

SOLIDARITY OF TEMPORARY WORKERS EFFECTS OF TEMPORAL AND NETWORK EMBEDDEDNESS ON SOLIDARITY OF PH.D. STUDENTS

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1. Introduction

Changes in the organizational and occupational structure of organizations have led to increasing demands by employers for solidarity among their employees (Janssens & Brett, 1994; Sanders, 2000; Sanders, Van Emmerik & Raub, 2002). As a result of decentralization and empowerment, many employees bear more responsibility for the quality of their work and output than ever before. Employers expect their employees to cooperate with each other and direct their mutual efforts towards the organization as a whole to reach the organizational goals (Schaubroeck & Ganster, 1990). In general, employee solidarity refers to the alignment of the interests of individual employees with those of other employees and that of the organization. The amount of solidarity employees exhibit is largely influenced by the nature of their employment relations with the organization (Tsui, Pearce, Porter & Tripoli, 1997). Given the continued increase in the demand for flexible contracts, the relation between temporary contracts and employee behavior is of particular interest (Davis-Blake & Uzzi, 1993; Kalleberg, 2000).

Employee solidarity can be either horizontal or vertical. Horizontal solidarity refers to solidarity among employees, and vertical solidarity reflects employees' efforts to reach organizational goals. In this article, we address vertical solidarity, as reflected by Organizational Citizenship Behavior (OCB; Organ, 1988). The concept of OCB is defined as employee behavior that is discretionary, not formally rewarded, and benefits the functioning of the organization (Organ, 1988).

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We study OCB from a social embeddedness perspective, which holds that the social context individuals are embedded in influences their solidarity (Raub, 1997). In this article, we focus on temporal and network embeddedness. Temporal embeddedness means social relations are time-specific, and behavior within relationships is influenced by the shared past and future of the parties involved. Network embeddedness refers to the fact that relations between people are often embedded in larger systems of social relations (Granovetter, 1985; Raub, 1997).

This paper addresses the effects of temporal and network embeddedness for a specific group of temporary contracts: Ph.D. students working at a Dutch university. Ph.D. students are junior researchers employed by the university to work on a research project. The normal length of employment for Ph.D. students is four years. The bulk of their job responsibilities consist of conducting research, but they also participate in educational activities. They are part of the university for a relatively long period of time, particularly as compared to other temporary employees. They are not completely external to the university organization, and have no certainty about their future with the university once their projects are finished. The question in this article is: under what conditions do Ph.D. students exhibit solidarity toward the organization they work for?

The article is structured as follows. In section 2, we define employee solidarity. In section 3, we discuss the effects of temporal and network embeddedness and formulate the research hypotheses. Section 4 describes the data and in section 5 the hypotheses are tested. The article closes with a discussion of the results, practical implications, and possibilities for further research.

2. Solidarity

Solidarity means putting effort into producing a collective good without any direct compensation (Hechter, 1987; Lindenberg, 1998). Within organizations, employees can contribute to the collective good in two ways: through in-role and extra-role performance. In-role performance means performing required duties and responsibilities, extra-role behavior refers to the performance of discretionary behavior that goes beyond the formal job description (Smith, Organ & Near, 1983; Williams & Anderson, 1991). The most extensively studied form of extra-role behavior is Organization Citizenship Behavior (OCB) (Bateman & Organ, 1983; Smith, Organ & Near, 1983; Morrison & Phelps, 1999). OCB is defined as "individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in aggregate promotes the effective functioning of the organization. By discretionary, we mean that the behavior is not an enforceable requirement of the role or job description, that is, the clearly specifiable terms of the person's employment contract with the organization; the behavior is rather a matter of personal choice, such that the

omission is not generally understood as punishable” (Organ, 1988: 4). This definition is a specific form of the general definition of solidarity. For the Ph.D. students in this article, in-role behavior consists of writing a thesis and participating in educational activities. Extra-role behavior includes working to improve research and education conditions. In this article, we use OCB as a form of extra-role behavior, and use it to study the solidarity of Ph.D. students with the organization they are employed in.

