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## From Strategy to Action: How Top Managers' Support Increases Middle Managers' Commitment to Innovation Implementation in Healthcare Organizations

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### Abstract

**Background**—Evidence suggests that top managers' support influences middle managers' commitment to innovation implementation. What remains unclear is how top managers' support influences middle managers' commitment. Results may be used to improve dismal rates of innovation implementation.

**Methods**—We used a mixed-method sequential design. We surveyed ( $n = 120$ ) and interviewed ( $n = 16$ ) middle managers implementing an innovation intended to reduce health disparities in 120 US health centers to assess whether top managers' support influences middle managers' commitment directly, by allocating implementation policies and practices, or by moderating the

influence of implementation policies and practices on middle managers' commitment. For quantitative analyses, multivariable regression assessed direct and moderated effects; a mediation model assessed mediating effects. We used template analysis to assess qualitative data.

**Findings**—We found support for each hypothesized relationship: Results suggest that top managers increase middle managers' commitment by directly conveying to middle managers that innovation implementation is an organizational priority ( $\beta = 0.37, p = 0.09$ ); allocating implementation policies and practices including performance reviews, human resources, training, and funding (bootstrapped estimate for performance reviews = 0.09; 95 percent CI: 0.03, 0.17); and encouraging middle managers to leverage performance reviews and human resources to achieve innovation implementation.

**Practice Implications**—Top managers can demonstrate their support by directly conveying to middle managers that an initiative is an organizational priority, allocating implementation policies and practices such as human resources and funding to facilitate innovation implementation, and convincing middle managers that innovation implementation is possible using available implementation policies and practices. Middle managers may maximize the influence of top managers' support on their commitment by communicating with top managers about what kind of support would be most effective in increasing their commitment to innovation implementation.

## INTRODUCTION

Implementation is the period following adoption during which employees ideally become proficient and consistent in their use of an innovation (Klein & Sorra, 1996). Implementing even seemingly simple healthcare innovations has proven to be challenging. The rate of successfully implemented quality improvement initiatives, for example, is less than 50 percent (Alexander, 2008). Poor implementation rates may be due to the substantial organizational changes required for the initiatives (Alexander, 2008), which may be cognitively, emotionally, physically, and spiritually demanding of employees and organizations (Shortell, Bennett, & Byck, 1998).

Top managers (e.g., chief executive officers, medical directors) may help to overcome these challenges by demonstrating support for innovation implementation (Klein, Conn, & Sorra, 2001). Weiner et al. (1997) showed that physicians were more involved in continuous quality improvement initiatives when top managers demonstrated support for implementation-related activities.

Increasingly, middle managers are also regarded as playing a key role in overcoming the challenges of innovation implementation (Birken, Lee & Weiner, 2012; Chuang, Jason & Morgan, 2011; Currie & Proctor, 2005). A study of middle managers overseeing the implementation of an innovation to reduce health disparities found that middle managers improved the effectiveness of Chronic Care Model implementation in their health centers by committing to implementation (Birken, Lee, Weiner, Chin & Schaefer, 2013; Bonomi, Wagner, Glasgow & VonKorff, 2002).

A growing body of evidence suggests that top managers' support influences middle managers' commitment to innovation implementation (Birken, 2011; Chuang et al., 2011).

For example, top managers' support for work-based learning in healthcare organizations increased middle managers' commitment to the initiative (Chuang et al., 2011). What remains unclear is how top managers' support influences middle managers' commitment to innovation implementation. In this paper, we assess the ways in which top managers' support influences middle managers' commitment to innovation implementation.

Our results make two new contributions. First, understanding how top managers' support influences middle managers' commitment helps to identify strategies to maximize middle managers' commitment and subsequently improve healthcare innovation implementation (Birken et al., 2013). For example, top managers may promote implementation effectiveness by giving middle managers "a seat at the table" in devising the implementation plan. The involvement conveys confidence in middle managers, increasing their buy-in and commitment, which is positively associated with implementation effectiveness (Birken et al., 2013). Second, results may contribute to theory development. The theory of innovation implementation suggests that top managers influence implementation effectiveness by allocating implementation policies and procedures (IP&Ps; e.g., Klein & Sorra, 1996; Klein et al., 2001). Recent work suggests that the relationship between IP&Ps and implementation effectiveness may be mediated by middle managers' commitment (Birken et al., 2013). A clearer understanding of relationships among these constructs will allow scholars to refine theory.

