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## Change Agents, Networks, and Institutions: A Contingency Theory of Organizational Change

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| <b>Citation</b>          | Battilana, Julie, and Tiziana Casciaro. "Change Agents, Networks, and Institutions: A Contingency Theory of Organizational Change." <i>Academy of Management Journal</i> 55, no. 2 (April 2012).   |
| <b>Published Version</b> | <a href="http://amj.aom.org/content/55/2/381.abstract">http://amj.aom.org/content/55/2/381.abstract</a>  |
| <b>Accessed</b>          | February 19, 2015 10:30:02 AM EST  |
| <b>Citable Link</b>      | <a href="http://nrs.harvard.edu/urn-3:HUL.InstRepos:9549319">http://nrs.harvard.edu/urn-3:HUL.InstRepos:9549319</a>  |
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# **Change Agents, Networks, and Institutions: A Contingency Theory of Organizational Change**

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**Acknowledgements:** We would like to thank Wenpin Tsai and three anonymous reviewers for their valuable comments on earlier versions of this paper. We also wish to acknowledge the helpful comments we received from Michel Anteby, Joel Baum, Stefan Dimitriadis, Martin Gargiulo, Ranjay Gulati, Morten Hansen, Herminia Ibarra, Sarah Kaplan, Otto Koppius, Tal Levy, Christopher Marquis, Bill McEvily, Jacob Model, Lakshmi Ramarajan, Metin Sengul, Bill Simpson, Michael Tushman and seminar participants at INSEAD, McGill, Harvard, Bocconi, and HEC Paris.

CHANGE AGENTS, NETWORKS, AND INSTITUTIONS: A CONTINGENCY THEORY OF  
ORGANIZATIONAL CHANGE

**Abstract**

We develop a contingency theory for how structural closure in a network, defined as the extent to which an actor's network contacts are connected to one another, affects the initiation and adoption of change in organizations. Using longitudinal survey data supplemented with eight in-depth case studies, we analyze 68 organizational change initiatives undertaken in the United Kingdom's National Health Service. We show that low levels of structural closure (i.e., structural holes) in a change agent's network aid the initiation and adoption of changes that diverge from the institutional status quo, but hinder the adoption of less divergent changes.

## INTRODUCTION

Scholars have long recognized the political nature of the change process in organizations (Frost & Egri, 1991; Pettigrew, 1973; Van de Ven & Poole, 1995). To implement planned organizational changes, that is, premeditated interventions intended to modify the functioning of an organization (Lippitt, 1958), change agents need to overcome potential resistance from other members of the organization and encourage them to adopt new practices (Kanter, 1983; Van de Ven, 1986). Change implementation within an organization can thus be conceptualized as an exercise in social influence, defined as the alteration of an attitude or behavior by one actor in response to another actor's actions (Marsden & Friedkin, 1993).

Research on organizational change has improved our understanding of the challenges inherent in change implementation, but it has not accounted systematically for how characteristics of a change initiative affect its adoption in organizations. Not all organizational changes are equivalent, however. One important dimension along which they vary is the extent to which they break with existing institutions in a field of activity (Battilana, 2006; Greenwood & Hinings, 2006), defined as patterns which are so taken-for-granted that they are perceived by actors as the only possible ways of acting and organizing (Douglas, 1986). Consider the example of medical professionalism, the institutionalized template for organizing within the United Kingdom's National Health Service (NHS) in the early 2000s. According to this template, physicians are the key decision makers in both the administrative and clinical domains. In this context, centralizing information to enable physicians to better control patient discharge decisions would be aligned with the institutionalized template. By contrast, implementing nurse-led discharge or pre-admission clinics would diverge from the institutional status quo by transferring clinical tasks and decision-making authority from physicians to nurses. Organizational changes may thus converge with or diverge from the institutional status quo

(Amis, Slack, & Hinings, 2004; D'Aunno, Succi, & Alexander, 2000; Greenwood & Hinings, 1996). The latter, hereafter referred to as divergent organizational changes, are particularly challenging to implement. They require change agents to distance themselves from their existing institutions and persuade other organization members to adopt practices that not only are new, but also break with the norms of their institutional environment (Battilana, Leca, & Boxenbaum, 2009; Greenwood & Hinings, 1996).

In this paper, we examine the conditions under which change agents are able to influence other organizational members to adopt a change depending on its degree of divergence from the institutional status quo. Because informal networks have been identified as key sources of influence in organizations (Brass, 1984; Brass & Burkhardt, 1993; Gargiulo, 1993; Ibarra, 1993; Ibarra & Andrews, 1993; Krackhardt, 1990) and policy systems (Laumann, Knoke, & Kim, 1985; Padgett & Ansell, 1993; Stevenson & Greenberg, 2000), we focus on how change agents' position in such networks affects their success in initiating and implementing organizational change.

Network research has shown that the degree of structural closure in a network, defined as the extent to which an actor's network contacts are connected to one another, has important implications for generating novel ideas and exercising social influence. A high degree of structural closure creates a cohesive network of tightly linked social actors while a low degree of structural closure creates a network with structural holes and brokerage potential (Burt, 2005; Coleman, 1988). The existing evidence suggests that actors with networks rich in structural holes are more likely to generate novel ideas (e.g., Burt, 2004; Fleming, Mingo, & Chen, 2007; Rodan & Galunic, 2004). Studies that have examined the effect of network closure on actors' ability to implement innovative ideas, however, have yielded contradictory findings, some having shown high levels (Obstfeld, 2005; Fleming et al., 2007), others low levels (Burt, 2005) of network closure to facilitate change adoption.

In this paper, we aim to reconcile these findings by developing a contingency theory of the role of network closure in the initiation and adoption of organizational change. We posit that the information and control benefits of structural holes (Burt, 1992) take different forms in change initiation compared to change adoption, and these benefits are strictly contingent on the degree to which the change diverges from the institutional status quo in the organization's field of activity. Accordingly, structural holes in a change agent's network aid the initiation and adoption of changes that diverge from the institutional status quo but hinder the adoption of less divergent changes.

In developing a contingency theory of the hitherto underspecified relationship between network closure and organizational change, we draw a theoretical link between individual-level analyses of network bases for social influence in organizations and field-level analyses of institutional pressures on organizational action. We thus aim to demonstrate the explanatory power that derives from recognizing the complementary roles of institutional and social network theory in a model of organizational change. To test our theory, we collected data on 68 organizational changes initiated by clinical managers in the United Kingdom's National Health Service (NHS) from 2004 to 2005 through longitudinal surveys and eight in-depth case studies.

### **NETWORK CLOSURE AND DIVERGENT ORGANIZATIONAL CHANGE**

In order to survive, organizations must convince the public of their legitimacy (Meyer & Rowan, 1977) by conforming, at least in appearance, to the prevailing institutions that define how things are done in their environment. This emphasis on legitimacy constrains change by exerting pressure to adopt particular managerial practices and organizational forms (DiMaggio & Powell, 1983); therefore, organizations embedded in the same environment, and thus subject to the same institutional pressures, tend to adopt similar practices.

Organization members are thus motivated to initiate and implement changes that do not affect their organizations' alignment with existing institutions (for a review, see Heugens &

Lander, 2009). Nevertheless, not all organizational changes will be convergent with the institutional status quo. Indeed, within the NHS, although many of the changes enacted have been convergent with the institutionalized template of medical professionalism, a few have diverged from it. The variability in the degree of divergence of organizational changes poses two questions: (1) what accounts for the likelihood that an organization member will initiate a change that diverges from the institutional status quo; and (2) what explains the ability of a change agent to persuade other organization members to adopt such a change.

