The Coevolution of Social Networks and Thoughts of Quitting

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Abstract

Research has shown that employees who occupy more central positions in their organization's network have lower turnover. As a result, scholars commonly interpret turnover as the consequence of social networks. Based on Conservation of Resources theory, we propose an alternative coevolution perspective that recognizes the influence of changes in individuals' social network position on their thoughts of quitting (the consideration of turnover), but also posits that thoughts of quitting shape individuals' agency in maintaining and changing their social network. Extending previous research, we predict that creation (dissolution) of both friendship ties and advice ties are negatively (positively) related to subsequent thoughts of quitting. We then develop and test the novel hypotheses that for friendship ties, thoughts of quitting are positively related to tie retention and negatively related to tie creation (leading to network stasis), whereas for advice ties thoughts of quitting are negatively related to tie retention and positively related to tie creation (leading to network churn). In a longitudinal network analysis that assessed 121 employees across three time points, we find support for our hypotheses that thoughts of quitting affect network changes, but do not find that network changes affect thoughts of quitting.

To better understand turnover, scholars increasingly focus on people's relations at work (Holtom, Mitchell, Lee, & Eberly, 2008). This stream of research indicates that as employees become more central in their organizational networks (i.e., the more ties they have), they exhibit lower thoughts of quitting (Friedman & Holtom, 2002; Moynihan & Pandey, 2007; Soltis, Agneessens, Sasovova, & Labianca, 2013) and lower turnover (Feeley, Hwang, & Barnett, 2008; McPherson, Popielarz, & Drobnic, 1992; Mossholder, Settoon, & Henagan, 2005; also see Krackhardt & Porter, 1986). These studies did not consider that thoughts of quitting and the turnover that may follow is a process that unfolds over time (Hom & Griffeth, 1991; Lee & Mitchell, 1994; Lee, Mitchell, Holtom, McDaneil, & Hill, 1999; Lee, Mitchell, Wise, & Fireman, 1996; Mobley, 1977) and that people who think of quitting become psychologically disengaged from the organization (Burris, Detert, & Chiaburu, 2008; Griffeth, Hom, & Gaertner, 2000; Kahn, 1990; Tett & Meyer, 1993). Thus, it is possible that employees who think of quitting will change their interpersonal connections within the organization before they leave it. This raises a question about whether employees' thoughts of quitting, which we define as the consideration of voluntary turnover as a possibility in the foreseeable future, are a precursor to or a consequence of network changes or whether they mutually influence each other. Based on the Conservation of Resources theory (Hobfoll, 1989, 2001), we argue for the latter by proposing a coevolution perspective (cf. Schulte, Cohen, & Klein, 2012) on thoughts of quitting and network change.

Moreover, previous studies have focused on the influence of degree network centrality, which is a count of one's network ties. However, an observed tie is either the result of a newly created tie or a retained tie and the absence of a tie may be the result of a tie that had not been created or one that was broken. These changes are typically not accounted for by aggregate measures such as centrality. To provide a more dynamic account of these micro processes we look at how changes at the tie level affect thoughts of quitting and how thoughts

of quitting affect tie level changes.

Scholars generally posit two major viewpoints on social networks: the structuralist and the individualist perspectives. The former assumes that people have little agency in choosing their relationships, and that once formed, such relationships continue over time (Mayhew, 1980; McPherson et al., 1992). While this approach has helped to simplify theory and advance research on networks and turnover, there is mounting evidence that people do play an active role in changing their networks over time (Moody, McFarland, & Bender-deMoll, 2005; Parker, Halgin, & Borgatti, 2016; Sasovova, Mehra, Borgatti, & Schippers, 2010). This individualist perspective suggests that individual cognition and personality shape the network positions that individuals occupy (Heider, 1958; Mehra, Kilduff, & Brass, 2001; Newcomb, 1961; Sasovova et al., 2010). Thus, the individualist tradition suggests a more dynamic view of networks than the structuralist perspective and raises questions about the association between social networks and thoughts of quitting. The contribution of our study lies in integrating both perspectives by proposing that the influence runs in both directions.

We develop this coevolution perspective further by recognizing that instrumental ties (captured as advice ties) and affective ties (captured as friendships ties) provide access to different resources and as a result are differentially affected by thoughts of quitting. For advice ties, we expect that thoughts of quitting reduce concerns regarding the obligation to pay back favors that usually come with advice seeking and this results in the perceived instrumentality of network churn (dropping old advice ties and creating new ones), because reduced concerns with the costs of churn let people focus more on the benefits of churn. For friendship ties, we propose that thoughts of quitting will incline people to maintain their existing friendship ties because they fear losing friends when leaving the organization. Because this requires effort and resources this should reduce effort aimed at creating new friendship ties. We refer to this as network stasis. Thus, our analysis suggests not only that

social networks and thoughts of quitting coevolve, but also that the specific nature of these relationships is contingent on the type of tie under consideration.

Our study makes two important contributions. First, we advance theory by recognizing that thoughts of quitting can be both a cause and a consequence of individuals' position within the social network. This suggests a more dynamic coevolution perspective on social networks, and addresses calls to study the coevolution of turnover antecedents (Lee, Hom, Eberly, Li, & Mitchell, 2017). Second, most of what we know about the antecedents and consequences of social networks is based on studies that have looked at how stable characteristics such as personality and demography correlate with static aggregate measures of networks such as network centrality. These aggregate measures may fail to capture changes at the tie level (Sasovova et al., 2010). This approach is problematic because it may confound micro aspects of network dynamics. Our paper addresses these shortcomings by considering the possibility that not only network changes affect thoughts of quitting but that thoughts of quitting may affect network changes.

THEORY AND HYPOTHESES

Earlier research on attitudes and social networks studied how attitude similarity between self and others predicts ties (i.e., homophily; McPherson, Smith-Lovin, & Cook, 2001), and how attitude similarity between connected people may increase over time (Schulte et al., 2012; Steglich, Snijders, & West, 2006; Visser & Mirabile, 2004). Our focus is different; it lies on how one's thoughts of quitting may shape one's network and vice versa. This is an analysis that is specific to quitting and does not concern similarity to others.

We build our arguments drawing from Conservation of Resources Theory (Hobfoll, 1989, 2001), which outlines how people protect their resources and acquire new resources. Resources are defined as things that people value (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014). Social networks are relevant in this regard, because they are a means

through which people gain access to instrumental (e.g., information) and affective (e.g., social support) resources. Such resources are assumed to flow freely through ties – indeed, in a sense ties are defined by the flow of resources (e.g., advice ties are defined by the flow of work-related information) – and accordingly knowing which ties exists is an effective way of capturing the flow of various types of resources (Borgatti & Halgin, 2011).

Instrumental ties, such as advice ties, are those that help people perform well and acquire achievement-related resources. A network of such ties contributes to a work context in which people feel they can achieve their work goals. Affective ties, such as friendships, serve as conduits that provide access to resources such as social and emotional support (Krackhardt, 1992; Lincoln & Miller, 1979). Friendship ties help to satisfy people's fundamental need to belong and develop enduring relationships (Baumeister & Leary, 1995). In considering the relationship between network ties and thoughts of quitting, it is important to consider that instrumental and affective ties provide access to different resources, and it is therefore valuable to study both. Our focus is on the most studied instances of each kind of tie: advice ties and friendship ties (Kilduff & Brass, 2010). Following from our reliance on Conservation of Resources theory, we focus on advice-seeking (as opposed to advice-giving), because this reflects access to instrumental resources, and on outgoing friendship ties (i.e., seeing someone else as a friend as opposed to being seen by the other as a friend), as the perception that someone is a friend contributes to one's sense of belongingness.

One's position in a network structure can facilitate or constrain the flow of resources, such as support or information (Borgatti & Halgin, 2011). This perspective has inspired previous studies on the effects that networks exert on turnover (Feeley, Moon, Kozey, & Slowe, 2010; Mossholder et al., 2005; Parker & Gerbasi, 2016) and thoughts of quitting (Moynihan & Pandey, 2007; Soltis et al., 2013). The central hypothesis in these studies is that people with more ties (a higher degree of network centrality) are more likely to stay with the

organization than those with fewer ties because leaving would mean sacrificing access to existing resources. We build upon this baseline prediction and argue that newly created ties should decrease thoughts of quitting whereas newly dropped ties should increase thoughts of quitting. Following the logic of the coevolution framework we then introduce the idea that thinking of quitting may also affect the extent to which an individual maintains (or drops) ties over time and creates new ties because of the anticipated consequences of quitting and the costs associated with keeping old versus creating new ties.