3. Social embeddedness and OCB

Many studies have identified factors at the level of the individual, team, and organization that influence OCB (Podsakoff, MacKenzie, Paine & Bachrach, 2000). The embeddedness approach offers potential explanations for these factors. This approach holds that cooperative behavior such as OCB arises under specific conditions. This is also emphasized in the social exchange model (Tsui, et al., 1997). To some degree, employees are free to choose to put effort into engaging in OCB. Engaging in OCB may well be based on the expected returns for their investment, such as intrinsic, material or social rewards. As Tsui et al. (1997) note an employer may react to an employee’s effort with greater consideration for the employee’s well-being or with investments in the employee’s career at the organization. These mutual exchanges take place within the social context or social embeddedness of the employment relation. By examining the effects of various kinds of social embeddedness, we can gain insight into how they affect OCB. In the following sections we discuss the expected effects of two types of social embeddedness. It is important to note that involvement in OCB entails costs for the individual employee. Employees also encounter a certain degree of uncertainty by performing OCB, since they are not sure whether others will also become involved. Given the costs and uncertainty, gathering information about the behavior of others increases OCB. Social relations that have a defined duration and are part of a larger network of relations make it possible to gather information (Granovetter, 1985; Hechter, 1987; Raub, 1997; Buskens, 1999). We thus expect that OCB will be positively influenced by both temporal and network embeddedness.

3.1 Temporal embeddedness

Temporal embeddedness refers to the duration of relations among individuals. Actors usually interact more than once, resulting in a joint past and future. The history of the relationship makes it possible to gather information about each other’s behavior. Based on this information, actors can estimate the trustworthiness of others. Positive past experiences increase mutual solidarity (Raub, 1997). Solidarity also increases if people can learn about each other’s preferences and behavior (Deutsch, 1949), and if there has also been interaction

between them in the past (Frey & Bohnet, 1995). The history of the relationship also makes it possible to make relationship-specific investments. These investments enhance the attractiveness of the relationship for both parties and lose their value when the relationship ends. Once relationship-specific investments have been made, breaking the relationship becomes costly. As a result, relationship-specific investments increase mutual solidarity (Raub, 1997).

Social relations are also influenced by the future of the actors involved. A shared future promotes solidarity through conditional cooperation (Axelrod, 1984). Conditional cooperation can be summarized as follows: “if you cooperate, I will cooperate, if you hurt me, I will hurt you” (Spicer, 1985). Conditional cooperation increases the long-term costs of non-solidarity (Burt & Knetz, 1996). The threat of future sanctions and the possibility of approving behavior increases solidarity between actors. Actors can decide to cooperate with others upon their first meeting, and can also choose to cooperate only if the other also cooperates. Through this process, the solidarity of one person is reciprocated by the solidarity of another one. The extent to which solidarity can be reciprocated within an organization depends on the duration of the relationship between employers and employees, as well as among the employees themselves (Spicer, 1985).

In the case of temporary contracts, such as the Ph.D. contracts considered here, the past and future of relationships have opposing effects. As the relationship develops, there are more opportunities for actors to show solidarity to one another. Solidarity can be expected to increase as actors have a longer history together. In contrast, it can be argued that solidarity will decrease if a relationship is coming closer to the end, since there are fewer possibilities for sanctioning and approving actions of others. These effects can be defined as follows. First, it can be expected that solidarity needs time to evolve. Solidarity will be low during the start of the relationship, due to the considerable costs of solidarity. At that point, an actor will not be able to estimate whether the other actor will act opportunistically (Kramer, Brewer & Hanna, 1996). As the relationship unfolds, uncertainty about the trustworthiness of others increases as more information is gathered. Although solidarity is likely to increase, there will be a limit to this growth. In a temporary relationship, it is likely that solidarity between actors will decline if the likelihood of future interaction decreases. In summary, we expect a curvilinear relationship between the duration of the Ph.D. contract and the amount of solidarity, and formulate the following hypothesis:

Hypothesis 1: *The solidarity of temporary employees has a curvilinear relation to the duration of the contract: there will be less solidarity in the beginning and end than in the years in between.*

3.2 Network embeddedness

Temporal embeddedness refers to the effects of past and future interactions on solidarity. Network embeddedness pertains to the effects of the amount and quality of relations people have with others. People have relations with each other, which are embedded in larger social structures. Networks provide information and serve as means for the direct and indirect sanctioning of non-solidarity actions. Social actions and outcomes are influenced by dyadic and larger structures of social relations (Granovetter, 1985). These social relations transform into structures of interacting actors who are dependent upon each other to reach their goals (Wasserman & Faust, 1994). As a result of the interactions with individuals, networks are the means that actors may use to reach their goals (Wasserman & Galaskiewicz, 1994). The network approach links individual actions and behavior to the contexts they occur in. Such organizational phenomena as motivation, turnover, and leadership have been studied successfully from a network perspective (Krackhardt & Brass, 1994). Network embeddedness can be either formal or informal. Formal networks are impersonal and explicit, whereas informal networks are personal and implicit (Smelser, 1976; Powell & Smith-Doerr, 1994). In order to understand organizational behavior formal and informal networks should be taken into account (Nohria & Eccles, 1992).