Research into the enabling role of actors' social position in implementing divergent change (Greenwood & Suddaby, 2006; Leblebici, Salancik, Copay, & King, 1991; Maguire, Hardy, & Lawrence, 2004; Sherer & Lee, 2002) has tended to focus on the position of the organization within its field of activity, eschewing the intra-organizational level of analysis. The few studies that have accounted for intra-organizational factors have focused on the influence of change agents' formal position on the initiation of divergent change and largely overlooked the influence of their informal position in organizational networks (Battilana, 2011). This is surprising in light of well-established theory and evidence concerning informal networks as sources of influence in organizations (Brass, 1984; Brass & Burkhardt, 1993; Gargiulo, 1993; Ibarra, 1993; Ibarra & Andrews, 1993; Krackhardt, 1990). To the extent that the ability to implement change hinges on social influence, network position should significantly affect actors' ability to initiate divergent changes and persuade other organizational members to adopt them.

A network-level structural feature with theoretical relevance to generating new ideas and social influence is the degree of network closure, that is, the extent to which actors' contacts are connected to one another, yielding a continuum of configurations ranging from cohesive networks of dense, tightly knit relationships among actors' contacts to networks of contacts separated by structural holes that provide actors with brokerage opportunities. A number of studies have documented the negative relationship between network closure and the generation

of new ideas (Ahuja, 2000; Burt, 2004; Fleming et al., 2007; Lingo & O'Mahony, 2010; McFadyen, Semadeni, & Cannella, 2009). Two mechanisms account for this negative association: redundancy of information and normative pressures (Ruef, 2002). With regard to the former, occupying a network position rich in structural holes exposes an actor to non-redundant information (Burt, 1992). To the extent that it reflects originality and newness, creativity is more likely to be engendered by exposure to non-redundant than to repetitious information. As for normative pressure, network cohesion not only limits the amount of novel information that reaches actors, but also pressures them to conform to the *modus operandi* and norms of the social groups in which they are embedded (Coleman, 1990; Krackhardt, 1999; Simmel, 1950), which reduces the degrees of freedom with which available information can be deployed.

Thus far, no study has investigated directly the relationship between network closure and the characteristics of change initiatives in organizations. We propose that the informational and normative mechanisms that underlie the negative association between network cohesion and the generation of new ideas imply that organizational actors embedded in networks rich in structural holes are more likely to initiate changes that diverge from the institutional status quo. Bridging structural holes exposes change agents to novel information that might suggest opportunities for change not evident to others, and it reduces normative constraints on how agents can use information to initiate changes that do not conform to prevailing institutional pressures.

*Hypothesis 1: The richer in structural holes a change agent's network, the more likely the agent is to initiate a change that diverges from the institutional status quo.*

With respect to the probability that a change initiative will actually modify organizational functioning, few studies have explored how the degree of closure in change agents' networks affects the adoption of organizational changes. This dearth of empirical evidence notwithstanding, Burt (2005: 86-87) suggests several ways in which brokerage opportunities provided by structural holes in an actor's network might aid *adaptive implementation*, which he



defines as the ability to carry out projects that take advantage of, as distinct from the ability to detect, opportunities. These include equipping a broker with a broad base of referrals and knowledge of how to pitch a project so as to appeal to different constituencies, as well as the ability to anticipate problems and adapt the project to changing circumstances (Burt, 1992).

These potential advantages suggest that structural holes may aid change initiation differently from change adoption. In change initiation, the information and control benefits of structural holes give the change agent greater exposure to opportunities for change, and creative freedom from taken-for-granted institutional norms. These are, therefore, mainly *incoming* benefits that flow in the direction of the change agent. By contrast, in change adoption, the information and control benefits of structural holes are primarily *outgoing*, in that they are directed to the organizational constituencies the change agent is aiming to persuade. These benefits can be characterized as structural reach and tailoring. Reach concerns a change agent's social contact with the constituencies that would be affected by a change project, information about the needs and wants of these constituencies, and how best to communicate how the project will benefit them. Tailoring refers to a change agent's control over when and how to use available information to persuade diverse audiences to mobilize their resources in support of a change project. Being the only connection among otherwise disconnected others affords brokers the opportunity to tailor the use of information to, and adjust their image in accordance with, each network contact's preferences and requirements with minimal risk that potential inconsistencies in how and when the change is presented and communicated will become apparent (Padgett & Ansell, 1993) and possibly delegitimize the agent.

The argument that structural holes may facilitate change adoption stands in contrast to the argument that network cohesion advances organizations' pursuit of innovation (Fleming et al., 2007; Obstfeld, 2005). Proponents of network cohesion maintain that people and resources are more readily mobilized in a cohesive network because multiple connections among members

facilitate the sharing of knowledge and meanings and generate normative pressures for collaboration (Coleman, 1988; Gargiulo, Ertug, & Galunic, 2009; Granovetter, 1985; Tortoriello & Krackhardt, 2010). Supporting evidence is provided by Obstfeld (2005), who found cohesive network positions to be positively correlated with involvement in successful product development, and by Fleming, Mingo and Chen (2007), who find collaborative brokerage to aid in the generation of innovative ideas but maintain that it is network cohesion that facilitates the ideas' diffusion and use by others.

These seemingly discrepant results are resolved when organizational change is recognized to be a political process that unfolds over time and takes on various forms contingent on the extent to which a change initiative diverges from the institutional status quo. Obstfeld (2005: 188) describes innovation as

an active political process at the microsocial level. . . . To be successful, the tertius needs to identify the parties to be joined and establish a basis on which each alter would participate in the joining effort. The logic for joining might be presented to both parties simultaneously or might involve appeals tailored to each alter before the introduction or on an ongoing basis as the project unfolds.

Change implementation, according to this account, involves decisions concerning not only which network contacts should be involved, but also the timing and sequencing of appeals directed to different constituencies. A network rich in structural holes affords change agents more degrees of freedom in deciding when and how to approach these constituencies and facilitate connections among them.

Building on this argument, we predict that in the domain of organizational change the respective advantages of cohesion and structural holes are strictly contingent on whether a change diverges from the institutional status quo, thereby disrupting extant organizational equilibria and creating the potential for significant opposition. Such divergent changes are likely to engender greater resistance from organizational members, who are in turn likely to attempt building coalitions with organizational constituencies to mobilize them against the change

initiative. In this case, a network rich in structural holes affords change agents flexibility in tailoring arguments to different constituencies and deciding when to connect to them, whether separately or jointly, simultaneously or over time. Less divergent change, because it is less likely to elicit resistance and related attempts at coalition building, renders the tactical flexibility afforded by structural holes unnecessary. Under these circumstances, the advantages of the cooperative norms fostered in a cohesive network are more desirable for the change agent. Consequently, we do not posit a main effect for network closure on change implementation, but only predict a crossover (disordinal) interaction effect (McClelland & Judd, 1993), the direction of which depends on a change's degree of divergence. Figure 1 graphically summarizes the predicted moderation pattern.

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Insert Figure 1 about here

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*Hypothesis 2: The more a change diverges from the institutional status quo, the more closure in a change agent's network of contacts diminishes the likelihood of adoption.*

## **METHOD**

### **Site**

We test our model using quantitative and qualitative data on 68 change initiatives undertaken in the United Kingdom's National Health Service, a government-funded healthcare system consisting of more than 600 organizations that fall into three broad categories: administrative units, primary care service providers, and secondary care service providers. In 2004, when the present study was conducted, the NHS had a budget of more than £60 billion and employed more than one million people including healthcare professionals and managers in the delivery of guaranteed universal healthcare free at the point of service.