Thoughts of quitting is a concept distinct from turnover. We conceptualize thoughts of quitting as withdrawal cognition that concerns quitting as a realistic option in the foreseeable future. This does not require that the individual has a concrete timeline to turnover or even that turnover will actually occur. Thoughts of quitting are associated with favorable attitudes toward turnover and employees thinking of quitting often psychologically detach and mentally begin the process of separation from the organization long before they actually physically exit the organization (Burris et al., 2008; Hom & Griffeth, 1991; Hom & Kinicki, 2001; Mobley, 1977). Voluntary turnover typically unfolds as a process over time, and thoughts of quitting may not necessarily lead to turnover even when people (psychologically) prepare for turnover (Lee & Mitchell, 1994; Lee et al., 1999; Lee et al., 1996; Tett & Meyer, 1993), and when people start thinking of quitting they typically do not know for certain that (or when) they will leave the organization (Mobley, 1977). Thus, we expect to see network changes inspired by thoughts of quitting even when people ultimately do not leave the organization, but would not expect network change if people exit without having thought of quitting (e.g., because they receive an unsolicited job offer).

We work from the perspective that there is agency in network creation and change, and that an individual's network is substantially affected by their decisions to create, retain, or drop ties. Even though we do not measure such decisions, we assume that individual

agency is reflected in the extent to which thoughts of quitting predict changes in the network.

We also note that positive interpersonal affect, which is typically found in friendship ties, is argued to come with the perception that a partner's task-related resources will be accessible (Casciaro & Lobo, 2008). Employees will therefore typically find it easier to create an advice-seeking tie with someone they are friends with (Casciaro & Lobo, 2008). In addition, people seem to strive for predictability in their interaction partners (Hinds, Carley, Krackhardt, & Wholey, 2000) and therefore should prefer partners with whom they were friends before and sought out for advice before. Therefore, an individual should be more likely to retain an existing advice-seeking tie (friendship tie) when the individual also has a friendship tie (advice-seeking tie) with this person. Friendship and advice networks may thus be interdependent. That said, they are also conceptually distinct and neither direction of the relationship between friendship and advice ties is deterministic; friendship ties and advice ties are sufficiently independent to study each in their own right – indeed, we build theoretical arguments that reflect these differences (our data will also speak to this).

The Effect of Network Changes on Thoughts of Quitting

The baseline prediction in the network-turnover literature is that having more ties reduces turnover. We extend this reasoning by arguing that it is not merely the size of the network but recently created and recently dissolved ties that drive thoughts of quitting because they should be salient events for employees. Thus, while we do not argue that network size should not matter we posit that changes in network size that result from the addition or dissolution of network ties explain additional variation in thoughts of turnover.

The baseline prediction of the effects of networks on turnover is based on arguments specified by the Conservation of Resources theory and we argue that these arguments also hold for thoughts of quitting. Specifically, Conservation of Resources theory is based on the idea that individuals are motivated to acquire resources and avoid losing them (Hobfoll,

1989, 2001). Individuals who feel threatened by the loss of valued resources strive to protect those resources (Hobfoll, 1989, 2001). The 'primacy of resource loss' in Conservation of Resources theory suggests that people have more negative perceptions of resource losses than they have positive perceptions of resource gains. Accordingly, people engage in behaviors that mitigate resource losses (Halbesleben et al., 2014).

Building on the notion that advice ties and friendship ties provide access to valued resources (Borgatti & Foster, 2003; Borgatti & Halgin, 2011; Brass, Galaskiewicz, Greve, & Tsai, 2004), we argue that employees risk losing access to these resources when they change jobs. Indeed, the opportunity for tie maintenance and the legitimacy of tie use may be substantially reduced upon exiting the work context. Thus, employees with high thoughts of quitting may anticipate a loss of advice ties upon leaving the organization, which they may regard as a substantial cost in terms of work-related advice and support. Friendship ties may similarly suffer: While these ties may be less linked to the work context than advice ties, the act of leaving the organization reduces key facilitating conditions of friendship such as physical proximity and frequency of contact. Additionally, one's friends at work may feel they have been left behind, and this feeling of rejection could further threaten the friendship. People cannot know whether they will be successful in preserving their ties beyond their departure, which will motivate those with many advice or friendship ties to stay with the organization and hence have lower thoughts of quitting. For example, research on employees in fast-food restaurants indicates that individuals with more friendship ties were less likely to leave (Feeley et al., 2008). This rationale is also reflected in the sacrifice dimension of job embeddedness theory, which emphasizes that leaving an organization implies losses such as foregoing access to colleagues (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001).

The loss aversion that is also emphasized in Conservation of Resources theory should be particularly salient for newly created ties. New ties are less secure compared to old ties

because the partners in the network exchange have not yet had much opportunity to test and confirm their relationship over time. When people are considering leaving the organization they will fear that the ties that were only recently created will easily break. Thus, a greater number of recently acquired ties should motivate people to stay with the organization and reduce thoughts of quitting. Also, creating ties requires people to invest time and energy but it takes time until this investment pays back in terms of access to new resources. Thus, we argue that people create new ties with the long term in mind. This can be more easily done by staying within the organization and therefore there will be a decrease in their thoughts of quitting (cf. Halbesleben & Wheeler, 2008).

Hypothesis 1: The number of newly created advice-seeking ties is negatively related to subsequent thoughts of quitting.

Hypothesis 2: The number of newly created friendship ties is negatively related to subsequent thoughts of quitting.

In contrast, recently experienced tie losses should foster thinking of quitting because they represent salient loss of resources. Dropping ties suggests that an individual no longer benefits from these ties as a source of resources. These recently lost ties should reduce the costs of leaving the organization and increase thoughts of quitting. An individual who has recently dissolved ties may see a new work context as more attractive and as an opportunity to build new ties to give them access to new resources.

Hypothesis 3: The number of recently dropped advice-seeking ties is positively related to subsequent thoughts of quitting.

Hypothesis 4: The number of recently dropped friendship ties is positively related to subsequent thoughts of quitting.

The Effect of Thoughts of Quitting on Advice Ties

Advice ties convey task-relevant information in pursuit of instrumental objectives

(Borgatti & Cross, 2003). These instrumental ties are based on interdependencies between tasks and jobs (Brass, 1984; Cross & Cummings, 2004; Podolny & Baron, 1997). Consistent with the notion that organizations rely on information exchange for their employees' performance (Agneessens & Wittek, 2012), research has shown that the number of advice ties an individual possesses is positively related to performance (Cross & Cummings, 2004; Sparrowe, Liden, Wayne, & Kraimer, 2001). Thus, there are clear instrumental benefits to seeking advice. Advice ties constitute a resource, but not without costs. These costs are typically considered from the perspective of someone who plans to stay with the company, but should differ for someone who thinks of quitting the organization.

The resource costs incurred by the advice-seeker are typically considered from a social exchange perspective and the norm of reciprocity (Gouldner, 1960). Receiving advice (a valued resource) implies a social debt that the receiver should repay the other party for (e.g., by providing help or advice in return to the advice-giver). As such, advice ties are often characterized by mutual advice-giving (Agneessens & Wittek, 2012). This can be costly for the advice-seeker because returning a favor potentially distracts from their own work (Monsell, 2003). Requests to pay back a favor may also come at inconvenient times (Coleman, 1990). Advice-seeking may also entail the resource costs of "status-giving": When advice is not reciprocated with other advice, advice-seekers "pay" the advice-giver in deferred status, which essentially implies that the advice-seeker concedes to have less expertise than the advice-giver (Blau, 1964; Borgatti & Cross, 2003). Because people have a fundamental desire for status (Frank, 1985; Loch, Huberman, & Stout, 2000), this constitutes a cost to the advice-seeker. These costs are typically not immediate: The norm of reciprocity dictates future repayment, but does not specify its timing (Nahapiet & Ghoshal, 1998). Discontinuing social ties can thus be a slow process: Even when requests for advice are discontinued, an individual may still be confronted with the obligation to repay past benefits.