At the university considered in this study, the formal networks of Ph.D. students are defined by the departments where they are employed. The most important services universities provide are education and research. Although departments try to perform well as regards research and education, they differ in the emphasis they place on each of them. The orientation of the department affects the people working there as follows. Within a research-oriented environment, good research performance is important and a high quality research output is the norm. Since the main part of the Ph.D. student's job consists of conducting research, we can expect a Ph.D. student to have an interest in working for a research-oriented department. At these departments, their work is more closely linked to the primary work of the department. More generally, the more central the employees' tasks are to the primary process of the organization, the greater the solidarity of the employees toward the organization. This leads us to the following hypothesis:

Hypothesis 2: *The solidarity of temporary employees is positively influenced by formal network embeddedness: greater congruence between the policy of the organization and the tasks of temporary employees will lead to greater solidarity.*

Informal networks consisting of personal relations also shape the behavior of people. At organizations, the most important relations employees have are with

their supervisors and colleagues. Good relationships with colleagues are important for employees. For instance, acceptance in a group is one of the most important informal rewards on the work-floor (Pfeffer, 1982). Compliance to group norms may be rewarded with social support from the group. Informal group norms influence the behavior of group members (Coleman, 1994), resulting in positive and negative behavior towards the organization (Roethlisberger & Dickson, 1939; Spicer, 1985). Within departments where Ph.D. students have good relations with each other, we can expect an atmosphere where department matters are discussed. If this is not the case, it is unlikely that Ph.D. students will be willing to change things for the better within the department. Based on the finding that good relationships between employees are related to good relations with the management (Hodson, 1997), we expect positive relations with fellow Ph.D. students to result in higher levels of solidarity towards the department.

The quality of the relation with the supervisor is also important for employee behavior. Solidarity towards the organization largely depends on the extent to which supervisors are able to create relational contracts with their employees (Leana & Van Buren, 1999). Due to mutual dependency, there is some uncertainty inherent in the relations between supervisors and Ph.D. students (Kramer, 1996). Ph.D. students depend on their supervisors, for instance, for help with their work and career. Supervisors, in turn, depend on their Ph.D. students, especially if the students gather data that is also used by their supervisors. Whether these data are gathered correctly is a matter of trust (Kramer, 1996). This mutual dependency increases the importance of solidarity between Ph.D. students and supervisors. We therefore expect a high quality relation between them to increase solidarity.

Hypothesis 3: *The solidarity of temporary employees is positively influenced by informal network embeddedness, in the sense of high-quality relations with colleagues (hypothesis 3a) and the supervisor (hypothesis 3b).*

4. Method

4.2 Procedure

As part of a study on the careers of university employees (Van Emmerik & Hermkens, 1996), all the staff members of the 14 departments at a Dutch university have been asked to complete questionnaires. The research population consists of 3,054 persons, 47 percent are female and 53 percent male; 1,232 people have responded, i.e. a response rate of 40.3 percent (Dekker, 2000). This study uses the data from Ph.D. students ($n=262$). The 262 Ph.D. students are employed at four different university clusters. The group of Ph.D. students who have responded is 57 percent male and 43 percent female. On average, they are

28.1 years old (standard deviation 3.36), and have worked at the university for an average of 2.9 years (standard deviation 1.2). The respondents are employed at four research units: Liberal arts, Natural science, Social science, and Biomedical (see appendix A for an overview of the departments). Of the respondents, 63 (24%) are employed in Natural science departments, 123 (47%) at Biomedical departments, 32 (12%) at Liberal arts departments (12%), and 44 in at Social science departments (17%). There are some age and gender differences between the departments. The Social science departments employ the highest percentage of female Ph.D. students (73%), the lowest percentage is found at the Natural science departments (32%). On average, the Ph.D. students employed at the Natural science departments are the youngest (26.9 years), and those in Social science departments are the oldest (29.3 years) (see also Table 1).

Table 1. Descriptive statistics per department

Department	Liberal arts	Natural science	Social science	Bio-medical	Total
Respondents	32	63	44	123	262
% women	56	32	73	64	57
Age	28.6	26.9	29.3	28.1	28.1
Number of Ph.D. degrees granted by each professor	.069	.089	.072	.076	.077

4.2 Measurement

Solidarity. We measure employee solidarity using five items of the Organizational Citizenship Behavior questionnaire of MacKenzie, Podsakoff, and Fetter (1991). An example of an item is “In my job I often make suggestions to improve the quality of research or education.” The items are measured on a 5-point scale, ranging from “totally disagree” to “totally agree.” Negatively worded items are reverse-coded. Taken together, the five items constitute a reliable scale (Cronbach’s alpha = .74). A higher score reflects a higher level of solidarity toward the organization (see appendix B).

