Trust and team performance : A meta-analysis of main effects, moderators, and covariates

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Abstract

Cumulating evidence from 112 independent studies (*N*=7,763 teams), we meta-analytically examine the fundamental questions of whether intrateam trust is positively related to team performance, and the conditions under which it is particularly important. We address these questions by analyzing the overall trust-performance relationship, assessing the robustness of this relationship by controlling for other relevant predictors and covariates, and examining how the strength of this relationship varies as a function of several moderating factors. Our findings confirm that intrateam trust is positively related to team performance, and has an above-average impact (ρ = .30). The covariate analyses show that this relationship holds after controlling for team trust in leader and past team performance, and across dimensions of trust (i.e., cognitive and affective). The moderator analyses indicate that the trust-performance relationship is contingent upon the level of task interdependence, authority differentiation, and skill differentiation in teams. Finally, we conducted preliminary analyses on several emerging issues in the literature regarding the conceptualization and measurement of trust and team performance. Together, our findings contribute to the literature by helping to: 1) integrate the field of intrateam trust research; 2) resolve mixed findings regarding the trust-performance relationship, 3) overcome scholarly skepticism regarding the main effect of trust on team performance, and 4) identify the conditions under which trust is most important for team performance.

Keywords: trust, performance, teams, meta-analysis.

Introduction

Trust is a fundamental characteristic of any work relationship and one of the most frequently studied constructs in organizational research today (De Jong, Kroon, & Schilke, forthcoming; Fulmer & Gelfand, 2012). As organizations have increasingly become flatter and team-centered (Devine, Clayton, Philips, Dunford, & Melner, 1999), scholarly interest in trust among team members (hereafter referred to as 'intrateam trust') and its implications for team performance has rapidly increased (see Figure 1). To date, a multitude of studies have been conducted on the performance implications of intrateam trust across a broad range of team types and contexts (e.g., Braun, Peus, Weisweiler, & Frey, 2013; Lee, Gillespie, Mann & Wearing, 2010; Langfred, 2007; Porter & Lilly, 1996). Given this fairly large number of studies, one would expect research on intrateam trust to have yielded accumulated insights to inform managers and scholars alike.

Unfortunately, research on this topic is fragmented in at least two ways. First, in many studies trust is not the core variable of interest. Rather, it is modeled as either one among many predictors of team performance (e.g., Cogliser, Gardner, Gavin, & Broberg, 2012; Cohen, Ledford Jr., & Spreitzer, 1996), or as a variable that further specifies the relationship between team performance and other independent variables of interest (e.g., Braun et al., 2013; Zheng, 2012). As a result, insights on trust lack coherence and remain widely spread across the team literature. Second, research in which intrateam trust *is* the focal predictor of team performance has yielded mixed and contradictory results (De Jong & Dirks, 2012; Dirks & Ferrin, 2001). Effect sizes across these studies vary substantially in magnitude and direction, with some offering support for a positive impact of trust on performance (De Jong & Elfring, 2010), while others fail to demonstrate an impact (Aubert & Kelsey, 2003), or even suggest a negative effect

on performance (Langfred, 2004). As a result, a cumulative body of evidence on the performance implications of intrateam trust is currently lacking.

The fragmentation and mixed evidence that characterize the field has triggered two reactions. The first is skepticism as evidenced by scholars questioning whether intrateam trust has a main effect on team performance at all. These scholars argue that trust may only impact performance indirectly (Dirks, 1999; Dirks & Ferrin, 2001), that it only benefits some performance dimensions but not others (Aubert & Kelsey, 2003; Jarvenpaa, Shaw, & Staples, 2004), and that trust in other referents (i.e., team leader) may be more critical for team performance (Dirks, 2000). These criticisms call into question whether trust in teams warrants any further attention. The second reaction is to account for the mixed findings by examining moderators of the trust-performance relationship (De Jong & Dirks, 2012; Langfred, 2004). Although such attempts are encouraging, they have tended to examine moderators in a piece-meal fashion, focusing on one or a few factors while ignoring relevant others (for an exception, see Muethel, Siebdrat, & Hoegl, 2012). Moreover, paradoxically, these studies have yielded inconsistent findings themselves regarding the moderating impact of the very factors they examined to help resolve mixed findings (see Alge, Wiethoff, & Klein, 2003; Bierly, Stark, & Kessler, 2009; Muethel et al., 2012; Staples & Webster, 2008).

These problems limit the insight that research on intrateam trust and team performance offers to scholars and practitioners alike. The current paper therefore aims to resolve these issues. First, to address fragmentation of the field, this paper meta-analytically integrates empirical findings from 112 independent studies (N=7,763 teams) conducted over the past two decades across a wide range of contexts and teams. Second, to help resolve mixed findings and overcome piece-meal examinations of moderators, we analyze a comprehensive set of contingency factors,

including but also expanding beyond those that have been empirically studied thus far. Third, to help overcome scholarly skepticism regarding the overall main effect of trust on team performance, we examine the robustness of the trust-performance relationship by controlling for a variety of alternative key predictors and covariates. Together, these examinations help answer two fundamental questions. First, is intrateam trust positively related to team performance and if so, what is the magnitude of the relationship? Second, what are key factors that influence the magnitude of this relationship, and under what conditions is intrateam trust particularly important?

Theory and Hypotheses

Conceptual Framework

Beyond simply testing the overall trust-performance relationship, we also examine a number of factors that help to further advance understanding of this relationship. To ensure that the factors we examine are both distinct and meaningful as a set, we distinguish between moderators and covariates (see Figure 2). Covariates are factors that serve to assess the robustness of the *overall main* effect of trust, by testing whether or not its effect holds after controlling for alternative drivers of team performance (e.g., team trust in leader). In doing so, these factors help address scholarly skepticism regarding the main effect of intrateam trust, and relate to our first research question. Moderators, by contrast, are factors that serve to explain the *differential* effects of intrateam trust, by providing insight into the conditions under which it matters most (and least) to team performance (e.g., low versus high task interdependence). In doing so, moderators help resolve mixed findings on trust and performance across studies, and relate to our second research question. In the next sections, we explain each factor in our conceptual model, starting with the direct effect of trust on team performance, and then turning

to the moderators and, lastly, the covariates of this relationship. For each, we propose hypotheses to be subjected to meta-analytic testing.

Direct Effect of Trust on Team Performance

Interpersonal trust can be defined as an individual's willingness to accept vulnerability based upon positive expectations of the intentions or behavior of another (Rousseau, Sitkin, Burt, & Camerer, 1998). By extension, intrateam trust refers to the aggregate levels of trust that team members have in their fellow teammates (Langfred, 2004). Team performance can be broadly defined as the extent to which a team accomplishes its goal or mission (Devine & Philips, 2001).

Despite mixed findings, the dominant assumption in the literature has been, and continues to be, that intrateam trust is beneficial for team performance (Braun et al., 2013; Dirks, 1999). Although the causal mechanisms underlying this relationship are likely to differ across dimensions of trust, the essence of the overall effect is as follows. Trust helps team members to suspend uncertainty about and vulnerability towards their fellow teammates, thereby allowing them to interact with their teammates *as if* this uncertainty and vulnerability were favorably resolved (De Jong & Elfring, 2010; Jones & George, 1998). Through suspension, trust enables team members to work together more effectively and efficiently, and to allocate their energy and exchange resources in ways that contribute to team performance (Dirks, 1999). A lack of trust, by contrast, leads team members to lose sight of the goals and interests of the team and to focus on their personal interests instead (Joshi, Lazarova, & Liao, 2009). In these situations, team members are more likely to engage in defensive actions aimed at protecting themselves against possible harm by others, thereby consuming valuable resources that could otherwise be spent on team goal attainment (Mayer & Gavin, 2005). Based on this reasoning, we hypothesize:

Hypothesis 1: Intrateam trust is positively related to team performance.

Moderators of the Trust-Performance Relationship

While we expect trust to be positively associated with team performance, we also expect that these performance benefits will be contingent on characteristics of the team. In examining the moderating role of team characteristics, we focus on task interdependence, team virtuality, temporal stability, authority differentiation, and skill differentiation; five structural design features that describe how the team as a whole is composed and organized (Stewart, 2006). Our choice of variables is grounded in two recently developed taxonomic frameworks for classifying and differentiating teams: one developed by Hollenbeck, Beersma, and Schouten (2012), which identifies temporal stability, authority differentiation, and skill differentiation as key features of a team's structural design, and one developed in parallel by Wildman, Thayer, Rosen, Salas, Mathieu, and Rayne (2012), which identifies three similar features[1], as well as virtuality and task interdependence as two additional features. Including these latter two characteristics adds to the comprehensiveness of our examination, and allows us to address mixed findings regarding their moderator role that have been found across studies on intrateam trust (see Alge et al., 2003; Bierly et al., 2009; Muethel et al., 2012; Staples & Webster, 2008). We discuss the moderating role of each of the five team characteristics in turn.

Task interdependence. One of the most common moderators in the team literature is task interdependence (Beal, Cohen, Burke, & McLendon, 2003; DeChurch & Mesmer-Magnus, 2010), which can be defined as the degree to which team members must rely on each other's input and resources (e.g., energy, information, materials) to perform their tasks effectively (Wageman, 1995). As this definition suggests, task interdependence reflects the degree to which

[1] Wildman et al. (2012) identify similar factors as Hollenbeck et al. (2012) but use different labels. Specifically, Wildman et al.'s team life span, leadership structure, and role structure factors align with Hollenbeck et al.'s temporal stability, authority differentiation, and skill differentiation factors. While team virtuality was originally labelled 'physical distribution' by Wildman et al., we use the former term in the interest of consistency with the broader intrateam trust literature (Bierly et al., 2009; Staples & Webster, 2008).

team members need to work together as a team (as opposed to working independently) in order to perform well. While intrateam trust brings about teamwork by helping team members to suspend uncertainty about and vulnerability to their fellow teammates (De Jong & Elfring, 2010), the notion of task interdependence implies that such teamwork behaviors will only contribute to the team's performance if they are required for team goal accomplishment (Staples & Webster, 2008). When task interdependence is high, teamwork interactions are critical for accomplishing team goals, and hence trust will strongly influence team performance. When task interdependence is low, by contrast, team members work relatively independently and the team has limited requirements for interaction and collaboration, thereby weakening the impact of trust on team performance. Thus, we predict:

> **Hypothesis 2:** Task interdependence moderates the relationship between intrateam trust and team performance, such that this relationship is stronger when task interdependence is high than when it is low.

Team virtuality. Virtuality can be defined as the degree to which team members do not work in either the same place and/or at the same time, and therefore cannot collaborate face-to-face all of the time (Ortiz de Guinea, Webster, & Staples, 2012; Schweitzer & Duxbury, 2010). As this definition suggests, virtuality is a continuum that varies from low to high as a function of geographical or temporal distribution among team members. Accordingly, low virtuality refers to teams consisting of co-located members who exclusively interact face-to-face (also sometimes referred to as 'face-to-face teams'), while high virtuality refers to teams consisting of distributed members who are unable to interact face-to-face and thus need to rely on technology-mediated communication (also referred to as 'purely virtual teams'; Wildman et al., 2012).