## CONCEPTUAL FRAMEWORK

Based on their synthesis of five decades of research on top managers' role, Yukl, Gordon and Taber (2002) developed a hierarchical taxonomy of leader (i.e., top managers') behavior. The taxonomy suggests that top managers' behavior can be classified into the following categories: task; relations; and change.

Task behaviors relate to ensuring that activities necessary to achieve objectives are completed. The purpose of these behaviors is to "guide and coordinate work activity and make sure people know what to do and how to do it" (p. 19). A key aspect of task behavior is stating task objectives and role expectations. By stating task objectives and role expectations to middle managers, top managers may directly influence middle managers' commitment (Figure 1; relationship (1)). This was the case in Veterans Health Administration primary care centers implementing a depression care quality improvement initiative. Results emphasized the importance of top managers directly conveying to middle managers that the initiative was an organizational priority and, as such, deserved their full commitment (Kirchner, Parker, Bonner, Fickel, Yano & Ritchie, 2012).

Relations behaviors relate to empowering people to do the work with which they have been tasked. This involves providing the material, technical, and socio-emotional support necessary to achieve objectives. Specifically, top managers may offer support by allocating IP&Ps (e.g., training opportunities, funding) to innovation implementation, indirectly influencing middle managers' commitment to implementing the innovation (Figure 1; relationship (2)). An example is the allocation of human resources and funding to facilitate

electronic health records implementation in a teaching hospital (Øvretveit, Scott, Rundall, Shortell & Brommels, 2007).

Change behaviors relate to promoting perspectives that are supportive of personal and organizational change. By encouraging innovative thinking, top managers may help middle managers to consider how IP&Ps might be leveraged to achieve innovation implementation, moderating the influence of IP&Ps on middle managers' commitment (Figure 1; relationship (3)). A key role of top managers is interpreting information (Daft & Weick, 1984). When top managers interpret information to encourage employees, organizational performance is enhanced (Thomas, Clark & Gioia, 1993). Indeed, performance improvement initiatives were more effective when top managers convinced children's hospital employees, including middle managers, that performance improvement was possible using available IP&Ps (Adler, Riley, Kwon, Singer, Lee & Satrasala, 2003).

## METHODS

### Research Design and Sample

To assess relationships among top managers' support, IP&Ps, and middle managers' commitment, we used a mixed-method sequential design. Using a mixed-method sequential design allowed us to triangulate results and minimize mono-method bias (Cook & Campbell, 1979; Tashakkori & Teddlie, 1998), and to elaborate on survey findings using illustrations from interviews with middle managers (Greene, Caracelli & Graham, 1989). Qualitative analysis allowed us to assess nuances of top managers' support, middle managers' commitment, and IP&Ps that would have been too circumscribed had we analyzed quantitative data alone.

The study capitalized on an evaluation of the Health Disparities Collaboratives (HDC). The HDC, a 10-year initiative developed by the Health Resources and Services Administration's Bureau of Primary Health Care, was a quality improvement collaborative that funded health centers (HCs) in underserved communities in the United States with the goal of eliminating health disparities by narrowing the gap between evidence and practice (Chin, 2010; Landon, Hicks, O'Malley, Lieu, Keegan, McNeil & Guadagnoli, 2007). The objectives of the HDC were to decrease or delay disease complications, reduce the economic burden, and improve access to quality chronic disease care for underserved populations, and to develop infrastructure, leadership, and expertise in health centers. Quality improvement targets were evidence-based clinical performance measures, including processes of care (e.g., glycosylated hemoglobin measurement for patients with diabetes) and outcomes (e.g., glycosylated hemoglobin levels). In 1998, the Health Resources and Services Administration Bureau of Primary Health Care invited HCs to participate in the HDC. Beginning in 1999, participating HCs were expected to form quality improvement teams; attend one national and three regional learning sessions where teams learned about the Chronic Care Model (Wagner, Austin, & Von Korff, 1996) and Plan-Do-Study-Act cycles using the Breakthrough Series process (Wagner, Austin, Davis, Hindmarsh, Schaefer & Bonomi, 2001); participate in conference calls; and submit monthly progress reports to regional HDC coordinators. Evidence suggests that the HDC improved clinical processes of care and outcomes in participating HCs and was societally cost-effective (Chin, 2010).

