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Team Virtues and Performance: An Examination of Transparency, Behavioral Integrity, and Trust

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ABSTRACT. Virtue-based research in business ethics has increased over the last two decades, but most of the research has focused on the actions of an individual person. In this article, we examine the associations among *team-level* virtues using data from two studies. Specifically, we investigate whether transparency (usually thought to be an organizational- or collective-level construct), behavioral integrity (usually thought to be an individual-level construct), and trust (usually thought to be an individual-level construct) can be conceptualized and operate at the team level of analysis and, if so, what their relationships are to team performance. Using Partial Least Squares (PLS) analysis, we found in both studies that team transparency was positively related to team behavioral integrity, which in turn was positively related to team trust. We also found evidence of a positive relationship between team trust and team performance. Implications of these findings for future teams and ethics research are discussed.

KEY WORDS: integrity, performance, teams, transparency, trust, virtues

The recent spate of organizational and individual ethical lapses in business and government has been met with an ever-growing chorus of calls for increased ethical awareness and action. As a result of such calls, organizational researchers have begun to consider different ethical frameworks for, as Chun (2005) points out, most research in applied business ethics has focused on Kantian (rule-based) or Utilitarian (cost/benefit) theoretical approaches. Over the past decade, an increasing amount of research has considered a more virtue-based approach (Solomon, 2003). An approach based on virtues, which are simply dispositions that constitute good character (MacIntyre, 1984), focuses on positive patterns of behavior across time and situations.

Despite this burgeoning interest in virtues, most research has tended to focus on the virtues (or lack thereof) of individual persons, or on the virtues (or lack thereof) of organizations, or on the relationship between the virtues of individuals and organizations (e.g., Audi and Murphy, 2006; Cameron et al., 2004; Caza et al., 2004; Chun, 2005). Although ethics research at the individual and organizational levels of analysis is undoubtedly important and potentially fruitful, we believe that that limiting research to these two levels omits another potentially important level of analysis: the team, defined as two or more interdependent individuals who work jointly to accomplish one or more tasks. Given the ever-increasing importance of teams in the knowledge-based economy (Baker et al., 2006), a great amount of research has focused upon the performance and effectiveness of teams (Guzzo and Dickson, 1996). Much of this research has focused on team-level performance antecedents such as team efficacy and potency (Gully et al., 2002; Howell and Shea, 2006), and newer research has focused on ethics within teams (Schminke et al., 2002), but, to our knowledge, no research has yet examined the effects of team-level ethical constructs on team performance. In response to this lack of exploration, we propose that consideration of team-level ethics is important, and that a virtue-based approach is a viable option for doing so.

Given that virtues typically have been considered in frameworks conceptualized at either the individual or organizational levels, an examination of team virtues should begin with a usable conceptualization at that level of analysis. Thus, we draw on research about multiple levels of analysis (cf. Dansereau et al.,

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1984; Klein et al., 1994) to develop a theoretical framework in which to explore team virtues. We start with the assumption that virtues are fundamentally isomorphic – that is, they have the same basic structure and function across levels of analysis (Kozlowski and Klein, 2000). Specifically, we develop a model which considers key virtues at the team level of analysis: transparency (usually considered as an organizational- or collective-level virtue), behavioral integrity (usually conceptualized as an individual-level virtue), and trust (usually considered as an individual-level virtue).

We begin by reviewing the literature about levels of analysis and each respective virtue (transparency, behavioral integrity, and trust). We next develop an initial theoretical model which considers the relationship among these variables; specifically, we propose that team transparency leads to team behavioral integrity, which in turn leads to team trust and finally to team performance. We then test this model with data from two studies. Study 1 is a longitudinal study of temporary work teams, while Study 2 is a field study of nurses in a healthcare network. We conclude with a discussion of the results and future directions for research.

Literature review and theoretical development

Levels of analysis

Yammarino et al. (2005, p. 882) define levels of analysis as ''the entities or objects of study.'' As Klein et al. (1994) point out, organizations inherently include multiple levels of analysis, as individuals may work alone, in dyads, in teams, and/or in organizations, all of which may in turn interact with other individuals, dyads, teams, and organizations. Many variables of interest may be considered at different levels of analysis. For example, performance is often considered at individual, dyad, team, and organizational levels. In contrast, other variables of interest are exclusive at a particular level of analysis. Group cohesion, for example, by definition is conceptualized exclusively to the group level of analysis.

Over the last two decades, there have been increasing calls for more explicit consideration of levels of analysis. Explicit consideration of levels of analysis is a critical task for two primary reasons (Yammarino et al., 2005). First, failure to consider levels of analysis leaves theory building and theory testing incomplete, and may lead to incorrect conclusions. For example, consider a company whose sales are lagging. Senior management believes that its sales force is unmotivated and decides to send all salespersons for individual motivational training (a response aimed at the individual level of analysis). After much time and effort, senior management is dismayed to discover that sales have not improved. Unknown to senior management, the problem was not the motivation of individual salespersons, but rather the existence of red tape and needless rules that inhibited the entire sales team (a problem which occurred at the team or organizational level of analysis). Second, consideration of different levels of analysis may provide important insight. For example, Yammarino et al. (2005, p. 881) point out that a revolution occurred in physics when physicists proposed, and subsequently demonstrated, that quantum mechanics operate at a level *lower* than the atomic level.

Klein et al. (1994) show that it is necessary to consider three elements when conducting multilevel research: the level of theory, the level of measurement, and the level of statistical analysis. First, the level of theory describes the target which a researcher wishes to describe or investigate. For example, our model is focused on teams as the target level of analysis. More specifically, we investigate the four constructs of transparency, behavioral integrity, trust, and performance at the team level. Thus, each of these four constructs is a property of the teams themselves, not the individuals that compromise the team, nor the organizations within which the teams are embedded. In other words, to say that Team A has high behavioral integrity is to say that Team A *as a whole unit in and of itself* has high behavioral integrity. Certainly, it seems plausible that Team A might have high behavioral integrity because it is composed of high behavioral integrity individuals or because it is embedded in an organization whose culture reflects high behavioral integrity, but these types of issues which involve multiple levels of analysis are not considered in the current model. In addition to consideration of teams as whole units, our model also includes an assumption of isomorphism, meaning that each construct has the same

structure and function (i.e., relationship to other constructs) at different levels of analysis. For instance, empirical evidence shows that behavioral integrity is related to trust at the individual level (Simons et al., 2007); the assumption of isomorphism leads to the assertion (which we test) that behavioral integrity is related to trust at the team level as well.