Virtuality is expected to strengthen the trust-team performance relationship due to the increased ambiguity and vulnerability that exists as a result of team members' distribution and their reliance on communication technology to interact and coordinate. Specifically, virtuality limits team members' ability to monitor and verify each other's progress on team tasks, thereby increasing the need for team members to accept inherent uncertainty about others' work status (Muethel et al., 2012). In addition, trust allows team members to suspend their judgement about others, which helps overcome misunderstandings and conflicts that often arise in virtual contexts as a result of low media richness and communication delays. Finally, while information sharing is particularly risky in virtual contexts due to low transparency about how this information will be used by others, trust heightens team members' willingness to share information by allowing them to assume others have positive motives and intentions (Staples & Webster, 2008). In low-virtuality contexts, by contrast, being able to interact face-to-face increases the ability to monitor and verify information, increases the media richness of communication, and heightens transparency about information use. As a consequence, team members need to rely less on trust in order to work together effectively. These arguments lead to the following hypothesis:

Hypothesis 3: Team virtuality moderates the relationship between intrateam trust and team performance, such that this relationship is stronger when virtuality is high than when it is low.

Temporal stability. Temporal stability can be defined as the degree to which team members have a history of working together in the past and an expectation of working together in the future (Hollenbeck et al., 2012; Lee, Koopman, Hollenbeck, Wang, & Lanaj, 2015). This conceptualization is intrinsically linked to the team's life span (Alge et al., 2003). In teams with a short, finite life span (i.e., short-term teams), members are purposefully brought together to

perform a specific task or mission, and disband once the task or mission is complete (Wildman et al., 2012), thereby preventing members from developing a shared history or an expectation of a future together. By contrast, in teams with a continuous, indefinite life span (i.e., ongoing teams), members are brought together to work on multiple tasks over an extended period of time, and there is no pre-defined disbandment date at the team's inception, thus enabling members to develop a shared history and anticipate ongoing future collaboration (Bradley, White, & Mennecke, 2003).

We argue that these two defining elements of temporal stability – a shared history of working together and expectation of ongoing collaboration – will enhance the impact of trust on team performance by making trust more salient, and in doing so, bring forth the effects described for Hypothesis 1. Specifically, in line with attention focus theory (Karau & Kelly, 2004; Saunders & Ahuja, 2006), recognizing that one will be interacting with and reliant upon teammates not only now, but in the foreseeable future, leads team members to be more cognizant of trust (e.g., will I be able to rely upon this team in the future?). By contrast, in temporary teams, recognition that the team is short-term leads team members to focus primarily on work-related issues and accomplishing the job at hand. This task focus makes trust-related issues less salient and hence less likely to affect team interactions. Likewise, a history of working together as a team is likely to create trust judgments that are salient and meaningful and by doing so increase the extent to which they elicit team member behaviors and willingness to devote energy toward team goals, as opposed to personal goals and self-protection. Working together for an extended period also allows the impact of trust to accumulate and persist over time, resulting in more positive team interactions when members trust each other, and more dysfunctional

dynamics when trust is lacking (Ferrin, Bligh, & Kohles, 2008; Zand, 1972). We therefore hypothesize:

> **Hypothesis 4:** Temporal stability moderates the relationship between intrateam trust and team performance, such that this relationship is stronger when temporal stability is high than when it is low.

Authority differentiation. Authority differentiation refers to how decision-making responsibility is distributed across the team (Hollenbeck et al., 2012; Lee et al., 2015). In authority-differentiated teams, a subset of members with high authority makes the decisions on behalf of their team. This situation is characterized by interdependence and vulnerability. High-authority members are dependent on the rest of the team to provide them with complete and accurate information in order to make good decisions and must rely on others to accept and implement their decisions. Members with low-authority, on the other hand, must rely on those with high authority to make thoughtful decisions that are in the interest of the team. In this context, trust is especially critical for decision-making effectiveness and hence team performance: trust enables low-authority team members to feel safe sharing their information and honest opinions (Edmondson, 2004) and accept the decisions made by others (Zand, 1972). Likewise, trust induces a more cooperative attitude among high-authority team members, and mitigates the tendency to discount input provided by their low-authority counterparts (Tost, Gino, & Larrick, 2012). In contrast, when authority is shared in the team (i.e., authority differentiation is low), each member has a greater influence over team decision-making, reducing their dependence on and vulnerability to others and making trust in fellow teammates less relevant for team functioning and performance. Hence, we propose:

Hypothesis 5: Authority differentiation moderates the relationship between intrateam trust and team performance, such that this relationship is stronger when authority differentiation is high than when it is low.

Skill differentiation. Skill differentiation refers to the degree to which teams consist of members with specialized knowledge or skills that make them uniquely qualified and therefore difficult to substitute (Hollenbeck et al., 2012; Lee et al., 2015). In skill-differentiated teams, members must rely on each other's unique knowledge and skill sets that are required for the team to perform well. At the same time, the very fact that team members have specialized expertise limits the ability of other team members to accurately assess their knowledge and contribution, thus making them even more vulnerable. In these contexts, high levels of trust are particularly important for team performance. Trust increases team members' willingness to openly share their specialized skills and knowledge in ways that benefit the team (Zheng, 2012), and to constructively work through differences in interpretation to enable members' input to be effectively combined to heighten team performance (Cronin & Weingart, 2007). Likewise, a lack of trust in skill-differentiated teams results in dramatic performance decreases, as it leads members to discount the perspectives and contributions of others, and inhibits the sharing of specialized knowledge. By contrast, trust is less critical for performance in low skill-differentiated teams, because team members' knowledge and skills are substitutable and redundant. In this context, team members are less dependent on the unique input of any single teammate and are in a better position to assess each other's knowledge and contributions, making trust in fellow teammates less critical for the team to perform well. We therefore propose the following hypothesis:

Hypothesis 6: Skill differentiation moderates the relationship between intrateam trust and team performance, such that this relationship is stronger when skill differentiation is high than when it is low.

Covariates of the Trust-Performance Relationship

Contrary to moderators that serve to explain variability in the strength of the trust-performance relationship, covariates serve to assess the robustness of this relationship by accounting for key alternative predictors. To assess robustness, we first test whether the effect of intrateam trust holds above and beyond the impact of team trust in leader and past team performance. We subsequently test whether its effect holds across particular dimensions of intrateam trust while controlling for their interrelation.

Team trust in leader. Most teams, even those that are self-managed, are typically also supervised by a team leader (Druskat & Wheeler, 2003; Hackman, 1987). Given their dependence on this leader, team members are likely to develop a certain level of trust in him/her. Team trust in leader serves as an important covariate of the intrateam trust-team performance relationship. Indeed, in response to mixed findings on intrateam trust, some scholars have argued that trust in the leader may be the more relevant predictor of team performance (Dirks, 2000). By contrast, we argue that intrateam trust and team trust in leader will both have a unique impact on team performance because teammates and team leaders have different responsibilities that are associated with distinct forms of dependence, vulnerability, and risk for team members. Specifically, team members typically rely on the leader for setting the overall direction and coordination of the team, monitoring the team's performance, as well as for boundary spanning activities such as negotiating and acquiring resources, information and support for the team's work, and representing the team to higher organizational authorities (Druskat & Wheeler, 2003).

In contrast, members' dependence on fellow members is typically focused on the operational aspects of accomplishing the team's tasks and responsibilities, such as completing tasks within agreed timelines, working cooperatively with other team members, and sharing resources (Hackman, 1987). Effective team performance requires that both team leaders and team members competently and reliably fulfill their responsibilities. We therefore expect intrateam trust and team trust in leader to have unique predictive validity with respect to team performance, and hence, intrateam trust to have incremental predictive validity above and beyond team trust in the leader. Hence:

> **Hypothesis 7:** Intrateam trust has a unique positive effect on team performance after controlling for the effect of team trust in leader.

Past team performance. In addition to team trust in leader, past team performance has also been shown to be a strong predictor of future performance (Dirks, 2000). Accounting for past performance when testing the impact of intrateam trust on team performance therefore serves as an important robustness check, as well as helping to address scholarly skepticism of the trust-performance relationship. This is particularly important because prior team performance is expected to positively influence both intrateam trust, as well as subsequent team performance, and hence acts as a potential confound that inflates the trust-performance relationship. The few studies that have explicitly examined this issue have provided inconclusive results. While a study of basketball teams by Dirks (2000) showed that intrateam trust had no meaningful impact on team performance when controlling for past performance, a more recent study of student teams by De Jong and Dirks (2012) showed a significant effect of intrateam trust above and beyond past performance. In line with this recent study, we expect intrateam trust to influence team performance above and beyond past performance due to the unique ability of trust to enable

members to suspend uncertainty and vulnerability and hence facilitate their collaboration, cooperation, and communication. We therefore propose:

Hypothesis 8: Intrateam trust has a unique positive effect on team performance after controlling for the effect of past team performance.

Trust dimensions. Trust is understood to be multi-faceted and multi-dimensional in nature. One of the most commonly recognized classifications in the literature is McAllister's (1995) distinction between cognitive and affective dimensions of trust. Whereas cognition-based trust is grounded in individuals' cognitive evaluations of the reliability, integrity, and competence of others, affect-based trust is grounded in individuals' feelings of emotional involvement and others' genuine care and concern for their welfare. Besides being conceptually distinct, cognition- and affect-based trust are regarded as functionally distinct, in that they affect outcomes through distinct causal mechanisms and thus uniquely contribute to predicting performance (Dirks & Ferrin, 2002; Schaubroeck, Lam & Peng, 2011).

Accordingly, we predict that cognition- and affect-based intrateam trust will uniquely contribute to team performance through distinct mechanisms. Specifically, perceiving the team as capable and competent (i.e., cognition-based trust) should strengthen members' belief in the team's ability to successfully attain its goals, and motivate them to engage in task-oriented teamwork behavior towards those goals (Marks, Mathieu, & Zaccaro, 2001; Schaubroeck et al., 2011). At the same time, perceiving the team to be genuinely concerned about their welfare (i.e., affect-based trust) should make team members feel comfortable raising sensitive issues and disclosing personal information, as well as motivate them to engage in interpersonal teamwork behaviors to maintain cohesion and a positive atmosphere within the team, as they work towards team goals (Marks, et al., 2001; Schaubroeck et al., 2011). We therefore predict:

Hypothesis 9: Cognition-based trust has a unique positive effect on team performance after controlling for the effect of affect-based trust, and vice versa.

Methods

To locate all relevant studies on trust in team contexts, we employed a comprehensive search strategy (up until November 2015). We searched the PsycINFO, ABI/INFORM and Web of Science databases for peer-reviewed manuscripts that included *trust* and *team* or *group* in their title or abstract. We complemented this broad search with several targeted strategies including inspecting edited volumes and special issues devoted to trust (e.g., Kramer & Cook, 2004; McEvily, Perrone, & Zaheer, 2003), a 'backward search' of reference lists of recent articles, narrative reviews, and meta-analyses on trust (e.g., Colquitt, Scott, & LePine, 2007; Drescher, Korsgaard, Welpe, Picot, & Wigand, 2014; Fulmer & Gelfand, 2012), as well as a 'forward search' of citations to highly-cited papers on trust in team contexts (e.g., Dirks, 1999). To identify unpublished studies, we searched the online programs of multiple scholarly conferences (AOM, SIOP, EAWOP, EURAM, EGOS, IACM, INGroup, EIASM Workshop on Trust), and the ProQuest Dissertations & Theses and Social Science Research Network search engines. Finally, we posted a request for unpublished studies on the OBNet list serv.