## The Health Disparities Collaboratives Survey

Between March and December 2004, the National Opinion Research Center, the University of Chicago, and the MidWest Clinicians' Network, a nonprofit corporation that provides research opportunities, mentoring programs and education opportunities for its members, conducted a survey to assess HDC implementation. The survey was sent to HCs in 10 Midwestern and West Central states that (1) had participated in the HDC for at least one year by March 2004 and (2) identified a chief executive officer (CEO), a medical director, and an HDC team leader. One hundred forty-nine HCs met these criteria. The survey collected information regarding top managers' support for HDC implementation, team leaders' commitment to HDC implementation, and IP&Ps during the 2003–04 calendar year.

In this study, HDC team leaders were considered middle managers because they supervised their HCs' team members in implementing the HDC and were supervised by their HCs' top managers. Team leaders were selected to fill the role through a mutual process of volunteering and appointment by top managers based on leadership skills and personality. The 120 middle managers responding to the survey were included in our analysis (81 percent response rate; one middle manager per HC).

One hundred three CEOs in those middle managers' HCs responded to a similar version of the survey (69 percent response rate). Middle managers' and top managers' surveys were identical with some exceptions: Middle managers' surveys included items related to perceptions of top managers' support, IP&Ps, and their HCs' internal environment that were not included in top managers' surveys. Top managers' surveys included items related to the organization's external environment and funding that were not included in middle managers' surveys. When available, we used CEOs' responses regarding organizational size and location in lieu of middle managers' responses because CEOs were more likely to have specific information regarding these measures.

### Variables in the Quantitative Analysis

The appendix contains variables' operationalizations and psychometric properties.

**Dependent Variable**—Middle managers' commitment has three dimensions: moral obligation to persist, perceived costs of discontinuing, and affective attachment to innovation implementation (Randall, Fedor, & Longenecker, 1990; Herscovitch & Meyer, 2002). We assessed the affective dimension because it relates to engaging in activities that go beyond fulfilling job requirements, which may in turn promote implementation effectiveness (Porter & Smith, 1970). For example, middle managers had the opportunity to go beyond job requirements by using the HDC listserv, an email-based discussion group regarding the HDC. By offering middle managers the opportunity to find information to solve HDC implementation-related problems, using the HDC listserv (an expression of commitment to the HDC implementation) had the potential to optimize care delivery systems (an indicator of HDC implementation effectiveness). Other indicators of middle managers' commitment included use of the HDC virtual classroom (computer-based education regarding the HDC) and HDC webpage.

**Key Independent Variables**—Top managers' support is defined as top managers' effort to create an environment that encourages innovation implementation.

IP&Ps refer to organizational efforts to train employees to use an innovation (i.e., training); the availability of assistance with innovation implementation (i.e., funding, human resources, local social network involvement); rewards for innovation implementation (i.e., incentives); and effective communication between top managers and middle managers regarding the status, challenges, and successes associated with innovation implementation (i.e., performance reviews) (Klein et al., 2001).

**Control Variables**—Several HC and middle manager attributes were assessed for inclusion ( $p < .1$ ) as controls in the analysis. HC size may have influenced middle managers' commitment to HDC implementation. With a greater number of patients, middle managers may have had to attend to a greater number of task demands that detracted from their ability to commit to HDC implementation. Turnover in the HC may have decreased middle managers' commitment to HDC implementation; associated personnel demands may have limited middle managers' ability to commit to HDC implementation. Regular use of the HDC web page, listserv, and virtual classroom may have been more critical for middle managers in isolated, rural locations. Less organizational tenure may have required middle managers to engage in activities that increase their organizational knowledge such as procedures for requesting information systems help, detracting from their ability to commit to HDC implementation. Less job tenure may have required middle managers to engage in activities that increase their knowledge of effective role performance, detracting from their ability to commit to HDC implementation. Middle managers with an administrative professional background may have had more frequent access to computers at which they could engage in behaviors exhibiting commitment to HDC implementation.