Second, the level of measurement describes the actual source of the data which are to be analyzed. For example, in both studies presented here, data were collected from individual team members (with the exception of team performance). Following the method used by Hofmann and Jones (2005) for adapting the individual-level Big Five personality types to the team level, we used what Chan (1998) has called a referent-shift compositional model. In other words, we adapted existing individual-level measures to allow individuals to rate the team as a whole unit. In contrast, team performance data were collected from third-party sources which provided a single, team-level rating of performance.

Finally, the level of statistical analysis describes the treatment of the data in statistical analysis. In both studies presented here, individual-level data were aggregated to the team level (again, with the exception of team performance, which was collected and analyzed at the team level). Mean individual scores were used for aggregation after justifying within-group agreement via within-group (r_{wg}) and intraclass correlation coefficient (ICC(1))statistics.

Transparency

Transparency has been discussed under different labels in several areas of the literature. While the core idea in all these conceptualizations is the same [i.e., that transparency is a virtue (Murphy et al., 2007) which involves openness, availability, or disclosure of information], they differ in terms of what is being disclosed and the level of analysis at which they are defined. For instance, in the accounting area, the notion of accounting transparency is concerned with public dissemination of information about business transactions and exists at the national level (Bushman and Smith, 2003). Political transparency is concerned with public disclosure of information the government possesses or collects as well as public disclosure of information about government actors, the decisions they make, and the reasons for those decisions (Balkin, 1999). It can exist at the national, state, and local government levels (Balkin, 1999). In the computer-supported cooperative work literature, a subarea within information systems, researchers focus on contextual awareness that results at the team level when team members disclose information about their current work context (e.g., how busy they are, and what they are currently doing) so that others in the team can decide whether or not to disturb them (Dabbish and Kraut, 2008). Within the organizational behavior area, transparency may be conceptualized at the organizational level as informational justice, which entails providing explanations about organizational procedures and being thorough, candid, timely, and considerate toward others' specific needs in communications about those procedures (Colquitt, 2001).

We are concerned with transparency at the team level, and our focus is on the sharing of enough information and explanations that enable group/team members to carry out their components of the group's/team's task. Accordingly, we define *team transparency* as the sharing of relevant information and explanations within a team to enable its members to carry out their responsibilities within the team. Similar to Eggert and Helm's (2003) description of relationship transparency, we focus on the degree to which there is an atmosphere in which team members inform one another with information and explanations about decisions which are made.

Behavioral integrity

Palanski and Yammarino (2007) have shown that there is a great deal of misunderstanding and difference surrounding the meaning of word *integrity*. They showed that integrity has been used in management, applied psychology, and business ethics literature to mean many things, including wholeness, authenticity, consistency in adversity, consistency between words and actions, and moral/ethical behavior. They proposed that integrity should be considered as a virtue within the framework of moral philosophy as a way to resolve this misunderstanding and difference of opinion. Based on this framework, they suggested that integrity should be defined as "the consistency of an acting entity's

words and actions'' (Palanski and Yammarino, 2007, p. 17). In addition, Palanski and Yammarino (2009) have developed a multi-level theory of integrity which, among other things, explicitly considers the integrity of teams. Palanski and Yammarino's (2007, 2009) definition of integrity is very similar to Simons (2002, p. 19) definition of behavioral integrity, the ''perceived pattern of alignment between an actor's words and deeds.'' Because behavioral integrity is more precise terminology and has a nascent stream of research at the individual level (e.g., Dineen et al., 2006; Simons et al., 2007), we retain the behavioral integrity terminology, but draw on Palanski and Yammarino's (2009) model as the basis for our theoretical discussion and hypotheses.

Behavioral integrity at the individual level has been linked theoretically to organizational citizenship behaviors and willingness to accept change (Simons et al., 2007) and has been shown both to directly affect and to moderate the effect of supervisory guidance on employee conduct (Dineen et al., 2006). Behavioral integrity of individual leaders has also been linked to increased follower trust, both theoretically (Simons, 2002) and empirically (Simons et al., 2007).

Because most theory about behavioral integrity focuses on the individual level of analysis, Palanski and Yammarino (2009) distinguished between the integrity of individual team members and the integrity of the overall group (team). They described the integrity of the group as the integrity of an acting entity; in other words, although group-level integrity may emerge from the individual integrity of the team members, group-level integrity refers to the integrity of the team as a separate, autonomous entity which is irreducible to the individual level of analysis. Simons' (2002) concept of behavioral integrity includes two theoretical sub-dimensions: consistency between espoused and enacted values and consistency between promises made and promises kept. Palanski and Yammarino (2009) retained these two sub-dimensions, noting that team values may be espoused in several forms, such as through team mission statements or mottos, in team lingo, or in team goals. Likewise, a team as a whole may also make and keep promises (e.g., the information technology team at a company promises to resolve issues within a specified period of time), thus demonstrating that team-level behavioral integrity is plausible.