Temporal embeddedness. Ph.D. students are clustered into year groups (according to the year their research started). The year groups vary from 1994 to 1998. First-year Ph.D. students comprise 13 percent of the respondents, 25 percent are in their second year, another 25 in their third year, and 27 percent in their fourth year. An additional ten percent of the respondents are in their fifth year, meaning they have received an extended contract to finish their projects.

Formal network embeddedness. Formal network embeddedness is measured as department orientation. The measure for research orientation is the amount of Ph.D. degrees granted by each professor (the relative number of Ph.D. degrees at a department).

Informal network embeddedness. Informal network embeddedness is measured by the strength of ties between Ph.D. students and their colleagues and supervisors. This measure varies from 1 (no tie) to 4 (strong tie).

Control variables. Research shows that several factors, including age and sex, influence OCB (Podsakoff et al., 2000). Older employees and female employees show less OCB than other groups. Therefore, we control for age and sex. Previous studies also note a negative relation between the year of entry and OCB, so we control this as well. Since many studies note a relation between organizational commitment and OCB, we also control for organizational com-

Table 2. Means, Standard Deviations, and Correlations

Variable	Mean	SD	1	2	3	4	5	6	7
1. solidarity	3.36	.64							
2. commitment	2.77	.78	.04						
3. # hours	37.75	4.41	.07	-.01					
4. % women	.57	.50	-.11	-.01	-.00				
5. age	28.10	3.34	-.11	.05	-.31**	-.03			
6. year started	1996	1.25	.01	-.05	-.07	-.00	-.36**		
7. tie supervisor	1.03	.76	.13**	.17**	-.05	-.05	.02	-.04	
8. tie colleagues	1.60	.35	.13**	.05	-.08	.10	.02	-.05	.23**
9. relative # Ph.D. degrees	.77	.13	.13*	-.07	.19**	.02	-.10	-.03	.02

* $p < .10$, ** $p < .05$

mitment. Organizational commitment is measured with four items on a 5-point scale (Mowday, Steers & Porter, 1979). One of the items is "I have the feeling that I belong to [name university]". The four items constitute a reliable scale (Cronbach's Alpha=.84) (see appendix B). We also control for the number of hours that Ph.D. students work every week.

4.3 Results

Table 2 presents the means, standard deviations, and correlation coefficients of the variables measured among the Ph.D. students.

Multilevel analysis (Bryk & Raudenbush, 1992; Snijders & Bosker, 1999) has been used to test the first two hypotheses, which state that the level of solidarity is related to the temporal and network embeddedness of the Ph.D. students. Determinants of solidarity have been examined at both the individual and department levels. Multilevel analysis divides the variance in the dependent variable into variance that can be accounted for by variables at a higher level, here the department-level variables of formal network embeddedness (the relative number of Ph.D. degrees granted), and the variance that can be accounted for by lower-level variables, in this case individual-level variables.

Table 3. Multilevel Analyses of Solidarity of Ph.D. students (n=262) explained by temporal and network embeddedness

Variable	'Empty' Model	Model 1	Model 2	Model 3	Model 4
Department Level					
# Ph.D. degrees					.64* (.24)
Individual Level					
Age		-.02** (.01)	-.02** (.01)	-.02** (.01)	-.01** (.01)
Gender (0 = male)		-.13 (.08)	-.11 (.08)	-.11 (.08)	-.10 (.08)
# hours		.01 (.01)	.01 (.01)	.01 (.01)	.01 (.01)
Commitment		.01 (.15)	-.02 (.15)	-.03 (.15)	-.04 (.14)
Year started			.01 (.01)	.01 (.01)	.00 (.00)
Temporal embeddedness					
(0=first en last year)			.24** (.09)	.23** (.09)	.20** (.09)
tie supervisor				.07 (.05)	.08 (.05)
tie colleagues				.07** (.03)	.07** (.03)
Constant	2.96** (.04)	3.11** (.49)	2.67** (.52)	2.21** (.54)	1.99** (.54)
Model fit	508.77	494.77	488.72	481.59	472.02
Deviance		14.00*	6.05**	7.13**	6.57**
Df		4	2	2	3

* p <.10, ** p<.05

The individual-level variables include temporal embeddedness, informal network embeddedness, and the control variables of organizational commitment, age, gender, and the number of working hours. Table 3 presents the results of the multilevel analyses. In Model 1, the effects of the control variables are reported. The temporal embeddedness variables, including both the year-group effect and the tenure effect, are added in Model 2. The effect of informal net-

