage in extrarole acts that are essentially asymmetrical. That is, some employees may engage in extrarole performance not because they expect a direct (if long-term) quid pro quo from the recipient but because they feel a responsibility to help. Smith et al. (1983) suggested that social responsibility develops in reciprocal task-interdependent relationships but saw it as fundamentally mutual.

Felt Responsibility and Extrarole Behavior

In addition to reciprocity, we hypothesized that *felt responsibility* is another reason for engaging in extrarole actions. Researchers studying altruism have argued that a subjective feeling of responsibility to help is a necessary precursor to altruistic acts (e.g., Krebs, 1970; Schwartz & Howard, 1982). If individuals feel responsibility toward the organization, fellow workers, or clients, they may be more likely to seek to help through extrarole acts. This may account for the occupational differences in extrarole behaviors reported by Loveland and Mendleson (1974) because certain role occupants may be made to feel responsible (either implicitly or explicitly) for others' actions.

Furthermore, the concept of felt responsibility has received some attention in the organizational psychology literature. Hackman and Oldham (1976) provided the most prominent discussion of felt responsibility. They argued that felt responsibility for one's output would lead individuals to be more concerned with output quality. That is, workers assembling airplane landing gear, because they are aware of the tragic consequences of a mistake, are more likely to pay careful attention to the correct performance of their tasks. Similarly, Salancik (1977) argued that certain job situations were associated with employees' organizational commitment because the situations induced a sense of responsibility toward the organization. Thus, at least some extrarole behaviors may arise from an employee's felt responsibility.

What might lead employees to feel responsible? Although it is possible to posit many different influences, the structural variable of task interdependence has received initial attention.

In an important initial study, Smith et al. (1983) hypothesized that employees would engage in more supervisor-reported citizenship behaviors if they were task interdependent with others. However, Smith et al. found no support for this relationship. We suggest that these results should not be viewed as definitive. In particular, structural characteristics may increase the likelihood of employee extrarole behaviors only through mediating variables. Certain environmental conditions, such as task interdependence, might provide a favorable setting for extrarole performance, but they will be mediated by employees' sense of fairness or felt responsibility.

Kiggundu (1981, 1983) proposed and tested a model linking felt responsibility and task interdependence. He argued that although task autonomy may lead to felt responsibility for one's own work, task interdependence ought to lead to felt responsibility for dependents. Because task-interdependent employees work continuously with other employees who depend on them, they ought to develop a greater sense of felt responsibility because they see the direct effects of their own actions. In addition, mere proximity and recurrent interactions could be expected to foster empathy. However, Kiggundu found that autonomy was associated with felt responsibility for employees' own work and for dependents' work. Kiggundu's path-breaking research helped to establish that employees who are not reciprocally interdependent may feel (as they apparently did in his sample) as responsible for others as do employees who are dependent on those others. The present work is an attempt to link previous theoretical and empirical research on task interdependence with the developing literature on extrarole behavior.

In summary, we expected that the effects of structural characteristics, such as task interdependence, on extrarole behaviors would be mediated by such cognitions as felt responsibility. The omission of this mediating variable may be one reason why the empirical research on the structural antecedents of extrarole behavior has been difficult to interpret.

Task Interdependence

Task interdependence figures prominently in numerous theories within organizational behavior, particularly those focusing on organization design (Galbraith, 1977; Hickson, Pugh, & Pheysey, 1969; Sayles, 1979; Thompson, 1967). However, the definitions of task interdependence have varied (e.g., Kiggundu, 1983; Mohr, 1971; Thompson, 1967), and empirical measurement of task interdependence has not kept pace with its theoretical importance. These measurement limitations and the development of new scales to overcome them are described in the Method section.

The new scales allowed us to test the following hypothesis about the mediating role of felt responsibility:

Task interdependence is associated with extrarole behaviors only through felt responsibility.

Method

Sample

Two hospitals were selected as research sites for this study, one in southern California and the other in western Pennsylvania. They were

similar in many respects. First, organizational size as measured by licensed bed count was comparable—471 and 562 beds, respectively. Second, their average occupancy rates were similar—75% and 70%, respectively. Third, the breadth and technological level of services provided were analogous. Finally, they were both nonprofit hospitals that were not unionized.