The NHS, being highly institutionalized, is a particularly appropriate context in which to test our hypotheses. Like other healthcare systems throughout the western world (e.g., Kitchener,

2002; Scott, Ruef, Mendel, & Caronna, 2000), the NHS is organized according to the model of medical professionalism (Giaimo, 2002), which prescribes specific role divisions among professionals and organizations.<sup>1</sup> The model of professional groups' role division is predicated on physicians' dominance over all other categories of healthcare professionals. Physicians are the key decision-makers, controlling not only the delivery of services, but also, in collaboration with successive governments, the organization of the NHS (for a review, Harrison, Hunter, Marnoch, & Pollitt, 1992). The model of role division among organizations places hospitals at the heart of the healthcare system (Peckham, 2003). Often enjoying a monopoly position as providers of secondary care services in their health communities (Le Grand, 1999), hospitals ultimately receive the most resources. The emphasis on treating acute episodes of disease in the hospital over providing follow up and preventive care in home or community settings under the responsibility of primary care organizations corresponds to an acute episodic health system.

In 1997, under the leadership of the Labour Government, the NHS embarked on a ten-year modernization effort aimed at improving the quality, reliability, effectiveness, and value of its healthcare services (Department of Health, 1999). The initiative was intended to imbue the NHS with a new model for organizing that challenged the institutionalized model of medical professionalism. Despite the attempt to shift from an acute episodic healthcare system to one focused on providing continuing care by integrating services and increasing cooperation among professional groups, at the time of the study, there persisted a distinct dominance order across NHS organizations with physicians (Ferlie, Fitzgerald, Wood, & Hawkins, 2005); Harrison et al., 1992; (Richter, West, Van Dick, & Dawson, 2006) and hospitals (Peckham, 2003) at the apex. This context of the extant model of medical professionalism continuing to define the institutional status quo across organizations afforded a unique opportunity to study organizational change in

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<sup>1</sup> This characterization of the NHS's dominant template for organizing is based on a comprehensive review of NHS archival data and the literature on the NHS, as well as on 46 semi-structured interviews with NHS professionals and three interviews with academic experts on the NHS analysed with the methodology developed by Scott et al. (2000).

an entrenched system in which enhancing the capacity for innovation and adaptation had potentially vast societal implications.

### **Sample**

The focus of the study being on variability in divergence and adoption of the organizational change initiatives, the population germane to our model is that of self-appointed change agents, actors who voluntarily initiate planned organizational changes and thus self-select into the role of change champion. Our sample is comprised of 68 clinical managers (i.e., actors with both clinical and managerial responsibilities) responsible for initiating and attempting to implement the change initiatives. All had worked in different organizations within the NHS and participated in the “Clinical Strategists Programme,” a two-week residential learning experience conducted by a European business school. The first week focused on cultivating skills and awareness to improve participants’ effectiveness in their immediate sphere of influence and leadership ability within the clinical bureaucracies, the second week on developing participants’ strategic change capabilities at the levels of the organization and the community health system. Applicants were asked to provide a description of a change project they would be required to begin to implement within their organization upon completing the program. Project implementation was a required part of the program, which was open to all clinical strategists within the NHS and advertised both online and in NHS brochures. There was no mention of divergent organizational change in either the title of the executive program or its presentation. Participation was voluntary. All 95 applicants were selected, and chose to attend and complete the program.

The final sample of 68 observations, which corresponds to the 68 change projects, reflects the omission of 27 participants who did not respond to the social network survey. Participants ranged in age from 35 to 56 years (average age, 44). All had clinical backgrounds as well as managerial responsibilities. Levels of responsibility varied from mid- to top-level management.

The participants also represented a variety of NHS organizations (54% primary care organizations, 26% hospitals or other secondary care organizations, and 19% administrative units) and professions (25% physicians, and 75% nurses and allied health professionals). To control for potential non-response bias, we compared the full sample for which descriptive data was available with the final sample. Unpaired t-tests showed no statistically significant differences for demographic and regression variables recorded in both samples.

### **Procedure and Data**

Data on the demographics, formal positions, professional trajectories, and social networks of the change agents, together with detailed information on the proposed changes, were collected over a period of 12 months. Data on demographics and professional trajectories were obtained from participants' curriculum vitae, and data on their formal position were gathered from the NHS's human resource records. Data on social networks were collected during the first week of the executive program, during which participants completed an extensive survey detailing their social network ties both in their organizations and in the NHS more broadly.

Participants were assured that data on the content of the change projects, collected at different points during their design and implementation, would remain confidential. They submitted descriptions of their intended change projects upon applying to the program and were asked to write a refined project description three months after implementation. The descriptions were very similar, the latter generally an expansion of the former. One-on-one (10-15 minute) telephone interviews, conducted with the participants and members of their organizations four months after implementation of the change projects, enabled us to ascertain whether they had been implemented— all had—and whether the changes being implemented corresponded to those described in the project descriptions, which all did.

During two additional (20-40 minute) telephone interviews conducted six and nine months after project implementation, participants were asked to (1) describe the main actions taken in

relation to implementing their changes, (2) identify the main obstacles (if any) to implementation, (3) assess their progress, and (4) describe their next steps in implementing the changes. Extensive notes were taken during the interviews, which were not recorded for reasons of confidentiality. The change agents also gave us access to all organizational documents and NHS official records related to the change initiatives generated during the first year of implementation. Longitudinal case studies of each of the 68 change initiatives were created by aggregating the data collected throughout the year from change agents and other organization members and relevant organizational and NHS documents.

After twelve months of implementation, we conducted another telephone survey to collect information about the outcomes of the change projects with an emphasis on the degree to which the changes had been adopted. We corroborated the information provided by each change agent by conducting telephone interviews with two informants who worked in the same organization. In most cases, one informant was directly involved in the change effort, and the other was either a peer or superior of the agent who knew about, but was not directly involved in, the change effort. These informants' assessments of the adoption of the change projects were, again for reasons of confidentiality, not recorded, but, as during the six- and nine-month interviews, extensive notes were taken.

At the beginning of the study, we randomly selected eight change projects to be the subjects of in-depth case studies. Data on these projects were collected over a one-year period via both telephone and in-person interviews. One year after implementation, at each of the eight organizations, we conducted between 12 and 20 interviews of 45 minutes to two hours in duration. On the basis of these interviews, all of which were transcribed, we wrote eight in-depth case studies about the selected change initiatives. The qualitative data used to verify the consistency of change agents' reports with the reports made by other organization members provided broad validation for the survey data.

