



Who speaks up to whom? A relational approach to employee voice[☆]

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ABSTRACT

We adopt a relational approach to examine the effects of social relations and formal structure on who speaks up to whom about problems at work. Data were collected in a two-wave employee survey in three Dutch preschools. Using exponential random graph modeling, we found significant positive effects of formal structure (recipient's hierarchical level; team co-membership) and good relations between speaker and recipient on the likelihood of voice in a dyad. Speaker's hierarchical level had positive effects, significant in Wave 1. Speaker's degree centrality significantly reduced the likelihood of voice, whereas recipient's degree centrality had no effect.

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1. Introduction

Employee voice, or speaking up, is an act of communication in which employees point out problems and/or make suggestions for improvements to other members of their organization, such as colleagues, supervisors or subordinates. As an act of communication, voice is inherently dyadic as it involves at least two parties: the person who speaks up (the 'speaker') and the person spoken to (the 'recipient').

Employee voice can be the first step towards resolving and, perhaps, learning from problems. Whether employees complain about problems, point out flaws or bottlenecks, or proactively develop solutions, their input provides important feedback for the organization (Hirschman, 1970; Morrison and Milliken, 2000; Zhao and Olivera, 2006). Consequently, there has been much research on the antecedents of voice.

But voice remains difficult to explain. As noted by LePine and Van Dyne (1998), in many studies the explained variance was low, and findings were often inconsistent between studies. Research on the effects of good social relationships with managers and colleagues, defined in terms of mutual affect, friendship or trust (Homans, 1950; Labianca et al., 1998), provides an example. Theoretically, good social relations are considered an important antecedent of employee voice. Because they entail empathy or solidarity with others, they have been argued to increase employees' motivation to speak up (Burris et al., 2008; Graham, 1991). By

providing a source of informal power, they can increase the effectiveness and reduce the riskiness of voice (Ehrhardt and Naumann, 2004; Nembhard and Edmondson, 2006). But findings have been mixed. For instance, some studies found positive effects of good relations with managers on employee voice (Burris et al., 2008; Van Dyne et al., 2008), while others found no effects (Premeaux and Bedeian, 2003). With regard to good relations with colleagues, both positive (Lazega, 2000) and negative effects (Krackhardt, 1999) on voice have been found.

We propose that some of the inconsistencies in previous research on antecedents of employee voice may stem from neglecting the dyadic nature of voice. Although we are not the first to note this dyadic nature of voice (Glaser, 1984; Near and Miceli, 1995), previous research has focused on speakers and their attributes (LePine and Van Dyne, 2001; Tangirala and Ramanujam, 2008). By comparison, the recipients of voice have received little attention. Often recipients were not specified at all, as in the widely-used scale by LePine and Van Dyne (1998). In other studies, recipients were identified in terms of social categories, rather than as specific individuals. For instance, research on issue-selling (Dutton and Ashford, 1993) focused on voice to 'top management', De Dreu et al. (2000) examined voice to 'colleagues'. In studies specifying the recipient, this was usually limited to the speaker's direct supervisor (Burris et al., 2008; Van Dyne et al., 2008: Study 2). Only few studies compared voice to recipients at different hierarchical levels (Kassing, 2000, 2009a; Stevenson and Gilly, 1993). This is surprising because voice, as an act of communication, necessarily involves a recipient. Indeed, much depends on the choice of recipient: it can affect both the effectiveness of voice in addressing the problem, and the risks involved for the speaker (Detert and Treviño, 2010; Miceli et al., 2008; Tepper et al., 2006). Therefore, an employee faced with a problem does not only have to consider *whether* to speak up, but also to *whom*.

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Who the recipients of voice are is less obvious than it may seem. Firstly, taking into account both the effectiveness and the riskiness of voice (Miceli et al., 2008; Milliken et al., 2003; Zhao and Olivera, 2006), employees may face conflicting goals: the person in the best position to take effective action (e.g., the manager) may also be able to inflict strong sanctions. Secondly, the ability to take effective action or to inflict sanctions may not only, perhaps not even primarily, be a matter of position within the formal organizational structure; position in the informal social network may be important as well (Borgatti and Foster, 2003; Brass et al., 2004).

To do justice to the dyadic nature of voice, in this paper we take a relational approach. This involves specifying both speakers and recipients, and taking into account characteristics of speakers, recipients and the speaker–recipient dyad. Here, the characteristics we consider are employees' position in the formal organizational structure and their social relations. Accordingly, we collected complete network data about all possible pairs of employees within a particular setting, in our case three preschools in the Netherlands.

Taking a relational approach has two implications for theory. Firstly, it entails an extension of previous theorizing on *whether* employees speak up to the question *to whom* they speak up. Secondly, it broadens the scope of potential antecedents of voice to include not only characteristics of speakers, but also characteristics of recipients and speaker–recipient dyads. An extended theory of voice should facilitate identification of the more important predictors in this larger spectrum.

Methodologically, taking a relational approach means that we need to analyse voice as a dyadic variable, examining who speaks up to whom. In the terminology of network analysis, we consider voice as a directed tie from a speaker to a recipient, and define a *voice network* as consisting of a set of individuals (in our case, the employees of a department) and the set of voice ties between them. Hence, our dependent variable is the conditional probability of a voice tie from a specific speaker to a specific recipient, given all the other ties.¹ The analysis of such data is facilitated by recent methodological advances in social network analysis, notably the development of exponential random graph modeling (Robins et al., 2007a). This makes it possible to assess the effects of characteristics of speakers, recipients, and speaker–recipient dyads on voice simultaneously, while accounting for statistical interdependencies between dyads that are inherent in a network.

Our study advances research on employee voice in several ways. On a theoretical level, we argue that voice, as an act of communication, involves not only a decision *whether* to speak up, but also *to whom*. This extends previous theoretical work by taking into account not only the speaker, but also the recipient and the speaker–recipient dyad.

To show that these indeed do matter, we use data on complete voice networks. In contrast to data on subordinate-supervisor dyads, this does not only allow us to include characteristics of the recipient and dyadic antecedents of voice, such as relationship quality. It also makes it possible to consider the role of third parties. In other words, we can test the effects of dyadic and positional antecedents of voice against each other (Granovetter, 1992). Previous studies have focussed on the quality of the relationship between speaker and recipient (Burris et al., 2008; Van Dyne et al., 2008); relations with third parties have been considered less frequently (Krackhardt, 1999; Lazega, 2000). Here, we compare their relative importance for employee voice.

Finally, our relational approach allows us to test the importance of employees' social relations against their position in the formal

organizational structure. Recent studies showed that employees' position in the formal organizational structure, such as their hierarchical level and role, influenced their likelihood to speak up (Kidder, 2002; Van Dyne et al., 2008). Because employees' social relations may partly reflect the formal organizational structure (Brass and Burkhardt, 1993; Brass et al., 2004), the importance of social relations can be overestimated when the formal organizational structure is not taken into account.

We start with our theoretical framework, and present our hypotheses about the effects of employees' position in the formal organizational structure and their social relations on who speaks up, and to whom. We then describe the data and present the results. We conclude with a discussion of our findings.

2. A relational approach to employee voice

We define voice, or speaking up, as an act of communication in which employees point out problems and/or make suggestions for improvements to other members of their organization. Our definition highlights the dyadic nature of voice as act of communication from a speaker to a recipient. The recipient can be a peer, a subordinate, or a superior. Including expressions of discontent as well as 'constructive challenge' (Van Dyne and LePine, 1998: p. 109), our definition combines aspects of voice typically associated with definitions going back to Hirschman (1970) and the organizational citizenship behaviour (civic virtue) literature (Organ, 1988), respectively. Thus, we consider voice a broad category, which includes more specific forms such as whistleblowing (Miceli et al., 2008), principled organizational dissent (Graham, 1986), error reporting (Zhao and Olivera, 2006), and constructive forms of voice (Van Dyne and LePine, 1998).

We present our theoretical framework in two steps. First, building on previous research on employee voice, we discuss the considerations that influence employees' decision whether and to whom to speak up. We argue that characteristics of speakers, recipients and the speaker–recipient dyad matter. Next, we examine how employees' position in the formal organizational structure and their social relations affect these considerations and, hence, the likelihood of voice between a pair of employees.

2.1. Deciding whether to speak up, and to whom

Employee voice can be considered the outcome of a calculated decision, involving four main considerations: the perception of a problem, the cost of voice, the effectiveness of voice, and the riskiness of voice (Ashford et al., 1998; Miceli et al., 2008; Milliken et al., 2003; Withey and Cooper, 1989; Zhao and Olivera, 2006). The perception of a problem (or, more generally, of possibilities for improvement (Barry, 1974)) is the motivation or reason for considering to speak up; this is a precondition for voice. Cost reflects the time and effort required for speaking up. Effectiveness refers to a speaker's expectation that voice will lead to improvements with regard to the problem. The riskiness of voice refers to potential informal sanction (e.g., verbal abuse, negative reputation, ostracism) and/or formal sanctions (e.g., negative performance evaluation, loss of job) (Cortina and Magley, 2003; Kish-Gephart et al., 2009). In general, then, when perceiving a problem, employees would be expected to speak up if they consider this an effective way to solve the problem, with little cost and low risk for themselves.