Nonmanagement employees were randomly selected from three general units of each hospital (nursing, radiology, and cardiopulmonary services). Both health-care professionals and administrative service employees (i.e., clerks and secretaries) were involved in the study. Administrative service employees were included specifically to ensure some degree of generalizability beyond health-care occupations (e.g., nurses, radiologists, etc.). Thirty percent of the sample were administrative service employees, 40% were nurses, 15% were radiology employees, and the final 15% were cardiopulmonary employees. In addition, nonmanagement employees' supervisors were surveyed about each employee's extrarole behavior. These supervisors were selected by the personnel departments at each hospital using the criterion of who had the most comprehensive, day-to-day knowledge of each nonmanagement employee's performance.

Data Collection

Nonmanagement employees received questionnaires first, with no indication that extrarole behavior would be independently evaluated. Two weeks after the nonmanagement questionnaires were returned, supervisors' questionnaires were distributed. This sequencing of questionnaires was used to reduce demand characteristics on employees' responses (Orne, 1959, 1962; Zemack & Rokeach, 1966).

Questionnaires and a cover letter from us were distributed through internal mail systems to nonmanagement employees. Respondents were guaranteed confidentiality, and the questionnaires were returned directly to us. Of 242 questionnaires sent to the Pennsylvania hospital, 148 were returned for a response rate of 61%. Of 227 questionnaires sent to the California hospital, 142 were returned for a response rate of 62%. Next, supervisors' questionnaires were prepared after all surveys were received from nonmanagement employees. The response rate on supervisor questionnaires was 100% for the Pennsylvania hospital and 88% for the California hospital, for a total response rate of 94%.

In the examination of the representativeness of the nonmanagement respondents, several variables seemed relevant. First, 90% of the respondents were women, and 10% were men. Forty-two percent of the respondents were under 30. Thirty-six percent were between 30 and 39, and 22% were over 40. Eleven percent were high school graduates, 26% had attended some college or had completed a professional diploma program, 30% had completed an associate degree, 23% had finished a bachelor's degree, and 11% had either attended graduate school or completed a graduate degree. Finally, 27% of the respondents were clerks or secretaries, 42% were nurses, 13% were radiology employees, and 18% were cardiology employees. These response percentages closely paralleled the initial survey distribution percentages.

Scale Development

Task interdependence. Fifteen positively and negatively worded items were generated for this study. In earlier research on task interdependence, two instruments have been prominent. The first, Van de Ven, Delbecq, and Koenig's (1976) instrument, has been the most widely used. Although the development of this instrument was an important step toward assessing task interdependence and helped to support the important findings outlined in Van de Ven et al.'s work, the instrument has two limitations. First, it is not easily adaptable to analyses at the individual employee level. Smith et al. (1983) used its pictorial index in their test of the association between task interdependence and citizenship behaviors, thereby committing an aggregation error. Respondents were asked to characterize the work in their unit (as a whole), and this aggregate score was then assigned to them as individuals. Although the interdependence of individuals within a unit may

be similar, it can also vary a great deal. It is also possible that individuals holding nominally the same job, such as registered nurse, may assume different tasks, which may lead to differences in task interdependence among employees in the same formal job type. In addition, Van de Ven et al.'s ordering of the types of interdependence on an interval scale has conceptual difficulties. Whereas Thompson (1967) ordered his forms of interdependence—pooled, sequential, and reciprocal—along a Guttman-type scale, with each higher level form of interdependence incorporating all lower forms, Van de Ven et al. placed their forms on an equal-interval scale of overall interdependence. Essentially, Thompson treated his forms as fundamentally different types of interdependence that can vary in their own degree or amount. Thus, it seems reasonable that many jobs are quite complex, having multiple facets and, potentially, multiple forms of interdependence. So, using Van de Ven's scale to measure an individual's job interdependence might have masked information essential to adequate tests of the effects of interdependence.

The second instrument that has been prominent in earlier research on task interdependence is Kiggundu's (1983) measure, which follows from his conceptualization of task interdependence as consisting of received and initiated task interdependence. Unfortunately, he did not complete rigorous tests of these hypothesized dimensions' discriminant validity. Specifically, he did not ascertain whether or not the items in each scale were more strongly associated with their assigned interdependence scale than the other, and the reported intercorrelation of .50 between the two scales indicates that these items may actually represent one interdependence scale.