## Dependent and Independent Variables

*Divergence from the institutional status quo.* The institutional status quo for organizing within the NHS is defined by the model of medical professionalism that prescribes specific role divisions among professionals and organizations (Peckham, 2003). To measure each change project's degree of divergence from the institutionalized models of professionals' and organizations' role division, we used two scales developed by Battilana (2011). The first scale measures the degree to which change projects diverged from the institutionalized model of role division among professionals using four items aimed at capturing the extent to which the change challenged the dominance of doctors over other health care professionals in both the clinical and administrative domains. The second scale measures the degree to which change projects diverged from the institutionalized model of role division among organizations using six items aimed at capturing the extent to which the change challenged the dominance of hospitals over other types of organizations in both the clinical and administrative domains. Each of the ten items in the questionnaire was assessed using a three-point rank-ordered scale.<sup>2</sup>

Two independent raters blind to the study's hypotheses used the two scales to code the change project descriptions written by the participants after three months' of implementation. The descriptions averaged three pages and followed the same template: presentation of project goals, resources required to implement the project, people involved, key success factors, and measurement of outcomes. Inter-rater reliability, as assessed by the kappa correlation coefficient, was .90. The raters resolved coding discrepancies identifying and discussing passages in the change project descriptions deemed relevant to the codes until they reached consensus. Scores for the change projects on each of the two scales corresponded to the average of the items included in each scale. To account for change projects that diverged from the institutionalized

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<sup>2</sup> Research on radical organizational change typically measures the extent to which organizational transformations diverge from previous organizational arrangements (Romanelli and Tushman, 1994). By contrast, we measured the extent to which the changes in our sample diverged from the institutional status quo in the field of the NHS.



models of both professionals' and organizations' role division, and thereby assess each project's overall degree of divergence, we measured change divergence as the un-weighted average of the scores received on both scales. Table 1 provides examples of change initiatives characterized by varying degrees of divergence from the institutionalized models of role division among organizations or professionals or both.

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Insert Table 1 about here

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***Change adoption.*** We measured level of adoption using the following three-item scale from the telephone survey administered one year after implementation: “(1) On a scale of 1-5, how far did you progress toward completing the change project, where 1 is defining the project for the clinical strategists program and 5 is institutionalizing the implemented change as part of standard practice in your organization; (2) In my view, the change is now part of the standard operating practice of the organization; (3) In my view, the change was not adopted in the organization?” The third item was reverse coded. The last two items were assessed using a five-point scale that ranged from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha for the scale was .60, which is the acceptable threshold value for exploratory studies like ours (Nunnally, 1978). Before gathering the change agents' responses, the research team that had followed the evolution of the change projects and collected all survey and interview data throughout the year produced a joint assessment of the projects' level of adoption using the same three-item scale later presented to the change agents. The correlation between the responses produced by the research team and those generated by the telephone survey administered to the change agents was .98.

To further validate the measure of change adoption, two additional raters, using the entire set of qualitative data collected from organizational informants on each change project's level of adoption, independently coded the notes taken during the interviews using the same three-item scale as was used in the telephone survey. Inter-rater reliability, as assessed by the kappa

correlation coefficient, was .88, suggesting a high level of agreement among the raters (Fleiss, 1981; Landis & Koch, 1977). We then asked the two raters to reconcile the differences in their respective assessments and produce a consensual evaluation (Larsson, 1993). The resulting measures were virtually identical to the self-reported measures collected from the change agents.

We also leveraged the case studies developed for each change initiative from the participant interviews and relevant sets of organizational documents and NHS official records collected throughout the year. Eight of these were in-depth case studies for which extensive qualitative data were collected. Two additional independent raters, for whom a high level of inter-rater reliability was obtained (Kappa coefficient = .90), coded all case studies to assess the level of adoption of the changes, and reconciled the differences in their assessments to produce a consensual evaluation. The final results of this coding were nearly indistinguishable from the self-reported measures of level of change adoption, further alleviating concerns about potential self-report biases.

**Network closure.** We measured network closure using ego-network data collected via a name-generator survey approach commonly used in studies of organizational networks (Ahuja, 2000; Burt, 1992; Podolny & Baron, 1997; Reagans & McEvily, 2003; Xiao & Tsui, 2007, to mention but a few). In name-generator surveys, respondents are asked to list contacts with whom they have one or more criterion relationships and specify the nature of the relationships that link contacts to one another. As detailed below, we corroborated our ego-network data with qualitative evidence from the eight in-depth case studies.

To measure the degree of closure in the change agent's network, we followed the seminal approach developed by Burt (1992), who measures the continuum of configurations between structural holes and cohesion in terms of the absence or presence of constraint, defined as:

$$c_i = \sum_{j \neq i} \left( p_{ij} + \sum_{k \neq i, k \neq j} p_{ik} p_{kj} \right)^2$$

where  $p_{ij}$  is the proportion of time and effort invested by  $i$  in contact  $j$ . Contact  $j$  constrains  $i$  to the extent that  $i$  has focused a large proportion of time and effort to reach  $j$  and  $j$  is surrounded by few structural holes that  $i$  can leverage to influence  $j$ . Unlike other measures of structural holes and cohesion, such as effective size or density, constraint captures not only redundancy in the network, but also an actor's dependence on network contacts. This is a more pertinent measure of the potential for tailoring because it assesses not only whether two contacts are simply linked, but also the extent to which social activity in the network revolves around a given contact, making a link to that actor more difficult to circumvent in presenting tailored arguments for change to different contacts.

We measured the network connections among focal actors' contacts using a survey item that asked respondents to indicate, on a three-point scale (1 indicating "not at all," 2 "somewhat," and 3 "very well"), how well two contacts knew each other. We included relevant network contacts in the calculation of constraint based on two survey items that measured the frequency and closeness of contact between an actor and each network contact. The first item, which asked "How frequently have you interacted with this person over the last year?", used an eight-point scale with point anchors ranging from "not at all" to "twice a week or more." The second item, which asked "How close would you say you are with this person?", used a seven-point scale that ranged from "especially close" to "very distant," with 4, "neither close nor distant," as the neutral point, and was accompanied by the following explanation: "(Note that 'Especially close' refers to one of your closest personal contacts and that 'Very distant' refers to the contacts with whom you do not enjoy spending time, that is, the contacts with whom you spend time only when it is absolutely necessary)." Based on these survey items, we constructed four measures of constraint to test the sensitivity of our prediction to more or less inclusive specifications of agents' networks. The first measure included alters with whom ego was at least somewhat close. The second measure, based on frequency of interaction, included only alters with whom ego

interacted at least twice a month. The third measure combined the first two by calculating constraint based on alters with whom ego either interacted at least twice monthly or to whom ego was at least somewhat close. The fourth measure included every actor nominated by ego in the network survey.

We used the eight in-depth case studies to assess convergence between the change agents' and interviewees' perceptions of the relationships between the people in the change agents' networks. Two external coders identified all the information in the interviews that pertained to the extent to which the people in change agents' networks knew each other, and coded this information using the same scale used in the social network survey. The interviews provided data on the relationships among more than 75% of the change agents' contacts. For all these relationships, the coders' assessments of alter-to-alter ties based on the interview data were consistent with each other and with the measures reported by change agents, thereby increasing our confidence in the validity of the survey reports.

### **Control variables**

We used five characteristics of the change agent (*hierarchical level, tenure in current position, tenure in management role, professional group status, and prominence in the task-advice network*), two characteristics of the change agent's organization (*size and status*) and one characteristic of the change (*creation of new service*) as controls. We measured actors' *hierarchical position* with a rank-ordered categorical variable based on formal job titles<sup>3</sup>; *tenure in current position* with the number of years change agents spent in their current formal role; and *tenure in management position* with the number of years they spent in a management role. As for the status of the professional group to which actors belonged, in the NHS, as in most healthcare systems, physicians' status is superior to that of other healthcare professionals

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<sup>3</sup> The NHS, being a government-run set of organizations, has standardized definitions and pay scales for all positions that assure uniformity of roles, responsibilities, and hierarchical positions across organizational sites Department of Health; About the NHS; <http://www.nhs.uk/England/aboutTheNHS>; November 1, 2006.