We surmise that both aspects of transparency, amount of information shared and amount of explanation for decisions made, will enhance behavioral integrity. Simons (2002) describes behavioral integrity as a *perceived* pattern of alignment between words and deeds. In order for individuals to formulate perceptions, the actual words and deeds of others must be made salient. Similarly, the words and deeds of a team must be made salient for ascriptions of team behavioral integrity. We believe that higher levels of information sharing will lead to more salient awareness of behavioral integrity. While increased salience may strengthen the relationship between transparency and behavioral integrity, the direction of this relationship (positive or negative) is still open to debate. For instance, a team might be high in transparency and yet have very low behavioral integrity. In such a case, the team's high transparency would likely lead to an even lower assessment of its behavioral integrity as the team's word/deed misalignment comes to light. However, based on evidence that virtues tend to enjoy a positive relationship with one another (Palanski and Yammarino, 2007), we suspect that such instances will be rare and that the transparency-behavioral integrity relationship will usually be positive. Moreover, the ''explanation of decisions made'' aspect of transparency may also support a positive relationship, as others may overlook a possible word/deed misalignment provided there is an adequate explanation. For example, a team may espouse the value of ''never be late for a meeting with another team,'' only to show up late to a meeting. Technically, this action would indicate a misalignment between word and action; however, if the offending team offers a reasonable explanation (e.g., they stopped to help at the scene of a traffic accident), the perception of behavioral integrity may not be affected. Thus, we propose

Hypothesis 1: Team transparency will be positively related to team behavioral integrity.

Trust

Research on trust, particularly follower trust in a leader, has expanded greatly over the past 15 years. Research has shown that trust is an important antecedent for a number of key outcomes, including

job performance, organizational citizenship behaviors, organizational commitment, job satisfaction, and turnover intentions (Dirks and Ferrin, 2002). Different researchers have proposed different conceptualizations of trust, which have resulted in confusion and disagreement about the meaning and impact of trust. Following Dirks and Ferrin (2002), we define trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (p. 395).

Palanski and Yammarino (2009) point out that a number of studies have examined team-level trust (e.g., Peters and Karren, 2009), but most of these studies do not consider trust in the team as a whole (Dirks and Ferrin, 2002). However, Currall and Inkpen (2002) examine the issues surrounding trust at various levels of analysis, proposing that an individual, a team, or a firm (organization) may be either a trustor or a trustee. Thus, trust may exist, for instance, between two different firms, between an individual (e.g., employee) and a firm, or between two teams within an organization (Palanski and Yammarino, 2009).

According to Palanski and Yammarino's (2009) model, the notion that team behavioral integrity will lead to trust in the team is based on an assumption of isomorphism (Kozlowski and Klein, 2000) in which the higher-level constructs (i.e., team behavioral integrity and team trust) have the same structures and functions as the lower-level constructs (i.e., individual behavioral integrity and individual trust). Given that team behavioral integrity has the same structure (consistency of words and actions) as behavioral integrity at the individual level, and that team trust has the same structure (willingness to be vulnerable) as trust at the individual level, we propose that the function of the two constructs is the same at both the individual and team levels. Specifically, we surmise

Hypothesis 2: Team behavioral integrity will be positively related to team trust.

Given the Aristotelian tradition upon which virtue ethics is based, one might legitimately ask the question, "What is/are the purpose(s) of teams?" Just as the virtues of a knife (e.g., sharpness and strength) enable it to fulfill its purpose (i.e., to cut), so too should team-level virtues (e.g., transparency, behavioral integrity, and trust) enable a team to fulfill its purpose(s). While teams may exist to fulfill multiple purposes, at the very least in a business context a team exists to accomplish specific tasks – i.e., to perform. Thus, team performance is a logical outcome to consider in conjunction with team virtues.

De Jong and Elfring (2010) demonstrated that intrateam trust (perceptions of trust that a team member has in his or her fellow team members) is positively related to team performance. Similarly, Dirks and Ferrin (2002), describing follower trust in leaders, articulated two mechanisms by which trust may positively impact performance. First, as trust develops, people will spend less time "covering their backs" and more time focusing on their jobs. Second, drawing upon social exchange theory, they suggested that individuals who trust one another will develop higher quality social relationships. In these relationships, individuals will help one another and go above and beyond the call of duty, actions which should lead to higher levels of performance. Although Dirks and Ferrin (2002) were describing leader–follower relationships, we believe that the same reasoning applies to teams. Members who belong to a team in which there is a high level of trust (in other words, where the team itself is the trustee) can devote more time to doing their jobs and less time to attempting to manipulate team dynamics to protect themselves. Similarly, teams which have high levels of trust are also likely to have high-quality social relationships in which team members help one another to fulfill job requirements. Thus, given the individual-level evidence that trust is related to performance and the plausible assumption that performance is isomorphic across levels of analysis, we propose

Hypothesis 3: Team trust will be positively related to team performance.

Method and results

We tested the hypotheses using data from two related empirical studies: a lab study with temporary work teams (Study 1) and a field study with ongoing work teams (Study 2). We chose a two-study

approach in an attempt to balance the relative strengths and weaknesses of each study design. Specifically, the lab design of Study 1 was designed to test the model with a sample of temporary, ad hoc teams, to utilize a somewhat larger sample size (n = 35 teams vs. n = 16 teams, respectively), and to allow for more rigorous testing by including data collected at different times. The field setting of Study 2 was designed to support inferences about generalizability of the results by examining permanent, ongoing teams who engaged in a variety of tasks and to replicate the construct, internal, and external validities from Study 1. We present the methods and results for each study independently, followed by a discussion which integrates both studies.

Study 1: laboratory study

Participants and procedures

Participants were 149 students (mostly juniors) in an introductory organizational behavior class at a medium-size public university in the Northeast United States who were randomly assigned to teams of 3–5 members each. Thirty-six students were assigned as team leaders by the researchers based on the results of previous personality test results. Specifically, students who scored highest on the team in previously administered extraversion and conscientiousness testing were assigned to be team leaders. The remaining students (N = 113) were assigned as team members. Missing data reduced useable number of participants to 148 participants (35 leaders and 113 followers) working in 35 teams of 3–5 members each. Participants had a mean age of 21 years, were split evenly between men and women, and had a mean of 4.8 years of at least part-time work experience.