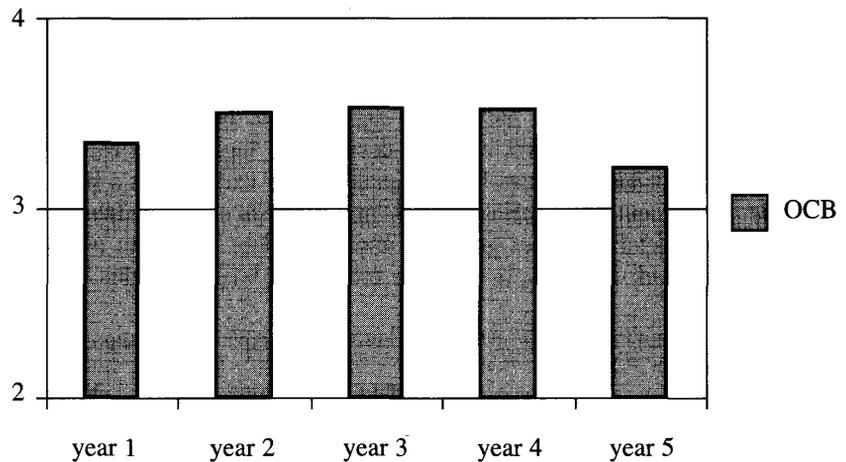


Figure 1. Relation between year groups and OCB.

work embeddedness, the strength of ties with colleagues and supervisors is entered in Model 3. Finally, in Model 4, the higher-level variable of formal network embeddedness (number of Ph.D. degrees granted) is added. Temporal embeddedness is significantly related to solidarity among Ph.D. students, even when controlled for the effects of networks the individual characteristics (age, gender, tenure, working hours, and organizational commitment). The curvilinear relation between year group and solidarity is graphically represented in Figure 1.

The model fit improves significantly if we add the network variables. We find that informal network embeddedness, in the sense of good relations with colleagues, is important for solidarity. Ph.D. students with good relations with other Ph.D. students also exhibit higher levels of OCB. The same does not hold for relations with supervisors. The results show that network embeddedness has a strong effect on the solidarity of Ph.D. students toward their departments. Ph.D. students in research-oriented departments demonstrate higher levels of OCB than their counterparts in education-oriented departments. In summary, empirical results confirm Hypothesis 1: Temporal embeddedness affects solidarity. Hypotheses 2 and 3 are partly confirmed.

5. Discussion

Employers demand more solidarity from their employees than ever before.

Employee solidarity has many different facets, one of which is reflected by Organizational Citizenship Behavior (OCB). OCB refers to employee behavior that is not part of the formal job description and that benefits the organization. This kind of behavior develops and is sustained if certain conditions are met. In this article we hypothesize the effects of embeddedness on solidarity. We argue that temporal embeddedness (the degree to which people share a mutual past and future) and network embeddedness (the degree to which people have relations with each other) increase solidarity.

We examine the effects of the conditions on the behavior of Ph.D. students, a special group of temporary workers at Dutch universities. The temporal embeddedness hypothesis asserts a curvilinear relations between temporary contracts and OCB. The analyses show that Ph.D. students demonstrate less OCB in the first and last years of their projects than in the intervening years. This result confirms the notion that solidarity needs time to grow. As a result, first-year Ph.D. students are less willing to exhibit OCB. We also note a decline in OCB at the end of the contract. This result is in line with the expectation that solidarity is affected by considerations pertaining to future interactions. Considering the effects of temporal embeddedness, we conclude that a good understanding of the effects of temporary contracts requires that the effects of the past and future be taken into account.

An alternative explanation for these results could be that the development of OCB depends on the work the Ph.D. students have to do during their projects. First-year Ph.D. students are not asked to take on extra assignments because they need to start up their projects. Similarly, last-year Ph.D. students are left alone because they need to finish their projects. As a result, Ph.D. students in the intervening years are more likely to be asked to demonstrate behavior consistent with OCB. This line of reasoning, however, does not take into account that Ph.D. students also have heavy workloads in connection with data gathering and analysis. We therefore interpret the focus of last-year Ph.D. students on completing their degrees as resulting from a shadow of the future. Instead of choosing to act in the general interest (by demonstrating OCB), the Ph.D. students choose to act in their own interests, devoting all their energy to writing a thesis. Assuming that the workload for Ph.D. students is constant throughout their projects, this latter finding confirms the proposed effect of temporal embeddedness. Last-year Ph.D. students consider their own work more important than the functioning of the organization as a whole.

In addition to the influence of temporal embeddedness, we hypothesize that network embeddedness affects solidarity. We distinguish between formal and informal network embeddedness. According to the formal network hypothesis, employee solidarity is higher if there is more congruence between organizational policy and individual tasks. Applied to the situation of Ph.D. students, we assert that solidarity is higher at research-oriented departments than at depart-

ments focused on education. The analysis confirms this hypothesis: Ph.D. students at research-oriented environments, exhibit greater solidarity towards their departments.