(Harrison et al., 1992). Accordingly, we measured *professional group status* with a dummy variable coded 0 for low status professionals (i.e., nurses and allied health professionals) and 1 for high status professionals (i.e., physicians). To account for change agents' informal status in their organizations, we constructed a measure of the structural prominence that accrues to asymmetric advice-giving ties (Jones, 1964; Thibaut & Kelley, 1959). To that end, we used two network survey items: (1) "During the past year, are there any individuals in your Primary Care Trust / Hospital Trust / Organization (delete as appropriate) from whom you regularly sought information and advice to accomplish your work? (Name up to 5 individuals)," and (2) "During the past year, are there any individuals in your Primary Care Trust / Hospital Trust / Organization (delete as appropriate) who regularly came to you for information and advice to accomplish their work? (Name up to 5 individuals. Some of these may be the same as those named before)." We measured actors' *prominence in the task-advice network* as the difference between the number of received advice ties and number of sent advice ties.

We also controlled for organization-level factors including *organizational size*, which we measured in units of total full-time equivalents (FTEs), and *organizational status*. Of the three types of organizations that compose the NHS, primary care organizations were considered to be of lower status than hospitals and administrative units (Peckham, 2003), but there was no clear status hierarchy between the latter (Peckham, 2003). Accordingly, we measured organizational status with a dummy variable coded 1 for low status organizations (i.e., primary care trusts) and 0 for high status organizations (i.e., hospitals and administrative organizations). Finally, although we theorize that a change's degree of divergence from the institutional status quo operates as the key contingency in our model, other change characteristics may affect adoption. In particular, whether a change involves the redesign of an existing service or creation of a new one may play an important role (Van de Ven, Angle, & Poole, 1989). Our models therefore included a dummy variable for *creation of a new service*.

## RESULTS

Table 2 includes the descriptive statistics and correlation matrix for all variables. Correlation coefficients greater than .30 are statistically significant ( $p < .01$ ). Most correlation coefficients are modest in size and not statistically significant.

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Insert Table 2 about here

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Table 3 presents the results of OLS regressions that predict change initiatives' degree of divergence from the institutional status quo. Model 1 includes control variables likely to influence change initiatives' degree of divergence. The positive and significant effects of tenure in management role, and organizational status and size are consistent with existing research (Battilana, 2011). Model 2 introduces egonetwork constraint, which measures the degree of structural closure in the network. As predicted by hypothesis 1, the effect is negative and statistically significant and increases model fit significantly ( $\chi_{(1)} = 3.85$ ,  $p < .05$ ), which implies a positive association between structural holes in a change agent's network and the change initiative's degree of divergence.<sup>4</sup>

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Insert Table 3 about here

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Our qualitative data provided several illustrations of this effect. A case in point is a change initiative aimed at replacing the head of the rehabilitation unit for stroke patients—historically a medical consultant—with a physiotherapist. This change initiative diverged from the institutional status quo in transferring decision making power from a doctor to a non-doctor. The change agent responsible for the initiative described her motivation as follows:

In my role as head of physiotherapy for this health community, I have had the opportunity to work with doctors, nurses, allied health professionals, managers and representatives of social

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<sup>4</sup> Supplemental regression models incorporated a host of additional control variables including gender, age, educational background, and organizational budget. Whether added separately or in clusters, none of these variables had statistically significant effects in any model, nor did they affect the sign or significance of any variables of interest. Consequently, we have excluded them from the final set of regression models reported here, mindful that our sample size constraints the model's degrees of freedom.

services. ... Although I was aware of the challenges of coordinating all the different players involved in stroke care, I was also aware that it was key if we wanted to improve our services. ... I recommended the appointment of a non-medical consultant to lead the rehabilitation unit because, based on my experience working with the different players involved in stroke services, I thought that it would be the best way to insure effective coordination.

Table 4 presents the results of OLS regressions that predict the likelihood of change adoption. Model 3 includes the control variables, none of which was significant except prominence in the task-advice network. This result suggests that change agents' informal status in their organizations is a critical source of social influence.<sup>5</sup>

Model 4 introduces the measure of constraint in change agents' networks. The coefficient is not statistically significant, providing no evidence of a main effect of structural holes on change implementation. The coefficient for the multiplicative term for egonetwork constraint and change divergence (model 5) is negative and significant, supporting hypothesis 2. A post-estimation test of joint significance of the main effect and interaction term for constraint was statistically significant ( $F_{(2, 52)} = 4.87, p < .05$ ), offering further evidence of the robustness of this moderation effect. The multiplicative term for constraint and divergence from the institutional status quo increased model fit significantly ( $\chi_{(1)} = 6.40, p < .05$ ). These findings, being robust to all four specifications of the measure of constraint, indicate a strong boundary condition on the effect of network closure on change adoption, with the degree of divergence from the institutional status quo intrinsic to a change initiative operating as a strict contingency.<sup>6,7</sup>

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Insert Table 4 about here

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<sup>5</sup> We also ran supplemental analyses that including the control variables listed in footnote 4 as well as a squared term for hierarchical level to account for the possibility that middle managers might be best positioned to implement change. As with hypothesis 1, none of the variables had statistically significant effects in any model, nor did they affect the sign or significance of any variables of interest.

<sup>6</sup> Testing hypothesis 2 using effective size and density as alternative measures of closure yields findings consistent with, albeit less robust than, those obtained using constraint, as we expected based on the conceptual differences across these measures.

<sup>7</sup> We tested the effects of several additional interaction terms including one for divergence and prominence in the task-advice network. None of these moderations were significant.

Our qualitative data offered numerous illustrations of this finding. For example, a change agent with a network rich in structural holes who was attempting to transfer a medical unit from the hospital to the PCT in his health community (a change that diverged from the institutionalized model of role division between organizations) explained the following:

Because of my role, I worked both in the hospital and in the PCT. I also was part of the steering group that looked at how the new national guidelines would be implemented across our health community. ... Having the responsibility to work in more than one organization gives you many advantages. ... I knew all the stakeholders and what to expect from them. ... It helped me figure out what I should tell to each of these different stakeholders to convince them that the project was worth their time and energy.

The people we interviewed in both the hospital and the PCT confirmed that they knew the change agent well. Stated a hospital employee:

He is one of us, but he also knows the PCT environment well. His experience has helped him identify opportunities for us to cooperate with the PCT. If it was not for him, I do not think that we would have launched this project. ... He was able to bring us on board as well as the PCT staff.

Similarly, a nurse trying to implement nurse-led discharge in her hospital explained how her connections to managers, nurses, and doctors helped her to tailor and time her appeals to each constituency relevant to her endeavor:

I first met with the management of the hospital to secure their support. ... I insisted that nurse-led discharge would help us reduce waiting times for patients, which was one of the key targets that the government had set. ... I then focused on nurses. I wanted them to understand how important it was to increase the nursing voice in the hospital and to demonstrate how nursing could contribute to the organizational agenda. .... Once I had the full support of nurses, I turned to doctors. ... I expected that they would stamp their feet and dig their heels in and say 'no we're not doing this.' ... To overcome their resistance, I insisted that the new discharge process would reduce their workload, thereby enabling them to focus on complex cases and ensure quicker patient turnover, which, for specialists with long waiting lists of patients, had an obvious benefit.