The perception of a problem depends on the speaker's interpretation of a situation (Hirschman, 1970; Miceli et al., 2008; Zhao and Olivera, 2006). Therefore it can be considered an attribute of the speaker, affecting an employee's decision *whether* to speak up. By contrast, the cost, effectiveness and riskiness of voice depend

¹ Throughout we use 'network' as technical term to refer to a set of individuals and a set of ties connecting them; a 'dyad' is a minimal network of two individuals; and a 'tie' refers to the link between them (Wasserman and Faust, 1994).

not only on characteristics of the speaker, but also on characteristics of the recipient and the speaker–recipient dyad. Hence, they affect not only employees' decision whether to speak up, but also to whom.

The cost of voice reflects the difficulty of a speaker's access to the recipient (Withey and Cooper, 1989; Zhao and Olivera, 2006). This will depend on their spatial proximity and the amount of time they spend together (De Dreu et al., 2000; Lazega, 2000; Stevenson and Gilly, 1993). With regard to managerial recipients, cost can be affected by organizational policies, such as open door policies (Detert and Treviño, 2010).

The effectiveness and riskiness of voice depend on the recipient's ability to take action, and on the likelihood that the recipient uses this ability to address the problem, rather than to punish the speaker. For instance, voice to powerful recipients can be especially effective, because they may be able to resolve a problem themselves, or involve others who are able to do so (Detert and Treviño, 2010; Near and Miceli, 1995). Thus, recipient characteristics matter. In addition, recipients' response to voice can be influenced by characteristics of the speakers, such as speakers' ability to influence the recipient and to protect themselves from sanctions (Nemhard and Edmondson, 2006). Recipients' response can also depend on characteristics of the speaker–recipient dyad. For instance, a good relationship between speaker and recipient can make the recipient inclined to support rather than to punish the speaker (Gouldner, 1960).

Consequently, taking into account who speaks up to whom is crucial. The characteristics of speakers, recipients and speaker–recipient dyads can matter. Therefore, when perceiving a problem, we expect employees to speak up to a recipient who they can contact easily, who is willing and able to take effective action, and who is unlikely to punish them for speaking up.

To show the advantages of a relational approach to employee voice, in this paper we focus on the effects of employees' good social relationships and their position in the formal organizational structure. We argue that they can affect speakers' considerations concerning the effectiveness and riskiness of voice. Consequently, although we will control for perceived problems and cost of voice in our analyses, our focus is on the effectiveness and riskiness of voice.

2.2. Formal organizational structure and social relations

The effectiveness and riskiness of voice depend on employees' ability and likelihood to act. These, in turn, are influenced by the power and norms deriving from employees' position in the formal organizational structure and their informal social relations. Hence, these should be major factors affecting the likelihood of voice in a dyad.

The importance of the formal organizational structure has often been emphasized (Thompson, 1967; Weber, 1964 [1947]). Each organization establishes rules, specifies procedures and assigns particular responsibilities to each of its members. Employees' formally prescribed positions, or roles, include both the duty to carry out particular tasks, and the means to do so. Here we consider two aspects of employees' position in the formal organizational structure: hierarchical position and team membership.

By contrast, informal social relations reflect the actual patterns of interaction among employees (Homans, 1950; Roethlisberger and Dickson, 1939). These relations can be conceptualized as social networks, with ties reflecting 'events' such as the frequency of communication, or 'states' such as perceived relationship quality (Borgatti and Halgin, 2011). Research on social exchange (Blau, 1964) and social capital (Adler and Kwon, 2002; Burt, 2000) suggests that both employees' relations with particular others and their network position can affect outcomes. Here we consider the

quality of the relationship between speaker and recipient, and their degree centrality, i.e., the number of employees in their department with whom they have a good relationship (Freeman, 1978/1979).

Power, or the 'ability to affect outcomes or get things done' (Brass and Burkhardt, 1993: p. 441) can derive from employees' position in the formal or informal organization (Brass, 2005). Formal power, also referred to as 'authority' or 'legitimate power' (Brass, 2005; Weber, 1964 [1947]), is based on employees' position in the formal organizational hierarchy. Informal power is based on centrality in the informal social network (Brass, 2005). Central employees are likely to have greater access to and control over resources, while direct interaction with numerous others allows them to influence opinions and mobilize support (Brass, 2005; Burt, 1992; Krackhardt, 1992).

Norms form an integral part of employees' roles in the formal organizational structure as well as of social relationships. They comprise shared understandings about expected and appropriate behaviour for the role's incumbent and those interacting with him or her (Homans, 1950), and inform employees' expectations about others' behaviour. Punishments and rewards provide incentives to comply with such norms (Coleman, 1990).

In the following, we present our hypotheses concerning how employees' position in the formal organizational structure and their social relations affect the effectiveness and riskiness and, hence, the likelihood of voice between a pair of employees. As we argued above, this can be influenced by characteristics of the recipient, the speaker and the speaker–recipient dyad. Our hypotheses address each of these in turn.

2.3. Characteristics of the recipient

Previous studies suggest that both recipients' ability to act, indicated by their hierarchical position, and their willingness to act, signaled for instance through norms and management styles (Ashford et al., 1998; Detert and Treviño, 2010; Nemhard and Edmondson, 2006), may matter. Extending this, we propose that recipients' ability and likelihood to act can be affected by the power and norms associated with their formal and their informal position in the organization.

2.3.1. Recipient's hierarchical level

Managers' roles typically include problem-solving responsibilities, as well as the means to carry them out (March and Simon, 1958; Stevenson and Gilly, 1993). Hence, managerial recipients should be able and willing to take effective action in response to voice. In addition, managers have a strong incentive to keep well-informed about developments or problems within their domain of responsibility. Hence, although their formal power enables managers to inflict severe sanctions on a speaker, it is not in their interest to do so: sanctioning those who speak up may deter voice in the future, and prevent access to potentially important information (Morrison and Milliken, 2000). Consequently, managers should be attractive as recipients of voice. In other words, voice should be more likely in dyads involving a high-ranking recipient.

Hypothesis 1. The higher a recipient's position in the organizational hierarchy, the higher the likelihood of voice in dyads involving that recipient.

2.3.2. Recipient's degree centrality

A central position in an organization's social network can be a source of informal power. Central individuals are likely to be well-informed about problems at work, who is affected by them, and to whom to turn for support (Brass and Burkhardt, 1993; Burt, 1992). Such knowledge, as well as the trust and support that characterize good social relationships, are essential for solving

problems (Borgatti and Cross, 2003; Hansen, 1999) and mobilizing support (Krackhardt, 1992; Brass, 2005). Other employees tend to be especially willing to help those who occupy central, influential positions (Bolino, 1999; Venkataramani and Dalal, 2007). Because they are able to take effective action, central employees are often approached by others for help and advice (Sparrowe et al., 2001; Venkataramani and Dalal, 2007). For the same reason, they should also be attractive as recipients of voice.

Whereas positions in the formal organizational hierarchy, such as being a member of a team or a manager, typically entail clear norms concerning the incumbents' behaviour, the situation is less clear with regard to network position. Research on social capital (Adler and Kwon, 2002; Coleman, 1990) suggests that employees who have a central position in the network may be more likely to help than to harm the speaker. This is because employees who have good social relations with many colleagues in their team or department are likely to identify with them, and, consequently, be more likely to use their power on their behalf rather than against them (Lamertz, 2005). We therefore expect that central employees will be attractive as recipients of voice.

Hypothesis 2. The higher a recipient's degree centrality in the informal social network, the higher the likelihood of voice in dyads involving that recipient.

2.4. Characteristics of the speaker

As noted above, we expect employees to speak up about a perceived problem if they consider this an effective way to solve the problem, with low risk for themselves. Previous studies suggest that a speaker's position in the formal organizational structure can increase the recipient's likelihood to address a problem, and reduce the recipient's likelihood – perhaps even his or her ability – to punish the speaker (e.g., Nembhard and Edmondson, 2006). We extend this argument to speakers' position in the informal social network.