Conservation of Resources theory posits that individuals' resources are limited, but at the same time, people must invest resources to acquire new ones. As a result, people are careful about acquiring new resources and search for new resources that can be acquired with low costs (Hobfoll, 2001), and people often make a cost-benefit analysis when deciding whether to acquire new resources. This means that people will be hesitant to build a large advice network, because the benefits of many sources of advice will be offset by the costs of being obligated to these sources of advice. There are also costs involved with dropping old advice ties while building new: It takes some time for old ties to dissolve (in terms of the obligations they imply) while new debts are being incurred. Moreover, the failure to fulfill one's obligations may lead to social sanctioning for the norm violator (Coleman, 1988).

What all of this implies is that people may rely on their existing advice network, even when others in the organization may be better sources of advice for specific issues, due to their hesitation in incurring the additional costs of advice tie creation (that are not counter-balanced in the short to mid-term by dissolving old ties). From an informational perspective, ideally there would be sufficient churn in the advice network to use the best sources of advice available for any specific issue (cf. Cook & Emerson, 1978). However, from a Conservation of Resources perspective, churn in the advice network is less attractive because the "cost savings" from tie discontinuation do not match the resource costs of tie creation in the short-to mid-term. As a consequence, there is typically more stability in the advice tie network than would be ideal from an information acquisition perspective (cf. Agneessens & Wittek, 2012).

We propose that higher thoughts of quitting change the costs-benefit analyses outlined above. Leaving a social system is a way of dissolving, or at least reducing, social exchange obligations to the extent that these are understood to be obligations within the system. The anticipation of leaving the system may thus reduce the perceived costs of new advice ties. Whereas the costs of new advice ties may be delayed – and may be sidestepped in part or

whole by leaving the system – the benefits of new advice ties are more immediate (i.e., by definition, establishing an advice tie means receiving advice – a valued resource). By the same token, people thinking of quitting may worry less about the delayed costs of dissolved advice ties. The perceived costs of establishing new advice ties may thus be lower with higher thoughts of quitting, whereas the perceived benefits would be less affected. In a related vein, status is tied to the social system in which people are embedded, and the costs of status deferral are lower for someone leaving the social system than for someone staying within the system (cf. Frank, 1985). An employee who is leaving the organization will also be less threatened by possible social sanctions for failing to repay obligations.

What these considerations imply is that stronger thoughts of quitting make the benefits of advice network churn more salient by lowering the perceived costs of creating and dropping advice ties. That said, there is no point where advice ties come "free of charge". The act of seeking advice entails expending time and effort, and thus people can be expected to focus on a limited number of sources. Moreover, the consideration of turnover does not relieve a person from fulfilling his or her obligations while still with the organization. For these reasons, we do not expect that thoughts of quitting motivate individuals to expand their advice tie network as much as we expect higher thoughts of quitting to produce more network churn (lower tie retention / higher tie creation).

Hypothesis 5: Thoughts of quitting are negatively related to the subsequent retention of advice ties (negative retention effect).

Hypothesis 6: Thoughts of quitting are positively related to the subsequent creation of advice ties (positive creation effect).

The Effect of Thoughts of Quitting on Friendship Ties

Friendship ties operate under a different dynamic than advice ties. The latter are, by definition, tied to the work context and thus revolve around work-related information. By

implication, the act of turnover will likely result in a loss of advice ties. As per the above, anticipating turnover changes the cost and benefit analysis for advice network churn and stasis. Friendship ties, by contrast, revolve around a non-work resource; thus, it is more feasible to maintain friendship ties after turnover compared to advice ties.

This is not to say that turnover would leave friendship ties unaffected. Friendship ties benefit from proximity and frequency of contact (Newcomb, 1961; van Duijn, Zeggelink, Huisman, Stokman, & Wasseur, 2003). Because both will decrease after turnover (cf. Roberts & Dunbar, 2011), there is a real risk of losing friendship ties (Stillman, Baumeister, Lambert, Crescioni, DeWall, & Fincham, 2009). Because people have a fundamental need to belong (Baumeister & Leary, 1995) that is satiated by friendship ties (Podolny & Baron, 1997), they may perceive these ties as valued resources they do not want to lose (Halbesleben et al., 2014). As such, we propose that higher thoughts of quitting make the potential loss of friendship ties more salient (when one does not think of quitting, one would typically worry less about losing friendship ties with colleagues). This heightened salience of potential loss may encourage the individual to try and mitigate the loss (Tversky & Kahneman, 1986), in this case by trying to retain friendship ties. In line with this, research shows that people who perceive a threat to their sense of belonging engage more in behavior that can secure existing friendship relationships, such as reciprocating favors, trusting others, and mimicking other members' behaviors (Derfler-Rozin, Pillutla, & Thau, 2010; Lakin, Chartrand, & Arkin, 2008). Thoughts of quitting should thus be positively related to friendship tie retention.

The effort invested in tie retention is not without consequence for tie creation, though. Conservation of Resources theory highlights that people must invest resources to gain resources and are therefore careful in doing so (i.e., assuming that resource loss is particularly salient; Halbesleben et al., 2014). Social network research similarly argues that the costs involved with tie creation and maintenance mean that people will not simply try to expand

their social network indefinitely (e.g., Hirst, van Knippenberg, Zhou, Quintane, & Zhu, 2015). Friendship ties take time to develop and require a sustained investment over time (Carley & Krackhardt, 1996). Thus, investments in friendship tie retention, inspired by thoughts of quitting, are likely to be met with lower investments in friendship tie creation. In sum, based on Conservation of Resources theory, we predict that the potential loss of friendship ties that arises from increased thoughts of quitting motivates an increased focus on tie (resource) retention and a decreased focus on tie (resource) creation; something that we refer to as network stasis.

Hypothesis 7: Thoughts of quitting are positively related to the subsequent retention of friendship ties (positive retention effect).

Hypothesis 8: Thoughts of quitting are negatively related to the subsequent creation of new friendship ties (negative creation effect).

METHODS

Sample

Our sample consisted of 121 employees from eight organizations in healthcare in the Netherlands. On average, organizations employed 16.7 employees (SD = 5.85). The smallest organization had 10 employees and the largest had 26. One organization was a veterinarian, one a physiotherapist, one a practice for acupuncture, two were pharmacists, the remaining three were dental practices. With the exception of the pharmacies, all were group practices. Within the group practices, doctors share facilities, have assistants support them, and treat their own stock of patients (though sometimes a doctor might help out a colleague and treat one of their patients). Each pharmacy employed two pharmacists, by legal requirement in the Netherlands because pharmacists mutually control the quality of their products. Most organizations also employed a practice manager, who usually holds a degree in management and performs tasks involving HR management, supply, finances, and planning. Most of the

other individuals working in the sampled organizations were medical/ pharmaceutical secretaries, some of which had additional qualifications (e.g., hygienist, prevention employee) to perform simple complementary treatments under supervision of a doctor.

We approached organizations to participate in our research in exchange for a report on their social networks. To assure respondents of confidentiality, we sent information letters prior to data collection; in one case, we provided an official written statement. We collected data on network ties and thoughts of quitting at three different time points, approximately four months apart, by means of questionnaires that were sent to all 121 employees. All questionnaires were administered in Dutch. In our sample, 78% were women, the average age was 37.3 years (*SD* = 10.9), and the average tenure was 5.4 years (*SD* = 5.7). On average, employees worked 26.8 hours per week (*SD* = 10.19).

Table 1 provides a summary of missing data organized by time point and by organization. The overall response rates were 91, 90, and 89 percent, which is well above the recommended threshold for SIENA analyses (i.e., 80 percent). As such, our data should be free from concerns about distortions, assuming that the missing data is non-systematic and therefore non-informative (Huisman & Steglich, 2008). For Time 1, the lowest response rate in an organization was 82 percent and the highest was 100 percent; for Time 2, the lowest was 73 percent and the highest was 100 percent; for Time 3, the lowest was 73 percent and the highest was 100 percent. Missing network data were imputed with the standard procedure in SIENA whereby the value from the previous period is taken if available, or alternatively, the value is set to zero; this accounts for a situation where the lack of a tie occurs more frequently than the presence of a tie (Huisman & Steglich, 2008). In order to further reduce the possible impact of missing data, SIENA only uses these imputed values when simulating network data to find parameter values; however, missing values are not used when calculating the standard errors, tie variables, and actor variables, which should minimize the

impact of missing data on the final results (Huisman & Steglich, 2008). Note that a person who did not respond to the survey could still receive incoming ties from other respondents, which means that imputation was only necessary for the outgoing ties. During the time of data collection, eleven people left the sample and three people joined the sample[1]. For those cases where employees did leave the organization or joined later, we coded their ties for the time period after leaving or before joining as structural zeros. In SIENA this is done via coding such a tie as a '10' in the network matrix whereas regular zeros are coded as '0' (Ripley, Snijders, Boda, Vörös, & Preciado, 2017). Importantly, structural zeros are different than regular zeros or missing values: Structural zeros indicate a tie could not possibly occur at a specific time point, a regular zero indicates that a tie could exist but did not, and missing values indicate that we simply had no information about the tie. Thus, we used structural zeros in cases where a tie at work was impossible, such as when an individual had not yet joined the organization or had left it. In total, we analyzed 1,932 network relations, which encompassed 121 people across two networks assessed over three time points.