In this study, participants were placed into teams with the purpose of working on one major class project. In an effort to simulate ''real-world'' experiences and enhance generalizability of the results, the team leader was responsible for scheduling and conducting team meetings and communicating with the class instructor and teaching assistants. Team leaders were given limited reward and coercive power (e.g., the option to reallocate extra credit based on contribution and performance). In addition, team members were given individual responsibilities within the team (e.g., communicating with professors and teaching assistants). Data in the form of surveys were collected online through survey software.

Measures

Transparency. We used a five-item scale adapted from Kernan and Hanges (2002) designed to measure the amount and thoroughness of information and explanations that are shared within a team. All five items were measured on a five-point scale ranging from 0 (''strongly disagree'') to 4 (''strongly agree''). An example item was, ''People on this team provide each other with enough details for us to do our jobs.'' Data used in theoretical testing were self-reports of team members collected at Time 1 (about halfway through the 8-week project).

Behavioral integrity. We developed a two-item scale based on Simons' Behavioral Integrity (BI) scale (Simons et al., 2007). Simons' BI scale is focused on the BI of individual leaders and is designed to measure both promise-keeping (e.g., ''When this person promises something, I can be certain that it will happen'') and consistency between espoused and actual values (e.g., ''This person conducts himself/herself by the same values that he/she talks about''). Our scale retains these two theoretical subdimensions with two questions (i.e.., ''How often does this team keep promises?'' and ''How often does this team act in a way that shows that these values are actually important?'', respectively) with behaviorally anchored responses ranging from 0 = ''not at all'' to 4 = ''frequently, if not always.'' Data used in theoretical testing were self-reports of team members collected at Time 1.

Trust. Mayer et al. (1995) have noted that various definitions of trust tend to confuse elements of trust and elements of its antecedents and consequences, and suggest using a narrower conceptualization of trust based on the willingness to be vulnerable to another. Mayer and Gavin (2005) have developed a trust scale that was modified for use in this study. All three items are measured on a five-point scale ranging from 0 (''strongly disagree'') to 4 (''strongly agree''). Trust items were modified slightly to reflect a shift from manager to the team. For example, ''If someone questioned my motives, my manager would give me the benefit of the doubt.'' was

changed to "If someone questioned my team's motives, I would give my team the benefit of the doubt." Data used in theoretical testing were self-reports of team members collected at Time 2 (at the conclusion of the 8-week project).

Team performance. Independent third-party (i.e., teaching assistant) reports of team performance were obtained using Mott's (1972) scale, which is designed to measure the quantity, quality, and efficiency of job performance. Answers were assessed on a scale ranging from 0 ("their quality is poor") to 4 ("their quality is excellent"). To minimize response error, each team's performance was rated by two teaching assistants who were asked to reach a consensus and provide a single rating for each team at Time 2.

Results

Table I contains means, standard deviations, correlations, and square roots of average variance extracted (AVE) (see PLS explanation below) for all the variables. Table II contains factor loadings and cross-loadings for all the variables.

To test the assertion that BI, trust, and transparency are all team-level constructs, we computed the r_{wg} within-group agreement statistic and intraclass correlation coefficient, or ICC(1), for team behavioral integrity, team trust, and team transparency. The r_{wg} statistic (James et al., 1993) is calculated by comparing the observed group variance to an expected random variance and is useful for analyzing the variance within a single group. Typically, the expected random variance is assumed to be uniform which, as Bliese (2000) points out, is not without theoretical problems. Still, the comparison to a uniform variance has become somewhat of a standard and is associated with a cutoff value of 0.70. All the variables in the study had an average r_{wg} of 0.84 across teams. The ICC(1) is the proportion of total variance that can be explained by team membership.

TABLE II

Factor and cross-factor loadings, AVE, and internal consistency reliability (ICR) of items in Study 1

Item	Factor			
	1	2	3	4
Team behavioral integrity (AVE = 0.78; ICR = 0.88)				
1	**0.92**	0.47	0.71	0.34
2	**0.84**	0.34	0.66	0.04
Team trust (AVE = 0.67; ICR = 0.86)				
1	0.39	**0.76**	0.32	0.22
2	0.32	**0.82**	0.19	0.24
3	0.37	**0.87**	0.33	0.46
Team transparency (AVE = 0.69; ICR = 0.91)				
1	0.70	0.25	**0.89**	0.10
2	0.73	0.38	**0.82**	0.08
3	0.64	0.32	**0.85**	0.27
4	0.68	0.28	**0.89**	0.20
5	0.43	0.22	**0.70**	0.25
Team performance (AVE = 0.70; ICR = 0.88)				
1	0.00	0.18	0.08	**0.76**
2	0.33	0.46	0.22	**0.93**
3	0.13	0.23	0.15	**0.82**

Note: Factor loadings are indicated in boldface.
AVE = average variance extracted.
ICR = internal consistency reliability.

TABLE I

Means, standard deviations, reliabilities, and correlations for Study 1

Variables	Mean	SD	1	2	3	4
1. Team transparency (Time 1)	3.19	0.34	**0.83**			
2. Team integrity (Time 1)	3.32	0.40	0.78**	**0.88**		
3. Team trust (Time 2)	2.83	0.40	0.35	0.43**	**0.82**	
4. Team performance	3.35	0.76	0.20	0.40**	0.24*	**0.84**

Note: The boldfaced values on the diagonal represent the square root of the AVE.
$n = 35$, *$p > 0.01$, **$p > 0.01$.

Although no clear standard cutoff for the ICC(1) exists, Bliese (2000) reports that most field studies result in an ICC(1) ranging from 0.05 to 0.30. The ICC(1)'s for the variables in this study were in this range, as team transparency was 0.28, team behavioral integrity was 0.23, and team trust was 0.19.