2.4.1. Speaker's hierarchical level

Managers' problem-solving responsibilities may involve resolving a problem themselves, but in many cases may require bringing up the problem with other managers and/or non-managerial employees (March and Simon, 1958; Stevenson and Gilly, 1993). Backed by their formal authority, managers can exert influence on recipients, making them more likely to take action. This makes their voice more effective (Miceli and Near, 2002). At the same time, high-ranking speakers tend to perceive voice as less risky (Nembhard and Edmondson, 2006). Indeed, findings indicate that managers' position reduces the likelihood of sanctions against them (Cortina and Magley, 2003; Kish-Gephart et al., 2009; Miceli et al., 2008). Managers may be less likely to be sanctioned in the first place, as others do not dare to sanction them for fear of retaliation. If sanctioned, the effect of sanctions may be less severe, as they may be able to count on the tacit or active support of others. Taken together, we expect that individuals with high positions in the organizational hierarchy will be more likely to speak up than those with lower positions. In other words, voice should be more likely in dyads involving a high-ranking speaker.

Hypothesis 3. The higher a speaker's position in the organizational hierarchy, the higher the likelihood of voice in dyads involving that speaker.

2.4.2. Speaker's degree centrality

As noted above, central individuals are not only well-informed about people and events at work, they are also able to mobilize support (Brass, 2005; Burt, 1992; Krackhardt, 1992). Hence, central employees should be confident that their voice will be

effective in bringing the recipient to take action to resolve the problem. In addition, as for formal power, a speaker's informal power may reduce the riskiness of voice by shielding him or her from sanctions (Kish-Gephart et al., 2009; Miceli et al., 2008). Informal sanctions such as gossip or ostracism, in particular, which depend on involving a large number of others to be effective, will be less severe, perhaps even infeasible if others refuse to participate (Coleman, 1990: pp. 278–282). Further, social support from others with whom the speaker enjoys good relationships might buffer the effect of sanctions from the recipient. We therefore expect that central employees will be more likely to speak up than less central employees.

Hypothesis 4. The higher a speaker's degree centrality in the informal social network, the higher the likelihood of voice in dyads involving that speaker.

2.5. Characteristics of the speaker–recipient dyad

The likelihood of voice between a speaker and a recipient can also be affected by characteristics of the speaker–recipient dyad. We consider dyad characteristics associated with the formal organization (team co-membership) and with the informal social network (relationship quality between speaker and recipient).

2.5.1. Team co-membership

Formally prescribed patterns of collaboration within teams are an important element of formal organizational structure. Team work entails task interdependence (Van der Vegt et al., 1998), so that problems affecting one employee can have repercussions for others. Recognizing and resolving such problems is in the interest of all team members. Although not all teams are completely self-managing (Barker, 1993; Williams et al., 2010), some coordination and problem-solving tasks are transferred from supervisors to the team members, empowering them to resolve certain problems among themselves, without involving third parties. Consequently, speaking to team members should be an effective way of addressing a problem. Although team members arguably can inflict informal sanctions on a speaker, this is unlikely if it is in their interest to recognize and resolve problems affecting the team. We therefore expect that voice will be more likely among team members than across team boundaries.

Hypothesis 5. Team co-membership increases the likelihood of voice in a dyad.

2.5.2. Good social relationship between speaker and recipient

Good social relationships, characterized by mutual affect, friendship and trust, involve care and concern for the other. Further, they entail solidarity norms demanding mutual support (Gouldner, 1960). This involves social exchange of supportive behaviour such as interpersonal helping (Bowler and Brass, 2006; Venkataramani and Dalal, 2007). Hence, a good relationship between speaker and recipient should make it more likely that the recipient will support the speaker by taking action to address the problem. In other words, it should make voice more effective.

Having a good relationship with the speaker, the recipient may be unwilling to risk losing a valued relationship (Venkataramani and Dalal, 2007) and more forgiving (Graham, 1991; Horwitz, 1990; Tepper et al., 2006; Wittek et al., 2003). Thus, the likelihood of sanctions should be lower. Consequently, we expect that a good relationship between speaker and recipient will increase the likelihood of voice between them.

Hypothesis 6. A good social relationship between speaker and recipient increases the likelihood of voice in a dyad.

3. Data collection

To test these hypotheses, we used exponential random graph modeling (Robins et al., 2007a). Our data came from a two-wave employee survey in three preschools in the Netherlands. In this section, we will introduce the three preschools, and describe the data collected. In the next section, we will describe our analytical approach, and the parameters included in the exponential random graph models.

3.1. The three preschools

The three preschools provided daycare and treatment for physically and mentally disabled children. They were departments of one large child-care organization in the Netherlands. Preschools A and B had about 35 employees, Preschool C about 50 employees. In each preschool, children were divided into five to eight groups; each group was supervised by a team of three to five preschool teachers. In addition, each preschool employed administrative and household staff, as well as specialists (such as physiotherapists or paediatricians) who provided treatment tailored to each child. Each preschool's management team consisted of the manager, two treatment coordinators, and (in Preschool C) a coach. As we will describe in more detail below, turnover was high in all three preschools. In Preschool A, the manager changed between waves, and preschool teachers' teams were restructured.

3.2. Procedure

Data on voice, relationship quality, communication frequency and perceived problems were collected through a web-based employee survey in spring 2008 (Wave 1) and autumn 2008 (Wave 2). Information about formal organizational structure and demographic information was provided by the child-care organization before the start of each wave.

To support interpretation of the results, we conducted interviews with the department managers and twelve employees in Preschools A and B in summer 2008. Interviewees were selected to maximize diversity with regard to team affiliation and extent of voice reported in the first wave of the study. The interviews focused on respondents' reactions to problems at their workplace. Interviewees were asked to describe general patterns, as well as to give specific examples.

3.3. Sample

All employees who worked in the three preschools at the time of our survey, and who had been working there for at least one month, were invited to participate in the survey.

In Wave 1, 94 of 118 employees responded (79.7%; Preschool A: 87.1%, Preschool B: 83.3%, Preschool C: 72.5%). In Wave 2, 95 of 121 employees responded (78.5%; Preschool A: 77.4%, Preschool B: 84.2%, Preschool C: 75.0%). Excluding one respondent with missing data on the dependent variable left an effective sample of 94 respondents for Wave 2.

Only 70 respondents participated in both waves. This was due to nonresponse as well as high turnover in all three preschools. Of the 139 persons employed in the preschools during the time of our study, only 96 were present in the same preschool in both waves. 20 employees left or went on pregnancy leave, and 23 employees returned from pregnancy leave or joined the preschools between the two waves. Two employees changed preschools.

Most respondents were women (Wave 1: 93%; Wave 2: 95%). The average age was 37.1 years (SD=10.3) in Wave 1, and 36.9 years (SD=10.7) in Wave 2. The average tenure was 8.2 years (SD=6.2) and 7.2 years (SD=6.3), respectively. Most worked

part-time, on average 24.6 h per week (SD=8.4) in Wave 1, and 23.2 h per week (SD=9.4) in Wave 2. Most had permanent contracts (Wave 1: 83%; Wave 2: 80%). Compared to respondents, in both waves nonrespondents worked significantly fewer hours per week (Wave 1: mean = 15.1, SD = 10.8, $t(114) = -3.816$, $p < 0.01$; Wave 2: mean = 17.4, SD = 11.0, $t(118) = -2.457$, $p < 0.05$). In Wave 1, only 57% of the nonrespondents had a permanent contract ($t(115) = -2.349$, $p < 0.05$). One-way ANOVAs showed no significant differences between preschools with regard to these demographic variables when considering all employees, or respondents only, in either wave.

3.4. Measurement

We collected the same information in both waves of the survey. Our data comprised data measuring dyad characteristics, and data measuring characteristics of individual employees.

3.4.1. Voice networks

Respondents were given a list of employees in their preschool, and asked to indicate whom they had 'spoken to in order to solve a problem' within the last three months. This resulted in six binary, directed voice networks (Fig. 1), one for each wave and preschool. They provided information on who spoke up, and to whom.

For comparison, we constructed a four-item employee voice scale, with items written for this study or adapted from previous studies (Podsakoff et al., 1997; Premeaux and Bedeian, 2003). Respondents were asked to what extent they had spoken up about problems experienced within their preschool. An example item was 'To what extent have you, within the last three months, openly spoken up about these problems?' The items did not specify the recipient. We used a five-point scale (1 = 'not at all', 5 = 'very much'). Cronbach's alphas were 0.92 (Wave 1) and 0.94 (Wave 2). The items were averaged to form the scale. The correlation between respondents' scores on this scale and their outdegree in the voice networks (i.e., the number of people to whom they had spoken up) was moderate (Wave 1: Spearman's rho = 0.53; Wave 2: Spearman's rho = 0.42). This suggested that these variables measured distinct but related concepts. Further, the voice networks showed that most employees spoke up to one or more members of the management team, notably the manager (Wave 1: 62.6%; Wave 2: 64.7%). Those with high scores (≥ 3) on the employee voice scale were more likely to do so than those with lower scores (Wave 1: 89% vs. 46%, $t(83) = 4.746$, $p < 0.001$; Wave 2: 82% vs. 51%, $t(84) = 3.169$, $p < 0.01$).