To overcome the measurement problems in previous research on task interdependence, we developed new scales of task interdependence for this study. The theoretical domain specified for item generation came from Thompson's (1967) distinction between sequential and reciprocal interdependence. (Thompson did not expect pooled interdependence to vary across jobs.) All scales were assessed on 5-point *agree-disagree* scales. Task interdependence items were assessed with exploratory factor analysis with a varimax rotation on all task interdependence items, and three factors were found with eigenvalues greater than 1 (the factor loadings and items for these three factors appear in Table 1). These factors accounted for 54% of the variance. The first factor was composed of five items, which collectively reflect reciprocal interdependence ($\alpha = .76$). The second factor contained three items, which reflect independence ($\alpha = .61$; see Table 1). These three items indicate whether respondents rely on others to complete their tasks. Finally, the third factor consisted of three items with an unacceptably low alpha (.51); this factor was dropped from further analyses (Nunnally, 1978).

In this sample, reciprocal interdependence differed across job type, $F(3, 279) = 3.19, p < .05$, but independence did not. There was no difference between the two hospitals in their employees' reported interdependence.

Felt responsibility. A psychological sense of felt responsibility was assessed with Hackman and Oldham's (1975) four-item scale ($\alpha = .61$). The numerous tests of Hackman and Oldham's model provide good support for the construct validity of this measure (Hackman & Oldham, 1980).

Extrarole behavior. Extrarole behavior was assessed for each employee by his or her immediate supervisor. To examine a wide range of extrarole behaviors, items developed from O'Reilly and Chatman's (1986), Smith et al.'s (1983), and Scholl's (1979) scales were used. Some of these items were modified to emphasize the extrarole dimension of the behavior. For example, items like "help others with their work" seemed more role-related than extrarole and were either discarded or modified in a way that would emphasize appropriately the extrarole dimension of a behavior (e.g., "goes out of his or her way to help others with job-related problems"). A principal components factor analysis revealed a single factor, which accounted for 57% of the variance. For the 10 items (see Appendix), an alpha of .92 was computed.

Table 1
Rotated Pattern Matrix for Interdependence Items

Item	Factor		
	1	2	3
I work closely with others in doing my work.	<u>.78</u>	-.11	.07
I frequently must coordinate my efforts with others.	<u>.74</u>	-.18	.11
My own performance is dependent on receiving accurate information from others.	<u>.69</u>	.06	-.02
The way I perform my job has a significant impact on others.	<u>.62</u>	.18	-.17
My work requires me to consult with others fairly frequently.	<u>.57</u>	-.18	-.20
I work fairly independently of others in my work.	-.12	<u>.73</u>	-.05
I can plan my own work with little need to coordinate with others.	-.09	<u>.73</u>	-.08
I rarely have to obtain information from others to complete my work.	.06	<u>.68</u>	.23
In order to do my job, I need to spend most of my time talking to other people.	-.07	-.16	-.74
In my job I am frequently called on to provide information and advice.	.04	-.05	-.72
I work fairly independently of others in my work.	.18	.70	-.58
Eigenvalue	3.38	1.47	1.04
Percentage of explained variance	30.7	13.4	10.0

Note. Significant loadings are underlined.

Results

The descriptive statistics and zero-order correlations are shown in Table 2. Despite the use of a single measurement instrument for three of the four variables, multicollinearity does not seem to be problematic (Billings & Wroten, 1978). Furthermore, the nonsignificant correlation between independence and felt responsibility suggests that the response effects here were modest.

We used structural equation modeling (i.e., path analysis; Billings & Wroten, 1978; Blalock, 1967; Heise, 1969) to test the hypothesized relationships of task interdependencies with extrarole behavior through felt responsibility. Extrarole behavior was regressed on all independent variables (i.e., task interdependencies and felt responsibility). Trivial paths—defined as those with standardized regression coefficients that were less than twice their standard errors—were then deleted. Those variables that survived this path criterion were interpreted as having direct effects on extrarole behavior. The path analysis was then continued to identify variables having indirect effects

on extrarole behavior. The results of this procedure are shown in Figure 1.

As hypothesized, only felt responsibility had a significant, direct effect on extrarole behavior. The hypothesis suggested that perceived task interdependence would be associated with extrarole behavior only through felt responsibility. The results shown in Figure 1 support this hypothesis. The multiple correlation produced by the entire model was .20 ($R^2 = .04$, adjusted $R^2 = .03$). Although the relationships were as hypothesized, they were weak, perhaps because of the modest reliabilities of the independence and felt responsibility scales.