### Quantitative Analysis

Multivariable regression analysis was used to assess the linear relationship between top managers' support and middle managers' commitment, holding constant covariates such as IP&Ps. The small size of the sample limited the statistical power of the analysis and increased the possibility of Type I error (i.e., failure to support the hypothesis when the hypothesis is true). This limitation was exacerbated by missing data. We decided to use complete case analysis because discarded observations represented a relatively small portion of the full dataset; data were missing at random (Little, 1988); and sensitivity analyses indicated that results from a multiple imputation model were qualitatively equivalent to complete case analysis. To achieve adequate statistical power and to ensure stability in coefficients and standard errors, p-values of less than .1 were considered significant; bivariate analyses were used to determine which independent variables to include in multivariable analyses; and Akaike and Bayesian Information Criterion were used to identify the set of covariates that best predicted middle managers' commitment.

Using middle managers' responses to construct both dependent and independent variables may introduce unmeasured variance to regression models. To control for this bias, we included in each model a self-reported attitude survey item that was theoretically unrelated



to middle managers' commitment or top managers' support and was minimally correlated with middle managers' commitment (see Table 2; Lindell & Whitney, 2001).

The top managers' support regression coefficient was interpreted as the direct effect of top managers' support on middle managers' commitment. Regression coefficients on the interaction terms between top managers' support and IP&Ps with statistically significant bivariate relationships with middle managers' commitment were interpreted as moderating effects of top managers' support on the relationship between these IP&Ps and middle managers' commitment.

A mediation model was used to assess whether top managers' support influenced middle managers' commitment by allocating IP&Ps. Specifically, we assessed relationships between (a) middle managers' commitment and IP&Ps and (b) top managers' support and IP&Ps, controlling for top managers' support. Given our small sample size, we used a bootstrapping approach (Shrout & Bolger, 2002; Preacher & Hayes, 2004), which involved resampling data 10,000 times with replacement to estimate *ab*, the product of (a) and (b), and a 95% confidence interval. Analyses were performed using SAS statistical software, Version 9.2 (SAS Institute Inc., Cary, NC).

### Semi-structured Interviews

**Participants**—Middle managers were selected based on their level of commitment to HDC implementation and the effectiveness of HDC implementation in their HCs using the following method. First, we used a publicly available list of 120 HCs whose middle manager responded to the HDC survey to identify and select eligible middle managers. Attempts were made to contact middle managers who no longer worked in the HCs using forwarding information provided by the HC. Then, we requested middle managers' consent to use their survey responses to determine their eligibility for interviews. We were unable to reach 89 of the middle managers, three declined to participate, and 57 consented. Of the 57 middle managers who consented, we selected the 16 with the highest and lowest commitment and implementation effectiveness scores (i.e., four in each of the high-high, high-low, low-high, and low-low quadrants) to participate. Variation in middle managers' commitment and implementation effectiveness was sufficient to result in a fairly even distribution of middle managers among the four quadrants.

**Procedure**—The first author conducted one- to two-hour interviews via telephone in January and February 2010. Middle managers were asked to describe whether and how top managers' support and IP&Ps influenced their commitment to HDC implementation exclusively based on their experience at the time of the 2004 HDC survey (interview guide is available upon request from the first author). For example, middle managers were asked to describe perceived support from top managers for HDC implementation, not top managers' general supportiveness. To minimize recall bias, prior to discussing their commitment to HDC implementation, middle managers were asked to discuss the HDC for several minutes. Many middle managers described the HDC as very memorable: Although some middle managers may have engaged in quality improvement initiatives before the HDC, the HDC was a distinct, major initiative that employed strategies that were unfamiliar

to middle managers (Chin et al., 2004). Interviews were recorded and transcribed verbatim to enhance data reliability. The consent and interview guide (available upon request from the first author) were approved by the Institutional Review Board at the University of North Carolina at Chapel Hill.

**Qualitative Analysis**—We employed template analysis, combining content analysis with grounded theory (King, 1998). Template analysis allowed us to assess whether top managers' support directly influences middle managers' commitment by asking middle managers to discuss whether and how top managers' support influenced their commitment to HDC implementation. Evidence of the other two proposed relationships emerged as analysis proceeded: When middle managers indicated that they engaged in extra-role behaviors intended to promote implementation as a result of IP&Ps that top managers allocated, the text unit was coded as evidence that top managers' support influenced middle managers' commitment by allocating IP&Ps (i.e., a mediated relationship); when middle managers indicated that they engaged in extra-role behaviors intended to promote implementation as a result of top managers strengthening the influence of IP&Ps, the text unit was coded as evidence that top managers' support moderated the influence of IP&Ps on middle managers' commitment.