3.4.2. Independent variables

Individuals' *hierarchical level* was measured based on information provided by the organization. It was coded '0' for non-managerial employees, '1' for treatment coordinators and (in Preschool C) the coach, and '2' for department managers.

Individuals' *degree centrality* was calculated based on the binary, symmetric relationship quality networks (see below), by counting the number of an employee's good relationships (Freeman, 1978/1979).²

Information on employees' *team membership* was provided by the organization. For preschool teachers, teams were defined as comprising the preschool teachers who supervised the same group of children. For other employees, teams were defined based on job type, i.e., management team, administrative staff, household staff, specialists, and on-call staff. From this information, we created a

² Additional analyses showed that our results were similar when using betweenness centrality (Borgatti et al., 2002; Freeman, 1978/1979). Thus, the choice of network measure did not affect our conclusions.

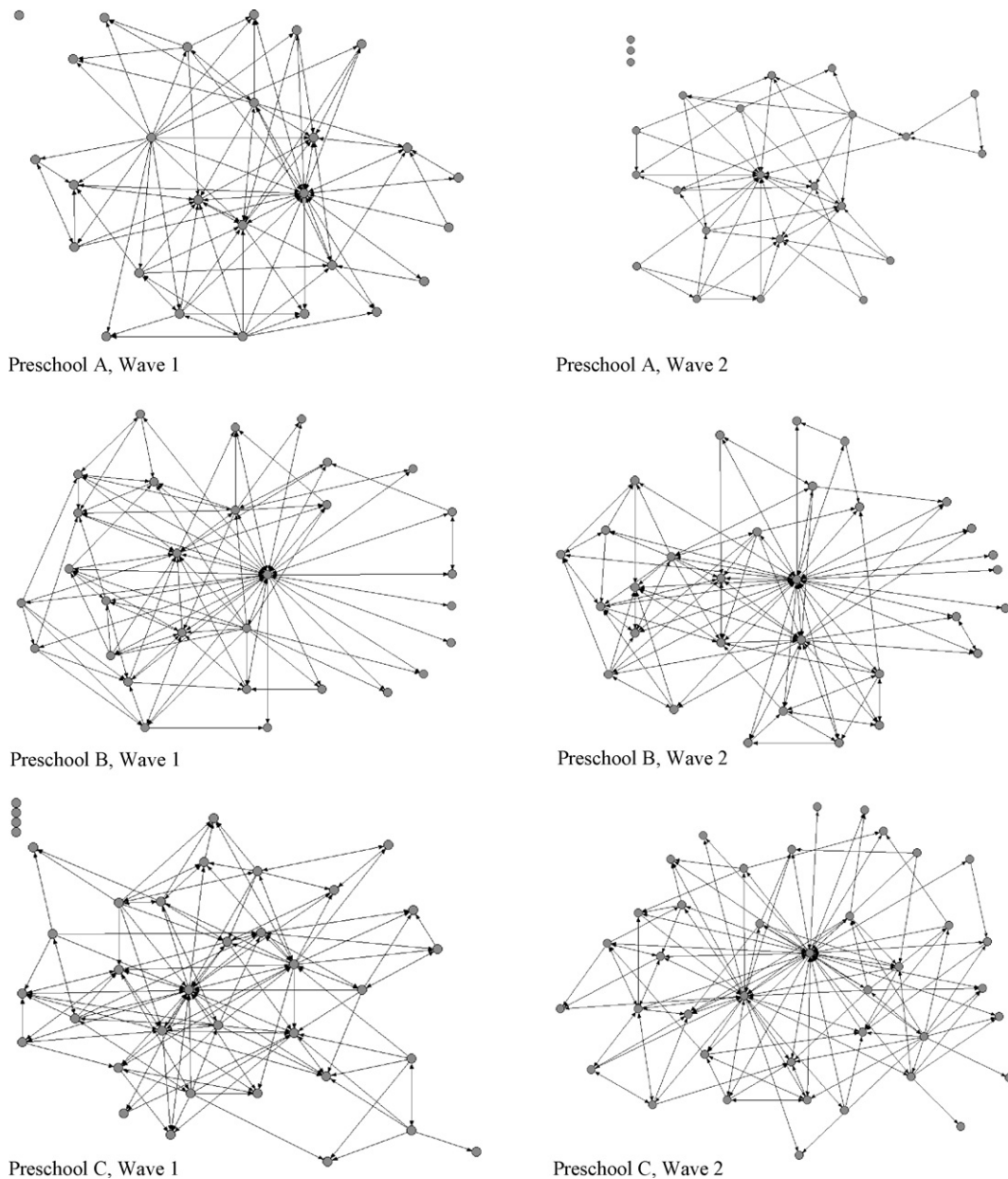


Fig. 1. Voice networks. Created using the Netdraw procedure in Ucinet 6 (Borgatti et al., 2002).

dyadic variable coded '1' for pairs of respondents belonging to the same team, and '0' otherwise.

To measure the *relationship quality* networks, respondents were given a list of employees in their preschool, and asked to rate the quality of their relationship with each of them during the past three months. Answer categories were 1 = 'very difficult relationship', 2 = 'difficult relationship', 3 = 'neutral', 4 = 'friend', and 5 = 'good friend'. Between 66.1% and 74.5% of the dyads in the valued networks were symmetric. The networks were symmetrized, using the nonmissing or, when respondents' ratings differed, the lower value. We then dichotomized the network, coding good relationships (i.e., values above '3') as '1'. This resulted in six binary, symmetric networks, one for each wave and preschool.

We included two variables to control for employees' motivation to speak up, and the cost of voice, respectively. *Perceived problems* were measured by asking respondents to what extent they or their colleagues had encountered different types of problems within the last three months. We selected eight problem types based on preliminary interviews and a study by Milliken et al. (2003).

Examples were 'problems with facilities or equipment', 'personnel shortage, or high work pressure', and 'personal conflicts, or concerns about a colleague's competence or performance'. We used a four-point scale (0 = 'not at all', 3 = 'very serious'). Cronbach's alphas were 0.78 (Wave 1) and 0.77 (Wave 2). Items were summed to form a scale.

To measure the *communication frequency* networks, respondents were asked to rate how frequently they had talked with each employee of their preschool during the past three months, considering both informal and formal communication. Answer categories were 1 = 'never', 2 = 'less than once a week', 3 = 'about once or twice a week', 4 = 'about three to four times a week', 5 = 'about five to seven times a week', and 6 = 'about eight or more times a week'. Between 35.9% and 40.5% of the dyads were symmetric; when networks were dichotomized (coding values above '3' as '1'), between 67.5% and 77.8% of the dyads were symmetric. We symmetrized and dichotomized the communication networks following the same procedure as for the relationship quality networks.

Table 1
Descriptive statistics for independent variables.

	Preschool A		Preschool B		Preschool C	
	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
Perceived problems, mean ^a	6.96	4.67	6.73	6.97	3.49	3.87
Communication frequency, mean ^b	0.22	0.20	0.19	0.14	0.18	0.12
Degree centrality, mean ^a	5.56	4.58	5.13	5.61	2.54	3.85
Relationship quality, mean ^b	0.21	0.21	0.18	0.19	0.07	0.11

^a Based on individual-level data.

^b Based on dyad-level data.

Table 1 shows descriptive statistics for the independent variables; dyad-level correlations are shown in Appendix A (Tables 5–7).

4. Analysis

As described in the previous section, we had data from two waves. However, there were considerable changes in the set of actors between waves. In total, 48 of the 118 cases (40.7%) were longitudinally incomplete, i.e. only present at one measurement point. Such high levels of incompleteness are known to lead to loss of statistical power and parameter identification (convergence) problems for longitudinal models (Huisman and Steglich, 2008). Indeed, exploratory analyses using stochastic actor-based modeling (Snijders et al., 2010) revealed some problems with parameter identification and (in Preschool C) a divergent rate parameter³. We therefore present the results of cross-sectional analyses, conducted separately for each wave and preschool.

More specifically, we used exponential random graph modeling (Robins et al., 2007a). This provides a way to test hypotheses about factors affecting tie probabilities in the dependent network (here: voice networks) in complete network data sets such as ours. The dependent variable is the network of directed voice ties between the employees. The statistical dependencies between the speaker–recipient dyads that characterize such data are modeled by so-called structural effects. Other parameters that are expected to affect the probability of a voice tie can be included in the model and tested simultaneously. These are the characteristics of the recipient ('recipient attributes'), the characteristics of the speaker ('speaker attributes') and the characteristics of the speaker–recipient dyad ('dyadic attributes').