These quotes illustrate the positive association between structural holes and the adoption of divergent change. Our qualitative evidence also offers examples of the flip side of this association, the negative relationship between network cohesion and the adoption of changes that diverge from the institutional status quo. For instance, a nurse who tried to establish nurse-led discharge in her hospital, a change that would have diverged from the institutionalized model of



role division between professionals, explained how lack of connection to some key stakeholders in the organization (in particular, doctors) handicapped her.

I actually know many of the nurses working in this hospital and I get on well with them, but I do not know all the doctors and the administrative staff. ... When I launched this change initiative, I was convinced that it would be good for the hospital, but maybe I rushed too much. I should have taken more time to get to know the consultants, and to convince them of the importance of nurse-led discharge for them and for the hospital.

A doctor we interviewed confirmed the change agent's assessment of the situation.

I made it clear to the CEO of this hospital that I would not do it. This whole initiative will increase my workload. I feel it is a waste of time. Nurses should not be the ones making discharge decisions. ... The person in charge of this initiative doesn't know how we work here.

The foregoing examples illustrate the utility of structural holes in a change agent's network when it comes to persuading other organization members to adopt a change that diverges from the institutional status quo. However, networks rich in structural holes are not always an asset. When it comes to the adoption of changes that do not diverge from the institutional status quo, change agents with relatively closed networks fared better. The cases of two change agents involved in similar change initiatives in their respective primary care organizations are a telling example. Both were trying to convince other organization members of the merits of a new computerized booking system, the adoption of which would not involve a divergence from the institutional status quo, affecting neither the division of labor nor the balance of power among the healthcare professionals within the respective organizations. Moreover, other primary care organizations had already adopted the system. The network of one of the change agents was highly cohesive, that of the other rich in structural holes. Whereas the former was able to implement the new booking system, the latter encountered issues. A receptionist explained what happened in the case of the former organization.

I trust (name of the change agent). Everyone does here. ... We all know each other and we all care about what is best for our patients. ... It was clear when (name of the change agent) told us about the new booking system that we would all be better off using it.

A receptionist in the latter organization described her relationship with the change agent who was struggling with the implementation of the system.

I do not know (name of the change agent) well. ... One of my colleagues knows her ... One of the doctors and some nurses seem to like her, but I think that others in the organization feel just like me that they do not know her.

Figure 2 graphs the moderation between divergence and constraint observed in our data, using the median split of the distribution of change divergence. The crossover interaction is explained by the influence mechanisms available to change agents at opposite ends of the distribution of closure, with both cohesion and structural holes conferring potential advantages. The graph also shows that, in spite of the tendency of change agents with networks rich in structural holes to initiate more divergent changes, our sample included a sizable number of observations in all four cells of the 2x2 in Figure 1. The matching of type of change to the network structure most conducive to its adoption was therefore highly imperfect in our sample.

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Insert Figure 2 about here

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## **DISCUSSION AND CONCLUSION**

The notion that change agents' structural position affects their ability to introduce change in organizations is well established, but because research on organizational change has thus far not systematically accounted for the fact that all changes are not equivalent, we have not known whether the effects of structural position might vary with the nature of change initiatives. The present study provides clear support for a contingency theory of organizational change and network structure. Structural holes in change agents' networks increase the likelihood that the actors will initiate organizational changes with a higher degree of divergence from the institutional status quo. The effects of structural holes on a change agent's ability to persuade organizational constituencies to adopt a change, however, are strictly contingent on the change's degree of divergence from the institutional status quo. Structural holes in a change agent's

network aid the adoption of changes that diverge from the institutional status quo, but hinder the adoption of less divergent changes.

These findings and the underlying contingency theory that explains them advance current research on organizational change and social networks in several ways. First, we contribute to the organizational change literature by showing that the degree to which organizational changes diverge from the institutional status quo may have important implications for the factors that enable adoption. In doing so, our study bridges the organizational change and institutional change literatures that have tended to evolve on separate tracks (Greenwood & Hinings, 2006). The literature on organizational change has not systematically accounted for the institutional environment in which organizations are embedded, and the institutional change literature has tended to neglect intra-organizational dynamics in favor of field dynamics. By demonstrating that the effect of network closure on change initiation and adoption is contingent on the degree to which the organizational change initiative diverges from the institutional status quo, this study paves the way for a new direction in research on organizational change that accounts for whether a change breaks with practices so taken-for-granted in a field of activity as to have become institutionalized (Battilana et al., 2009).

Second, research on organizational change has focused on the influence of change agents' position in their organizations' formal structure over their informal position in organizational networks. Ibarra (1993) began to address this gap by suggesting that actors' network centrality might affect the likelihood of their innovating successfully. Our study complements her work by highlighting the influence of structural closure in change agents' networks on their ability to initiate and implement change.

Third, our study advances the body of work on social networks in organizations. Network scholars have contributed greatly to our understanding of organizational phenomena associated with change, including knowledge search and transfer (Hansen, 1999; Levin & Cross, 2004;

Reagans & McEvily, 2003; Tsai, 2002) and creativity and innovation (Burt, 2004; Fleming et al., 2007; Obstfeld, 2005; Tsai, 2001). We extend this literature with insights into the structural mechanism for social influence through which network closure aids or impedes change agents' attempts to initiate and implement organizational change. We thus build on the long-standing tradition of scholarship on the relationship between network position and social influence (Brass, 1984; Brass & Burkhardt, 1993; Gargiulo, 1993; Ibarra & Andrews, 1993; Krackhardt, 1990).

Finally, despite its remarkable impact on network research, structural holes theory remains underspecified with regard to boundary conditions. By documenting that the benefits of structural holes are strictly contingent on an organizational change initiative's degree of divergence from the institutional status quo, we join other scholars in highlighting the need to specify the contextual boundaries of brokerage and closure in organizations (Fleming et al., 2007; Gargiulo et al., 2009; Stevenson & Greenberg, 2000; Tortoriello & Krackhardt, 2010; Xiao & Tsui, 2007). As for the phenomenological boundaries, scholars have thus far focused primarily on the notion that the non-redundant information generated by bridging structural holes is germane to idea generation (Burt, 2004) and identifying opportunities for change, and attended less to the role of structural holes in capitalizing on opportunities for change once they are identified. Yet gains from new ideas are realized only when they are adopted by an organization (Klein & Sorra, 1996; Meyer & Goes, 1988). Our findings move beyond anecdotal evidence (Burt, 2005) to show the relevance of structural holes in the domain of change implementation.

In addition to these theoretical contributions, our findings can advance public policy and managerial practice by informing the development and selection of change agents in organizations. The question of how to reform existing institutions, such as financial and healthcare systems, has taken on great urgency all over the world. A better understanding the factors that facilitate the initiation and adoption of change that diverges from the institutional status quo is crucial to ensuring successful institutional reforms. A key question policy-makers

face when executing major public sector reforms like the NHS reforms Labor government attempted to implement at the turn of this century is to identify champions who will become local change agents within their organizations. Our study suggests that one important dimension in selecting local champions is their patterns of connections with others in their organizations. Change agents can be unaware that their social network in the organization may be ill-suited to the type of change they wish to introduce. In our sample, although change agents with networks rich in structural holes were more likely to initiate divergent changes, mismatches between the degree of divergence of a change initiative and the network structure most conducive to its adoption were common (see Figure 2). Because managers can be taught how to identify structural hole positions and modify their networks to occupy a brokerage role within them (Burt & Ronchi, 2007), organizations can improve the matching of change agents to change type by educating aspiring change agents to recognize structural holes in the organizational network. Organizations can also leverage change agents who already operate as informal brokers by becoming aware of predictors of structural holes, such as actors' personality traits (Burt, Jannotta, & Mahoney, 1998) and characteristics of the structural positions they have occupied in the organization over time (Zaheer & Soda, 2009).