We formulate two hypotheses on informal network embeddedness. We assert that the solidarity of temporary employees is affected by the quality of their relations with their colleagues and supervisors. The analyses partly confirm these hypotheses. Good relations with colleagues have a positive effect on OCB of Ph.D. students. However, we do not find the same effect for relationships with supervisors. It is possible to argue that supervisors are more appreciative of Ph.D. students who work hard on their own projects and devote less attention to the general organization issues. In that case, however, OCB would be negatively linked to the quality of the relations with the supervisor. Our analysis does not show any evidence of this type of effect. We therefore conclude that OCB on the part of Ph.D. students is more strongly influenced by their relations with colleagues and less by their relations with their supervisors.

Contrary to earlier research findings (Organ & Ryan, 1995; Schappe, 1999), we do not observe a strong relation between OCB and organizational commitment. People's behavior is generally assumed to be largely influenced by their attitudes. Organizational commitment reflects an attitude towards the organization. High commitment should result in more OCB. However, the data do not show this relation. We explain this by referring to the special employment relations Ph.D. students have with the organization and the kind of commitment they are asked to report on. They are asked whether they feel a sense of belonging at the department. It is their own decision to only be part of a department for a short period of time without really belonging there. For this group of temporary workers, commitment in the sense of belonging to the organization does not affect OCB.

These findings have implications for OCB and labor flexibility research. So far, OCB studies have mainly focused on factors that determine OCB behavior (Podsakoff, et. al., 2000). By studying OCB from an embeddedness perspective, we hope to discover why these factors are important. Future research will focus on how social embeddedness influences OCB in particular and solidarity in general. The theoretical ideas proposed in this article can be elaborated in several ways. It is wise to study the effects of different forms of flexible employment relationships on solidarity. One interesting question might concern differences between internal and external flexibility. Little is known so far about the effects of flexible labor on solidarity within organizations. Flexibility of labor affects the embeddedness of employers and employees and influences their behavior. This study shows that OCB among employees depends on the length of time they spend in the organization and the quality of the relations they have at work. However, the group under study here – Ph.D. students – are part of the organization for quite a long period of time. It is likely that the

effects will be even stronger in the case of short-term employment contracts.

We would like to conclude this article with some suggestions for future research. Our focus on a special group of temporary workers has enabled us to study in detail how their behavior develops during the course of their contracts. It would be of interest to study different types of temporary workers and draw stronger conclusions about the effects of short-term contracts. The focus of this article was on external flexibility, and studying different forms of flexibility would enhance our knowledge on the effects of flexibility. We studied a particular form of solidarity – OCB – the behavior of employees towards their organization, but future research should contrast and compare it with other forms of solidarity so as to gain more insight about the effects of flexibility of labor on social embeddedness and solidarity.

APPENDIX A

Overview of the departments:

- Liberal arts: Faculty of Arts, Faculty of Law, Faculty of Philosophy, Faculty of Theology.
- Natural sciences: Faculty of Mathematics and Computer Science, Faculty of Physics and Astronomy, Faculty of Earth Sciences.
- Social sciences: Faculty of Social Sciences, Faculty of Geographical Sciences.
- Biomedical: Faculty of Medicine, Faculty of Pharmaceutical Sciences, Faculty of Veterinary Medicine, Faculty of Chemistry, Faculty of Biology.

APPENDIX B

Items Organizational Citizenship Behavior (OCB):

In my job....

- I work as many hours as necessary to finish my work. (R)
- I always think constructively about changes that are possible within the department.
- I regularly make suggestions to improve research or education.
- I devote a lot of attention to giving feedback to colleagues.
- I keep my doubts concerning departmental affairs to myself. (R)

Items Organizational Commitment:

- I am proud to work here.
- I really have the feeling that I belong at [name university].
- Working for [name university] means a lot to me.
- I have the feeling that problems at [name university] are also my problems.