Inclusion Criteria and Sample

To be included in the meta-analysis, the study needed to: 1) be empirical and quantitative in nature, 2) measure trust in either the team (members) or the team leader, 3) use measures that align with the definitions of our core constructs, and 4) report sufficient information to allow effect size computation at the team level of analysis. When essential statistical information was missing, we requested it from the authors. When we encountered 'duplicate studies' that relied on the same sample and variables, we combined relevant information across studies and treated

them as a single study to ensure effect size independence.[2] Applying the above criteria resulted in a final sample of 112 independent studies (*N*=7,763 teams), of which 76 were published and 36 were unpublished. The sample included 16 lab studies and 96 field studies, with 46 studies using a student team sample and 65 using a work team sample. Collectively, the included studies represented a broad range of team types (Sundstrom, 1999), including project (45), management (19), service (14), action (11), and production (5) teams. Of the 112 studies, 100 studies reported effect size estimates for intrateam trust and team performance (among others), whereas the remaining 12 studies exclusively reported effect size estimates between the other variables included in our conceptual model, such as team trust in leader and team performance (e.g., Schaubroeck et al., 2011) or cognition- and affect-based intrateam trust (e.g., Wilson, Straus, & McEvily, 2006). All the included studies are marked by an asterisk in the reference list.

Variable Coding

Moderators. As several of our moderators had not been coded in prior meta-analyses, we developed a comprehensive coding procedure (see Appendix A). In keeping with the preference for low inference coding (Orwin & Vevea, 2009), we recorded sample-level descriptive statistics (i.e., mean and standard deviation) on the team characteristics whenever these were reported in the primary studies, and converted these into low and high values by applying pre-specified dichotomization rules (see Appendix A). This generated values for 59 of the total number of 500 potential cases to be coded (5 moderators across 100 intrateam trust – team performance studies).

When low inference coding was not possible, we relied on two complementary forms of high inference coding. One procedure was the conventional approach of having trained coders –

[2] Specifically, when studies overlapped completely in terms of effects sizes and variables (e.g., Costa, 2000; Costa, Roe & Taillieu, 2001), we only included the study that was the most comprehensive. When studies partially overlapped (e.g., Kanawattanachai & Yoo, 2002, 2007), we combined the studies' unique correlations and treated them as a single study.

in this case, the first author and a research assistant – independently code the moderator variables by applying a detailed coding protocol to the information reported in the primary studies. This generated codings for 291 of the 500 potential cases. To assess coder agreement, we compared the codings obtained from the two coders for each moderator. Analyses showed high levels of inter-coder agreement across the 242 cases that were jointly coded across moderators, as indicated by a mean Krippendorf's Alpha of .92 (*SD* = .15) (Hayes & Krippendorff, 2007).

While this conventional approach has the advantage of ensuring coding *agreement*, it also has a potential limitation with respect to coding *accuracy* and *feasibility*, as information about the focal team characteristics was often deficiently reported in studies (see Orwin & Vevea, 2009). In some cases, the information reported was minimal, making it difficult to code the team characteristics. In other cases, however, information on these characteristics was completely lacking, making it impossible to code them at all. To overcome this limitation, we complemented the conventional approach with a second high inference approach. Following Orwin and Vevea's (2009) recommendations, we contacted the authors of the primary studies and asked them to code the five moderator variables based on descriptions we developed for high and low values of those variables (see Appendix B)[3]. This yielded a 90% response rate and 396 codings across the 500 cases. Relying on authors' in-depth expertise about the teams in their sample helps ensure coding accuracy, and yields codings even when information is not reported in the primary studies (Orwin & Vevea, 2009). Indeed, the responses we received from authors included 147 unique codings that could not be coded using either the conventional high inference approach or by low inference coding, thereby considerably increasing the number of data points and statistical power for our moderator analyses.

[3] Besides 'high' and 'low', each team characteristic also included a 'varied considerably across teams' response option, to account for within-sample variability in the focal characteristic. As these responses are not meaningful for hypotheses testing, we excluded them from the analyses.

Despite these benefits, the author coding approach is not without its limitations: relying on authors' willingness to provide responses and on different coders across studies may threaten coding replicability and inter-coder agreement[4]. To address this potential limitation, we compared author codings with those provided by one of the trained coders (the research assistant). The analyses showed adequate levels of inter-coder agreement across all moderator variables (Krippendorf's Alpha: $M = .82$, $SD = .14$) across the 244 cases that were jointly coded. This suggests that, besides ensuring coding accuracy, the author coding approach also yields codings similar to those by trained coders. We therefore relied on author codings when there was a discrepancy between the author and the trained research assistant (11 cases). In cases where authors did not respond (10 of 100 studies, or 50 of the 500 cases), we relied on codings provided by the trained coders (42 cases).

Covariates. The covariates were identified based on the empirical measures that were either reported in the primary studies or requested from the authors when they were missing. We classified trust measures as *team trust in leader* whenever the referent of trust was the team's direct leader or supervisor. Measures using top management as the referent of trust were therefore excluded. Performance measures were classified as *past team performance* when performance was measured at an earlier time point than trust, or when it was measured at the same time but clearly referred to an earlier period (e.g., performance over the last three years). Finally, intrateam trust measures were coded in terms of whether they captured cognitive or affective *dimensions of trust*. Because all trust measures were either sufficiently reported or obtained from the authors, we employed conventional high inference coding and had both the first author and a research assistant independently code trust dimension using the same coding

[4] We thank one of the anonymous reviewers for bringing these to our attention.

protocol (see Appendix A). The Krippendorf's Alpha indicated high levels of inter-coder agreement (α= .92) across the 117 cases that were jointly coded.

Meta-Analytic Procedures

We followed the psychometric meta-analysis approach described by Schmidt and Hunter (2015), which uses a random effects model and corrects for both sampling error and measurement error in the independent and dependent variables. We used the Pearson correlation coefficient as our effect size metric. To ensure consistency in the meaning across correlations for the same underlying relationship, the correlation sign was reversed when team performance was measured in the opposite direction, such that higher scores indicated poorer performance. For studies that reported multiple correlations of the same relationship, we employed a 'shifting unit of analysis' approach to computing correlations (Cooper, 2010), which maximizes the utilization of available information from each study while minimizing violations of the assumption of independent effect sizes. Specifically, for most hypotheses (H1-H8), we combined multiple correlations from the same study using linear composites (Schmidt & Hunter, 2015), or averaged correlations when studies provided insufficient information to compute linear composites. For Hypothesis 9, however, we computed separate correlations for each trust dimension when multiple dimensions were reported within the same study. When multiple performance measures with varying levels of objectivity were available from the same study, we only included the most objective performance measure to minimize rater bias (Mesmer-Magnus & DeChurch, 2009). Consistent with the causal directionality implied in our model, we only included lagged correlations for studies that reported both lagged and cross-sectional correlations. For the main effect and moderator analyses (H1-H6), we coded correlations between intrateam trust and team performance (Appendix C). For the covariate analyses (H7-H9), we coded correlations among

intrateam trust, team performance, team trust in leader and past performance (Appendix D), as well as correlations among cognition-based intrateam trust, affect-based intrateam trust, and team performance (Appendix E).

Besides sample-size weighted observed mean correlations, we also report true mean correlation estimates that have been corrected for measurement error in both the independent and dependent variable[5]. To correct correlations for measurement error, we use the *ICC*(2) coefficient, which captures the reliability of team-level mean scores (Bliese, 2000) and accounts for inconsistency across raters as a key source of unreliability (Courtright, Thurgood, Stewart, & Pierotti, in press)[6]. In several instances, *ICC*(2)s were not reported in the study but could nevertheless be calculated using *ICC*(1)s and *F*-statistics[7]. When these were also not reported, we requested the *ICC*(2)s or the raw data from the authors. When trust was manipulated or performance was measured objectively, we assumed perfect reliability and imputed a reliability of 1. We also imputed a reliability of 1 when correlations were based on latent variables to avoid overcorrecting already corrected correlations (cf. Willness, Steel, & Lee, 2007). Whenever we combined multiple correlations from the same study using linear composites, we also combined *ICC*(2)s using Mosier reliability composites (Schmidt & Hunter, 2015). Despite these efforts and procedures, *ICC*(2) values could not be obtained or imputed for a considerable portion of the studies – on average, 28% were missing across all the relationships we analyzed. We therefore

[5] Correcting for measurement error in both the independent and dependent variable is consistent with the theory-oriented nature of our study and our interest in construct-level relationships.

[6] Although measurement error of team-level means scores consists of both item-specific and rater-specific error variance, the latter is often the dominant source of measurement error. As such, *ICC*(2)s are the more appropriate reliability statistic for correcting study correlations (as opposed to Cronbach's Alpha). Nonetheless, given that we do not correct for item-specific measurement error, our artifact distributions corrections are incomplete and our results should therefore be understood as conservative estimates of the true population correlations (Schmidt & Hunter, 2015).

[7] The following formulas were used: $ICC(2) = k*ICC(1) / 1 + (k\text{-}1)*ICC(1)$ and $ICC(2) = 1 - (1/F)$, where k is the average number of raters for the team-level construct and F is the F-statistic from the One-Way ANOVA on which the *ICC*s are based.

used artifact distributions to correct the distribution of correlations for unreliability (Schmidt & Hunter, 2015).

We tested our hypotheses by means of true mean correlation estimates (ρ) and 95% confidence intervals (*CI*s) around these estimates. A *CI* captures the range of plausible values of the (unknown) true mean population correlation, and ρ, located at the centre of the *CI*, captures our best point estimate of that population parameter (Cumming, 2012). The point estimate is likely to have a certain margin of error with the population parameter due to sampling error. Given that we can be 95% confident that the true mean population correlation will be located within the *CI*, the maximum margin of error is the distance between ρ and either bound of the *CI*. A narrow *CI* indicates that the error margin is probably small and ρ is thus a relatively precise estimate. A wide *CI*, on the other hand, indicates that the error margin is probably large and ρ is therefore a relatively imprecise estimate of the mean population correlation[8]. We interpret the magnitude of true mean correlation estimates in reference to the average effect size estimate across team meta-analyses ($\rho = .26$), as reported by Paterson, Harms, Steel, and Credé (2016, see Table 2), and qualify our estimates as "below-average", "average", and "above-average".