In exponential random graph modeling, recipient attributes assess the overall probability of voice ties in dyads involving a recipient with the attribute in question. In other words, they assess a recipient's probability to have incoming voice ties from *any* (i.e., non-specified) others. Similarly, speaker attributes assess the overall probability of voice ties in dyads where the speaker has the attribute in question. That is, they assess a speaker's probability to have outgoing voice ties to non-specified others. By contrast, dyadic attributes assess the probability of voice in a dyad, given that the dyad has the particular dyadic attribute. Thus they assess the probability of voice between *two specific* employees.

For our analyses, we used exponential random graph modeling with Monte Carlo Maximum Likelihood estimation, as implemented in SIENA, version 3.17y (Snijders et al., 2009). All models converged, indicated by convergence *t*-statistics between -0.1 and 0.1 for all parameter estimates (Lubbers and Snijders, 2007; Snijders et al., 2009).

³ A divergent rate parameter indicates that the observed changes between two observations of a network cannot easily be decomposed into a sequence of conditionally independent decisions by single actors. Such decomposability, however, is a prerequisite of stochastic actor-based models (Snijders et al., 2010).

Below we will present two sets of exponential random graph models. To describe the voice networks, and to allow comparison with other types of networks described in the literature (e.g., Lazega and Pattison, 1999; Lubbers and Snijders, 2007), we first estimated models including only structural effects (Model 1): reciprocity, alternating out-*k*-stars, alternating in-*k*-stars, alternating *k*-paths, alternating *k*-triangles, and 3-cycles. Taken together, they capture key characteristics of networks, notably the extent of reciprocity and centralization, as well as the extent and type of closure. Detailed descriptions of these statistics are given by Robins et al. (2007b), Snijders et al. (2006), and Snijders et al. (2009).

To test our hypotheses, in a second set of exponential random graph models we added parameters for attributes of recipients, speakers, and speaker–recipient dyads (Model 2). We added hierarchical level and degree centrality as recipient attributes to test Hypotheses 1 and 2, and as speaker attributes to test Hypotheses 3 and 4, respectively. To test Hypotheses 5 and 6, we included team co-membership and relationship quality as dyadic attributes. As control variables, we included perceived problems as a speaker attribute, and communication frequency as a dyadic attribute.⁴

Following Robins et al. (2007b: pp. 206–207), we examined how well simulations based on the estimated models reproduced observed characteristics of the original voice networks, using the simulation procedure implemented in SIENA (Snijders et al., 2009). This can be considered a test of the goodness of fit of the estimated models. We tested this with regard to selected characteristics that had not been explicitly modeled, namely the number of out-2-stars, in-2-stars, 2-paths, and transitive triplets. Details on these parameters are provided by Snijders et al. (2009). We found that the simulated networks did not differ significantly from the observed networks with regard to 2-paths and transitive triplets. However, the simulated networks contained significantly less out-2-stars than the observed networks in Models 1 and 2 for Wave 1 of Preschools A and B, and significantly less in-2-stars in Model 1 for Preschool A (Wave 1). We therefore included both parameters in the final models.

To summarize the results, we conducted separate meta-analyses of the results for each wave, using Snijders and Baerveldt's (2003) meta-analytic procedure. This allowed us to obtain estimates of the mean parameters and their standard errors across the three preschools, as well as estimates of the variance between preschools. Significance tests of the parameter means were based on Fisher's one-sided tests ($df=6$).

When presenting our findings, we will focus on the results of the meta-analyses (Tables 3 and 4), but refer to the results for particular preschools when relevant (Appendix A, Tables 8 and 9). Conclusions

⁴ Preliminary analyses showed that demographic characteristics of speakers and recipients (education, tenure, hours worked per week) had significant effects only in a few cases. Their inclusion had virtually no effect on other parameters in the model, and did not affect our conclusions; they were therefore not included in the final model. As only one to three men worked in each of the preschools, we did not test for gender effects.

Table 2
Descriptive statistics of the voice networks. Density is the number of actual ties divided by the number of possible ties. Reciprocity is calculated as $2M/(2M+A)$, where M is the number of dyads with mutual nominations, and A is the number of asymmetric dyads. Transitivity is calculated as the number of transitive triplets divided by the number of 2-paths.

	Preschool A		Preschool B		Preschool C	
	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
Number of respondents	27	24	30	31	37	39
Mean degree	3.85	2.21	4.20	4.48	4.03	3.97
Density	14.8%	9.6%	14.5%	15.0%	11.2%	10.5%
Reciprocity	36.5%	3.8%	49.2%	63.3%	38.9%	47.7%
Transitivity	37.5%	50.0%	29.1%	27.8%	34.5%	23.4%
Manager's outdegree	14	0	29	30	14	27
Manager's indegree	18	15	20	23	19	21

concerning our hypotheses are based on the results of the meta-analyses of Model 2.

5. Results

5.1. Structural characteristics of the voice networks

Our analyses showed striking similarities between the voice networks (Fig. 1; Tables 2 and 3). An exception was the Wave 2 network in Preschool A, which we will discuss separately below.

The voice networks were relatively sparse, with densities between 10.5% and 15.0%. On average, respondents reported that they had spoken to about four others within the last three months to resolve a problem. The managers were those with the highest indegree and the highest or second-highest outdegree. That is, many employees reported having spoken to the manager to resolve a problem, and the managers too reported speaking to a large number of employees.

Moderate to high levels of reciprocity (between 36.5% and 63.3%), reflected in a significant positive effect in the meta-analyses in both waves, suggested that voice tended to occur between pairs of employees who took turns in acting as speaker or recipient, respectively. Over half of the reciprocal nominations (between 51.7% and 75.7%) involved a member of the management team, notably the manager (between 34.5% and 63.2%). Again, this suggested the management team's importance for dealing with problems within the preschools.

About a third of the 2-paths in the voice networks were part of transitive triplets. In the meta-analyses, this was reflected in the significant positive effect of alternating k -triangles in both waves, and a negative effect of alternating k -paths, significant in Wave 2. 3-cycles were relatively rare in the voice networks; in the meta-analyses, the effect was negative in Wave 1, and nonsignificant in Wave 2. Taken together, this suggested a certain extent

of clustering within the voice networks, as well as a tendency towards closure. Closure tended to be through transitive ties, rather than 3-cycles, suggesting a hierarchical structure. Given the centrality of the management team, it seemed that employees spoke up to members of the management team, notably the manager, but also spoke to each other in order to resolve problems.

The meta-analyses revealed significant positive effects of out-2-stars and in-2-stars in both waves, although, in Wave 1, with significant variation between preschools. The corresponding alternating k -stars parameters had nonsignificant or significant negative effects. This suggested that there were some differences in the extent to which employees acted as speakers or recipients of voice, but very few acted as speaker or recipient with regard to very large numbers of others.

The Wave 2 network in Preschool A differed in three respects. Firstly, it was the sparsest network, with a mean degree of 2.21. This was probably connected to the position of the new manager, who reported an outdegree of zero. In addition, some serious problems (notably, lack of space for one of the children's groups) had been resolved, so that employees perceived significantly fewer problems than in Wave 1 (paired samples t -test: $t(16) = -3.252, p < 0.01$). Secondly, there was only one dyad (i.e., the treatment coordinators) with mutual nominations, reflected in a nonsignificant negative parameter estimate for reciprocity (Appendix A, Table 8). Thirdly, the tendency towards closure was stronger than in the other networks (transitivity: 50%), reflected in a significant positive effect of alternating k -triangles combined with a significant negative effect of alternating k -paths (Appendix A, Table 8).

5.2. Hypothesis testing

When adding the other variables (Table 4), the structural effects remained largely unchanged, with the exception of reciprocity

Table 3
Structural characteristics of voice networks (Model 1). Results of meta-analyses of exponential random graph models for Waves 1 and 2. Significance tests for parameter means are based on Fisher's one-sided tests ($df=6$).

	Wave 1					Wave 2				
	Mean parameter		Standard deviation			Mean parameter		Standard deviation		
	Estimate	SE	Estimate	χ^2	df	Estimate	SE	Estimate	χ^2	df
Reciprocity	1.50***	0.27	0.00	1.75	2	1.34***	0.87	1.30	3.92	2
Out-2-stars	0.13***	0.04	0.06**	13.62	2	0.13***	0.02	0.00	0.37	2
Alternating out- k -stars	0.11	0.21	0.00	0.86	2	0.26	0.27	0.00	0.17	2
In-2-stars	0.16***	0.03	0.04*	6.14	2	0.12***	0.03	0.00	0.94	2
Alternating in- k -stars	-0.59**	0.23	0.00	2.23	2	-0.20	0.28	0.00	1.05	2
Alternating k -paths	-0.03	0.02	0.00	0.89	2	-0.07*	0.11	0.16	3.95	2
Alternating k -triangles	0.81***	0.26	0.38*	7.63	2	0.70***	0.27	0.37	5.24	2
3-cycles	-0.43***	0.22	0.32*	8.11	2	-0.02	0.12	0.00	0.33	1 ^a

^a For Preschool A, this effect was fixed at -5.00 , and therefore not included in the meta-analysis; $df=4$ for Fisher's one-sided test.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 4

Predicting employee voice (Model 2). Results of meta-analyses of exponential random graph models for Waves 1 and 2. Significance tests for parameter means are based on Fisher's one-sided tests ($df=6$).