Insert Table 1 about here

Measures

***Thoughts of quitting*.** To measure thoughts of quitting, respondents indicated their agreement with the following two items that we adopted from the Michigan Organizational Assessment Questionnaire (Cammann, Fichman, Jenkins, & Klesh, 1979) and that have been used elsewhere (Konovsky & Cropanzano, 1991; Schaubroeck, Cotton, & Jennings, 1989): "I frequently think about quitting this job" and "I will probably look for a new job soon". These

[1] We explored whether people's thoughts of quitting were affected when one of their friends or advisors left. We created two covariates that measured the number of outgoing friendship ties and the number of outgoing advice ties to someone who had left the organization. We then included these variables in the model that estimated thoughts of quitting. Relationships for both variables were not significant. Therefore, we did not include these variables in the final model.

items were rated on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Because SIENA only uses discrete dependent variables, we summed the scores and subtracted one. This transformation resulted in a discrete measure that could range from one (lowest possible level of thoughts of quitting) to nine (highest possible level of thoughts of quitting). Note that this transformation did not affect the distribution of the average score. Cronbach's alphas for the three time points were .74, .83, and .82, respectively.

Advice ties. We relied on self-reported data of ties. Self-reports are frequently used in social network research and generally considered a valid measure of interactions (Marsden, 1990). We followed methodological recommendations about how to measure social networks in organizations (Marsden, 1990). First, respondents were presented a randomly sorted list with the names of all employees in their organization and asked to check the names of those people to whom they turn for advice or help. We asked them: "Do you usually go to this person for help or advice on work-related matters?" (Sparrowe et al., 2001). This allowed us to gather data on whom people went to for advice and help (outgoing tie), as well how often a person was nominated as a source of advice and help by others (incoming tie). The randomly sorted presentation of a list of names can improve the reliability of a network measure because it increases the chance that people accurately recall previous interactions and avoids ranking biases (Marsden, 1990). Second, we did not restrict the number of names that respondents could choose, which would bias recall in favor of strong ties (Marsden, 1990). SIENA uses a count of the newly created outgoing ties as the independent variable to test Hypothesis 1 and a count of recently lost ties as the independent variable in Hypothesis 3. To this end we used the recently developed degPosContrX and degNegContrX effects in SIENA[2]. To test Hypothesis 5 SIENA estimates whether thoughts of quitting decrease the likelihood of retaining outgoing ties compared to dropping outgoing ties. To test Hypothesis

[2] We thank Tom Snijders for developing the test of these effects.

6 SIENA estimates whether thoughts of quitting increase the likelihood of creating an outgoing tie compared to not creating a tie.

Friendship ties. We presented participants with a definition of friendship ties to ensure a common understanding: "People with whom you like to spend your free time, people you have been with most often for informal social activities, such as visiting each other's homes, attending concerts or other public performances" (Mehra et al., 2001). This allowed us to gather data on whom people perceived as a friend (outgoing tie) and how often a person was perceived as friend by others (incoming/received ties). A count of newly created outgoing ties was used as the independent variable in Hypothesis 2 and a count of recently lost ties as the independent variable in Hypothesis 4. We used the degPosContrX and degNegContrX effects in SIENA to model these effects. To test Hypothesis 7 SIENA estimates whether thoughts of quitting increase the likelihood of retaining an outgoing tie compared to dropping an outgoing tie. To test Hypothesis 8 SIENA estimates whether thoughts of quitting decrease the likelihood of creating an outgoing tie compared to not creating a tie.

Covariates and structural effects. We included a number of variables that were not focal to our hypotheses testing, but that could theoretically have affected our results[3]. We start by describing the variables that we included when predicting thoughts of quitting. We then describe the covariates that we included in order to predict outgoing network ties.

First, we included a number of covariates in the model that predicts thoughts of quitting. Prior research indicates that tenure, age, gender, and job satisfaction can affect

[3] We ran a sensitivity analysis that included only our hypothesized variables, organization dummies, rate parameter effects, and intercepts. The results lead to the same interpretations as our main analysis model, with the exception that the no-controls model did show support for the negative tie creation effect in the friendship network (the full model including controls failed to find support for this). Thoughts of quitting led to more friendship tie retention ($\theta = 0.67$, $p < .01$) and less friendship tie creation ($\theta = -0.37$, $p < .05$). Thoughts of quitting increased advice tie creation ($\theta = 1.93$, $p < .001$) and reduced advice tie retention ($\theta = -2.01$, $p < .001$). We found no effect of network tie change on thoughts of quitting.

turnover (Griffeth et al., 2000) and we reasoned that they could similarly affect thoughts of quitting. We also accounted for working hours because someone working long hours may have different thoughts of quitting than someone working short hours. Furthermore, we accounted for rank under the assumption that differences in people's organizational status may affect their thoughts of quitting. We also included need to belong because people with a high need to belong may be less likely to think of quitting. We measured need to belong with the 10 items of Leary and colleagues' (2013) Need to Belong Scale. A sample item reads: "Being apart from my friends for long periods of time does not bother me" (reverse coded). Responses were given on five-point Likert scales (1 = strongly disagree, 5 = strongly agree) and subsequently averaged (Cronbach's alpha = .68). We included a measure of the number of outgoing hindrance ties because it may be that people think of quitting because they have difficult relationship with others at work. Finally, we included an count of outgoing advice and friendship ties (i.e. degree centrality) because previous studies have argued that larger networks should reduce turnover and we would argue that this should also reduce thoughts of quitting. Controlling for network centrality also allows us to test whether changes in network ties account for differences in thoughts of quitting above and beyond actual network size.

Second, when predicting outgoing network ties, we included structural effects such as reciprocity, transitivity (i.e., the transitive triplets effect in SIENA), three-cycles, indegree popularity and outdegree activity. Scholars generally recommend that models encompass these effects (Ripley et al., 2017) because they capture important endogenous status and exchange dynamics in networks (Agneessens & Wittek, 2012). Reciprocity measures the focal individual's tendency to send an outgoing friendship tie or seek advice if someone else has previously extended a tie to them. Transitivity and three-cycles measure dynamics in the local (triadic) network structure (Ripley et al., 2017). Transitivity measures the tendency to become friends with a friend's friends or to ask advice from an advice-giver's advisors.

Three-cycles measure the tendency for generalized exchanges in networks, such as the tendency for person i to seek advice from person j, person j to seek advice from person k, and finally person k to seek advice from person i, which would form a closed unidirectional triangle. A positive tendency for three-cycles in the advice and friendship network would suggest the absence of a status hierarchy. Outdegree activity measures people's tendency to send more outgoing ties because they already have a larger network of outgoing ties. This effect captures variations in individuals' tendency to send outgoing ties (Ripley et al., 2017). We also accounted for indegree popularity, which measures the tendency to send ties to those individuals who receive many other advice or friendship ties (Barabási & Albert, 1999).

Third, less than half of all ties were friendship ties as well as advice ties to the same person; T1 = 38%; T2 = 45%; T3 = 45%). It is important to note that we have theoretically distinguished the evolution of friendship ties from that of advice ties; thus, we include both in our analyses because they potentially influence each other. Because advice ties may lead to friendship tie formation and vice versa, we included effects that accounted for the influence of one type of tie on the other (e.g., Lazega & Pattison, 1999).