Results

The Overall Trust-Performance Relationship

All the analyses required for testing our hypotheses were conducted using Version 2 of the Hunter-Schmidt meta-analysis software (Schmidt & Le, 2014). In Hypothesis 1, we proposed an overall positive relationship between intrateam trust and team performance. In support, the

[8] It should be noted that, while each provides unique information about population correlations, *CI*s should not be confused with credibility intervals (*CV*s). The former captures the likely margin of error of a single population estimate (namely the mean true correlation estimate) that is due to sampling error, whereas the latter captures the likely distribution (or range) of population correlation values and is not a function of sampling error. *CV*s are calculated as $\rho \pm z_{\alpha/2} SD_{\rho}$ (Schmidt & Hunter, 2015).

results shown in Table 1 indicate a positive, and an above-average effect size estimate for intrateam trust and team performance (ρ = .30, $CI_{95\%}$ = .24, .36). To assess whether this point estimate was affected by publication bias, we performed cumulative meta-analysis. This procedure involves ordering studies by precision, and then adding them to the meta-analysis one at the time. The cumulative point estimates resulting from these iterative analyses can be plotted in a forest plot, and a positive drift would be indicative of publication bias (Kepes, Banks, McDaniel, & Whetzel, 2012). The plot, however, showed that the cumulative point estimates stabilized relatively quickly and became virtually identical to the overall meta-analytic estimate, suggesting that systematic publication bias is unlikely to be present[9].

Moderators of the Trust-Performance Relationship

To determine whether analysis of moderators of the trust-performance relationship was warranted, we first assessed the level of effect size heterogeneity using multiple indicators, namely 95% credibility intervals (*CV*), the *Q*-statistic, and the 75%-rule (see Cortina, 2003 for more details). The analyses show *CV*s that are wide and include zero ($CV_{95\%}$ = -.17, .77), a *Q*-statistic that is significant (Q = 395.16, p < .001), and a percentage of between-study variance that can attributed to artifacts smaller than 75% (var_{art} = 15%). These results consistently indicate considerable effect size heterogeneity across the studies in our sample, suggesting that moderator analysis was warranted. We subsequently proceeded to test our moderators using sub-group analysis (Schmidt & Hunter, 2015). This procedure involves creating subsets of correlations for each value of the moderator, and then estimating mean true correlations for those subsets. To assess whether these estimates are meaningfully different in magnitude, we

[9] The forest plot is available from the first author.

constructed a 95% *CI* around the difference between two subset correlations (Olkin & Finn, 1995; Zou, 2007)[10].

Hypothesis 2 predicted that trust would be more strongly related to team performance when task interdependence was high rather than low. Consistent with this prediction, the results, shown in Table 1, indicate that the magnitude of the trust-performance relationship varies across levels of task interdependence ($\rho_{high} - \rho_{low} = .12$, $CI_{95\%} = .01, .23$), with an above-average true correlation estimate for high task interdependence ($\rho = .33$), but a below-average estimate for low interdependence ($\rho = .21$). In Hypothesis 3, we proposed that trust would be more strongly linked to performance as virtuality increased. The results fail to support this hypothesis. While the correlation estimate is above-average for high virtuality ($\rho = .35$) and average for low virtuality ($\rho = .26$), the between sub-group analysis indicates that the two estimates do not meaningfully differ from each other ($\rho_{high} - \rho_{low} = .09$, $CI_{95\%} = -.03, .20$). We also examined whether the relationship between trust and performance was stronger for high levels of temporal stability than for low levels, as predicted by Hypothesis 4. The results do not support this prediction. Although the two correlation estimates differed in that the estimate was above-average for high temporal stability ($\rho = .32$) and below-average for low temporal stability ($\rho = .23$), these effect size estimates do not meaningfully differ from each other in magnitude ($\rho_{high} - \rho_{low} = .09$, $CI_{95\%} = -.04, .21$). The moderating role of authority differentiation proposed in Hypothesis 5 was supported. The magnitude of the trust-performance relationship varies

[10] The *CI* around the difference between two subset correlations is calculated as $\rho_1 - \rho_2 \pm z_{\alpha/2}\sqrt{SE_{\rho 1}^2 + SE_{\rho 2}^2}$. Note that this approach to inferring moderation is different from that based on assessing the (non-)overlap between CIs around individual subset correlations – i.e., the (non-)overlap between $\rho_1 \pm z_{\alpha/2}\, SE_{\rho 1}$ and $\rho_2 \pm z_{\alpha/2}\, SE_{\rho 2}$. The latter approach is widely acknowledged by methods experts to be overly conservative, failing to support moderation in cases where moderation is actually present in the data (Afshartous & Preston, 2010; Austin & Hux, 2002; Belia, Fidler, Williams, & Cumming, 2005; Cumming, 2009; Schenker & Gentleman, 2001). We therefore relied on the more accurate approach described above.

considerably across levels of authority differentiation ($\rho_{high} - \rho_{low} = .16$, $CI_{95\%} = .03, .29$), with a true correlation estimate that is above-average when authority differentiation is high ($\rho = .41$), but slightly below-average when it is low ($\rho = .25$). Likewise, Hypothesis 6, which proposed that skill differentiation would strengthen the relationship between trust and performance, was also confirmed. This relationship differs systematically as a function of skill differentiation ($\rho_{high} - \rho_{low} = .12$, $CI_{95\%} = .01, .24$), with the correlation estimate being above-average for high skill differentiation ($\rho = .36$), but below-average for low skill differentiation ($\rho = .23$).

Covariates of the Trust-Performance Relationship

For our covariate analyses, we used Viswesvaran and Ones' (1995) meta-analytic structural equation modeling (MASEM) procedure. In short, this procedure involves creating a correlation matrix by pooling meta-analytically derived correlation estimates across all pairs of variables in the model (see Tables 2 and 3), and subjecting this pooled correlation matrix to SEM. As sample sizes differed across cells of the correlation matrix, we used the harmonic mean as the sample size in our MASEM analysis. We subsequently specified an additive model with paths running from our independent variable(s) to our dependent variable (team performance). Testing this model yields beta-coefficient estimates and 95% *CI*s for all paths. To interpret the magnitude of the coefficient estimates, we calculated the average and absolute estimate across team meta-analyses that reported MASEM results with respect to team performance ($\beta = .19$), and used this as our benchmark[11].

We proposed intrateam trust would uniquely predict team performance above and beyond team trust in leader (Hypothesis 7) and past team performance (Hypothesis 8). To conservatively assess these predictions, we ran a model in which team trust in leader and past performance were

[11] Tables with more detailed results of our MASEM analyses, as well as an overview of the meta-analyses upon which the average coefficient estimate is based, are available from the first author.

simultaneously entered as covariates. The results confirm that intrateam trust uniquely predicts team performance, and has a below-average but meaningful impact (β = .13, $CI_{95\%}$ = .02, .25) after controlling for both team trust in leader (β = .21, $CI_{95\%}$ = .09, .34) and past performance (β = .29, $CI_{95\%}$ = .19, .38). Finally, Hypothesis 9 posited that cognition- and affect-based intrateam trust would have unique predictive validity with respect to team performance. In support, the MASEM analysis shows that both dimensions have unique, positive relationships with team performance while controlling for their intercorrelation, with an above-average coefficient estimate for cognition-based trust (β = .24, $CI_{95\%}$ = .17, .31) and a below-average estimate for affect-based trust (β = .15, $CI_{95\%}$ = .08, .22).

Discussion

The volume of research on intrateam trust has shown a steep trajectory over the past two decades, resulting in a multitude of studies examining trust across a range of different contexts and types of teams. As is the case with many literatures, however, individual studies have produced seemingly disparate and contradictory results, limiting scholarly and practical insight. The purpose of this meta-analysis was to use data from 112 studies to address two fundamental questions. First, is intrateam trust positively related to team performance and if so, what is the magnitude of the relationship? Second, what are key factors that influence the magnitude of this relationship, and under what conditions is intrateam trust particularly important?

Overcoming Scholarly Skepticism: A Positive, Robust, and Meaningful Relationship

In response to mixed results, scholars have questioned whether intrateam trust has an overall positive relationship with team performance (e.g., Dirks & Ferrin, 2001; Jarvenpaa et al., 2004). Our meta-analytic findings not only confirm that the trust-performance relationship is positive, but also show that intrateam trust has unique predictive validity on team performance

even after both team trust in leader and past team performance are taken into account. Moreover, we show that the relationship holds across cognitive and affective dimensions of trust. A post-hoc analysis of the MASEM results furthermore reveals that these dimensions not only have unique, but also relatively comparable effects on team performance (β_{cog} - β_{affect} = .09, $CI_{95\%}$ = -.01, .19). Our meta-analytic findings thus offer support for a positive and meaningful relationship between trust and team performance, and attest to the robustness of this relationship. In doing so, they confirm positive findings from prior research (De Jong & Elfring, 2010) and challenge the suppositions that intrateam trust only impacts performance indirectly (Dirks, 1999; Dirks & Ferrin, 2001), or that intrateam trust is no longer critical for team performance when other referents of trust are also considered (Dirks, 2000).

Trust in team members has long remained a relatively neglected variable in team research (Kiffin-Petersen, 2004), and has received much less attention in trust research compared to trust in leadership (Dirks & Ferrin, 2002; Fulmer & Gelfand, 2012). Our results suggest that its effect is stronger than many key variables in the literature. Specifically, the magnitude of the effect size estimate for intrateam trust and team performance is higher than the average estimate of other team-level constructs, and exceeds in magnitude about 60% of the effect sizes reported in the field of Organizational Behavior (Paterson et al., 2016). Furthermore, while the results of our MASEM its impact is somewhat below-average when controlling for alternative key predictors, a follow-up analysis reveals that its effect is comparable in magnitude to that of team trust in leader $\beta_{intrateam}$ - β_{leader} = -.08, $CI_{95\%}$ = -.25, .09). Together, these results imply that intrateam trust should be afforded a more prominent and central role in future models of trust and of team performance.

Resolving Mixed Findings: Conditions Under Which Trust Is Most (and Least) Important

The study also provided insight into the factors that account for variability in the magnitude of the trust-performance relationship. To provide a comprehensive analysis, we utilized the recently developed frameworks by Hollenbeck et al. (2012) and Wildman et al. (2012). These frameworks helped to expand beyond the limited set of team characteristics that have been studied in relation to trust thus far (i.e., task interdependence and virtuality) to also include authority differentiation, skill differentiation, and temporal stability. As noted by Hollenbeck et al. (2012), these team characteristics are similar in that they all represent a unique form of structural dependence among team members (also see Lee et al., 2015). Thus, the results we find for task interdependence, authority differentiation, and skill differentiation can be understood as providing consistent support for the fundamental assumption in the trust literature that trust matters most when parties are dependent on each other (Rousseau et al., 1998). Specifically, the results across structural dependencies suggest that trust matters most for team performance when authority differentiation is high ($\rho = .41$), and least when task interdependence is low ($\rho = .21$). At the same time, the lack of support for the moderating role of temporal stability suggests that this assumption may not hold for all forms of dependence. Indeed, our results suggest that trust is of similar importance for team performance in short-term teams as ongoing teams, perhaps because trust plays a valuable role in diminishing uncertainties associated with individuals needing to quickly function together to deliver within the team's finite lifespan (Wildman et al., 2012). Together, these findings on team characteristics suggest that examining the way trust operates in teams requires careful consideration of both the *level* and the *form* of dependence among team members (also see Courtright et al., in press).