	Wave 1					Wave 2				
	Mean parameter		Standard deviation			Mean parameter		Standard deviation		
	Estimate	SE	Estimate	χ^2	df	Estimate	SE	Estimate	χ^2	df
Structural parameters										
Reciprocity	0.39	0.47	0.55	3.27	2	0.08*	1.40	2.17	4.20	2
Out-2-stars	0.17***	0.04	0.07***	13.92	2	0.15***	0.05	0.06	3.11	2
Alternating out- k -stars	0.33	0.23	0.00	1.16	2	0.48	0.27	0.00	0.47	2
In-2-stars	0.03	0.05	0.00	0.79	2	-0.02	0.08	0.00	1.13	2
Alternating in- k -stars	0.15	0.30	0.00	0.38	2	0.35	0.39	0.00	0.79	2
Alternating k -paths	-0.01	0.03	0.00	0.68	2	-0.04	0.10	0.14	2.32	2
Alternating k -triangles	0.63***	0.15	0.10	2.60	2	0.39**	0.16	0.00	2.15	2
3-cycles	-0.38***	0.18	0.24	4.85	2	0.00	0.13	0.00	0.02	1 ^a
Control variables										
Perceived problems, speaker	0.03*	0.02	0.00	1.67	2	0.05**	0.02	0.00	0.18	2
Communication frequency	1.10***	0.26	0.36*	6.05	2	0.95***	0.16	0.00	1.21	2
Recipient										
Hierarchical level	1.71***	0.36	0.00	0.20	2	1.81***	0.49	0.00	0.79	2
Degree centrality	0.00	0.03	0.00	0.47	2	-0.01	0.02	0.00	1.50	2
Speaker										
Hierarchical level	0.45**	0.15	0.00	0.51	2	0.26	0.20	0.04	1.11	2
Degree centrality	-0.06**	0.02	0.00	0.96	2	-0.01*	0.01	0.00*	6.38	2
Speaker-recipient dyad										
Team co-membership	1.67***	0.27	0.28	3.07	2	1.69***	0.21	0.00	1.73	2
Relationship quality	1.13***	0.38	0.52	5.41	2	1.24***	0.46	0.68*	6.13	2

^a For Preschool A, this effect was fixed at -5.00, and therefore not included in the meta-analysis; $df=4$ for Fisher's one-sided test.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

and the in-2-stars parameter. The control variables (perceived problems, communication frequency) had significant positive effects in the meta-analyses in both waves: employees perceiving problems tended to be more likely to speak up; and voice was more likely between employees who communicated frequently with each other.

Our findings provided support for Hypothesis 1, which predicted that voice would be more likely within dyads involving high-ranking recipients. We found that the recipient's hierarchical level had a significant positive effect in all preschools and waves, as well as in the meta-analyses of both waves. Additional analyses showed that the effects of in-2-stars and alternating in- k -stars became nonsignificant when including recipient's hierarchical level; this suggests that this parameter accounted for much of the variation in indegree in the voice networks.

Hypothesis 2 predicted a positive effect of employees' degree centrality on their likelihood of acting as recipient of voice. However, recipient's centrality had small, nonsignificant effects in all preschools and waves, as well as in the meta-analyses. This provided no support for Hypothesis 2.

Hypothesis 3 predicted that voice would be more likely within dyads involving high-ranking speakers. Indeed, the effect of speaker's hierarchical level was positive in all preschools and waves, but significant only in Preschool B, Wave 1 (Appendix A, Table 9). In the meta-analyses, the effect was significant in Wave 1, and nonsignificant in Wave 2. This did not provide sufficient support for Hypothesis 3.

Hypothesis 4 predicted a positive effect of employees' degree centrality on their likelihood of acting as speaker. Speakers' centrality had nonsignificant or positive correlations with voice (Appendix A, Tables 5–7). In the exponential random graph models, when examining each preschool and wave separately (Appendix A, Table 9), we found significant negative effects in Preschool A (Wave 1) and Preschool B (Waves 1 and 2), and nonsignificant effects in Preschool A (Wave 2) and Preschool C (Waves 1 and 2). In the meta-analyses, there was a significant negative effect in both waves.

This provided no support for Hypothesis 4. Additional analyses suggested that the effects of speaker's degree centrality became negative when controlling for dyadic relationship quality.

Our findings provided support for Hypothesis 5, which predicted that voice would be more likely among team members. We found that team co-membership had a significant positive effect in all preschools and waves, as well as in the meta-analyses in both waves.

Hypothesis 6 predicted that a good social relationship would increase the likelihood of voice in a dyad. We found that relationship quality had positive effects for all preschools and waves, although nonsignificant in Preschool C, Wave 1 (Appendix A, Table 9). In the meta-analyses, this was reflected in a significant positive effect in both waves. This provided support for Hypothesis 6.

6. Discussion

As an act of communication, voice is inherently dyadic, involving not only a speaker but also a recipient. We argue that the characteristics of speakers, recipients and speaker-recipient dyads need to be taken into account to advance our understanding of employee voice. In other words, we propose a relational approach to voice. Our study, based on data from employees of three preschools in the Netherlands, demonstrated the usefulness of this approach. We found that characteristics of speakers, recipients and speaker-recipient dyads did matter. As expected, recipients' hierarchical level, team co-membership and a good relationship between speaker and recipient significantly increased the likelihood of voice in a dyad. Speakers' hierarchical level had a positive effect as well, but this was significant only in Wave 1. Contrary to expectations, degree centrality did not affect employees' likelihood to act as recipients, and significantly reduced their likelihood to act as speakers. We will discuss each of these findings in turn. In interpreting the results, we draw on information from

interviews with department managers and employees in Preschools A and B.

The formal organizational structure had strong effects on the voice networks in our study. Members of the management team were especially likely to act as recipients of voice. This finding adds to the small number of studies examining *recipient's hierarchical level* (Kassing, 2009a; Stevenson and Gilly, 1993). Further, voice was especially likely among *team members*. Although to our knowledge team co-membership has not been examined as antecedent of voice previously, our findings are in line with related research on task interdependence (Pearce and Gregersen, 1991) and office co-location (Lazega, 2000).

The importance of recipient's hierarchical level and team co-membership was also evident from our interviews. The interview data suggested that the effectiveness of voice was a key consideration in this connection. According to interviewees, in general employees first sought to resolve a problem themselves, or with others affected by it – often team members. When problems could not be solved in this way, the next step was to speak to a member of the management team. For problems concerning a child's treatment, the appropriate recipient was the treatment coordinator. For other problems, this was the manager. Similar sequences have been described by Graham (1986) and Kassing (2009b). Our interviewees emphasized the importance of 'direct communication', that is, the individual most directly affected by a problem should speak directly to the appropriate recipient, i.e. the individual able to resolve the problem (for descriptions of similar norms, see Kowalski, 1996). In their view, this was not only the most effective way of addressing a problem, but also prevented talk about unresolved problems from 'lingering in the corridors' and creating a negative atmosphere.

In line with previous research (Ashford et al., 1998; Burris et al., 2008; Van Dyne et al., 2008: Study 2), we found that a *good relationship between speaker and recipient* increased the likelihood of voice between them. Similarly, our interviewees said that good relations with a recipient made it easier to speak up. Being able to openly address problems, including problems concerning the recipient's behaviour, was mentioned as characteristic of good social relations. Knowing the recipient (i.e., being able to predict the recipient's reaction to voice and trusting that the recipient would not react negatively) was particularly important. It reassured speakers that there would be no negative consequences. These comments suggest that good relationships between speaker and recipient might be especially important in reducing the riskiness of voice for the speaker.

In line with previous studies (Mesmer-Magnus and Viswesvaran, 2005; Nembhard and Edmondson, 2006), we found that *speaker's hierarchical level* increased the likelihood of voice, however the effect was significant in only one wave of the meta-analyses. Thus, some non-managerial employees were almost as active as managerial employees in speaking up about problems. This reflects the fact that voice is not only part of managers' attempt to resolve problems. It is also part of employees' problem-solving activities as they bring problems to the attention of management, or seek to resolve them among themselves.