For testing of both the measurement and the theoretical models, Partial Least Squares (PLS) using *SmartPLS* (Ringle et al., 2005) was employed as the primary data analysis technique. PLS is widely used for exploratory data testing and has several advantages over other techniques (Chin and Newsted, 1999). PLS does not require multivariate normal distribution and is especially suitable for the analysis of small samples. Moreover, PLS can help reduce measurement error by weighing the individual indicators of a multi-indicator variable (Sosik et al., 2009). Other forms of path modeling, such as covariance-based structural equation modeling, are generally used in confirmatory model testing and may be susceptible to error in situations where there is a low construct-to-sample size ratio, as was generally the case in this study. PLS also has the ability to test both the measurement model and theoretical model simultaneously. This ability makes PLS preferable to multiple regression analysis in which the measurement model and theoretical models must be tested independently.

The test of the measurement model includes three primary parts: (1) individual item reliability, (2) internal consistency, and (3) discriminant validity. Tables I and II include results for all the three parts. Individual item reliability was assessed by examining the factor loadings of each measure on its corresponding construct. Fornell and Larcker (1981) suggest accepting items which have more explanatory power than error variance. In practice, the generally accepted cutoff is 0.70 or greater. All factor loadings in Study 1 were equal to or greater than 0.70; thus, individual item reliability was generally quite robust for the constructs in these studies.

Construct internal consistency may be assessed by composite internal scale reliability, which is similar to Cronbach's α. Fornell and Larcker (1981) suggest a cutoff of 0.70 for internal consistency. A second way to measure internal consistency is with AVE, which is a measure of variance accounted for by the underlying construct. Fornell and Larcker (1981) suggest a cutoff of 0.50 for AVE. All constructs met both criteria for internal consistency.

Discriminant validity in PLS is assessed in two ways. First, each item should load higher on the construct that it is supposed to measure than on any other construct (Carmines and Zeller, 1979). All items in the study met this criterion. Second, each construct should share more variance with its items than with any other construct in the model (Barclay et al., 1995). This criterion is usually assessed similar to a multi-trait/multi-method approach. Specifically, the square root of the AVE of a construct should be greater than the construct's correlation with any other construct in the model. For Study 1, an examination of Table I (in which the square root of the AVE is located on the diagonal) demonstrates that this criterion was also met. Based on both of these criteria, the variables in this study showed strong discriminant validity.

Results of the test of the theoretical model are shown in Figures 1 and 2. The standardized beta coefficient for each path in the model was obtained from the PLS algorithm in *SmartPLS*. Statistical significance of each path in the theoretical model was determined by the *t*-value for a given bivariate relationship based on a bootstrapping technique with 500 iterations. Results showed that team transparency was positively related to team behavioral integrity ($b = 0.78$, $p < 0.01$); thus, Hypothesis 1 was supported. The relationship between team behavioral integrity and team trust was also positive ($b = 0.43$, $p < 0.05$); thus, Hypothesis 2 was supported. Similarly, in support of Hypothesis 3, there was a significant positive relationship between team trust and team performance ($b = 0.40$, $p < 0.05$).

Study 2: field study

Participants and procedures

Data were collected from clinical nurses and their managers in a regional healthcare organization. Eighty-three nurses from 18 offices (which were directed by a total of five managers, each of whom was responsible for 1–5 offices and approximately 20 nurses) participated in the study with a response rate of 80%. Because of low response rates in two offices, the number of usable teams (defined as the staff in a given office) was 16. Participants were 95.3% women with a mean age of 45.4 years. Average

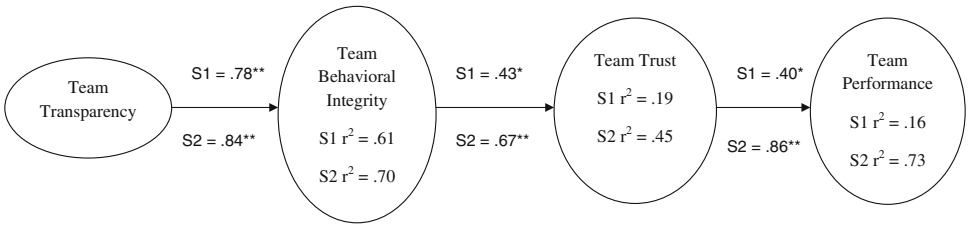

Figure 1. Results from Study 1 and Study 2. Results on path lines are standardized *b* weights. S1 = Study 1; S2 = Study 2, $\star p < 0.05$; $\star\star p < 0.01$.