The analysis focused on the degree to which constructs emerged in the data (strength) and the degree to which constructs affected responses (valence). Atlas.ti 5.0, a multifunctional qualitative data analysis software program, was used to code the interview data and identify emergent themes. The text units were coded using a coding manual with definitions, decision rules, and examples to ensure consistency of data analysis and increase internal validity. The first author and a researcher familiar with qualitative analysis each independently coded 20 percent of the interview transcripts, compared coding, and reconciled disagreements until consensus was reached. In most cases, the reason for the discrepancy was obvious (e.g., lapse of attention). Remaining discrepancies were resolved by collaboratively refining code definitions.

## FINDINGS

### Survey

**Descriptive Statistics**—Table 1 displays descriptive statistics. The size of middle managers' HCs widely varied (range = 300–63,000 unique, unduplicated patients annually). Rural and urban HCs were equally represented. The majority of middle managers (62%) were the first to serve as team leader in their HC. At the time of the survey, middle managers had worked at their HC for an average of seven years and had been a team leader for 2.7 years. The majority of middle managers (72.5%) were clinicians. No HC or middle manager attribute had a statistically significant relationship with middle managers' commitment in bivariate analyses.

Middle managers' commitment varied (mean = 2.67; SD = 0.89); however, middle managers generally reported that their commitment to HDC implementation was moderate. Less than 12 percent of middle managers "agreed" or "strongly agreed" that they regularly used online HDC tools.



Top managers' support for HDC implementation was rated as moderate-to-poor in most HCs. Nearly 40 percent received only "a little" or no support from top managers. Less than twenty percent of middle managers indicated that they received "a great deal" of support from top managers.

Overall, middle managers rated IP&Ps as moderate-to-poor. Of note, on average, middle managers rated performance reviews as moderate, but only 35 percent of middle managers "agreed" or "strongly agreed" that performance reviews addressed HDC performance; 65 percent of middle managers reported that they "neither agreed nor disagreed," "disagreed," or "strongly disagreed" that performance reviews addressed their HDC-related performance. In contrast, half of middle managers reported that they received at least "a moderate amount" of incentives related to HDC implementation; only ten percent indicated that they received no incentives.

**Direct Effect**—In multivariable regression analysis (Table 2), top managers' support had a marginally significant effect ( $p = .09$ ) on middle managers' commitment.

**Mediation**—The bootstrapped estimate of the indirect effect was 0.09, indicating that the relationship between top managers' support and middle managers' commitment was significantly mediated by performance reviews (CI: 0.03, 0.17). Results were not statistically significant for other IP&Ps.

**Moderation**—Middle managers' commitment had statistically significant relationships with performance reviews ( $p < .01$ ) and incentives ( $p = .08$ ) in bivariate analyses. Neither performance reviews nor incentives had a statistically significant effect on middle managers' commitment when interacted with top managers' support (Table 2).

## Interviews

**Direct Effect**—Quantitative results indicated that the direct effect of top managers' support on middle managers' commitment was marginally significant. The middle managers whom we interviewed reported that top managers' support had a large, direct effect on their commitment. For example, one middle manager remembered that a small gesture of support from top managers redoubled her commitment to HDC implementation. The middle manager's commitment to HDC implementation suffered when she had a miscarriage. The top managers had not previously supported her efforts with the HDC, so the middle manager was surprised when top managers directly voiced their support. Subsequently, the middle manager "came back with a new attitude," willing to engage in activities intended to promote HDC implementation (059). Top managers' support directly influenced this middle manager's commitment by encouraging her to commit to HDC implementation in a way that worked well for her.

Other middle managers discussed how top managers' direct endorsement of the HDC as an organizational priority increased their commitment. Top managers in one middle manager's HC incorporated an introduction to the HDC into new employee orientation. The emphasis on the HDC as a central HC initiative signaled its importance to new employees and the middle manager. Another top manager included regular HDC updates in the HC's

newsletter. This communicated the importance of the HDC to employees, including middle managers.