Billings and Wroten (1978) suggested that one of the most powerful applications of path analysis is the assessment of the relative goodness of fit of the model to the data. Reproduced correlations based on the resultant model were compared with the actual correlations. These comparisons are found in Table 3.

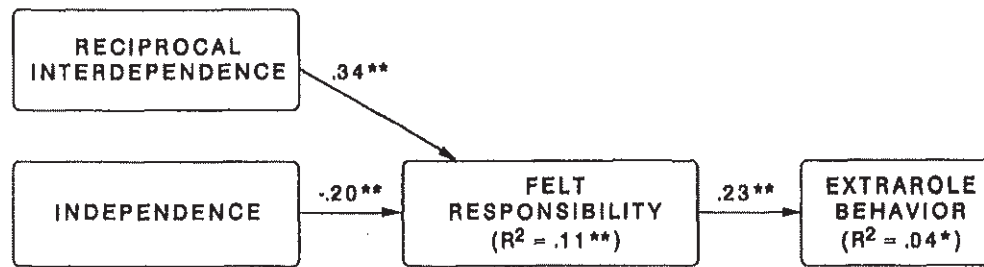
The discrepancies between the actual and expected correlations were minimal, with only the discrepancy for r_{23} not meet-

Table 2
Descriptive Statistics

Variable	M	SD	Range	1	2	3	4
1. Reciprocal interdependence	4.02	0.58	2.20-5.00	—			
2. Independence	2.78	0.85	1.00-5.00	-.34*	—		
3. Felt responsibility	4.26	0.53	2.25-5.00	.30*	.10	—	
4. Extrarole behavior	3.09	0.78	1.30-4.70	.01	-.02	.20*	—

Note. Variables were measured with 5-point Likert-type scales ranging from *strongly disagree* (1) to *strongly agree* (5).

* $p < .001$.



* Significant at the .05 level.

** Significant at the .001 level.

Figure 1. Path analysis of antecedents to extrarole behavior. (Coefficients are standardized regression coefficients.)

ing Kerlinger and Pedhazur's (1973) conservative recommendation. Thus, the theoretical model appears to present a good fit to the data.

The same procedure was applied separately on the sample from each hospital to ensure that the results were not due to conditions particular to one of the hospitals. These results also support the theoretical model: In both samples, the only influence of interdependence on extrarole behavior occurred indirectly through felt responsibility. However, the smaller sample sizes resulted in one of the three significant relationships in each hospital reaching only $p = .10$ (the path from independence to felt responsibility in the Pennsylvania hospital and from felt responsibility to extrarole behavior in the California hospital). Nevertheless, the results seem to be robust across samples.

Finally, it is important when using path analysis on a set of measures to ensure that alternative hypotheses are addressed. Three sets of alternative hypotheses were relevant to this test. The first concerns the possibility that the causal ordering among the variables may not be as theorized. Unfortunately, static correlations taken at one point in time cannot provide a definitive rejection of this alternative hypothesis. However, we suggest, on the basis of the literature reviewed, that the hypothesized causal ordering is most plausible. Experimental research in altruism (Krebs, 1970) has established the causal direction from the structure of the situation to feelings of responsibility to altruistic acts. However, it is possible that engaging in uncoerced extrarole acts might lead employees to perceive themselves responsible or interdependent.

Table 3
Goodness of Fit of the Model to the Data

Correlation	Predicted value	Actual value	Discrepancy
r_{14}	.08	.02	.06
r_{24}	.05	-.01	.06
r_{34}	.23	.20	.03
r_{13}	.34	.30	.04
r_{23}	.20	.10	.10

Second, it is possible that there is a potentially insufficient conceptual distinction between felt responsibility and extrarole behaviors, that is, that they are simply attitudinal and behavioral manifestations of the same concept. However, we suggest that the traditional approach to the study of attitudes as predictors of behavior is both theoretically justified and practically useful. If particular attitudes can be found to be reliable predictors of behaviors, this will provide practitioners with a relatively convenient method to forecast work-related behaviors.