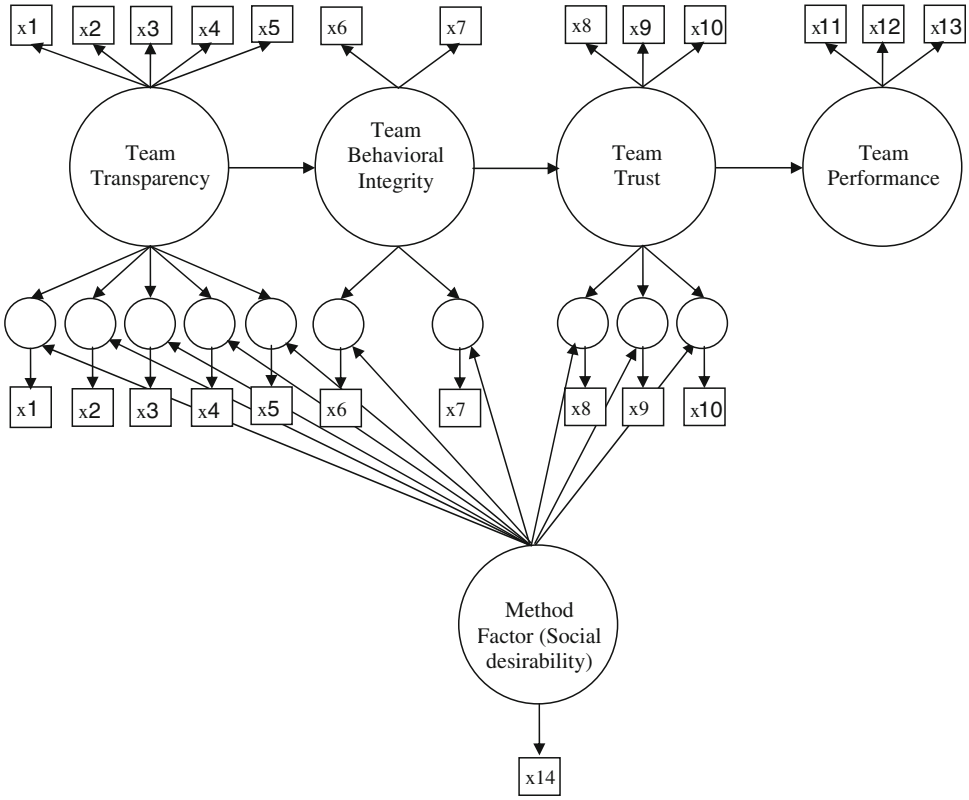

Figure 2. PLS model for assessing common-method bias. *Note*: Team transparency, team behavioral integrity, team trust, and team performance are substantive constructs. The method factor is added to the theoretical model to assess common-method bias. x1–x14 are indicators of constructs. Indicators x1–x10 were obtained using a survey. x14 is a scale based on items obtained from the same survey that was used to obtain x1–x10. The small circles below substantive constructs are single-indicator constructs that were added to represent survey-based indicators.

organizational tenure was 6.59 years, average job tenure was 4.04 years, and average tenure with manager was 2.02 years. All the participants had at least three months' tenure with the team. Potential non-response bias was assessed by comparing demographics of usable responses with demographics of non-usable (anonymous) responses and non-participants. Results of a MANOVA for age and gender revealed no significant differences on these variables. Data were collected on site in paper-and-pencil format. Participants who were not able to complete the surveys on-site were provided with postage-paid envelopes which were addressed directly to the principal investigator.

Measures

For consistency across studies, we used the same scales from Study 1 for team transparency, team behavioral integrity, team trust, and team performance. Data for transparency, BI, and trust were cross sectional and obtained from team members, but, in an effort to reduce common-source bias, team performance was assessed by a director who was not a part of the teams and responsible for overseeing all the 18 offices.

Results

Table III contains means, standard deviations, correlations, and square roots of AVE (see PLS explanation below) for all the variables. Table IV contains factor loadings and cross-loadings for all the variables.

To test the assertion that transparency, BI, and trust are all team-level constructs in Study 2, we again computed the r_{wg} within-group agreement statistic and intraclass correlation coefficient, or ICC(1), for team transparency, team behavioral integrity, and team trust. All the variables in the study had an acceptable r_{wg} average across teams (team behavioral integrity = 0.75, team trust = 0.77, and team transparency = 0.75, respectively). The ICC(1)'s for the variables in this study were also in the range reported by Bliese (2000), as team behavioral integrity was 0.17, team trust was 0.08, and team transparency was 0.10.

For testing of both the measurement and the theoretical models, we once again used PLS with *SmartPLS* (Ringle et al., 2005). We followed the same methods for assessing the measurement and the theoretical models as for Study 1. Tables III and IV include results for all the three parts. Individual item reliability exceeded the 0.70 threshold suggested by Fornell and Larcker (1981). All the constructs also met both criteria (0.70 for internal scale reliability and 0.50 for AVE) for internal consistency. Finally, discriminant validity was demonstrated as each item

TABLE IV

Factor and cross-factor loadings, AVE, and ICR of items in Study 2

Item	Factor			
	1	2	3	4
Team behavioral integrity (AVE = 0.96; ICR = 0.98)				
1	**0.98**	0.69	0.81	0.54
2	**0.98**	0.61	0.84	0.42
Team trust (AVE = 0.75; ICR = 0.90)				
1	0.51	**0.84**	0.64	0.80
2	0.76	**0.94**	0.79	0.71
3	0.43	**0.81**	0.46	0.61
Team transparency (AVE = 0.93; ICR = 0.99)				
1	0.79	0.67	**0.94**	0.51
2	0.84	0.75	**0.97**	0.51
3	0.82	0.66	**0.96**	0.68
4	0.75	0.78	**0.97**	0.71
5	0.85	0.81	**0.97**	0.63
Team performance (AVE = 0.70; ICR = 0.88)				
1	0.63	0.68	0.64	**0.73**
2	0.31	0.73	0.45	**0.93**
3	0.31	0.73	0.45	**0.93**

Note: Factor loadings are indicated in boldface.
AVE = average variance extracted.
ICR = internal consistency reliability.

TABLE III

Means, standard deviations, reliabilities, and correlations for Study 2

Variables	Mean	SD	1	2	3	4
1. Team transparency	3.03	0.61	**0.96**			
2. Team integrity	3.32	0.56	0.67⋆	**0.98**		
3. Team trust	3.10	0.40	0.83⋆	0.67⋆	**0.87**	
4. Team performance	3.34	0.65	0.64⋆	0.49⋆	0.84⋆	**0.85**

Note: The boldfaced values on the diagonal represent the square root of the AVE.
$n = 16$, ⋆$p > 0.01$.

loaded the highest on its designated construct and all square roots of each construct's AVE were greater than each respective construct's correlation with other constructs.

Results of the test of the theoretical model are shown in Figure 2. The standardized beta coefficient for each path in the model was obtained from the PLS algorithm in *SmartPLS*. Statistical significance of each path in the theoretical model was determined by the *t*-value for a given bivariate relationship based on a bootstrapping technique with 500 iterations. Results showed that team transparency was positively related to team behavioral integrity ($b = 0.84$, $p < 0.01$); thus, Hypothesis 1 was supported. The relationship between team behavioral integrity and team trust was also positive ($b = 0.67$, $p < 0.01$); thus, Hypothesis 2 was supported. Similarly, in support of Hypothesis 3, there was a significant positive relationship between team trust and team performance ($b = 0.86$, $p < 0.01$).