Fourth, we included actor covariates. We included demographics (age, gender, working hours per week, and tenure) because demographic similarity is known to promote homophily-based ties (McPherson et al., 2001). Thus, we included similarity effects for all measured demographics, as well as ego and alter effects. We included ego and alter effects for tenure and working hours because they may affect how much opportunity there is to form a tie. We measured tenure in years and working hours as an employee's working hours per week. We also accounted for people's gender because gender has been shown to account for differences in network access (Ibarra, 1992). Gender was coded as 1 for women and 0 for man. We included age (in years) because it has been shown to affect the number of ties in and composition of networks (Burt, 2004). We also coded whether a respondent in our sample

had a high or low hierarchical rank within their respective organization because rank represents an important dimension of the formal organization and may influence how people form friendship and advice ties (Soda & Zaheer, 2012). We considered all executive functions as high-ranking (doctors, pharmacists, and practice managers; coded as 1) and all support functions as low-ranking (medical/pharmaceutical secretaries; coded as 0). Because people may differ in their need to belong, we also included it as an ego effect. In addition, we accounted for the possibility that thoughts of quitting effects were confounded with job satisfaction by including job satisfaction as an ego effect. We measured job satisfaction with the three items from the Michigan Organizational Assessment Questionnaire (Cammann et al., 1979; Cronbach's alpha = .87). Next, we included a varying dyadic covariate measure of hindrance relationship to account for the possibility that some ties were broken or not formed because of some negative relationship between employees. To that end, we had people answer yes or no to the question: "Do you have a difficult relationship with this person?" (Baldwin, Bedell, & Johnson, 1997).

ANALYSIS

To test our hypotheses, we used SIENA (Simulation Investigation for Empirical Network Analysis), a stochastic, actor-based modeling method developed by Snijders and his colleagues (Ripley et al., 2017; Snijders, 2001; Snijders, 2005). This method has been specifically designed to model the coevolution of networks and behaviors or attitudes (Snijders, Steglich, & Schweinberger, 2007; Steglich, Snijders, & Pearson, 2010). It is able to account for a person sending an outgoing tie to a colleague based on the focal person's attributes, the colleague's attributes, or some structural characteristics of the network (e.g., reciprocity; transitivity, three-cycles, indegree popularity, outdegree activity). These endogenous structural effects are well documented (e.g., Davis, 1970; Gouldner, 1960; Heider, 1946; Sahlins, 2003), but not usually accounted for by regression-based approaches

(Schulte et al., 2012). SIENA also allowed us to test our hypotheses in both the friendship and advice networks simultaneously. We expected that both networks might be correlated (and were in our sample; see Table 4) and thus deemed it important to account for their mutual dependencies. Below we provide a brief description of the estimation process of SIENA, but we refer interested readers to the more detailed writings of Snijders, van de Bunt, and Steglich (2010), as well as the in-depth discussion by Ripley and colleagues (2017).

SIENA models the adding, dropping, and maintenance of ties within a bounded network over a series of time periods. There are several assumptions in the model, notably that change can occur at multiple time points and is not constrained to the observed time points. Realistically, people can potentially add or drop a tie at any point in time, and this fact is modeled as a probabilistic (stochastic) process utilizing a continuous time Markov chain. SIENA simulates the change between observed time points through a series of unobserved small changes and calculates the most likely sequence of changes (Snijders et al., 2010). In the simulation model, actors can choose to add, drop or keep a tie. They can also choose to maintain, increase or decrease their behavior or attitude, which in our case concerns thoughts of quitting. Actors make these decisions based upon the current network structure, their own preferences, and other actors' attributes. The resulting choices will then affect other actors' subsequent network choices due to altering the current structure of their surrounding network. The model conditions on the T1 network and attitude/behavior and tests hypothesized effects to produce the network and attitude/behavior observed at T2 and T3 as the result of a series of micro-steps. This simulation process is repeated until SIENA finds weights (parameters) for the actor preferences that best explain the observed networks and attitude/behavior (i.e., that minimize the deviations between generated and observed values of the statistics). In the final phase, these parameter values are held constant to estimate the covariance matrix and the matrix of derivatives used for the computation of standard errors.

Within each micro-step, a randomly selected actor evaluates all possibilities to add, drop, or maintain an outgoing tie, or otherwise do nothing. Actors make changes in an effort to maximize the following objective function:

$$f_i(\beta, x) = \sum_k \beta_k s_{ki}(x)$$

where $f_i(\beta, x)$ is the value of the function for actor (i) given the current set of parameter estimates (β) and state of the network (x). The k effects, represented as $s_{ki}(x)$, may be based on endogenous structural effects, actor attributes (ego, alter and similarity effects), or some attributes of pairs of actors (i.e., dyadic covariates) (Snijders et al., 2010). After evaluating possible changes, an actor makes the change that creates the highest value given the tested effects (taking into account a small amount of randomness that is introduced by the algorithm). For example, when the reciprocity parameter is positive, changes that create a reciprocated tie or remove an unreciprocated tie are evaluated higher and are more likely to be made. If no changes have a positive evaluation, the actor makes no change to their outgoing ties. SIENA models estimate changes in attitudes and behavior analogously. During one micro-step an actor decides to change his or her attitude or behavior one level up or down, or to otherwise maintain it at the same level. In addition, a rate effect estimates how often actors are given the opportunity to change their ties (or attitude/behavior) between two observations. Only one actor can change a tie at any given moment, preventing actors from coordinating relationships between each other.

Following recommendations (Ripley et al., 2017), we observed changes within, rather than between, eight different organizations, as well as separating organizational networks by structural zeros in the analyses. In this case, structural zeros are constraints added to the network data that indicate that people cannot have ties between organizations. This yields the most parsimonious model with the highest statistical power (Ripley et al., 2017). We also

included dummies to account for between-organization differences, which is akin to what Schulte and colleagues (2012) did to account for between-team differences[4]. Since we were estimating three dependent variables (advice, friendship and thoughts of quitting), we had to include 21 dummy variables (seven organization dummy variables per model with one organization acting as the comparison category). We also considered alternatives for dealing with multiple networks by using a multi-group analysis and a meta-analysis of our single groups (Ripley et al., 2017). However, the algorithms did not converge in either of these approaches, possibly due to the size of our networks (the multi-group option and the meta-analysis technique require rather large data sets; Ripley et al., 2017).

To ensure that the SIENA framework was appropriate for our model, we first calculated Jaccard indices for each network (Ripley et al., 2017). The Jaccard index measures the percentage of ties maintained over each period compared with the total number of ties that are maintained or changed. Low Jaccard indices mean that the changes in the network may be too high to be appropriately modeled using the SIENA framework. In the case of our data, all values were above the recommended value of 0.3 (see Table 2). Second, we carried out the analyses with 5,000 iterations to derive stable estimates of standard errors. Third, we continued estimations until all convergence statistics were between -0.1 and 0.1, which indicates good model convergence. In addition, the overall maximum convergence ratio was 0.24, which is less than the recommended maximum of 0.25 (Ripley et al., 2017).

RESULTS

Table 2 shows the network changes between observations at the level of the network

[4] We also tested whether the effects differed between organizations by testing interactions between dummies and the hypothesized effects (Snijders & Bosker, 1999). When SIENA predicts an individual-level outcome, it only allows for the inclusion of a maximum of four interactions. Because we had to test the interactions of eight organizations with two outdegree effects, we could not replicate this test for the effect of outdegree centrality on thoughts of quitting. However, our results showed no significant interaction between the organization dummies and thoughts of quitting on network ties. We are careful to interpret these results because the large amount of effects could increase the Type II error rate (the mistake of not detecting a significant effect), but at least the results do not contradict our assumption that effects are homogenous across organizations.

tie. Table 3 presents the means, standard deviations, and correlations for thoughts of quitting, outgoing advice ties (advice network centrality), outgoing friendship (friendship network centrality), outgoing hindrance ties, need to belong, job satisfaction, and the demographic covariates. The correlations between time points are relatively high, as expected, but this is not considered a cause for concern in SIENA models (Ripley et al., 2017). Table 4 shows the QAP results for the correlations between networks. These correlations measure whether having a tie to a specific person in one network (e.g., advice) is correlated with a tie to the same person in another network (e.g., friendship).

Insert Table 2-4 about here

In Table 5 we detail the networks' effects on thoughts of quitting. It is important to note that SIENA simultaneously models the effects of the advice and friendship networks on thoughts of quitting and the effect of thoughts of quitting on the advice and friendship networks. For ease of understanding, we present the results of the former in Table 5 and the latter in Table 6. The parameter estimates in Table 5 indicate an employee's tendency to change his or her thoughts of quitting. The parameter estimates in Table 6 indicate an employee's tendency to change his or her friendship or advice network. The significance of a parameter is calculated by comparing the t-ratio (estimated parameter divided by standard error) to a standard normal distribution. *Sender* refers to a focal employee's tendency to send an outgoing tie to a friend or advisor.