Finally, it is possible to imagine a model in which relationships are moderated, rather than mediated as in the model we have hypothesized. Accordingly, we tested two alternative moderator models. First, we tested a model in which the relationship between felt responsibility and extrarole behavior was moderated by interdependence (such that only when there is high interdependence does felt responsibility lead to extrarole behavior). When we used a median split on reciprocal interdependence, we found no significant difference in the relationship between felt responsibility and extrarole behavior between groups high ($r = .21$) and low ($r = .14$) in interdependence. Similarly, interdependence may be more highly related to extrarole behavior for those employees who feel more responsible. However, using a median split on felt responsibility, we found no difference in the correlation between reciprocal interdependence and extrarole behavior for the high responsibility group ($r = -.03$) and the low responsibility group ($r = -.01$). Taken as a whole, this elimination of questions regarding results in the separate hospitals and the moderator models provides additional confidence in our hypothesized model. Nevertheless, this one study cannot provide definitive support for the hypothesized model. The possibility that the relationships among the self-report measures may result from response effects cannot be ruled out, nor can the causal ordering hypothesized between these variables be tested in this study's cross-sectional design.

Discussion

This study's results support the hypothesis that perceived task interdependence is associated with extrarole behavior only through the mediation of felt responsibility. That is, this job structure operated on supervisor-reported extrarole behavior

only for those employees who also felt responsible. This suggests that Smith et al.'s (1983) weak results in their earlier test of the effects of job structures on extrarole effort may have been partially due to an incomplete model. Here, task interdependence did influence supervisor-reported extrarole effort, but only indirectly through felt responsibility.

These results provide support for the argument that extrarole behaviors, like the more extensively researched altruistic behaviors, may result from an asymmetric sense of obligation to others as well as from mutuality. Because so much theoretical work is dominated by implicit assumptions of simple two-party exchanges, this empirical support for a variable reflecting internalized obligations may help stimulate greater interest in these ideas.

Felt responsibility is a psychological state that may play an important role in numerous aspects of job performance and deserves further research attention. Future research might seek to understand how felt responsibility is fostered, perhaps building on the excellent theoretical work on altruism (e.g., Krebs, 1970). On the basis of this research, we might expect felt responsibility to be strongly influenced by situations. Although this study showed a relationship with perceived task interdependence, other environmental cues—more easily controlled by managers—may be important as well. Some examples might include formal training and behavior modeling. Similarly, if future research indicates that personality plays a role in felt responsibility, this would have important implications for selection system design. Because felt responsibility seems to hold the potential for providing insight into numerous workplace behaviors—from motivation and turnover to extrarole performance—it deserves additional empirical attention. For example, future research might examine the relative influence of mutual obligation and asymmetric felt responsibility in extrarole acts.

This study also provides support for the argument that extrarole behavior can be affected by perceptions of structural features of the workplace rather than solely by the quality of the employees' interpersonal relationships or their self-reported affect. It is hoped that these results will encourage greater theoretical and empirical attention to the possible structural antecedents of extrarole effort, building on the work of Organ (1988) and Brief and Motowidlo (1986). For example, procedural justice in personnel procedures, such as performance appraisals, is receiving increasing attention; it should be possible to test the proposition that the relative perceptions of fairness resulting from different personnel procedures may affect extrarole behavior.

Finally, this study reports the successful use of two new scales measuring perceived reciprocal task interdependence and independence. The work reported here is preliminary in nature, but we hope that it will spur additional empirical development of a concept that has been central to many organizational theories. Future research might profitably address the relationships between actual or objective task interdependence and perceived task interdependence. In addition, the hypothesized causal ordering between perceived interdependence and felt responsibility might be pursued through cross-lagged field research or laboratory experiments.

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Appendix

Extrarole-Behavior Scale Items

1. Attends nonrequired training or educational sessions on own time.
2. Makes especially helpful suggestions to improve the organization.
3. Works before or after regular working hours in order to finish a task.
4. Standards of work quality are higher than the stated standards.
5. Actively and constructively seeks to get his or her suggestions adopted by the organization.
6. Orients new people even though it is not required.
7. Makes special attempts to gain more knowledge about job-related techniques and skills.
8. Attends functions that are not required, but that help this organization.
9. Goes out of his or her way to help others with job-related problems.
10. Looks for additional responsibilities and/or tasks despite the fact that it increases his or her work load.

Received November 29, 1990
 Revision received July 22, 1991
 Accepted July 22, 1991 ■