Discussion

Before discussing the results from hypothesis testing, it is important to note some of the construct validation results from PLS testing in both studies. First, variables which were measured at the individual level and aggregated to the team level (i.e., transparency, BI, and trust) all had very robust support for aggregation both from r_{wg} and ICC(1) statistics. Further, these variables also displayed robust internal consistency and reliability, as well as acceptable discriminant validity. We highlight these results because, to our knowledge, these are the first studies which contain team-level transparency and BI as focal constructs, and the data here offer initial empirical support for their operation at the team level of analysis.

Hypothesis 1 suggested a positive relationship between team transparency and team behavioral integrity, as the free exchange of information may be necessary for the recognition of BI. PLS results showed strong support for the paths in both studies ($b = 0.78$ and $b = 0.84$, respectively), as well as the practical significance of transparency as an antecedent to BI, with a high amount of variance explained in both studies ($r^2 = 0.61$ in Study 1 and $r^2 = 0.70$ in Study 2). Although the PLS results showed support for the discriminant validity of the two variables, we were concerned that the magnitude of their relationship might be exaggerated by common-method bias, as both variables were collected at the same time in the same way from the same raters in both studies. As such, we performed post hoc analyses to test for the possible effects of common-method bias as follows.

Except for team performance, all other criterion and predictor variables were measured using group members' responses to a survey, resulting in a concern about common-method bias. In a structural equation model, the presence of common-method bias can be assessed by including a common-method factor in the model being tested and linking this factor to indicators measured by this common method. Williams et al. (2003) suggest that the common-method factor may be modeled using a scale for social desirability, which can be a potential reason for the common-method bias. The surveys administered in both the laboratory and field studies included 10 true–false questions that measured social desirability (Strahan and Carrese Gerbasi, 1972). Items measuring this variable included "I like to gossip at times." and "I never resent being asked to return a favor." A scale for social desirability was constructed from these items and was used to indicate the common-method factor that we included in our model to assess the level of common-method bias.

Unlike covariance-based structural equation modeling (which is implemented using packages such as LISREL and AMOS), PLS does not allow one to directly link more than one construct with an indicator. Therefore, to model the effects of a substantive construct and the common-method factor on any survey-based indicator, one has to finesse the structural equation model using a method suggested by Liang et al. (2007). This method involves the modeling of survey-based indicators that need to be tested for common-method bias as new constructs. Essentially, one adds new constructs to the model: one for each survey-based indicator. Each of these new constructs is modeled with a single but different survey-based indicator and is represented as being dependent on the substantive construct (that the indicator is representing) and the common-method factor. See Figure 2 for a depiction of the resulting model. Liang et al. (2007) argue that this finessing is valid because the variance that is shared between a survey-based indicator and its substantive construct

remains unaltered and is now represented as the variance shared between two constructs, i.e., the new single-indicator construct representing the indicator and the substantive construct represented by the indicator. Similarly, the variance shared between a survey-based indicator and the common-method factor is unaltered and is now represented as the variance shared between the new single-indicator construct representing the indicator and the common-method factor.

According to Williams et al. (2003), common-method bias may be suggested when (a) the common-method factor has a significant effect on the new constructs representing survey-based indicators, and (b) the new constructs share more variance with the common-method factor than with their respective substantive constructs. Results of testing the new model suggest that common-method bias is probably not a serious concern for this study. Specifically, in the laboratory study, none of the 10 paths from the common-method factor to the new constructs representing survey-based indicators were significant (the magnitudes of path coefficients ranged from 0.036 to 0.129); in the field study, only one path out of ten (the path from the common-method factor to a construct representing an indicator of transparency) was significant (the magnitudes of path coefficients ranged from 0.017 to 0.213). In addition, in the laboratory study as well as the field study, none of the new constructs shared more variance with the common-method factor than it did with their respective substantive constructs. In the laboratory study, the average substantively explained variance was 0.70, while the average method-based variance was 0.02. Thus, the ratio of substantively explained variance to method-based variance was 35:1. In the field study, the corresponding variances were 0.08 and 88, and the ratio was 11:1.

The second path in the model (Hypothesis 2) suggested a relationship between team behavioral integrity and team trust. This relationship was predicated on an assumption of isomorphism based on prior BI research at the individual level of analysis (Simons, 2002; Simons et al., 2007). Results from both studies showed support for both the paths ($b = 0.43$ and $b = 0.67$) and variance explained ($r^2 = 0.19$ and $r^2 = 0.45$). Although the post hoc test described above did not reveal common-method bias between BI and trust, the relatively lower path weights and variance explained in Study 1 may be in part attributed the fact that these variables were collected at different times, whereas in Study 2 they were collected simultaneously. Some of the differences are also likely attributable to the differences between the samples. Sample 1 consisted of temporary, ad hoc teams in which trust may not be fully developed and may not play a major role for the team. In contrast, Study 2 consisted of more permanent and established teams in which consistent behavior, as demonstrated by BI, is more important for developing trust in the team over time and across different situations.

Relative differences in the results for Hypothesis 3 may also be attributed in part to differences between the two samples. The results in Study 1 showed a solid path weight ($b = 0.40$) and variance explained ($r^2 = 0.19$), indicating that trust plays an important role in determining team performance. In contrast, results from Study 2 indicate a very strong relationship between team trust and team performance, both in terms of path weight ($b = 0.86$) and variance explained ($r^2 = 0.73$). In retrospect, this makes a good deal of sense, for the teams in Study 2 are providing healthcare services which intrinsically require a great deal of trust in the team (especially on the part of patients).

Despite the differences in magnitude of the results for Hypothesis 3 between the samples, the fact that the paths in both samples were significant is somewhat striking, given that team performance was rated by independent, third-party raters in both samples. Trust in the individual has tended to play a modest role with respect to individual performance. For example, in their meta-analysis, Dirks and Ferrin (2002) found a correlation of 0.16 between trust in leader and job performance at the individual level. Based on correlations ($r = 0.24$ in Study 1 and $r = 0.84$ in Study 2) in our two studies, there may be a more significant association between trust and performance at the team level.