Based on theoretical and empirical work on social capital, we had expected a positive effect of *recipient's degree centrality* on the likelihood of voice in a dyad. However, we found no effect. Two possible explanations come to mind. The first concerns the association between centrality and informal power. Little is known about the relative importance of formal and informal structure as source of power (Brass, 2005); the extent to which power is based on one or the other may vary between settings. Our interviewees associated effectiveness with position in the formal organizational structure. Thus, in this setting, perhaps the ability to address a problem derived from formal position rather than from position in the

social network. The second explanation concerns the recipient's likelihood to act. A managerial position entails the ability as well as norms to take effective action in response to voice. By contrast, although central employees might be able to take action, the expectations attached to their position are less clear, and they may feel no obligation to act. Voice to central recipients may therefore be less effective, and hence less likely, than voice to managerial recipients.

Contrary to expectations, *speakers' degree centrality* made voice less likely. A possible explanation is that the expected positive effects of informal power were cancelled out by potential negative effects. Firstly, the informal power inherent in a central network position may allow resolving problems oneself, without resorting to voice. Secondly, although central employees are likely to be better informed than others, this may not necessarily encourage them to speak up. Our interviews contained examples of information about sanctions and ineffectiveness of voice passed on through informal contacts. Hearing about these may make voice less likely (for similar examples of such vicarious learning, see Milliken et al., 2003: p. 1466). Another explanation could be that well-connected employees were more likely to speak directly to the appropriate recipient. As noted above, our interviews suggested that typically only one, or very few individuals were considered appropriate recipients for a particular problem. This means that the effect of speakers' degree centrality would be negative for voice measures that assess the number of recipients, as in this case. Finally, contrary to our assumptions, informal power derived from network centrality may not affect employees' decision to speak up. As we saw, degree centrality had nonsignificant or positive correlations with voice, however the effect became negative when controlling for dyadic relationship quality. This suggests that it is the good relationship with the recipient, rather than network position, that matters with regard to voice. In other words, well-connected individuals may be more likely to speak up because they have good relationships with a large number of potential recipients. However, they are unlikely to go beyond their circle of good relationships – perhaps they do not need to: their circle may already include the appropriate recipients for most problems.

Extending previous theorizing on considerations affecting employees' decision whether to speak up to the choice of recipient proved useful in accounting for our findings. As we noted above, the strong effects of position in the formal organizational structure probably reflect the importance of effectiveness considerations, whereas the strong effect of relationship quality could reflect concerns with preventing potential risks of voice. Further, we found that voice was more likely between employees who communicated frequently with each other. This could reflect considerations regarding the cost of voice. More research will be needed to test the proposed mediating role of these considerations more directly.

On the whole, the results were remarkably similar for the three preschools. An exception was the Wave 2 network in Preschool A, which differed with regard to several structural characteristics (low mean degree, low levels of reciprocity, strong tendency towards transitive closure). Further, the effect of communication frequency was nonsignificant. To some extent, this may be due to the fact that some serious problems had been resolved before Wave 2, the arrival of a new manager, and the restructuring of preschool teachers' teams.

6.1. Limitations

Some limitations of our study should be noted. Our data came from three departments, similar with regard to size and organizational structure, all part of the same child-care organization in the Netherlands. More research, using a larger number of teams or departments from different settings, will be needed to assess the generalizability of our findings. In particular, the formal

organizational structure, and the nature and salience of role-related norms, may vary between settings. This, in turn, may affect the importance of relations with third parties: network position could be more important when there are few or non-salient formal distinctions between employees, or when the formal structure proves ineffective.

Other variables than those examined here may affect the cost, effectiveness and riskiness of voice. In our view, the characteristics of the problem may be of particular interest. As we argued above, the speaker's interpretation of a situation provides the motivation for voice and affects the decision *whether* to speak up. It can be influenced by problem characteristics such as visibility, salience or seriousness (Hirschman, 1970; Miceli et al., 2008; Zhao and Olivera, 2006). Other problem characteristics could influence the decision *to whom* to speak up. For instance, according to our interviewees, the type of problem affected the choice of recipient, based on effectiveness considerations. Thus, if problem characteristics affect not only whether but also to whom employees speak up, voice should actually be studied as a three-way phenomenon, involving a triplet of problem, speaker and recipient of voice.

Further, more research will be needed to examine the direction of causality between social relations and voice. While we, in line with previous research, considered the quality of social relations an antecedent of voice, it could arguably be a consequence. Milliken et al. (2003) found that employees feared that speaking up might damage their relations with colleagues and supervisors. In theoretical work, voice has been classified as 'challenging' behaviour that 'can damage relationships' (Van Dyne and LePine, 1998: p. 108). While this suggests a negative effect of voice, the positive associations between voice and social relations in our study could be the result of voice as well. This could happen, for instance, when voice resolved interpersonal tensions; when speaker's and recipient's joint action in resolving a problem brought them closer together; or when the recipient's reactions signaled that the relationship was strong enough to allow addressing problems.

6.2. Implications

Our study demonstrated the advantages of a relational approach. We noted that characteristics of speakers and recipients as well as characteristics of the speaker–recipient dyad mattered. This demonstrates the importance of specifying speakers and recipients. Providing a framework for taking into account characteristics of speakers, recipients and the speaker–recipient dyad, our approach allows testing their relative importance, as well as potential interactions. Our study replicated some of the findings of previous research on employee voice concerning the quality of the relationship between speaker and recipient, although using a different methodology. In contrast to previous studies, our approach provided a stronger test, by testing the effects of the quality of the relationship between speaker and recipient against effects of their relations with third parties, and against effects of their position in the formal organizational structure.

Our findings also point to the importance of taking into account the formal organizational structure in future research on employee voice, and in research on the effects of social relations more generally. We found significant effects of employees' position in the formal organizational structure on their likelihood to act both as speakers and as recipients of voice. Further, from our interviews it seems that norms concerning who should speak up to whom about which problem may be equally, if not more salient than norms concerning simply whether to speak up or not (see also Kassing, 2009b). Hence, currently used scales assessing *whether* organizational or role-related norms encourage speaking up (e.g., top management openness: Ashford et al., 1998; role perceptions: Van Dyne et al.,

2008) may underestimate the importance of norms for voice. Identifying relevant norms and developing suitable measures could be an important task for future research on employee voice.

Previous research on social capital highlighted the importance of good social relations for 'getting things done' at work (Brass, 2005; Burt, 2000). In contrast, in the context of employee voice the formal organizational structure seems at least equally important. As we noted above, this raises questions about the relative importance of social relations and formal position as basis of power in different organizational settings, suggesting a fruitful avenue for future research (Brass, 2005).

Our relational approach, specifying speakers and recipients, also allowed us to distinguish between the speaker–recipient relationship and relations with third parties. This distinction can help to disentangle some of the inconsistent findings concerning the effects of social relations on voice. Good relations between speakers and recipients had strong positive effects, whereas speakers' and recipients' good relations with third parties (i.e., degree centrality) had negative or no effects. A similar (i.e., positive) effect is evident in previous studies that specify speakers and recipients (Burrus et al., 2008; Lazega, 2000). Findings were mixed when recipients were not specified (Krackhardt, 1999; Premeaux and Bedeian, 2003; Van Dyne et al., 2008: Study 1). In terms of research on social capital, our findings are in line with a connectionist rather than a structuralist perspective (Borgatti and Foster, 2003): what mattered was the quality of the relationship between speaker and recipient, rather than informal power based on network centrality. In other words, in this context, social capital seemed to be relation-specific. In this way, our approach using exponential random graph modeling provided a more nuanced understanding.

Our data also provided insights concerning more conventional measures of voice. Comparing respondents' voice network outdegrees and their scores on a four-item employee voice scale suggested that these variables measured distinct but related concepts. Whereas voice outdegree can be considered a measure of the concentration vs. spread of voice (i.e., few recipients vs. numerous recipients), the voice scale seemed to measure what one might call the intensity of voice. Further, we found that although most employees reported that they spoke up to members of the management team, notably the manager, employees with high scores on the employee voice scale were especially likely to do so. If this is generalizable, this suggests that when voice scales leave recipients unspecified, respondents' answers typically include, but are not limited to, voice to the direct supervisor(s). This could explain why several studies found positive effects of good relations with direct supervisors on voice to non-specified recipients (Kassing, 2000; Premeaux and Bedeian, 2003; Van Dyne et al., 2008: Study 1).

In sum, our study demonstrated the usefulness of a relational approach to employee voice that considers who speaks up to whom. Offering important insights into voice processes in organizations, this can help to improve our understanding of the antecedents of voice. Our findings highlighted the importance of taking into account the formal organizational structure, and distinguishing between the speaker–recipient relationship and relations with third parties in future research on employee voice.

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Appendix A.

See Tables 5–9.

Table 5
Pearson correlations (dyad-level), Preschool A, Wave 1 (below the diagonal) and Wave 2 (above the diagonal). Significance values calculated using the Quadratic Assignment Procedure implemented in the R package 'sna' (Butts, 2008).