REFERENCES

- Axelrod, R. (1984). *The Evolution of Cooperation*. New York: Basic Books.
- Bateman, T.S. & D.W. Organ (1983) 'Job Satisfaction and the Good Soldier: The Relationship Between Affect and Employee "Citizenship"', *Academy of Management Journal*, vol. 26, pp. 587-595.
- Bryk, A.S. & S.W. Raubenbush (1992). *Hierarchical Linear Models: Applications and Data Analysis Methods*. Newbury Park, CA: Sage Publications.
- Burt, R.S. & M. Knez (1996). Trust and Third-Party Gossip. In *Trust in Organizations: Frontiers of Theory and Research*. R. M. Kramer & T. R. Tyler (eds), Thousand Oaks, CA: Sage Publications.
- Buskens, V.W. (1999). *Social Networks and Trust*. Amsterdam: Thesis Publishers.
- Coleman, J.S. (1994). A Rational Choice Perspective on Economic Sociology. In *The Handbook of Economic Sociology*. N.J. Smelser & R. Swedberg (eds), Princeton, NJ: Princeton University Press.
- Davis-Blake, A. & B. Uzzi (1993) 'Determinants of Employment Externalization: A Study of Temporary Workers and Independent Contractors', *Administrative Science Quarterly*, vol. 38, 2, pp. 195-224.
- Dekker, R. (2000). *De Wetenschappelijke Match. Persoon-Cultuur Fit en Loopbanen van Vrouwelijke en Mannelijke Wetenschappers [The Scientific Match. Person-Culture Fit and Careers of Female and Male Scientists]*. Amsterdam: Thela Thesis.
- Deutsch, M. (1949) 'A Theory of Cooperation and Competition', *Human Relations*, 2, pp. 129-152.
- Frey, B.S. & I. Bohnet (1995) 'Institutions Affect Fairness', *Journal of Institutional and Theoretical Economics*, vol. 151, pp. 286-303.
- Granovetter, M. (1985) 'Economic Action and Social Structure: The Problem of Embeddedness', *American Journal of Sociology*, vol. 91, 3, pp. 481-510.
- Hechter, M. (1987). *Principles of Group Solidarity*. Berkeley: University of California Press.
- Hodson, R. (1997) 'Group Relations at Work. Solidarity, Conflict, and Relations with Management', *Work and Occupations*, vol. 24, pp. 426-452.
- Janssens, M. & J.M. Brett (1994). Coordinating Global Companies: The Effects of Electronic Communication, Organizational Commitment, and a Multi-Cultural Managerial Workforce. In *Trends in Organizational Behavior*. C. L. Cooper & D. M. Rousseau (eds), New York, NY: John Wiley & Sons.
- Kalleberg, A.L. (2000) 'Nonstandard Employment Relations: Part-Time, Temporary and Contract Work', *Annual Review of Sociology*, vol. 26, pp. 341-366.
- Krackhardt, D. & D.J. Brass (1994). Intraorganizational Networks: The Micro Side. In *Advances in Social Network Analysis: Research in the Social and Behavioral Sciences*. S. Wasserman & J. Galaskiewicz (eds), Thousand Oaks, CA: Sage Publications.
- Kramer, R.M., M.B. Brewer, & B.A. Hanna (1996). Collective Trust and Collective Action: The Decision to Trust As a Social Decision. In *Trust in Organizations*. R. M. Kramer & T. R. Tyler (eds), Thousand Oaks, CA: Sage Publications, Inc.
- Kramer, R.M. (1996). Divergent Realities and Convergent Disappointments in the Hierarchic Relation: Trust and the Intuitive Auditor at Work. In *Trust in Organizations*. R. M. Kramer & T. R. Tyler (eds), Thousand Oaks, CA: Sage Publications.
- Leana, C.R. & H.J. Van Buren (1999) 'Organizational Social Capital and Employment Practices', *Academy of Management Review*, vol. 24, 3, pp. 538-555.
- Lindenberg, S. (1998). Solidarity: Its Microfoundations and Macro Dependence. In *The Problem of Solidarity: Theories and Models*. P. Doreian & T. J. Fararo (eds), Amsterdam: Gordon and Breach.