Insert Table 5-6 about here

The non-significant intercepts in Table 5 show that everything else being equal employees have a tendency towards the midpoint (5) of the 'thoughts of quitting' scale. Also, job satisfaction decreased thoughts of quitting. Importantly, Hypotheses 1-4 predicted that the

number of created and dropped outgoing advice ties and friendship ties would predict changes in thoughts of quitting. Our results show no support for this. The effect of tie creation was not significant, advice: θ = -.01, *ns* and friendship: θ = .04, *ns*, nor was the effect of tie dissolution significant, advice: θ = -.19, *ns,* and friendship: θ = .03, *ns*.

However, there were a number of significant network effects when looking at how thoughts of quitting affect network ties (Table 6). The rate parameter for advice ties – which estimates how often actors are given the opportunity to change their ties between two observations – was slightly lower in the first wave than the second wave. This indicates an increase in the number of potential tie changes for each person in each wave of the SIENA model. The opposite was true for the friendship network. The outdegree parameter is similar to an intercept in regression analysis (Table 6). The estimates for the advice network and the friendship network were both negative, indicating that, everything else being equal, individuals have a tendency to avoid sending an outgoing tie to another person as a source of advice or as a friend. This finding parallels those from other analyses of organizational networks (Snijders et al., 2010). The positive and significant reciprocity parameters in both networks show that individuals were more likely to seek advice (pursue a friendship) if someone else had previously extended an advice (friend) tie to them. The positive transitivity effects in both networks indicate people's tendency to ask advice from an advice-giver's advisors and to become friends with a friend's friends. Moreover, the transitivity effects, in conjunction with the negative and significant negative three-cycle effects in both networks, reflect a tendency towards hierarchical relationship patterns (see Agneessens & Wittek, 2012, for a discussion of a combination of these effects). The positive and significant indegree popularity and outdegree activity effects in the friendship network indicate that people were more likely to send outgoing friendship ties to others who are often nominated as friends by their colleagues; meanwhile, people who have previously sent many outgoing friendship ties

are more likely to continue sending more outgoing ties.

In the advice network, the actor covariates indicate that higher-ranking employees, those who worked longer hours and those with higher tenure were more frequently sought out for advice, while those who were older were less frequently sought out for advice. Meanwhile, people with a higher need to belong sought out more advice. Of our actor covariates in the friendship network, rank similarity exhibited a significant effect, indicating that friendships mostly emerge between employees of the same rank. We also found that senders' job satisfaction, the need to belong, rank, age, and tenure exerted significant effects on friendship ties: Higher values on these variables increased the likelihood of observing a friendship tie. The positive and significant dyadic effects of friendship and advice ties indicate that people were more likely to become friends with people whom they sought for advice, as well as sought advice from their friends. Alternatively, having a hindrance tie decreased the likelihood of having a friendship tie. Importantly, thoughts of quitting had a significant and negative effect on advice-seeking tie retention, $\theta = -2.53$ $p < .001$, which means that thoughts of quitting increased the likelihood of dropping existing advice ties. Thus, Hypothesis 5 was supported. Likewise, the positive and significant creation effect of thoughts of quitting, $\theta = 2.51$, $p < .001$ provided support for Hypothesis 6, which predicted that thoughts of quitting would increase the likelihood of creating new advice ties. Thoughts of quitting increased the tendency of maintaining friendship ties, $\theta = .51$, $p < .05$, which supports Hypothesis 7. Finally, Hypothesis 8 predicted that thoughts of quitting would be negatively related to the creation of friendship ties. While the effect was indeed negative, it was not significant, $\theta = -.17$, *ns.* Thus, Hypothesis 8 was not supported.

DISCUSSION

Drawing from the basic tenets of Conservation of Resources Theory, our longitudinal network study shows that individuals with higher thoughts of quitting had a higher tendency

towards churn in their advice network and stasis in their friendship network. Thoughts of quitting increased the likelihood of dropping old and adding new advice ties. In addition, thoughts of quitting were positively related to the retention of friendship ties, but had no effect on the creation of new friendship ties. However, changes in network ties did not predict thoughts of quitting. Thus, in contrast to our proposed coevolution perspective, we found that thoughts of quitting influences changes in social networks, but not vice versa.

Theoretical Implications

To appreciate our findings, it is important to emphasize the nature of evidence in hypothesis-testing research. Indeed, the very logic of hypothesis testing holds that predicted findings carry greater weight than unpredicted findings, and probability testing involves accepting a higher chance that one concludes there is no relationship when in fact one exists, than the other way around. Extending previous arguments that network centrality predicts turnover and turnover intention (Friedman & Holtom, 2002; Krackhardt & Porter, 1986; McPherson et al., 1992; Mossholder et al., 2005; Soltis et al., 2013) we argued that the addition or dissolution of ties should affect thoughts of quitting. In our study neither tie changes nor network centrality (which we included as a covariate) affected thoughts of quitting. We should cautiously see the present findings as reflecting a *lack* of evidence that networks affect thoughts of quitting, rather than as proof against the existence of such influence. While this may sound like a subtle distinction, we think it is important to highlight the lack of strong evidence against the coevolution perspective. Instead, given our current findings in conjunction with earlier studies about social networks' effects on turnover and turnover intentions, we argue that future research should further develop the coevolution perspective and constructively replicate our findings.

In this respect, our study offers a novel and important insight: that thoughts of quitting may shape social networks. Our analysis shows that these influences are not simply the

mirror image of the influence that social networks exert on turnover or thoughts of quitting. From the perspective that network embeddedness ties the individual to the organization (Lee, Mitchell, Sablynski, Burton, & Holtom, 2004; Mitchell et al., 2001; Mitchell & Lee, 2001; Mossholder et al., 2007), one could extrapolate that thoughts of quitting, as a form of psychological disengagement (Burris et al., 2008; Griffeth et al., 2000; Tett & Meyer, 1993), would motivate individuals to drop social ties. Whereas previous studies showed that network embeddedness (centrality, size) may predict turnover and turnover intentions, our analysis suggests that thoughts of quitting do not predict the size of the network as much as they predict network stasis (for friendship ties) and churn (for advice ties).

One important implication of our analysis is that the influence of thoughts of quitting would not be captured when simply extrapolating from the effects of the network on thoughts of quitting. Instead, one needs to make a distinction between tie retention and tie creation to capture the influence of thoughts of quitting on social networks. Where the embeddedness argument applies to instrumental and affective ties alike, thoughts of quitting differentially impact instrumental and affective ties. Thus, the coevolution perspective does not suggest a same-nature influence that runs both ways, but rather points to a more complex dynamic. In order to take the coevolution perspective forward, scholars need to study influences at the tie level rather than the aggregated level, as well as differentiate instrumental and affective ties.

Future research may also include measures of people's closeness and intimacy to test more fine-grained hypotheses about the network-thoughts of quitting relationship that go beyond simple size predictions (cf. Holtom et al., 2008). Individuals have a tendency to form a minimum quantity of long-lasting friendships to satisfy belongingness needs (Baumeister & Leary, 1995). Based on this, future studies may for instance test whether the strength of friendship ties explains thoughts of quitting better than (changes in) network size alone when weighting those ties in terms of the time since people became friends. In a similar vein, the

logic for our predictions about advice tie churn revolves around ties' instrumental nature, as well as the assumption that churn is informed by the motivation to seek out the best sources of advice. This analysis can be further developed in future research by assessing advice tie quality and analyzing the extent to which churn follows a pattern of dropping lower-quality ties and adding higher-quality ties. Thus, our findings suggest that future research on turnover and withdrawal cognitions go beyond static network explanations, and theorize and model how network dynamics affect thoughts of quitting over time, taking into account more fine-grained assessments of tie quality and duration. We also note that we took an agentic coevolution perspective and therefore looked at outgoing ties because they should be under the control of the actor but future studies may also consider incoming ties or reciprocated ties.