### **Limitations and future research directions**

Our study can be extended in several directions. With regard to research design, because collecting data on multiple change initiatives over time is arduous (Pettigrew, Woodman, & Cameron, 2001), constructing a sizable sample of observations in the domain of change implementation constitutes an empirical challenge. Despite the limited statistical power afforded by the phenomenon we studied, our predictions were confirmed in the data, increasing our confidence in the robustness of our findings. But these reassuring findings notwithstanding, future research would benefit from investigating these research questions with larger samples of observations, laborious as they may be to assemble. Our sample was also non-probabilistic in

that it purposefully selected self-appointed change agents. This is a population of interest in its own right, because the change initiatives embarked upon by change agents can vary considerably in type and the degree to which they are adopted. Although pursuing an understanding of the determinants of change agents' performance is a worthy endeavor even when the process of self-selection into the role is not analyzed, why and how organizational actors become change agents are as important questions as why and how they succeed.

As for the use of ego-network data, in-depth interviews with a substantial number of organizational actors in a sub-sample of eight change projects enabled us to corroborate change agents' self-reports and reduce perceptual bias concerns. This validation notwithstanding, ego-network data remain an oft-used but suboptimal alternative to whole-network data. Although ego-network data correlate well with dyadic data based on information gathered from both members of each pair (Bondonio, 1998; McEvily, 1997) and measures from ego-network data correlate highly with measures from whole-network data (Everett & Borgatti, 2005), several studies have documented inaccuracies in how respondents perceive their social networks (for a review, see Bernard, Killworth, Kronenfeld, & Sailer, 1984). Future research can productively complement our analysis with fully validated ego-network data or whole-network data.

The time structure of our data can also be further enriched. Collecting data on adoption twelve months after the initiation of a change enabled us to separate the outcome of the change initiative from its inception, and the qualitative evidence provided by our case studies suggested intervening mechanisms that might affect the change process. Our data do not, however, support a systematic study of the process through which change unfolds over time and change agents' networks evolve. Future studies can extend our work in this direction.

With regard to context, although we were able to control for the influence of organizational size and status on the initiation and adoption of divergent change, studies are needed that will provide a more fine-grained account of the possible influence of the organizational contexts in

which change agents operate. The NHS is a highly institutionalized environment within which the dominant template of medical professionalism contributed to making the culture of NHS organizations highly homogenous (Giaimo, 2002). In environments characterized by greater cultural heterogeneity, organizational differences may influence the relationship between change agents' network features and the ability to initiate and implement more or less divergent change. Future research should explore the influence of other germane organizational characteristics, such as the organizational climate for implementing innovations (Klein & Sorra, 1996).

Because our analysis concerned a sample of planned organizational change projects initiated by clinical managers in the NHS, the external validity of our findings is also open to question. As a large public sector organization, the NHS's hierarchical nature can increase both the constraints faced by change agents and the importance of informal channels of influence for overcoming resistance in the entrenched organizational culture. These idiosyncratic features that make the NHS an ideal setting for the present study call for comparative studies across different settings that better account for the potential interactive effects of actors' positions in organizational networks and contextual factors on the adoption of planned changes. Considering this study of the NHS explores a mature field with institutionalized norms, it would be fruitful to examine the influence of actors' network positions in emerging fields.

These questions and concerns notwithstanding, our findings demonstrate the explanatory power that derives from recognizing the complementary roles of institutional theory and social network theory in understanding organizational change. The informal channels of influence on which change agents rely to build coalitions, overcome resistance, and shift attitudes towards new ideas emerge from our research as important engines of change within an organization; their effects, however, can be fully understood only when the institutional pressures that constrain an organization and the actions of the change agents within it are included in a comprehensive model of organizational change.

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**FIGURE 1**

**Predicted Interactive Effects of Network Closure  
and Divergence from Institutional Status Quo on Change Adoption**

|                            |             |                          |             |
|----------------------------|-------------|--------------------------|-------------|
|                            | <i>High</i> | +                        | -           |
| <b>Network<br/>Closure</b> | <i>Low</i>  | -                        | +           |
|                            |             | <i>Low</i>               | <i>High</i> |
|                            |             | <b>Change Divergence</b> |             |

**TABLE 1**  
**Examples of change initiatives with high, medium and low levels of divergence from the institutional status quo**

| High Divergence  | Medium Divergence   | Low Divergence   |
|--|---|--|
| <p><i>Example 1.</i> Initiative to transfer stroke rehabilitation services, such as language retraining, from a hospital-based unit to a PCT (i.e., from the secondary to the primary care sector). Prior to the change, stroke patients were stabilized and rehabilitated in the acute ward of the hospital. This resulted in long hospital stays and occupied resources that were more appropriate for the acute treatment than for the rehabilitation phase. As a result, there was often not enough room to admit all stroke patients to the acute ward, as many beds were used for patients undergoing rehabilitation. With the transfer of service, post-acute patients, once they were medically stable and ready for rehabilitation, were relocated to a unit operated by the PCT, ensuring that the acute unit would be dealing only with patients who were truly in need of acute care. This transfer of the delivery of rehabilitation services from the secondary to the primary care sector greatly diverged from the institutionalized model of role division among organizations.</p> <p><i>Example 2.</i> Initiative to develop nurse-led discharge that would transfer clinical tasks and decision-making authority from physicians to nurses. Traditionally, discharge decisions were under the exclusive control of physicians. With the new nurse-led initiatives, nurses would take over responsibility from specialist physicians and make the final decision to discharge patients, thus assuming more responsibility as well as accountability and risk for clinical decisions. Physicians ceded control over some aspects of decision-making, freeing them to focus on more complex patients and tasks.</p> | <p><i>Example 3.</i> Initiative involving primary and secondary care service providers aimed at developing a day hospital for elderly patients. The day hospital was to facilitate continued care, reduce hospital stays, and decrease hospital readmission for frail elderly patients too ill to be cared for at home but not sufficiently ill to justify full admission to the hospital. Patients would check into the hospital-operated day unit for a few hours and receive services from both primary and secondary care professionals. Because the primary care service providers were engaged in the provision of services formerly provided only by secondary care service providers, there was increased collaboration between the primary and secondary care service providers involved in this project. Even so, the project diverged from the institutionalized model of role division among organizations only to some extent because the new service was still operated by the hospital.</p> <p><i>Example 4.</i> Initiative to have ultrasound examinations performed by nurses rather than by physicians. Although this project enabled nurses to perform medical examinations they usually did not perform, the nurses gained no decision-making power in either the clinical or administrative domain. Consequently, this project diverged from the institutionalized model of role division among professionals only to some extent.</p> | <p><i>Example 5.</i> Initiative to transfer a ward specializing in the treatment of elderly patients from a PCT to a hospital. Prior to the change, both the PCT and hospitals provided services for the elderly, who make up the bulk of patients receiving care in the hospital setting. Rather than diverging from the institutionalized model of role division among organizations, the transfer of responsibility for all elderly care services to the hospital reinforced the centralization of healthcare services around the hospital, strengthening the dominant role of the hospital over the PCT in the institutionalized delivery model.</p> <p><i>Example 6.</i> Initiative of a general practice to hire an administrative assistant to implement and manage a computerized appointment booking system. The addition of this assistant to the workforce changed neither the division of labor nor the balance of power between healthcare professionals within the general practice.</p> |