- MacKenzie, S.B., P.M. Podsakoff, & R. Fetter (1991) 'Organizational Citizenship Behavior and objective productivity as determinants of managerial evaluations of salespersons' performance', *Organizational Behavior and Human Decision Process*, vol 50, pp. 123-150.
- Morrison, E.W. & C.C. Phelps (1999) 'Taking Charge at Work: Extrarole Efforts to Initiate Workplace Change', *Academy of Management Journal*, vol. 42, pp. 403-419.
- Mowday, R.T., R.M. Steer, & L.W. Porter (1979) 'The Measurement of Organizational Commitment', *Journal of Vocational Behavior*, vol. 14, 2, pp. 224-247.
- Nohria, N. & R.G. Eccles (1992). *Networks and Organizations: Structure, Form, and Action*. Boston, MA: Harvard Business School Press.
- Organ, D.W. (1988). *Organizational Citizenship Behavior: The Good Soldier Syndrome*. Lexington, MA: Lexington Books.
- Organ, D.W. & K. Ryan (1995) 'A Meta-Analytic Review of Attitudinal and Dispositional Predictors of Organizational Citizenship Behavior', *Personnel Psychology*, vol. 48, 4, pp. 775-802.
- Pfeffer, J. (1982). *Organizations and Organization Theory*. Boston: Pitman.
- Podsakoff, P.M., S.B. MacKenzie, J.B. Paine, & D.G. Bachrach (2000) 'Organizational Citizenship Behaviors: A Critical Review of the Theoretical and Empirical Literature and Suggestions for Future Research', *Journal of Management*, vol. 26, 3, pp. 513-563.
- Powell, W.W. & L. Smith-Doerr (1994). Networks and Economic Life. In *The Handbook of Economic Sociology*. N. J. Smelser & R. Swedberg (eds), Princeton, NJ: Princeton University Press.
- Raub, W. (1997). *Samenwerking in Duurzame Relaties en Sociale Cohesie [Cooperation in Durable Relations and Social Cohesion]*. Amsterdam: Thesis Publishers.
- Roethlisberger, F.J. & W.J. Dickson (1939). *Management and the Worker: an account of a research program conducted by the Western Electric Company, Hawthorne Works*, Chicago.
- Sanders, K. (2001). *Solidair Gedrag Binnen Moderne Arbeidsorganisaties. [Solidarity in Modern Organizations]*. Tilburg: Dutch University Press.
- Sanders, K., H. van Emmerik, & W. Raub (2002) 'Nieuwe Vragen voor Onderzoek naar Solidair Gedrag Binnen Moderne Arbeidsorganisatie' ['New Questions for the Study of Solidarity within Modern Organizations'], *Gedrag & Organisatie*, vol. 15, pp. 184-201.
- Schappe, S.P. (1998) 'The Influence of Job Satisfaction, Organizational Commitment, and Fairness Perceptions on Organizational Citizenship Behavior', *Journal of Psychology*, vol. 132, 3, pp. 277-290.
- Schaubroeck, J. & D.C. Ganster (1991) 'Beyond the Call of Duty: A Field Study of Extra-Role Behavior in Voluntary Organizations', *Human Relations*, pp. 569-583.
- Smelser, N. (1976). *The Sociology of Economic Life*. Englewood Cliffs, NJ: Prentice-Hall.
- Smith, C.A., D.W. Organ, & J.P. Near (1983) 'Organizational Citizenship Behaviors: Its Nature and Antecedents', *Journal of Applied Psychology*, vol. 68, 4, pp. 653-663.
- Snijders, T.A.B. & R.J. Bosker (1999). *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. London: Sage.
- Spicer, M.W. (1985) 'A Public Choice Approach to Motivating People in Bureaucratic Organizations', *Academy of Management Review*, vol. 10, 3, pp. 518-527.
- Tsui, A.S., J.L. Pearce, L.W. Porter, & A.M. Tripoli (1997) 'Alternative Approaches to the Employee-Organization Relationship: Does Investment in Employees Pay Off?', *Academy of Management Journal*, vol. 40, 5, pp. 1089-1121.
- Van Emmerik, H. & P. Hermkens (1996). *Loopbaanbeleid & Emancipatieprocessen. Een Voorstel voor een Onderzoek bij de Universiteit Utrecht naar de Factoren die de Effectiviteit van het Emancipatiebeleid Beïnvloeden. [Career Policy and Emancipation Processes. A Proposal for a Study of Factors Influencing the Effectiveness of Emancipation Policy at Utrecht University]*. Utrecht, Department of Sociology, Utrecht University.

- Wasserman, S. & K.L.M. Faust (1994). *Social Network Analysis: Methods and Applications*. Cambridge, MA: Cambridge University Press.
- Wasserman, S. & J. Galaskiewicz (1994). *Advances in Social Network Analysis: Research in the Social and Behavioral Sciences*. Thousand Oaks, CA: Sage Publication.
- Williams, L.J. & S.E. Anderson (1991) 'Job Satisfaction and Organizational Commitment As Predictors of Organizational Citizenship and In-Role Behaviors', *Journal of Management*, vol. 17, pp. 601-617.

**Solidarity of Temporary Workers
Effects of Temporal and Network Embeddedness
on Solidarity of Ph.D. Students**

Ferry Koster, Karin Sanders & Hetty van Emmerik

This article addresses the effect of temporary employment on employee solidarity. From an embeddedness perspective, we argue that solidarity is influenced by social context. Two forms of embeddedness that are of special importance are temporal and network embeddedness. The temporal embeddedness hypothesis posits a curvilinear relation between employee solidarity and year of employment. The network embeddedness hypothesis states that employee solidarity is positively related to formal and informal network characteristics. Using data for 262 Ph.D. students, multilevel analyses support both these hypotheses. Year of employment has a curvilinear relation with solidarity, and formal network embeddedness (as measured by the research orientation of the faculty) and informal network embeddedness (as measured by good relations with colleagues) are positively related to the solidarity of Ph.D. students.

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