Besides expanding the scope of team characteristics and identifying new moderators of the trust-performance relationship, our findings also have implications for previously studied

team characteristics. Specifically, the results refute earlier findings that task interdependence weakens the link between trust and performance (Staples & Webster, 2008) and confirm that it in fact strengthens this link (Alge et al., 2003). Thus, these results aid in resolving previous inconsistent findings regarding the moderating role of this team characteristic. In contrast, our findings do little to resolve inconsistent results on the moderating role of virtuality (Alge et al., 2003; Muethel et al., 2012; Staples & Webster, 2008). This may be due to the fact that we treated virtuality as a unitary construct, thereby failing to distinguish between distinct dimensions of virtuality and account for their potential differential impact (Mesmer-Magnus, DeChurch, Jimenez-Rodriguez, Wildman, & Shuffler, 2011). An alternative explanation could be that rather than directly impacting the trust-performance relationship, virtuality may only impact this relationship indirectly, through its interaction with other team characteristics, such as temporal stability (see Ortiz de Guinea et al., 2012). To better understand these complexities, more sophisticated and fine-grained research is needed.

Emerging Issues and Considerations for Future Research

In the course of our review, other sources of variability besides our focal moderators and covariates emerged from the primary studies. What stood out most were the different ways in which intrateam trust and team performance were conceptualized and measured across studies. The first issue that emerged concerns the *referent of intrateam trust* (Fulmer & Gelfand, 2012): should it be conceptualized and measured as members' trust in their team as a whole (e.g., "I trust my team"), or as an aggregation of members' trust in each individual teammate (e.g., "I trust teammate X")? Whereas the former is more common, the latter has recently gained increased interest among scholars studying intrateam trust (e.g., Chung & Jackson, 2013) and has been identified as a fruitful direction for future research (Fulmer & Gelfand, 2012). This issue is

important because the two approaches are based on fundamentally different assumptions about how individuals arrive at perceptions of trust in their team – that is, linear mental aggregation of trust in each individual referent versus the possibility of non-linear (e.g., conjunctive) mental aggregation across individuals (Naquin & Kurtzberg, 2009). To find out whether these approaches show different results with respect to team performance, we conducted a preliminary analysis[12]. Our results show that the trust-performance relationship is substantially stronger when the referent of trust is the team than when it is each teammate individually (ρ_{team} = .32; ρ_{indiv} = -.01; ρ_{team} - ρ_{indiv} = .33, $CI_{95\%}$ = .15, .50). These findings suggest that the referent of intrateam trust, and assumptions about how team trust perceptions are formed, can have important implications for how trust operates in teams. Further research is needed to examine this issue in more detail.

A second issue concerns the *dimension of performance*. While the dimensionality of performance has received considerably less attention in the literature than the dimensionality of trust, it may nevertheless be important for understanding the trust-performance relationship. Specifically, in response to mixed findings in prior research, scholars have questioned the robustness of the trust-performance relationship, and speculated that while trust may enhance team efficiency by reducing process losses, it should have a negligible effect on team effectiveness because it does not make teams more capable of producing high-quality outputs (Aubert & Kelsey, 2003; Jarvenpaa et al., 2004). To assess the merit of these speculations, we examined the relationship between team effectiveness, team efficiency and intrateam trust. The results of our MASEM analysis show that trust is positively related to both effectiveness (β = .23, $CI_{95\%}$ = .17, .28) and efficiency (β = .22, $CI_{95\%}$ = .17, .28), and these effect size estimates are

[12] More details on the coding protocol used and the results of the analyses are available from the first author.

very similar in magnitude ($\beta_{effectiveness} - \beta_{efficiency} = .01$, $CI_{95\%} = -.07, .08$). These findings confirm that the beneficial impact of intrateam trust is robust across performance dimensions, and contest scholarly skepticism regarding this issue.

The third emerging issue concerns *performance objectivity*. Scholars have argued that studies using objective performance measures are likely to yield smaller effect size estimates than those using subjective measures, because objective measures tend to be less contaminated with rater bias and tend to involve narrow indicators that fail to adequately capture the content domain of performance (Mesmer-Magnus & DeChurch, 2009). We therefore conducted a preliminary analysis to examine this issue. Our results confirm that the trust-performance relationship is substantially weaker when performance was measured objectively than when it is measured subjectively ($\rho_{obj} = .14$; $\rho_{subj} = .36$; $\rho_{obj} - \rho_{subj} = .21$, $CI_{95\%} = .12, .31$).

Together, these findings have at least two important implications for future research. First, in showing that variability in the trust-performance relationship can be explained by differences in conceptualizations and measures of trust and performance, our findings highlight an alternative and often-overlooked explanation for prior contradictory findings, and suggest that researchers' choices on these factors can lead to substantially different results. Indeed, the impact of these factors on the relationship of trust and performance are of the same order of magnitude as those of the team characteristics in our study. Future research may therefore undertake a more in-depth examination of referent of trust and performance objectivity as moderators, and consider other trust and performance characteristics of interest. Second, our results imply that our two-part distinction between moderators and covariates can be further expanded into a more comprehensive framework, in which factors are distinguished based on both their *nature* (i.e., team, trust and performance characteristics) and their *function* in advancing understanding of the

trust-performance relationship (i.e., moderators, covariates). Such a framework can aid future research by enabling scholars to identify and classify factors related to trust and performance in a more systematic manner, and ensure that the factors they examine are meaningful as a set.

Practical Implications for Managers

While our study is primarily theory-oriented, with an interest in construct-level relationships, it also has several important implications for practice. By showing that intrateam trust enhances team performance, our findings clearly demonstrate the importance and practical meaningfulness of trust in team contexts. Our findings offer practical guidelines on what trust building initiatives should focus on to maximize team performance, namely develop both cognitive and affective bases of trust within the team, and enhance team members' trust both in each other and in the team leader. Our results further inform HR professionals and managers on when team trust will be most critical for team performance, namely when team members work in a highly interdependent manner, with other members who possess unique skills and have different levels of authority in the team. Finally, the results suggest managers of well performing teams need to guard against complacency in maintaining and nurturing team trust, given that team trust contributes to team performance over and above past team performance.

Methodological Limitations and Strengths

Despite the comprehensiveness of our investigation and the benefits of the meta-analytical approach over primary studies, we recognize several limitations of our study. First, despite attempts to account for the causal nature and directionality implied in our conceptual model, by including lagged correlations whenever available and controlling for past performance, the majority of the primary studies included in our analyses were non-experimental and/or cross-sectional in nature. This limits our ability to make causal inferences regarding the

effect of trust on team performance. Experimental replications of our findings are necessary to overcome this limitation. Second, we acknowledge that for some analyses (i.e., task interdependence, referent of intrateam trust), the number of available studies for particular sub-groups was relatively small, making the results subject to second-order sampling error, which is known to affect meta-analytic estimates (Schmidt & Hunter, 2015). As such, the results for these moderators should be interpreted with caution. We encourage further research into these moderators, and recommend using larger and more balanced sub-groups to better assess their impact.

Besides limitations, we also introduce author coding as a novel approach that has methodological strengths and complements conventional high inference coding practices. While requiring considerable effort on the part of both the meta-analyst to elicit responses from the authors, this approach (a) helps to ensure the accuracy of high inference coding and (b) increases the number of cases that can be meaningfully coded, which in turn enhances statistical power and yields more accurate estimates. This present study is one of the first to use this novel approach, and we encourage scholars to consider this approach in future research. That said, we do see possibilities for further improvement, in particular with respect to construct measurement. In the current study, the descriptions of team characteristics we sent to authors used limited (mostly dichotomous) response formats and thus reflect somewhat crude measures of the underlying constructs. Future meta-analyses using the author coding approach would benefit from adopting more continuous, multi-item measures, such as those recently developed by Lee et al. (2015).

Conclusion

Our meta-analytic findings reveal a moderate, positive impact of trust on team performance, showing that intrateam trust has unique predictive validity above and beyond

alternative key predictors of team performance, and is robust across key dimensions of trust. Furthermore, our results indicate that the strength of the trust-performance relationship is contingent on how teams are organized and structured. Our findings should reassure scholars that trust is relevant for teams and worthy of examination as a variable of substantive interest in its own right. To better understand the trust-performance relationship, scholars should consider the impact of team, trust, and performance characteristics as well as the need to adopt a contingency approach. We hope our meta-analytic examination will serve as a foundation for future research into this important topic.

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(Online) Appendix A

Coding Protocol for Moderators and Covariates

MODERATORS

Across coding procedures:

- 'High' and 'low' scores should only be assigned when this qualification applied to the vast majority of the teams in the sample;
- When there is considerable within-sample variability on the moderator variable or its value cannot be determined, it should not be coded;
- Preference is given to low inference coding over high inference coding (Orwin & Vevea, 2009)
- We use low inference criteria whenever possible, which we derived both deductively based on descriptions in the extant literature (e.g., Hollenbeck et al., 2012) and inductively by reading the primary studies and extracting descriptive information about the moderator variables (Wilson, 2009).

Low inference coding:

For all moderator variables, except temporal stability:

- Only code when the moderator variable was measured using a Likert-type scale (in order to ensure comparability of scores across studies);
- M = sample-level mean; SD = sample-level standard deviation;
- Rescale M to 7-point scale, and reverse score when higher scores in the original scale represents lower values on the moderator variable;
- Code as 'high' when $M > 5.0$ and $SD < 1.5$;
- Code as 'low' when $M \leq 2.0$ and $SD < 1.5$;
- Do not code when $SD \geq 1.5$, as this is indicative of within-sample heterogeneity;
- Do not code when levels of the moderator variable were experimentally manipulated, as this is indicative of within-sample heterogeneity;

For temporal stability:

- Code when study reported either the team's finite life span, or the sample-level team tenure mean and standard deviation;
- Convert life span and tenure into years;

- Code as ‘high’ when M > 1 and SD ≤ (0.5*M);
- Code as ‘low’ when M ≤ 1 and SD ≤ (0.5*M);
- Do not code when SD > (0.5*M), as this is indicative of within-sample heterogeneity.

High inference coding:

For all team characteristics:

- If the study’s sample description contains explicit statements about levels of the team characteristics (e.g., “The teams in our sample were characterized by high levels of interdependence”) or labels for teams that directly refer to one of the team characteristics, use this to code the characteristic. With regard to the latter:

  Task interdependence

  - Code as ‘high’ when teams are described in terms of reciprocal or intensive interdependence;
  - Code as ‘low’ when teams are described in terms of pooled or sequential interdependence.

  Team virtuality

  - Code as ‘high’ when the teams are described as virtual teams, geographically dispersed/distributed teams, hybrid teams, or as teams that primarily or exclusively communicated through virtual technology, or as teams consisting of partially co-located and partially dispersed team members;
  - Code as ‘low’ when teams are described as consisting of co-located team members or as face-to-face teams.

  Temporal stability

  - Code as ‘high’ when teams are described as intact teams, ongoing teams, long-term teams.
  - Code as ‘low’ when teams are described as temporary teams, short-term teams, ad-hoc teams, or teams with a finite life span;

  Authority differentiation

  - High: N/A;
  - Code as ‘low’ when the teams are described as self-managing teams or autonomous teams.