Lack of support from top managers also had a direct and negative effect on middle managers' commitment to HDC implementation. For example, one middle manager resigned when top managers in her HC decided to hire an employee to enter HDC-related patient data without first discussing it with her. Whereas some middle managers got clear messages from top managers that they were expected to commit to HDC implementation, this middle manager indicated that top managers in her HC undermined her commitment to HDC implementation. Another middle manager described how her top manager's unwillingness to attend a national HDC meeting decreased her commitment to HDC implementation:

“I remember going to these meetings feeling frustrated that it was just...me and some support staff, and I never really had a CEO...coming to...these higher level meetings... I...felt like we can't really do this the best way because we don't really have [top managers] coming here to participate.” (109)

**Mediation**—Quantitative analyses suggested that the relationship between top managers' support and middle managers' commitment was mediated by performance reviews. Qualitative analyses elaborated on this finding by suggesting that middle managers' commitment increased when they had the opportunity to communicate with top managers about potential problems, existing problems, and success stories related to HDC implementation. One middle manager said, “I just walk in [to talk with top managers] and say, ‘Hey, I need something’” (064). Another said, “...we meet weekly and hash out issues and problems and talk about wonderful things that have happened” (087). This open communication encouraged middle managers' agreeableness toward the HDC and openness to changes that it brought.

The only mediator of the relationship between top managers' support and middle managers' commitment identified in quantitative analyses was performance reviews. Qualitative analyses identified the following other IP&Ps as mediators: human resources, training, and funding. One middle manager remembered that the top managers in her HC allowed her to participate in hiring decisions. Doing so ensured that new providers would be willing HDC participants.

Another middle manager remembered that top managers in his HC authorized National Committee for Quality Assurance training. He recalled:

“[I]t was a huge thing for administration [to say], ‘This is a problem, we recognize it, and now we're going to support it, and you're all going to be educated on how to take care of patients with diabetes.’” (109)

Another middle manager indicated that top managers allowed her to bill for time spent on HDC-related activities. Access to this funding increased her commitment to HDC implementation. Other middle managers' commitment to HDC implementation was constrained by having to use unpaid or vacation time to engage in HDC-related activities.

**Moderation**—Quantitative analyses found no evidence that top managers’ support strengthened the influence of IP&Ps on middle managers’ commitment. In contrast, qualitative analyses suggested that top managers’ support strengthened the influence of performance reviews and human resources on middle managers’ commitment. For example, one middle manager explained that top managers encouraged her to use opportunities for informal communication (e.g., hallway conversations, emails) to discuss implementation-related concerns before they became problematic enough to report during infrequent, formal performance reviews. However, many middle managers reported that top managers did not encourage informal communication regarding HDC implementation. Instead, these top managers gave infrequent, contrived performance reviews that diminished the influence of performance reviews on middle managers’ commitment. One middle manager said:

“...the human resource person will turn in the evaluations to [the CEO, and], they sit there on his desk forever. One year goes by, another year, and whatever, I don’t know [if] they get lost or what happens.” (100)

Some middle managers indicated that top managers encouraged providers to buy into HDC implementation, improving the influence of providers’ HDC implementation-related efforts on middle managers’ commitment. For example, one middle manager recalled:

“[O]ur medical director [had] the time and experience to be able to be an influence, an agent for change, and [he said to the providers], ‘Look, we can’t put this off any longer,’ and then [it] was agreed upon by the providers.” (106)

## DISCUSSION

In this study, we assessed how top managers’ support influences middle managers’ commitment to innovation implementation in healthcare organizations. We found support, primarily in qualitative analysis, for each proposed relationship: top managers influenced middle managers’ commitment directly, by allocating IP&Ps, and by strengthening the influence of IP&Ps on middle managers’ commitment. Examples of each type of support from top managers exist in the literature (e.g., Proctor, Knudsen, Fedoravicius, Hovmand, Rosen & Perron, 2007; Øvretviet et al., 2007; Adler et al., 2003); however, our study was the first to empirically assess how top managers’ support influences middle managers’ commitment.

Inconsistencies between quantitative and qualitative results may be due in part to limitations of survey data. Specifically, the statistical significance of quantitative relationships may have been limited by the small sample size. Future studies with larger samples may find stronger relationships, commensurate with our qualitative results.