In a more general sense, our findings add to social network theory (Borgatti & Foster, 2003; Borgatti & Halgin, 2011; Borgatti, Mehra, Brass, & Labianca, 2009) by supporting the idea that employees are not just passive enactors of social structure, but also actively shape their social networks. This insight is important for the discussion of organizations' micro-foundations, which sees organizational networks and individual behavior as emergent properties that are rooted in individual-level processes (Tasselli, Kilduff, & Menges, 2015). Indeed, our study shows that people actively change the composition of their network. Consequently, describing a network in terms of aggregate measures may fail to account for variation in who an individual is connecting with at the individual tie level. This failure is dangerous because it may fuel the "structural bias" that implicitly ignores much of the dynamic nature of social relations (Emirbayer, 1997; Emirbayer & Goodwin, 1994).

We are not aware of many network studies that examine network change in organizations and we can only speculate about the reasons for this. It may be that network researchers are restricted in their theory development by what they can measure. It is probably a fair assessment to say that much of social network theory was preceded by

developments in social network methodology and researchers' fascination with making social structures visible. But methods should help test our theories, not substitute for them. Thus, we call for network theory and measures that are developed for the purpose of testing predictions about network dynamics. Scholars such as Moody and colleagues (2005) and Sasovova and colleagues (2010) offer excellent examples of such research, but more studies are needed.

Our study also extends Conservation of Resources theory by recognizing that social network ties provide access to resources, and further, that network stasis and churn can be predicted based on considerations of resource loss and gain. This not only demonstrates the broad-ranging applicability of the Conservation of Resource theory, but also enriches the conceptual analysis of social networks (cf. Kalish, Luria, Toker, & Westman, 2015). Social network research has recognized that tie formation and maintenance involve costs, which put boundaries on the size of the network that individuals would actually or ideally form (e.g., Hirst et al., 2015). Our extension of Conservation of Resources theory enriches this analysis by identifying an asymmetry: the subjective costs of resource loss (tie loss) are higher than the subjective gains of resource gain (tie creation). This suggests that there may be a "base rate" bias towards network stasis rather than network churn. To more fully develop this analysis, future research needs to document network evolution at the tie level. The current analysis provides a conceptual basis and promising first evidence for the conservation of resource lens and the primacy of the resource loss perspective.

Limitations and Recommendations for Future Research

Like most studies, this one has its limitations. First, despite our longitudinal design, simulation-based analysis, and the inclusion of relevant effects as covariates, we cannot establish causality. We would need to further replicate our findings – ideally with experimental data – in order to increase confidence in our results. Second, in order to understand how networks may change before people actually leave an organization, we

looked at thoughts of quitting. Looking at thoughts of quitting rather than actual turnover has the benefit of capturing the dynamics that might ultimately lead to turnover. Of course, we do not know whether thoughts of quitting will necessarily lead to turnover, but we took great care to treat the former as distinct from the latter throughout the paper. Our findings can only speak directly to the relationship between networks and thoughts of quitting, but they hold promising insights for future research on turnover.

Third, it is important to note that the overall turnover during the roughly eight-month period of our data collection was 12 people (10%). Though this number does not differ from the general working population in the Netherlands (CBS, 2016; Haygroup, 2013), the effects of networks may be contingent on the cultural composition of the organization (Tröster, Mehra, & van Knippenberg, 2014). After all, the previously cited effects of network centrality on turnover (intentions) were based on U.S. samples. The Netherlands and the United States differ mainly on the masculinity dimensions of culture, which has prompted an argument that employees in the Netherlands (a more 'feminine' culture) have stronger affective commitment with their organizations, while employees in the U.S. may have a more calculative involvement (Randall, 1993). Whether these or other cultural differences may explain our non-finding for network centrality and tie changes as influences on thoughts of quitting seems an interesting avenue for future research.

Fourth, our analysis only examined friendship networks within the organization. While we would argue that thoughts of quitting primarily affect and are affected by work-related friendship ties, future research may also consider friendship ties outside of work. Fifth, we did not look at the kind of advice that was exchanged. There are obvious differences between more in-depth advice relationships, which focus on problem solving, and those that simply give quick answers to questions; these different types of ties could be associated in different ways with an individual's thoughts of quitting. Sixth, our research design

purposefully minimized the amount of time and effort asked of respondents in order to ensure a high response rate, which is necessary for this kind of analysis. Though we succeeded in that regard, we had to leave out other variables, such as personality traits other than need to belong, which were not of direct theoretical interest, but could have added more robustness to our findings. Finally, our discussion above indicates that future research should look at other relationship characteristics such as the age or intensity of a relationship. In this regard, our findings make the case that new studies should move beyond simple measures of network size in predicting turnover and withdrawal cognitions (Holtom et al., 2008). It may be time for network researchers to move beyond the "links" element in job embeddedness theory and consider how other aspects such as "fit" and "sacrifice" can be included.

Implications for Practice

Scholars generally recommend that companies consider employees' social networks when trying to reduce turnover (Ballinger, Craig, Cross, & Gray, 2011). Our findings provide a word of caution in this regard, we did not find that changes in network size nor actual network size is indicative of thoughts of quitting, nor capable of reducing these thoughts. What we found had not been previously considered: that thoughts of quitting shape network stasis and churn. As per our discussion in the Theoretical Implications section, we are careful not to draw strong conclusions based on nonsignificant findings; still, the present findings do not support investing in social network expansion as an antidote to turnover. If anything, they suggest that shifts in a person's networking behavior (i.e., indicated by greater churn in advice networks and stasis in friendship networks) reflect thoughts of quitting which could then prompt a company intervention to retain that person.

Conclusion

While previous studies have focused on the opportunities and constraints that networks bestow on individuals, little research has focused on how these social networks

evolve. Most of the studies that have investigated this evolution have proven to be un-dynamic because they did not consider that cognitions and networks may coevolve, and further, that most changes should occur at the network tie level. To address this gap, we tested for the possible reciprocal relationship between network changes and thoughts of quitting. Our results show that social networks are shaped and sustained through individually motivated network choices to drop, retain, or create network ties. Due to these individual choices, organizational networks may vary in stasis or churn. Future research should continue to explore how people actively enact changes in their network ties and how said changes affect people's cognitions.

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Table 1. Leavers, joiner, and missing cases

	T1->T2		T2->T3		T1 Total	T1 missing	T2 Total	T2 missing	T3 Total	T3 missing
	Leavers	**Joiners**	**Leavers**	**Joiners**						
1	1	0	2	0	20	3 (15%)	19	4 (21%)	17	2 (12%)
2	0	0	0	0	16	0 (0%)	16	1 (6%)	16	2 (13%)
3	1	1	0	0	11	1 (0%)	11	1 (9%)*	11	3 (27%)
4	2	1	0	0	15	2 (13 %)	14	0 (0%)	14	0 (0%)
5	1	0	1	0	26	2 (8%)	25	0 (0%)	24	1 (4%)
6	2	1	0	0	9	1 (11%)	8	1 (13%)**	8	2*** (25%)
7	0	0	1	0	11	2 (18%)	11	3 (27%)	10	2 (20%)
8	0	0	1	0	10	0 (0%)	10	1 (10%)	9	0 (0%)
Total	**7**	**3**	**5**	**0**	**118**	**11 (9%)**	**114**	**11 (10%)**	**109**	**12 (11%)**

* Only missing data on psychological detachment but not on networks

** Only missing data on networks but not on psychological detachment

*** One of the missing employees only had missing data on networks but not on psychological detachment and for the other employee it was the other way around

Table 2. Ties created, maintained and dropped during time periods

Ties	Period 1 (T1-T2)	Period 2 (T2-T3)
Friendship		
Initial ties	518	560
Created	215	180
Dropped	173	131
Maintained	345	429
Jaccard Index	.47	.58
Advice		
Initial ties	757	839
Created	231	168
Dropped	149	145
Maintained	608	694
Jaccard Index	.62	.69

Note: Missing data was treated the same as by the SIENA algorithm, i.e., missing data in the adjacency matrix at T1 is treated as 0. For T2 and T3, the last observed data is used (Ripley et al., 2017).