  Skill differentiation

- Code as 'high' when teams are described as cross-functional teams, or when they are described as consisting of team members who received specialized training and/or who performed specialized roles on the team (as part of a computer simulation), or when the team was involved in an (experimental) exercise in which information/ expertise was distributed (e.g., logical puzzle);
- Code as 'low' when teams are described as consisting of team members who were cross-trained.

- If such explicit statements are missing, then code team type based on Sundstrom (1999) and use this to infer team characteristics, as specified in the below coding rules. This procedure is grounded in explicit, pre-existing specifications in the extant literature of the levels of the team characteristics associated with particular team types (Cohen & Bailey, 1997; Devine, Clayton, Philips, Dunford, & Melner, 1999; Hackman, 1990; Hollenbeck, Beersma, & Schouten, 2012; Sundstrom, 1999; Sundstrom, De Meuse, & Futrell, 1990; Wildman et al., 2012). This procedure uses a combination of low inference criteria (i.e., team type) and clear coding rules to reduce coding difficulty, as recommended by Orwin & Vevea (2009);
- When the study's sample consists of a mixture of different types of teams, or when the study explicitly states that teams in the sample varied in the level of the team characteristic (i.e., considerable within-sample heterogeneity on the team characteristic), do not proceed with coding;

Team type	Examples
Action teams	Sports teams, performing (entertainment/ concert/theater) groups, expeditions, surgery teams, cockpit crews, military platoons, fire fighter teams, negotiation teams, rescue teams, emergency response team
Production teams	Assembly teams, manufacturing/ production crews, mining teams, data processing groups, maintenance crews
Service teams	Consulting teams, hospital units, bank service teams, sales teams, retail store teams, insurance service teams, customer service teams, flight attendance crews, teaching/training teams
Project/development teams	Scientific research groups, planning teams, architect teams, engineering teams, R&D teams, task forces, new product development teams, creative teams, design teams, student project teams
Management teams	Management teams, top management teams, executive teams, new business venturing teams, entrepreneurial teams

Task interdependence

- Code as 'high' when the teams are described as action teams;
- Low: N/A

Team virtuality

- High: N/A
- Code as 'low' when the teams are described as organizational top management teams or as production teams.

Temporal stability

- Code as 'high' when the teams are described as organizational top management teams, production teams, or service teams;
- Code as 'low' when the teams are described as student teams or ad hoc lab teams.

Authority differentiation:

- High: N/A
- Code as 'low' when the teams are described as top management teams, student project teams, or ad-hoc lab teams;

Skill differentiation

- Code as 'high' when the teams are described as organizational project teams, organizational top management teams, or organizational action team;
- Code as 'low' production teams, service teams, student project teams (only when students were non-MBA/executive students), or ad-hoc lab teams.

COVARIATE: TRUST DIMENSION

- When a primary study includes multiple distinct trust measures, code each measure separately;
- Code measures with the same items consistently;
- Code as 'cognition-based' or 'affect-based' only when all items that comprise the measure capture this dimension;
- Do not code when trust measures do not specify any dimension (e.g., "I trust my team members", "We can fully trust each other"), or when multiple dimensions are combined into a single measure;
- Do not code when trust is experimentally manipulated (as is the case in Dirks 1999, Pitariu 2011, Fulmer 2015);

- Cognitive and affective criteria/indicators are grounded in the extant literature (Dietz & Den Hartog, 2006; Dirks & Ferrin, 2002; Kong, Dirks, & Ferrin, 2014; McAllister, 1995; Seppänen, Blomqvist, & Sundqvits, 2007).

Cognition-based trust: professional trust, personal characteristic

- Code as 'cognition-based' when items capture individuals' cognitive evaluations of the reliability, integrity, and competence of others;
- Indicators of 'cognition-based trust' include: competence, credibility, work-related skills, (cap)abilities, expertise, professionalism, and judgments. Also reliability, dependability, honesty, truthfulness, being upfront, (behavioral/moral) integrity, predictability, consistency, promise fulfillment, fairness;
- Cognition-based trust measures may include a single indicator, or a mixture of the above indicators.

Affect-based trust: personal trust, relational characteristic

- Code as 'affect-based' when items capture individuals' feelings of emotional involvement with the other party and their perception of the other party's genuine care and concern for their welfare;
- Indicators of 'affect-based trust' include: benevolence (benevolent motives and intentions), goodwill, confiding personal issues, openly sharing personal beliefs and true feelings, discreteness, caring, considerate and demonstrates concern for welfare and emotions, has best interests in mind, does not take advantage, makes personal sacrifices for the other, malevolence (negative indicator);
- Affect-based trust measures may include a single indicator, or a mixture of the above indicators.

(Online) Appendix B

Descriptions For Author Codings

Please indicate which of the below descriptions best describes your sample.

Task interdependence

High: Team members tend to be highly and mutually dependent on one another to successfully complete their tasks. It is critical for team members to work together as they cannot do their part without getting information and resources from others. Most if not all the team's work is accomplished together and work is continuously passed back and forth until it is completed. Team performance may be best understood as the result of the joint efforts among all members of the team.

Low: With few exceptions, most team members do their part of the work relatively independently. Although some work may be passed along to others, there is generally little need for members to work together or obtain information or resources from others to be able to successfully complete their work. Team performance may thus be understood as the simple aggregation of each team member's outputs, where these individual outputs are primarily a function of each team member's own efforts.

Mixed: Varied greatly across the teams in my sample.

Team virtuality[13]

High/ purely virtual: Team members could not meet face to face and needed to rely on computer technology to communicate. Often team members were geographically dispersed (e.g. different countries) and lived in different time zones. An exception may be student teams that are forced to only work together virtually as part of the course they are enrolled in, even though they were co-located and working at the same time.

Hybrid: This qualification applies to 2 cases: 1) for all teams, part of the team members were co-located and could work face to face whereas part of them were dispersed and needed to work virtually; 2) for all teams, all members relied partly on face-to-face and partly on virtual communication.

Low/ face-to-face: Team members worked face-to-face for the vast majority of the time. The teams in the sample don't fit the other two descriptions.

Mixed: Varied greatly across the teams in my sample.

Temporal stability

High: All teams were not a priori intended to disband (except for natural turnover of individual team members). Teams that were involved in multiple temporary projects, but nevertheless remained intact as they moved from one project to the next, are also considered to be temporally stable.

Low: For these teams, it was known in advance that they would disband after a certain amount of time or after having completed a certain task. This category not only includes teams for which disbandment date was explicitly specified (e.g. a deadline), but also teams that were temporary but for which the disbandment date was not yet specified but nevertheless definitive (i.e. whenever the job is done). One-shot lab teams are by definition low in temporal stability, as are student project teams.

[13] Prior to analyzing the data, we collapsed high virtuality and hybrid in order to align author codings with our dichotomous theorizing and conventional high inference codings.

Mixed: Varied greatly across the teams in my sample.

Authority differentiation

High: In these teams, there is a clear decision-making hierarchy. Certain team members can make decisions that affect the whole team, without other members necessarily having a say in the matter. Team members need explicit permission/ approval from a certain teammate(s) higher in rank before being able to proceed with their work.

Low: These teams consist of peers who have no authority over one another. Members collectively make decisions and everybody has an equal say in the matter. Self-managing teams, for example, often have low authority differentiation.

Mixed: Varied greatly across the teams in my sample.

Skill differentiation

High: In these teams, members had unique and specialized skills in certain areas that were not possessed by the other teammates. Team members often come from different educational or professional backgrounds. Because of the high level of specialization, it would be difficult for team members to learn how to perform each other's tasks, or to assume tasks for a team member if needed. A typical example is a cross-functional team.

Low: In these teams, members have very similar skills, and to the extent that this is not the case, the skills of other team members can easily be learned by teammates. Team members are often cross-trained to be able to perform all tasks required. Student teams, whose members may be assigned to different roles but who nevertheless don't possess unique skills, are typically "low" in skill differentiation.

Mixed: Varied greatly across the teams in my sample.

(Online) Appendix C

Summary of Included Studies and Coded Moderators for Main Effect and Moderator Analysis

Article	r_{xy}	N	r_{xx}	r_{yy}	TI	VI	TS	AD	SD
Akgun, Byrne, Keskin, Lynn & Imamoglu (2005)	0.38	69			High		Low	Low	High
Akgun, Keskin, Byrne, & Imamoglu (2007)	0.43	53	0.70	0.93	High		Low	Low	High
Akgun, Keslin, Lynn, & Dogan (2012)	0.48	92	1.00	1.00	High		Low	Low	High
Akgun, Lynn, Keskin, & Dogan (2014)	0.31	129							High
Alge, Wiethoff, & Klein (2003)	0.11	66	0.45	1.00				Low	Low
Baruch & Lin (2012)	0.56	152	0.74	0.74		High	High		
Berson, Da'as, & Waldman (2015)	0.19	69	0.57	0.64	High	Low	High	Low	Low
Bijlsma-Frankema, De Jong, & Van de Bunt (2008)* Costa, Bijlsma-Frankema, & De Jong (2009)*	0.20	68	0.69		High	Low	Low	Low	Low
Bjornstad, Fostervold, & Ulleberg (2011)	0.23	32	0.28	1.00	High	High	Low	Low	Low
Blatt (2008) Study 2	0.45	123	0.37			Low	High	Low	High
Boies, Lvina, & Martens (2010)	0.11	49	0.49	1.00	High	Low	Low	Low	Low
Boies, Fiset, & Gill (2015)	-0.03	44	0.58	1.00	High	Low	Low	Low	Low
Brahm & Kunze (2012)	0.59	50	0.47	0.64		High	Low	Low	Low
Braun, Peus, Weisweiler, & Frey (2013)	0.15	28	0.67	1.00	High	Low	High	High	High
Bresnahan (2008)	-0.02	49	0.84				Low	Low	Low
Carmeli, Tishler, & Edmondson (2012)	0.32	77	1.00	1.00	High	High	High	Low	High
Celani & Tasa (2010)	0.33	60	0.86		High	Low	Low	Low	Low
Chang, Sy, & Choi (2012)	0.30	91	0.39			Low	High		
Chen & Wang (2008)	0.04	112		1.00	High	Low	High	High	High
Chen, Wu, Yang, & Tsou (2008)	0.77	14				High	Low	High	Low
Cheung, Gong, Wang, Zhou, & Shi (2012)	0.30	96	0.26		High	Low			High
Chung & Jackson (2013)	-0.17	56		1.00		Low			
Cogliser, Gardner, Gavin, & Broberg (2012)	0.03	71	0.45		High	High	Low	Low	Low

(Appendix continues)