Inconsistencies between quantitative and qualitative results may also be due to our inability to include some potential determinants of middle managers’ commitment (e.g., innovation-values fit and innovation effectiveness (Klein & Sorra, 1996)) in quantitative analyses, potentially biasing estimates. In contrast, qualitative analyses allowed us to control for confounders such as innovation effectiveness by specifically asking interview participants to describe the influence of top managers’ support on their commitment to innovation implementation.

Another limitation of survey data was their sometimes vague variable definitions. In qualitative analyses, we were able to define variables in collaboration with middle managers. For example, middle managers may have interpreted the survey's reference to performance reviews as formal, regularly scheduled meetings with top managers regarding middle managers' performance. During interviews, we found that middle managers defined performance reviews as opportunities to communicate with top managers.

Our study had other limitations. The survey and interview responses in our study may have been subject to social desirability bias and recall bias. We used middle managers' responses to operationalize independent variables. Ideally, we would have used more objective measures.

In addition, the cross-sectional study design limited our ability to identify causal relationships. For example, there is a possibility that top managers offered more support to committed middle managers.

Further, the relationship between top managers' support and middle managers' commitment may be biased in our study sample given the HDC's idiosyncrasies, such as its multifaceted nature. The generalizability of our findings might be bolstered by studies of innovations with a variety of characteristics.

### **Implications for Practice**

Despite these limitations, the dynamic relationship between top and middle managers in innovation implementation suggests practical strategies for improving implementation effectiveness. First, top managers may demonstrate their support by directly conveying to middle managers that an initiative is an organizational priority (Kirchner et al., 2012); allocating IP&Ps such as human resources and funding to facilitate innovation implementation (Øvretveit et al., 2007); and convincing middle managers that innovation implementation is possible using available IP&Ps (Adler et al., 2003). Second, middle managers may maximize the influence of top managers' support on their commitment by communicating with top managers about what kind of support would be most effective in increasing their commitment to innovation implementation. For example, middle managers experiencing resistance from providers may solicit top managers' support in encouraging providers to buy into innovation implementation.

### **Implications for Theory**

Our findings regarding the dynamic relationship between top and middle managers in innovation implementation have theoretical implications. Theories suggest that top managers' support influences implementation effectiveness by allocating IP&Ps (Klein et al., 2001; Klein & Sorra, 1996), and middle managers' commitment influences implementation effectiveness (Birken et al., 2013). Our findings suggest that top managers influence implementation effectiveness not only by allocating IP&Ps, but also by directly communicating the importance of innovation implementation and strengthening the influence of IP&Ps. Further, our results suggest that middle managers influence top managers (see Figure 1) by specifying the type of support that would be most effective in facilitating their commitment to innovation implementation.

## Future Research

Our results raise several questions that should be addressed in future research. First, what circumstances incite a particular functional relationship between top managers' support and middle managers' commitment? Does the way in which top managers' support influences middle managers' commitment depend upon characteristics of top managers, middle managers, or the HCs in which they work? Studies with larger sample sizes than ours should investigate these questions.

Second, what is the relative influence of top managers' method of support? Does middle managers' commitment increase most when top managers offer support directly, when they allocate IP&Ps, or when they strengthen the influence of IP&Ps?

Third, we operationalized top managers' support based on middle managers' perceptions. This suggests that middle managers' perceptions may mediate the relationship between top managers' support and middle managers' commitment. If perceptions mediate the relationship, efforts to improve middle managers' perceptions may complement efforts to increase top managers' support. Investigation of these questions will contribute to finding effective ways to improve middle managers' commitment and implementation effectiveness.