**TABLE 2**  
**Means, standard deviations of variables, and correlation matrix**

|                                      | Mean  | S.D.  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9   | 10   |
|--------------------------------------|-------|-------|------|------|------|------|------|------|------|------|-----|------|
| 1 Change adoption                    | 3.91  | .82   |      |      |      |      |      |      |      |      |     |      |
| 2 Change divergence                  | 1.41  | .38   | .09  |      |      |      |      |      |      |      |     |      |
| 3 Senior management                  | 10.37 | 5.94  | -.05 | .18  |      |      |      |      |      |      |     |      |
| 4 Seniority in role                  | 2.32  | 2.05  | -.03 | .05  | .11  |      |      |      |      |      |     |      |
| 5 Hierarchical level                 | 3.85  | .95   | -.07 | -.11 | -.02 | -.03 |      |      |      |      |     |      |
| 6 Professional group status (Doctor) | .25   | .43   | .03  | -.09 | -.41 | .02  | .33  |      |      |      |     |      |
| 7 Organizational status (PCT)        | .52   | .50   | .09  | .35  | -.12 | -.06 | .10  | .06  |      |      |     |      |
| 8 Organizational size                | 22.70 | 21.20 | -.13 | -.04 | .04  | .06  | -.20 | -.20 | -.59 |      |     |      |
| 9 Prominence in task-advice network  | .03   | 1.09  | .25  | .08  | .22  | -.20 | .18  | -.10 | -.11 | .08  |     |      |
| 10 Egonetwork constraint             | .34   | .12   | .14  | -.23 | -.05 | -.01 | .03  | .13  | -.07 | -.05 | .09 |      |
| 11 Constraint * Divergence           | -.01  | .04   | -.27 | -.38 | .01  | .00  | .01  | -.14 | -.19 | .09  | .12 | -.11 |

Correlation coefficients greater than .30 are statistically significant at  $p < .01$

**TABLE 3**  
**OLS Regressions Predicting Degree of Change Divergence**

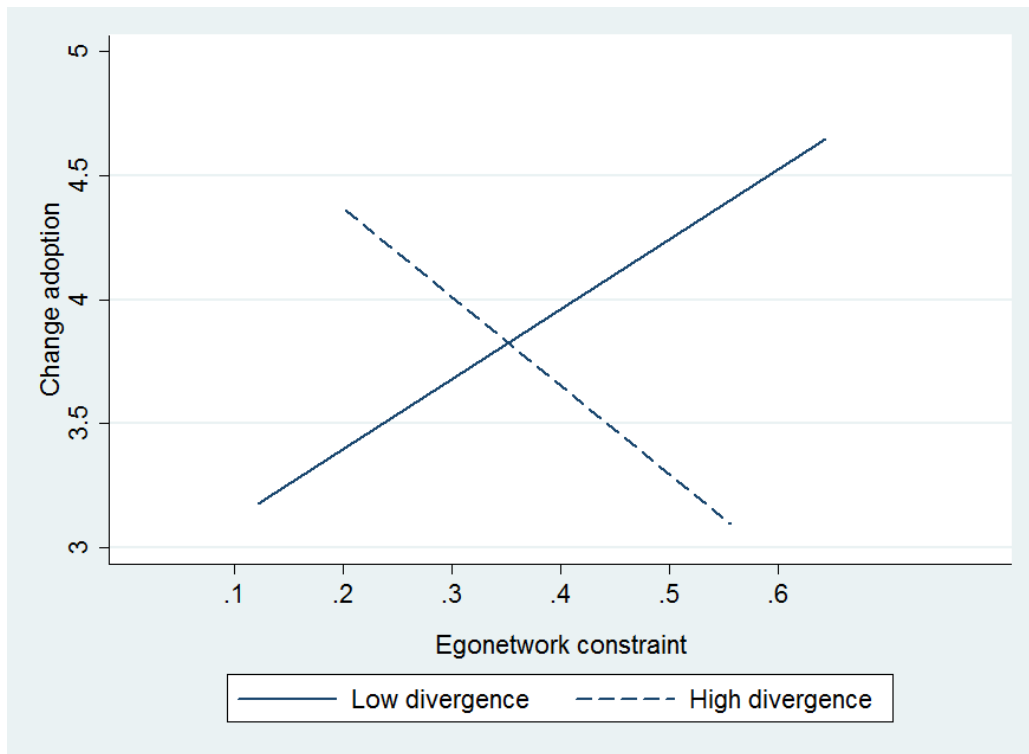
|   | (1)    | (2)    |
|---|--------|--------|
| Tenure in management role                       | .02*   | .02*   |
|   | (.01)  | (.01)  |
| Tenure in current role                          | .01    | .01    |
|   | (.02)  | (.02)  |
| Hierarchical level                              | -.07   | -.08   |
|   | (.05)  | (.05)  |
| Professional group status (doctor)              | .08    | .11    |
|   | (.09)  | (.09)  |
| Organizational status (PCT)                     | .42*** | .40*** |
|   | (.09)  | (.09)  |
| Organizational size                             | .04*   | .04    |
|   | (.02)  | (.02)  |
| Prominence in task-advice network               | .03    | .04    |
|   | (.04)  | (.05)  |
| Egonetwork constraint                           |        | -0.68* |
|   |        | (0.34) |
| R <sup>2</sup>                                  | .24    | .28    |
| N   | 68     | 68     |
| Standard errors in parentheses                  |        |        |
| Two-tailed tests. * p<.05; ** p<.01; *** p<.001 |        |        |

**TABLE 4**  
**OLS Regressions Predicting Degree of Change Adoption**

|   | (3)    | (4)    | (5)     |
|---|--------|--------|---------|
| Tenure in management role                       | -.02   | -.02   | -.02    |
|   | (.02)  | (.02)  | (.02)   |
| Tenure in current role                          | .02    | .02    | .02     |
|   | (.04)  | (.04)  | (.04)   |
| Hierarchical level                              | -.14   | -.13   | -.13    |
|   | (.09)  | (.08)  | (.09)   |
| Professional group status (doctor)              | .18    | .14    | .07     |
|   | (.26)  | (.24)  | (.24)   |
| Change divergence                               | .09    | .14    | -.11    |
|   | (.33)  | (.34)  | (.30)   |
| Creation of new service                         | -.31   | -.30   | -.28    |
|   | (.23)  | (.25)  | (.23)   |
| Organizational status (PCT)                     | .04    | .04    | .03     |
|   | (.33)  | (.33)  | (.32)   |
| Organizational size                             | -.01   | -.01   | -.01    |
|   | (.01)  | (.01)  | (.01)   |
| Prominence in task-advice network               | .30*** | .29*** | .33**   |
|   | (.07)  | (.08)  | (.10)   |
| Egonetwork constraint                           |        | .69    | .30     |
|   |        | (1.33) | (1.28)  |
| Constraint * Divergence                         |        |        | -5.83** |
|   |        |        | (2.04)  |
| R <sup>2</sup>                                  | .21    | .22    | .29     |
| N   | 68     | 68     | 68      |
| Standard errors in parentheses                  |        |        |         |
| Two-tailed tests. * p<.05; ** p<.01; *** p<.001 |        |        |         |



**FIGURE 2**  
**Observed Interactive Effect of Egonetwork Constraint and Divergence from Institutional Status Quo on Change Adoption**



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