Appendix *(continued)*

Article	r_{xy}	*N*	r_{xx}	r_{yy}	TI	VI	TS	AD	SD
Cohen, Ledford, & Spreitzer (1996)	-0.12	120					High		
Connelly & Turel (2011)	0.05	55	0.31			High	Low	Low	Low
Costa (2000)	0.03	112	0.57	0.51	High	Low	High		
Crisp & Jarvenpaa (2013)	0.32	68	1.00	1.00	High	High	Low	Low	Low
Cronin (2005)	-0.08	64		1.00	High	Low	Low	Low	High
Curseu & Schruijer (2010)	0.25	174	0.46			High	Low	Low	Low
Dai & Chok (2014)	-0.13	148			High	Low	High	Low	High
Dayan & Di Benedetto (2010)	0.68	93	1.00	1.00	High		High	Low	High
De Jong & Elfring (2010)	0.30	73	0.65		High	Low	High	High	Low
De Jong & Dirks (2012) Study 1	0.35	67	0.72			Low	Low	Low	High
De Jong, Bijlsma-Frankema, & Cardinal (2014)* De Jong & Dirks (2012) Study 2*	0.30	41	0.63				High	Low	Low
Dekker (2008)	0.57	47	0.63	0.69		High			High
Dirks (1999)	-0.15	42	1.00	1.00	High	Low	Low	Low	Low
Dirks (2000)	0.37	30	0.80	1.00	High	Low	High	High	Low
Donati, & Zappalà (2013)	0.55	28	0.73	0.77	High	High	Low	Low	High
Drescher, Korsgaard, Welpe, Picot, & Wigand (2014)	0.34	86	0.88	1.00	High	High	High	High	Low
Druskas & Pescosolido (2006)	0.48	16		1.00	High	Low	High	Low	Low
Evans, Hendron, & Oldroyd (2015)	0.20	41			High	Low	High	High	High
Ferguson & Peterson (2015)	0.15	125	0.73		High	Low	Low	Low	Low
Fulmer, Tsai, & Chawla (2015)	0.02	79	1.00	1.00	High	Low	Low	Low	Low
Geister, Konradt, & Hertel (2006)	0.09	52		0.71		High	Low	Low	Low
Gilson & Ammeter (2002)	0.48	34					Low	Low	

(Appendix continues)

Appendix *(continued)*

Article	r_{xy}	*N*	r_{xx}	r_{yy}	TI	VI	TS	AD	SD
Greer, Jehn, & Thatcher (2005) Study 1	0.04	70	0.39	1.00	High	Low	High		High
Greer & Caruso (2007)	0.29	42	0.66	1.00	High	Low	High	Low	High
Groesbeck (2001)	0.71	100	0.69		High		High		
Harvey (2010)	0.73	33			High		High		High
Hempel, Zhang, & Tjosvold (2009)	0.25	102	0.68		High	Low			High
Hertel, Konradt, & Orlikowski (2004)	0.23	31			High	High		High	Low
Hu (2012)	0.35	60	0.65			Low	High		Low
Huang (2009)	0.56	60	1.00	1.00	High	Low			High
Hyatt & Ruddy (1997)	0.10	100	0.70	1.00	Low	High	High	Low	
Jarvenpaa, Shaw, & Staples (2004) Study 1	0.15	16	1.00	1.00		High	Low	Low	Low
Jehn & Mannix (2001)	0.32	51			High	Low	Low	Low	High
Joshi, Lazarova, & Liao (2009)	0.33	28	0.72		High	High	High	Low	Low
Kanawattanachai & Yoo (2002)* Kanawattanachai & Yoo (2007)*	0.04	37	1.00	1.00	High	High	Low	Low	High
Khan, Breitenecker, Gustafsson, & Schwarz (2015)	0.58	88	1.00	1.00	High	Low		Low	
Kirkman, Rosen, Tesluk, & Gibson (2006)	0.24	36	0.71		High		High	High	High
Langfred (2004)	-0.10	71	0.80				Low	Low	High
Langfred (2007)	0.26	33	0.83		High		Low	Low	High
Lee, Gillespie, Mann, & Wearing (2010)	0.64	34	0.57	0.54	High	Low	High	High	High
Leslie (2007) Study 2	-0.06	85	0.53	1.00		Low		High	Low
Liu, Magjuka, & Lee (2008)	0.22	38		1.00		High	Low	Low	Low
Lvina (2011) Study 1	-0.14	189	1.00	1.00		Low	Low	Low	Low
Lvina (2011) Study 2	-0.05	28	1.00	1.00		Low			Low
Mach, Dolan, & Tzafrir (2010)	0.39	59	0.79	1.00	High	Low	High	Low	Low
Mach & Baruch (2015a)	0.44	63	0.56		High	Low	Low	Low	Low
Mach & Lvina (2015b)	0.29	73	0.82	1.00	High	Low		High	Low

(Appendix continues)

Appendix *(continued)*

Article	r_{xy}	N	r_{xx}	r_{yy}	TI	VI	TS	AD	SD
Mahoney, Korsgaard, & Pitariu (2012)	0.07	59	0.44		High	Low	Low	Low	
Moshier & Foti (2012)	0.10	36	0.60		Low	Low	Low	Low	Low
Muethel, Siebdrat, & Hoegl (2012)	0.36	80	0.66		High		Low	Low	High
Ning, Liao, Tangirala, & Firth (2014)	0.02	88	0.26	1.00	High	Low	High		
Olson, Bao, Parayitam (2007)	0.47	252			High	Low		High	High
Palanski, Kahai, & Yammarino (2011) Study 1	0.24	35	1.00	1.00		Low	Low	High	Low
Papenhausen (2006)	0.29	35		1.00	High	Low	Low	Low	Low
Parayitam & Dooley (2007)	0.51	109	0.66	0.46	High	Low		High	High
Peterson & Behfar (2003)	-0.10	67	0.66		High	Low	Low	Low	High
Pitariu & Korsgaard (2011) Study 1	0.24	71	1.00	1.00	Low	High	Low	Low	Low
Pitts (2010)	0.03	58	0.57	1.00	High	High	Low	Low	High
Politis (2003)	0.05	49	1.00	1.00	Low	Low	High	Low	Low
Porter & Lilly (1996)	0.22	80			High		Low	Low	Low
Rau (2005)	-0.03	111	0.46	1.00	High	Low	High	Low	High
Raver, Ehrhart, & Chong (2013)	0.43	52	0.60		High	Low	Low	High	Low
Rispens, Greer, & Jehn (2007)	0.76	27	0.71	0.62		Low			Low
Robert (2012)	0.09	51	0.82		High	High	Low	Low	Low
Sanchez, Olson-Buchanan, Schmidtke, & Bradley (2009)	0.23	63			Low	High	Low	Low	Low
Schippers (2003) Study 2	0.72	59	0.58	0.66	High	Low	High	Low	High
Schippers, Den Hartog, & Koopman (2005)* Schippers (2003) Study 1*	0.15	32	0.81			Low	High		
Schneider, Dowling, & Payton (2009) Study 4	0.28	67	0.57	1.00	High	High	Low	Low	High
Small & Rentsch (2010)	0.28	60	0.59	1.00	High	Low	Low	Low	
Spreitzer, Noble, Mishra, & Cooke (1999)	0.42	43	0.98		High	Low	High	High	High

(Appendix continues)

Appendix *(continued)*

Article	r_{xy}	*N*	r_{xx}	r_{yy}	TI	VI	TS	AD	SD
Stewart & Gosain (2006)	0.09	67		1.00		High		Low	
Talaulicar, Grundei, & Werder (2005)	0.23	56				Low	High	Low	High
Todorova & Weingart (2010)	0.19	21		0.56		Low	Low	Low	High
Webber (2008a)	0.75	31	0.85	0.77	High	High	High	High	High
Webber (2008b)	0.29	54	0.75		Low	Low	Low	Low	Low
Zheng (2012)	0.10	98	0.72	0.72	High	Low	High		High
Zornoza, Orengo, & Peñarroja (2009)	0.21	65	0.58		High		Low	Low	Low

Note: r_{xy} = uncorrected, unweighted correlation coefficient; *N* = sample size; r_{xx} = reliability for trust; r_{yy} = reliability for performance; TI = Task interdependence; VI = Virtuality; TS = Temporal Stability; AD = Authority differentiation; SD = Skill differentiation.

* Correlations and alphas across the two studies were combined into single composites.

(Online) Appendix D

Summary of Included Studies for Covariate Analyses on Team Trust in Leader and Past Performance

Article	r_{xy}	N	r_{xx}	r_{yy}
Team Trust in Leader - Team Performance				
Bijlsma-Frankema, De Jong, & Van de Bunt (2008)	-0.17	57	0.78	
Bijlsma-Frankema, Sleebos, & De Gilder (2009) Study 1	0.37	93	0.75	1.00
Bijlsma-Frankema, Sleebos, & De Gilder (2009) Study 2	0.28	104	0.63	1.00
Braun, Peus, Weisweiler, & Frey (2013)	0.37	28	0.86	1.00
Carter & Mossholder (2015)	0.69	96	0.81	
Dayan, Di Benedetto, & Colak (2009)	0.52	107	1.00	1.00
Dirks (2000)	0.57	30	0.80	1.00
Gong, Kim, Lee, & Zhu (2013)	0.26	100	0.64	
Lau & Liden (2008)	0.00	32	0.47	
Lee, Gillespie, Mann, & Wearing (2010)	0.70	34	0.56	0.54
Mach, Dolan, & Tzafrir (2010)	0.01	59	0.91	1.00
Mach & Lvina (2015b)	0.05	73	0.87	1.00
Schaubroeck, Laum, & Peng (2011)	0.47	191	0.88	
Intrateam Trust - Team Trust in Leader				
Bijlsma-Frankema, De Jong, & Van de Bunt (2008)	0.12	57	0.73	0.81
Braun, Peus, Weisweiler, & Frey (2013)	0.46	28	0.67	0.86
Dirks (2000)	0.64	30	0.79	0.79
Fulmer (2012)	0.48	105	0.22	0.44
Lee, Gillespie, Mann, & Wearing (2010)	0.75	34	0.57	0.65
Mach, Dolan, & Tzafrir (2010)	0.36	59	0.79	0.91
Mach & Lvina (2015b)	0.46	73	0.82	0.87
Past Team Performance - Team Trust in Leader				
Dirks (2000)	0.60	30	1.00	0.79
Mach & Lvina (2015b)	0.28	73	1.00	0.87

(Appendix continues)

Appendix *(continued)*

Article	r_{xy}	N	r_{xx}	r_{yy}
Past Team Performance - Intrateam Trust				
Carmeli, Tishler, & Edmondson (2012)	0.09	77	1.00	1.00
Chung & Jackson (2013)	0.01	56	1.00	
Cronin (2005)	0.09	64	1.00	
Dai & Chok (2014)	0.10	148	1.00	
De Jong & Dirks (2012) Study 1	0.02	67		0.72
Dirks (2000)	0.23	30	1.00	0.79
Drescher, Korsgaard, Welpe, Picot, & Wigand (2014)	0.32	86	1.00	0.88
Kanawattanachai & Yoo (2002)* Kanawattanachai & Yoo (2007)	0.23	37	1.00	0.70
MacCurtain, Flood, Ramamoorthy, West, & Dawson (2010)	0.11	39	1.00	0.87
Mach & Lvina (2015b)	0.09	73	1.00	0.82
Moshier & Foti (2012)	0.47	36		0.65
Rau (2005)	-0.09	111	1.00	0.46
Past Team Performance - Team Performance				
Carmeli, Tishler, & Edmondson (2012)	0.36	77		1.00
Chung & Jackson (2013)	0.19	56	1.00	1.00
Cronin (2005)	0.46	64	1.00	1.00
Dai & Chok (2014)	0.20	148	1.00	
De Jong & Dirks (2012) Study 1	0.65	67		
Dirks (2000)	0.62	30	1.00	1.00
Drescher, Korsgaard, Welpe, Picot, & Wigand (2014)	0.92	86	1.00	1.00
Kanawattanachai & Yoo (2002)* Kanawattanachai & Yoo (2007)*	0.35	37	1.00	1.00
Mach & Lvina (2015b)	-0.01	73	1.00	1.00
Moshier & Foti (2012)	0.32	36		

Note: r_{xy} = uncorrected correlation coefficient; N = sample size; r_{xx}, r_{yy} = reliabilities for each of the two variables.