		1	2	3	4	5	6	7	8	9
1	Voice		0.09*	0.24***	0.45***	-0.02	-0.05	0.12*	0.20***	0.24***
2	Perceived problems, speaker	0.08		0.15*	0.00	-0.01	0.09	0.32	-0.03	0.11
3	Communication frequency	0.20**	0.09		0.05	0.23***	0.05	0.23**	0.26***	0.50***
4	Hierarchical level, recipient	0.35***	0.00	0.00		-0.16	-0.04***	0.01	-0.05	-0.06
5	Degree centrality, recipient	0.06	-0.01	0.20**	-0.13		0.01	-0.04***	0.04	0.39***
6	Hierarchical level, speaker	0.17	-0.07	0.00	-0.04***	0.00		-0.16	-0.05	-0.06
7	Degree centrality, speaker	0.02	0.29	0.20**	0.00	-0.04***	-0.13		0.04	0.39***
8	Team co-membership	0.22***	0.07*	0.24***	-0.04	0.03	-0.04	0.03		0.24**
9	Relationship quality	0.21***	0.11	0.35***	-0.05	0.38***	-0.05	0.38***	0.37***	

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

Table 6
Pearson correlations (dyad-level), Preschool B, Wave 1 (below the diagonal) and Wave 2 (above the diagonal). Significance values calculated using the Quadratic Assignment Procedure implemented in the R package 'sna' (Butts, 2008).

		1	2	3	4	5	6	7	8	9
1	Voice		0.17*	0.27***	0.34***	0.00	0.42**	-0.02	0.22***	0.19**
2	Perceived problems, speaker	0.20*		-0.06	-0.01	0.00	0.19	-0.15	0.01	-0.05
3	Communication frequency	0.22***	0.06		0.07	0.13**	0.07	0.13**	0.33***	0.29***
4	Hierarchical level, recipient	0.31***	-0.01	-0.07		-0.03	-0.03***	0.00	-0.02	-0.01
5	Degree centrality, recipient	0.05	-0.01	0.13*	-0.14		0.00	-0.03***	0.01	0.32***
6	Hierarchical level, speaker	0.37*	0.23	-0.07	-0.03***	0.00		-0.03	-0.02	-0.01
7	Degree centrality, speaker	0.02	0.21	0.13*	0.00	-0.03***	-0.14		0.01	0.32***
8	Team co-membership	0.20***	0.00	0.24***	-0.04	-0.03	-0.04	-0.03		0.25***
9	Relationship quality	0.23***	0.07	0.40***	-0.05	0.34***	-0.05	0.34***	0.21***	

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

Table 7
Pearson correlations (dyad-level), Preschool C, Wave 1 (below the diagonal) and Wave 2 (above the diagonal). Significance values calculated using the Quadratic Assignment Procedure implemented in the R package 'sna' (Butts, 2008).

		1	2	3	4	5	6	7	8	9
1	Voice		0.12	0.20***	0.28***	0.10*	0.37***	0.18*	0.22***	0.21***
2	Perceived problems, speaker	0.16**		0.00	-0.01	0.00	0.26	0.17	0.02	0.05
3	Communication frequency	0.35***	0.10*		0.00	0.05	0.00	0.05	0.27***	0.26***
4	Hierarchical level, recipient	0.25***	-0.01	0.01		0.22	-0.03***	-0.01	-0.01	0.06
5	Degree centrality, recipient	0.02	0.00	0.08	-0.02		-0.01	-0.03***	0.00	0.29***
6	Hierarchical level, speaker	0.17**	0.28	0.01	-0.03***	0.00		0.22	-0.01	0.06
7	Degree centrality, speaker	0.04	-0.07	0.08	0.00	-0.03***	-0.02		0.00	0.29***
8	Team co-membership	0.38***	0.01	0.30***	0.02	0.03*	0.02	0.03*		0.19***
9	Relationship quality	0.19***	-0.02	0.26***	0.00	0.24***	0.00	0.24***	0.35***	

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

Table 8
Structural characteristics of the voice networks (Model 1): exponential random graph models for each wave and preschool.

	Exponential random graph models					
	Preschool A		Preschool B		Preschool C	
	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
Reciprocity	1.95*** (0.56)	-0.86 (1.49)	1.01* (0.48)	2.12*** (0.43)	1.62*** (0.42)	1.62*** (0.37)
Out-2-stars	0.14*** (0.03)	-0.04 (0.28)	0.19*** (0.02)	0.13** (0.04)	0.05 (0.03)	0.13*** (0.02)
Alternating out- <i>k</i> -stars	0.41 (0.39)	0.01 (0.81)	-0.04 (0.46)	0.17 (0.54)	-0.01 (0.30)	0.33 (0.33)
In-2-stars	0.20*** (0.03)	0.09 (0.06)	0.17*** (0.04)	0.08 (0.08)	0.11*** (0.03)	0.15*** (0.04)
Alternating in- <i>k</i> -stars	-0.37 (0.39)	0.09 (0.41)	-0.06 (0.56)	-0.28 (0.74)	-0.92* (0.32)	-0.54 (0.46)
Alternating <i>k</i> -paths	-0.02 (0.03)	-0.34* (0.17)	-0.01 (0.03)	0.03 (0.07)	-0.05 (0.03)	-0.03 (0.03)
Alternating <i>k</i> -triangles	0.65** (0.24)	1.27*** (0.36)	0.41 (0.28)	0.69* (0.30)	1.28*** (0.20)	0.33 (0.21)
3-cycles	-0.74** (0.27)	-5.00 (fixed)	-0.02 (0.16)	-0.12 (0.21)	-0.61** (0.19)	0.03 (0.15)
<i>n</i>	27	24	30	31	37	39

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

Table 9
Predicting employee voice (Model 2): exponential random graph models for each wave and preschool.

	Exponential random graph models					
	Preschool A		Preschool B		Preschool C	
	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
Structural parameters						
Reciprocity	1.19 (0.61)	−3.41 (2.19)	−0.44 (0.66)	1.18* (0.51)	0.36 (0.50)	0.80 (0.45)
Out-2-stars	0.19*** (0.04)	−0.18 (0.32)	0.24*** (0.03)	0.19*** (0.03)	0.09** (0.03)	0.13*** (0.02)
Alternating out- <i>k</i> -stars	0.67 (0.45)	0.32 (0.82)	−0.04 (0.50)	0.22 (0.52)	0.31 (0.33)	0.62 (0.34)
In-2-stars	0.03 (0.11)	−0.33 (0.30)	0.08 (0.08)	0.01 (0.14)	−0.04 (0.09)	0.00 (0.10)
Alternating in- <i>k</i> -stars	0.13 (0.51)	0.82 (0.67)	0.51 (0.68)	0.27 (0.89)	0.01 (0.44)	0.04 (0.57)
Alternating <i>k</i> -paths	−0.03 (0.05)	−0.34 (0.22)	0.02 (0.05)	0.02 (0.07)	−0.02 (0.04)	−0.01 (0.04)
Alternating <i>k</i> -triangles	0.50* (0.25)	0.85* (0.41)	0.38 (0.29)	0.54 (0.33)	0.89*** (0.21)	0.22 (0.21)
3-cycles	−0.65* (0.26)	−5.00 (fixed)	−0.04 (0.19)	−0.02 (0.21)	−0.50** (0.17)	0.01 (0.16)
Control variables						
Perceived problems, speaker	0.00 (0.03)	0.06 (0.07)	0.03 (0.03)	0.06** (0.02)	0.06* (0.03)	0.04 (0.04)
Communication frequency	0.58* (0.26)	0.63 (0.45)	1.35*** (0.34)	1.16*** (0.27)	1.40*** (0.24)	0.87*** (0.23)
Recipient						
Hierarchical level	1.93* (0.77)	3.10* (1.54)	1.79** (0.57)	1.61* (0.75)	1.53** (0.56)	1.71* (0.72)
Degree centrality	0.00 (0.04)	−0.06 (0.08)	0.01 (0.05)	−0.03 (0.03)	−0.03 (0.05)	0.01 (0.03)
Speaker						
Hierarchical level	0.42 (0.27)	1.48 (1.20)	0.60* (0.26)	0.17 (0.33)	0.36 (0.23)	0.26 (0.25)
Degree centrality	−0.07* (0.03)	−0.05 (0.07)	−0.06* (0.03)	−0.06** (0.02)	−0.03 (0.03)	0.01 (0.02)
Speaker–recipient dyad						
Team co-membership	1.20** (0.39)	1.81*** (0.52)	1.64*** (0.40)	1.33*** (0.35)	2.15*** (0.38)	1.94*** (0.32)
Relationship quality	1.31** (0.40)	2.21*** (0.62)	1.70*** (0.43)	1.26*** (0.33)	0.41 (0.39)	0.60* (0.30)
<i>n</i>	27	24	30	31	37	39

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

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