Limitations and future directions

Although we tried to balance strengths and weaknesses through a two-study design, several limitations remain. First, although Study 1 employed data

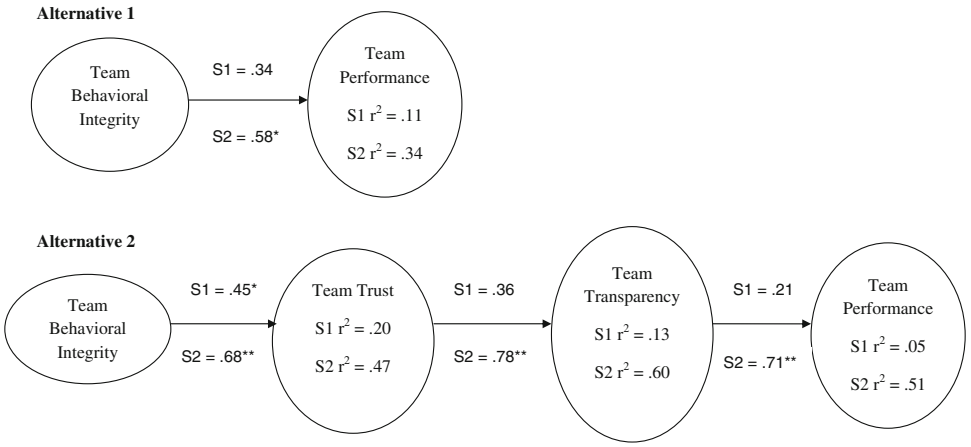

Figure 3. Alternative model results from Study 1 and Study 2. Results on path lines are standardized *b* weights. S1 = Study 1; S2 = Study 2. $\star p < 0.05$; $\star\star p < 0.01$.

collection at a different time for trust, data from both studies were mostly cross sectional. Even third-party ratings of team performance were collected at the same time as other variables. Thus, inferences about how and when constructs develop and influence one another with respect to teams should be interpreted with caution.

Second, although the level of theory and the level of data analysis are at the team level, data for transparency, BI, and trust were collected at the individual level and aggregated. Although aggregation to the team level was supported, perceptions of team transparency, BI, and trust were not totally homogenous; thus, there may be individual differences in perception which are important. Moreover, data about transparency, BI, and trust were collected from team members themselves. One could make an argument, however, that perceptions of these constructs, especially BI and trust, should be measured by parties outside the group. For example, in Study 2, it would be interesting to obtain patient perceptions of BI and trust for the teams of nurses. After all, in that type of situation, patient trust might be the most important outcome.

Finally, the model presented here is not the only conceivable model, especially with respect to BI and transparency. Research at the individual level of analysis has posited and subsequently demonstrated that BI's impact on performance is mediated by trust (e.g., Simons, 2002). We have made assumptions of isomorphism such that team-level constructs in this model will function in the same manner as constructs at the individual level of analysis; however, other alternatives may be possible. As such, we also tested an alternative model in which team-level BI has a direct association with team performance. The results are described in Figure 3 (Alternative 1).

Likewise, while we have posited that transparency is necessary to demonstrate BI, transparency may also be viewed as a risk of sorts. For example, when a person discloses information about himself/herself, that information may be potentially used against the person in a harmful way. If the same person is faced with the choice of whether to disclose information on behalf of the team, then he/she may be more likely to disclose the information whether he/she trusts the team. As a result, we may be able to make a case that transparency (when viewed as a risk) should be an outcome resulting from high trust, rather than an antecedent to BI. Thus, we also tested an alternative model in which team behavioral integrity is associated with team trust, which in turn is associated with team transparency and subsequently team performance. The results from this alternative model are described in Figure 3 (Alternative 2).

In Study 1, the results indicate that the proposed alternative models' paths were not significant, thus lending support to the fact that the hypothesized model is a better fit to the data. In Study 2, the proposed alternative models' paths were significant, indicating that both of these models may provide alternative explanations. Although PLS does not produce model-fit matrices (as might be found in covariance-based SEM), the variance explained may

be used to compare models in terms of explanatory power (Chin, 1998). In the hypothesized model, the team performance r^2 is 0.73. In Alternative 1, the team performance r^2 is 0.34, while in Alternative 2 it is 0.51. Thus, while both alternatives may provide alternative explanations, neither provides as much explanatory power as the hypothesized model. The result from Study 2, when coupled with the null alternative results in Study 1, lend further support to the hypothesized model as the best explanation.

Overall, the model and results presented here suggest that the analysis of virtues at the team level of analysis has the potential for contributing to our knowledge on team performance and team dynamics. The validity of the model would be strengthened by considering other perceptions (e.g., customer) of a team's transparency, BI, and trust in future studies. Other research should also consider possible cross-level effects on team performance and other variables in the model. For example, in consideration of ''top-down'' effects, what effect might transparency at a higher level (e.g., organization) have on team functioning? With respect to integrity, Palanski and Yammarino (2009) discussed the differences between a compositional entity (the compositional ''makeup'' of the team based on the level of integrity of each of its members) and an acting entity (the integrity of the team in and of itself). It is likely that there are similar ''bottom-up'' cross-level aspects to transparency and trust, and future research should consider these aspects. Also, just as a team leader's integrity likely affects the team's integrity (Palanski and Yammarino, 2009), research is needed about how a team leader's transparency and trustworthiness impact the same elements at the team level.

Finally, the model and methods presented here may serve as a guide to future research which expands virtues from the individual level to the team level. For example, at the individual level, transparency is closely related to informational justice. Thus, our approach may be helpful for expanding other forms of justice (e.g., interpersonal) to higher levels of analysis. Similarly, it would be interesting to explore the role that other virtues (e.g., honesty, courage, and compassion) play in driving team outcomes. Similarly, future research should examine outcomes other than simply performance; for example, overall team ethical conduct would be worthy of future consideration. For now, though, the initial support for team transparency, BI, and trust presented here is a promising first step.

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