* Correlations and alphas across the two studies were combined into single composites.

(Online) Appendix E

Summary of Included Studies for Covariate Analyses on Trust Dimensions

Article	r_{xy}	N	r_{xx}	r_{yy}
Cognition-Based Intrateam Trust - Team Performance				
Akgun, Byrne, Keskin, Lynn & Imamoglu (2005)	0.35	69		
Bresnahan (2008)	0.01	49		
Carmeli, Tishler, & Edmondson (2012)	0.32	77	1.00	1.00
Celani & Tasa (2010) Study 1	0.33	60	0.86	
Curseu & Schruijer (2010) Study 1	0.25	174	0.46	
Dayan & Di Benedetto (2010)	0.53	93	1.00	1.00
Drescher, Korsgaard, Welpe, Picot, & Wigand (2014)	0.34	86	0.88	1.00
Ferguson & Peterson (2015)	0.15	125	0.73	
Geister, Konradt, & Hertel (2006)	0.09	52		0.71
Gilson & Ammeter (2002)	0.48	34		
Greer & Caruso (2007)	0.29	42	0.66	1.00
Hempel, Zhang, & Tjosvold (2009)	0.25	102		
Hu (2012)	0.35	60	0.65	
Joshi, Lazarova, & Liao (2009)	0.33	28	0.72	
Kanawattanachai & Yoo (2007)	0.11	38	1.00	1.00
Khan, Breitenecker, Gustafsson, & Schwarz (2015)	0.61	88	1.00	1.00
Kirkman, Rosen, Tesluk, & Gibson (2006)	0.24	36	0.71	
Lee, Gillespie, Mann, & Wearing (2010)	0.64	34		
Mach & Lvina (2015b)	0.35	73		1.00
Mahoney, Korsgaard, & Pitariu (2012)	0.07	59	0.44	
Moshier & Foti (2012)	0.10	36	0.60	
Olson, Bao, Parayitam (2007)	0.40	252		
Papenhausen (2006)	0.29	35		1.00
Parayitam & Dooley (2007)	0.65	109		
Peterson & Behfar (2003)	-0.10	67	0.66	
Pitts (2010)	0.14	58		1.00
Rau (2005)	-0.03	111	0.46	1.00
Rispens, Greer, & Jehn (2007)	0.76	27	0.71	0.62
Sanchez, Olson-Buchanan, Schmidtke, & Bradley (2009)	0.16	63		
Small & Rentsch (2010)	0.28	60	0.59	1.00
Stewart & Gosain (2006)	0.10	67		1.00
Talaulicar, Grundei, & Werder (2005)	0.23	56		
Webber (2008a)	0.74	31		

(Appendix continues)

Appendix *(continued)*

Article	r_{xy}	N	r_{xx}	r_{yy}
Affect-Based Intrateam Trust - Team Performance				
Akgun, Byrne, Keskin, Lynn & Imamoglu (2005)	0.30	69		
Bresnahan (2008)	-0.04	49		
Cheung, Gong, Wang, Zhou, & Shi (2012)	0.30	96	0.26	
Costa (2000)	0.03	112	0.57	0.51
Dayan & Di Benedetto (2010)	0.61	93	1.00	1.00
Groesbeck (2001)	0.71	100	0.69	
Hempel, Zhang, & Tjosvold (2009)	0.19	102		
Kanawattanachai & Yoo (2002)	-0.02	36	1.00	1.00
Khan, Breitenecker, Gustafsson, & Schwarz (2015)	0.46	88	1.00	1.00
Lee, Gillespie, Mann, & Wearing (2010)	0.40	34		
Mach & Lvina (2015b)	0.18	73		1.00
Olson, Bao, Parayitam (2007)	0.45	252		
Parayitam & Dooley (2007)	0.15	109		
Pitts (2010)	-0.08	58		1.00
Robert (2012)	-0.01	51		
Sanchez, Olson-Buchanan, Schmidtke, & Bradley (2009)	-0.13	63		
Stewart & Gosain (2006)	0.06	67		1.00
Webber (2008a)	0.57	31		
Cognition-Based Intrateam Trust - Affect-Based Intrateam Trust				
Akgun, Byrne, Keskin, Lynn & Imamoglu (2005)	0.50	69		
Barczak, Lassk, & Mulki (2010)	0.52	82		
Bresnahan (2008)	0.59	49	0.74	0.74
Dayan & Di Benedetto (2010)	0.41	93	1.00	1.00
Hempel, Zhang, & Tjosvold (2009)	0.52	102	0.56	0.48
Kanawattanachai & Yoo (2002)	0.66	36	0.66	0.68
Khan, Breitenecker, Gustafsson, & Schwarz (2015)	0.68	88	1.00	1.00
Mach & Lvina (2015b)	0.72	73	0.74	0.64
Ng, Ayoko, & Kifle (2011)	0.51	26	0.92	0.90
Olson, Bao, Parayitam (2007)	0.67	252		
Parayitam & Dooley (2007)	0.22	109	0.62	0.55
Pitts (2010)	0.55	58	0.34	0.34
Sanchez, Olson-Buchanan, Schmidtke, & Bradley (2009)	0.22	63		
Stewart, & Gosain (2006)	0.50	67		

(Appendix continues)

Appendix *(continued)*

Article	r_{xy}	N	r_{xx}	r_{yy}
Webber (2008a)	0.52	31	0.77	0.77
Webber (2008b)	0.64	54	0.60	0.60
Wilson, Straus, & McEvily (2006)	0.67	52		

Note: r_{xy} = uncorrected correlation coefficient; N = sample size; r_{xx}, r_{yy} = reliabilities for each of

* Correlations and alphas across the two studies were combined into single composites.

Table 1

Results for Main Effect and Moderator Analyses

variable			main effect and within-subgroup statistics										between-subgroup statistics		
type	**name**	**values**	***k***	***N***	***r***	***SD*$_r$**	**ρ**	***SD*$_\rho$**	***95% CV***		***SE*$_\rho$**	***95% CI***	**$\rho_1 - \rho_2$**	***95% CI***	
Direct effect	*Team performance*		100	6,748	0.24	0.23	0.30	0.24	-0.17	0.77	0.0289	0.24	0.36			
Team characteristic	*Task interdependence*	High	64	4,330	0.26	0.22	0.33	0.23	-0.12	0.78	0.0350	0.26	0.40	0.12	0.01	0.23
		Low	6	373	0.17	0.08	0.21	0.00	0.21	0.21	0.0430	0.12	0.29			
	Team virtuality	High	26	1,564	0.27	0.19	0.35	0.17	0.02	0.68	0.0471	0.25	0.44	0.09	-0.03	0.20
		Low	56	3,940	0.20	0.22	0.26	0.24	-0.21	0.73	0.0387	0.19	0.34			
	Temporal stability	High	36	2,541	0.25	0.25	0.32	0.28	-0.23	0.87	0.0539	0.22	0.43	0.09	-0.04	0.21
		Low	48	2,891	0.18	0.19	0.23	0.17	-0.10	0.57	0.0344	0.17	0.30			
	Authority differentiation	High	18	1,165	0.33	0.19	0.41	0.18	0.05	0.77	0.0570	0.30	0.52	0.16	0.03	0.29
		Low	63	4,082	0.20	0.21	0.25	0.21	-0.16	0.66	0.0332	0.18	0.31			
	Skill differentiation	High	40	2,888	0.28	0.24	0.36	0.25	-0.14	0.85	0.0470	0.27	0.45	0.12	0.01	0.24
		Low	46	2,701	0.19	0.18	0.23	0.15	-0.05	0.52	0.0329	0.17	0.30			

Note: k = number of independent studies; N = cumulative sample size; r = sample-size-weighted mean observed correlation; ρ = mean true score correlation; SD_ρ = standard deviation of ρ; *CV* = credibility interval of ρ; SD_r = standard deviation of r; SE_ρ = standard error of ρ; *CI* = confidence interval of ρ; $\rho_1 - \rho_2$ = difference between subgroup effect sizes.

Table 2

Meta-Analytic Correlation Matrix for MASEM Analyses on Team Trust in Leader and Past Performance

	1	2	3
1 Team trust in leader			
2 Past performance	0.38 (2, 103)		
3 Intrateam trust	0.62 (7, 386)	0.12 (12, 824)	
4 Team performance	0.41 (13, 1004)	0.38 (10, 674)	0.3 (100, 6748)

Note: results are reported as ρ (k, N), where ρ = mean true score correlation; k = number of independent studies; and N = cumulative sample size. The harmonic mean sample size = 371.

Table 3

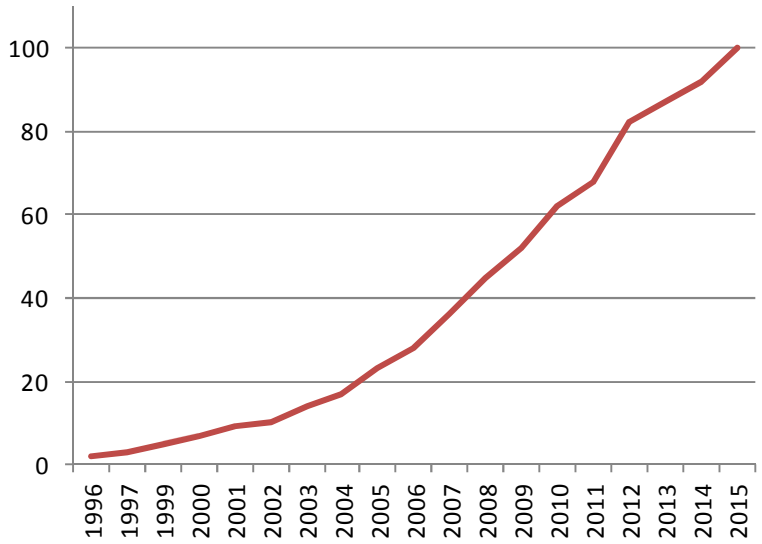
Meta-Analytic Correlation Matrix for MASEM Analyses on Team Trust Dimensions

	1	2
1 Cognition-based trust		
2 Affect-based trust	0.76 (17, 1304)	
3 Team performance	0.35 (33, 2351)	0.33 (18, 1483)

Note: results are reported as ρ (k, N), where ρ = mean true score correlation; k = number of independent studies; and N = cumulative sample size. The harmonic mean sample size = 1645.

Figure 1

Included Studies on Intrateam Trust and Team Performance Across Years*



Note: a- axis = year in which the studies' manuscript appeared, y-axis = the cumulative number of studies.
** The figure is based only on studies included in the current meta-analysis.*

Figure 2

Conceptual Model