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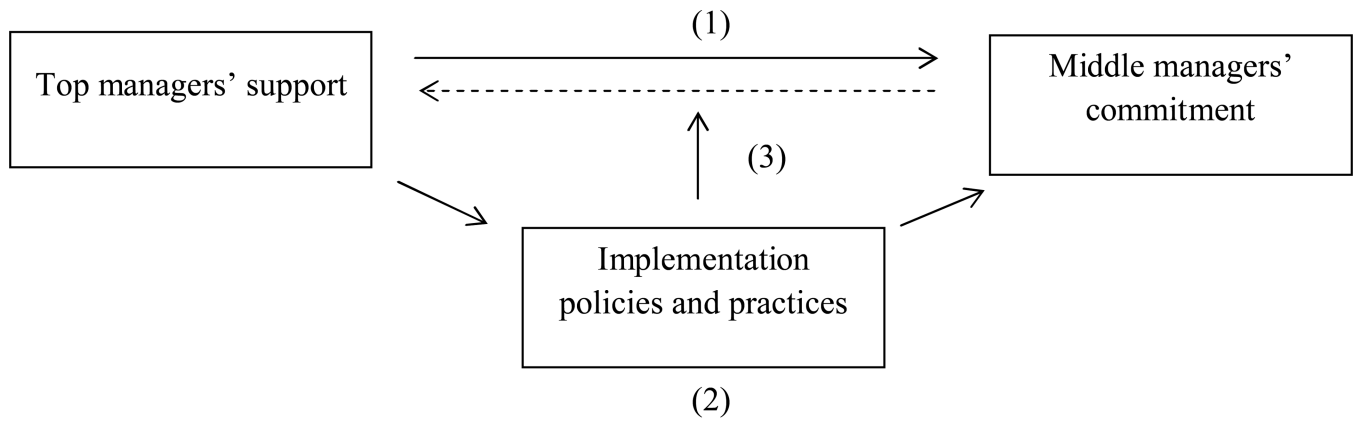
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- (1) Direct effect through task behavior
- (2) Mediated effect through relations behavior
- (3) Moderated effect through change behavior
- <----- Emergent relationship

**Figure 1.**  
The relationship between top managers' support and middle managers' commitment to innovation implementation in healthcare organizations

**Table 1**  
 Descriptive Statistics of Middle Managers and Health Centers Implementing the Health Disparities Collaboratives

Variable <sup>a</sup>	N	Mean	SD	Minimum	Maximum
Middle managers' commitment	119	2.67	0.89	1.00	4.33
Top managers' support	109	3.09	1.30	1.00	5.00
Incentives	119	2.75	0.89	1.00	5.00
Performance reviews	120	2.94	1.15	1.00	5.00
Funding	95	2.28	1.02	1.00	5.00
Human resources (administrative)	118	3.95	0.88	1.00	6.00
Human resources (clinical)	119	4.14	0.76	1.67	5.67
Training (changing health systems)	120	3.73	0.73	2.00	5.00
Training (encouraging providers)	120	3.74	0.93	1.50	5.00
Local social network involvement	118	3.54	3.26	1.00	17.00
Organizational size <sup>b</sup>	84	15182.00	13278.00	300.00	63000.00
Organizational turnover <sup>c</sup>	118	1.80	1.70	1.00	18.00
Organizational tenure <sup>d</sup>	119	7.20	5.60	1.00	26.00
Job tenure <sup>d</sup>	96	2.68	1.43	0	6.00

<sup>a</sup>The appendix contains variables' operationalizations and psychometric properties

<sup>b</sup>Health center's annual number of unique, unduplicated patients

<sup>c</sup>Number of employees who served as health center's Health Disparities Collaboratives team leader

<sup>d</sup>In years

**Table 2**

Predictors of Middle Managers' Commitment to Health Disparities Collaboratives Implementation in Ordinary Least Squares Regression Analysis<sup>a</sup>

Variable	$\beta$	SE
Intercept	0.73	0.80
Top managers' support	0.37*	0.21
Performance reviews	0.40**	0.20
Incentives	0.40*	0.23
Top managers' support $\times$ Performance reviews	-0.04	0.05
Top managers' support $\times$ Incentives	-0.08	0.07
Accurate patient data entry <sup>b</sup>	-0.10	0.10

\*\*  
p < .05

\*  
p < .10

<sup>a</sup>N = 102. R<sup>2</sup> = 0.18. Adjusted R<sup>2</sup> = -0.13. F = -3.46. Middle managers' commitment is defined as engaging in activities that go beyond fulfilling Health Disparities Collaboratives job requirements: regular use of Health Disparities Collaboratives web page, listserv, and virtual classroom. The appendix contains variables' operationalizations and psychometric properties.

<sup>b</sup>A marker variable was included to control for the unmeasured variance associated with using middle managers' responses to construct both dependent and independent variables.