Table 3. Descriptive statistics

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. Thoughts of quitting T1	1.65	0.88								
2. Thoughts of quitting T2	1.67	0.93	.64**							
3. Thoughts of quitting T3	1.83	1.04	.61**	.61**						
4. Outgoing advice ties T1	6.26	4.66	-.07	.13	-.05					
5. Outgoing advice ties T2	6.23	5.30	-.02	.08	.06	.56**				
6. Outgoing advice ties T3	5.78	4.92	-.12	-.01	-.05	.70**	.65**			
7. Outgoing friendship ties T1	4.28	4.58	-.08	.05	.05	.40**	.38**	.40**		
8. Outgoing friendship ties T2	3.93	4.53	-.08	.08	.01	.45	.70**	.57**	.60**	
9. Outgoing friendship ties T3	3.68	4.37	-.01	.12	.10	.40	.50**	.64**	.58**	.70**
10. Outgoing hindrance ties T1	0.74	1.46	.06	-.03	-.07	.09	.06	.04	-.02	-.07
11. Outgoing hindrance ties T2	0.42	0.96	.02	.09	-.05	.17	.16	.14	-.03	.10
12. Outgoing hindrance ties T3	0.28	0.87	-.01	-.03	-.03	.08	.12	.22*	-.00	.10
13. Rank	0.37	0.48	.14	-.02	-.03	.14	.23*	.16	-.10	.16
14. Age	37.29	10.91	-.09	-.10	-.26*	-.26**	-.22*	-.13	-.22*	-.10
15. Tenure	5.35	5.68	-.06	-.05	-.10	-.18	-.15	-.08	-.07	-.06
16. Working hours	26.81	10.19	-.06	.05	-.03	.23*	.23*	.17	.16	.25*
17. Gender (0 = Male; 1 = Female)	0.78	0.42	.15	-.08	-.08	.20*	.16	.19*	.13	.04
18. Need to belong	3.09	0.53	.18	.07	.18	.23*	.24*	.30**	.20	.21*
19. Job satisfaction	4.02	0.70	-.51**	-.37*	-.56**	.01	.10	.10	.01	.14

*$p < .05$; ** $p < .01$

Table 3 (continued)

Variable	9	10	11	12	13	14	15	16	17	18
1. Thoughts of quitting T1										
2. Thoughts of quitting T2										
3. Thoughts of quitting T3										
4. Outgoing advice ties T1										
5. Outgoing advice ties T2										
6. Outgoing advice ties T3										
7. Outgoing friendship ties T1										
8. Outgoing friendship ties T2										
9. Outgoing friendship ties T3										
10. Outgoing hindrance ties T1	-.05									
11. Outgoing hindrance ties T2	.05	.60**								
12. Outgoing hindrance ties T3	.09	.50**	.64**							
13. Rank	.13	-.02	.10	.00						
14. Age	-.10	.02	.13	.04	.18					
15. Tenure	.04	-.03	-.10	-.02	.05	.50**				
16. Working hours	.23*	.06	.13	.12	.28**	-.20*	-.02			
17. Gender (0 = Male; 1 = Female)	.05	-.00	.03	-.02	-.41**	-.30**	-.20*	-.12		
18. Need to belong	.23*	-.10	-.08	-.19	-.09	-.39**	-.30**	-.09	.23*	
19. Job satisfaction	.13	.12	.01	.02	.08	.30**	.10	.10	-.10	-.20

*$p < .05$; ** $p < .01$

Table 4. QAP results of correlations between networks

Variable	1	2	3	4	5	6	7	8
1. Advice T1								
2. Advice T2	.51*							
3. Advice T3	.58***	.56*						
4. Friendship T1	.30*	.31***	.35***					
5. Friendship T2	.30*	.44*	.42*	.57***				
6. Friendship T3	.28*	.32*	.42*	.56*	.63***			
7. Hindrance T1	-.05	-.04	-.02	-.10	-.09	-.03		
8. Hindrance T2	-.04	-.07	-.02	-.10	-.10	-.06	.43**	
9. Hindrance T3	-.04	-.04	-.06	-.10	-.08	-.07	.35*	.50*

Note. * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed)

Table 5. **SIENA estimation results of the coevolution of thoughts of quitting**

Parameter	Estimate	*S.E.*
Intercept		
Thoughts of quitting	-0.38	(0.21)
Thoughts of quitting sq.	0.03	(0.03)
Control variables: Actor		
Rank (sender)	-0.21	(0.21)
Gender (sender)	0.23	(0.21)
Working hours (sender)	0.01	(0.01)
Age (sender)	-0.02	(0.01)
Tenure (sender)	-0.03	(0.02)
Need to belong (sender)	-0.01	(0.17)
Job satisfaction (sender)	-0.35*	(0.15)
Friendship outdegree centrality	-0.01	(0.02)
Advice outdegree centrality	0.01	(0.03)
Hindrance outdegree centrality	-0.05	(0.07)
Control variables: Organization		
Dummy 1	0.41	(0.32)
Dummy 2	0.28	(0.29)
Dummy 3	-0.18	(0.39)
Dummy 4	-0.10	(0.32)
Dummy 5	-0.47	(0.54)
Dummy 6	0.27	(0.37)
Dummy 7	1.10**	(0.37)
Main variables		
Tie creation (advice ties)	-0.01	(0.04)
Tie creation (friendship ties)	0.04	(0.06)
Tie dissolution (advice ties)	-0.19	(0.10)
Tie dissolution (friendship ties)	0.03	(0.04)
Rate function		
Rate period 1 (T1-T2)	3.90***	(0.93)
Rate period 2 (T2-T3)	4.08***	(1.05)

Note. Significance levels are two-tailed: * p < .05; ** p < .01; *** p < .001.

Table 6. SIENA results of the coevolution of outgoing advice ties and friendship ties

Parameter	Advice ties		Friendship ties	
	Estimate	*S.E.*	Estimate	*S.E.*
Intercept				
Outdegree	-1.37**	(0.44)	-3.70***	(0.54)
Control variables: Network				
Reciprocity	0.39**	(0.12)	1.09***	(0.14)
Transitivity	0.12***	(0.03)	0.09*	(0.04)
Three-cycles	-0.07**	(0.02)	-0.25***	(0.05)
Indegree popularity	0.04	(0.02)	0.08**	(0.03)
Outdegree activity	0.01	(0.01)	0.07***	(0.01)
Friendship tie	1.23***	(0.16)		
Advice tie			0.96***	(0.18)
Hindrance tie	0.03	(0.05)	-0.14*	(0.06)
Control variables: Actor				
Rank (sender)	0.20	(0.12)	0.34**	(0.13)
Rank (receiver)	0.41***	(0.12)	-0.17	(0.13)
Rank (similarity)	0.04	(0.09)	0.29**	(0.11)
Gender (sender)	-0.18	(0.12)	-0.26	(0.16)
Gender (receiver)	-0.08	(0.12)	0.00	(0.15)
Gender (similarity)	0.06	(0.11)	-0.17	(0.12)
Working hours (sender)	-0.01	(0.01)	0.01	(0.01)
Working hours (receiver)	0.01*	(0.01)	0.00	(0.01)
Working hours (similarity)	0.11	(0.43)	0.26	(0.58)
Age (sender)	0.01	(0.01)	0.02**	(0.01)
Age (receiver)	-0.01*	(0.01)	-0.00	(0.01)
Age (similarity)	0.38	(0.24)	-0.13	(0.29)
Tenure (sender)	-0.01	(0.01)	0.04**	(0.01)
Tenure (receiver)	0.03**	(0.01)	0.01	(0.01)
Tenure (similarity)	0.02	(0.35)	0.51	(0.41)
Need to belong (sender)	0.20*	(0.08)	0.26*	(0.11)
Job satisfaction (sender)	0.06	(0.07)	0.36**	(0.12)
Control variables: Organization				
Dummy 1	0.17	(0.15)	-0.20	(0.21)
Dummy 2	-0.19	(0.18)	-0.40*	(0.18)
Dummy 3	0.24	(0.19)	0.94***	(0.23)
Dummy 4	-0.07	(0.16)	0.14	(0.19)

Dummy 5	1.21***	(0.26)	0.29	(0.29)
Dummy 6	0.58**	(0.19)	0.43	(0.23)
Dummy 7	-0.01	(0.20)	0.10	(0.25)
Main variables				
Thoughts of quitting: Tie creation:	2.51***	(0.36)	0.51*	(0.23)
Thoughts of quitting: Tie retention[a]	-2.53***	(0.36)	-0.17	(0.20)
Rate function				
Rate period 1 (T1-T2)	10.71***	(1.66)	6.51***	(0.71)
Rate period 2 (T2-T3)	12.35***	(1.85)	5.74***	(0.62)

Note. Significance levels are two-tailed: * p < .05; ** p < .01; *** p < .001. [a] negative tie retention effect means that the likelihood of dropping a tie is greater than retaining it.

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