


RESEARCH ARTICLE

Mutual trust and employee performance of virtual and face-to-face dyads in multilatinas organisations

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Abstract

Firms are calling their employees back to the office because of concerns about employee productivity, collaboration, and trust. Thus, knowledge about the psychosocial aspects of virtual work environments is now more essential than ever. This study compared the relationships between mutual cognitive trust and employee performance in virtual and face-to-face leader–member dyads. Numerous studies have adopted a unidirectional approach to leader–member trust, exhibiting difficulties related to common method bias. The validity of previous research results comparing trust in face-to-face and virtual leader–member dyads can also be questioned because of other methodological drawbacks. We examined mutual trust and employee performance using different raters. We utilised the multigroup exploratory approach to simultaneously analyse face-to-face and virtual dyads formed by 180 leaders and 561 employees working at a multilatinas company. Our results reveal the existence of differences between virtual and face-to-face leader–member dyads *vis-à-vis* mutual cognitive trust and employee performance relationship.

Keywords: mutual trust; leader–employee dyads; virtual; face-to-face; multigroup; HRM

Introduction

The COVID-19 pandemic and the resulting lockdowns accelerated the transition of all types of jobs towards remote work. Some predictions have indicated the impossibility of returning to traditional work environments (The Economist, 2021). However, firms are currently calling their staff members back to the office in an effort to increase employee productivity, collaboration, and career advancement. Congruently, some CEOs claim that it is easier to build trust in person (di Domenico, 2023).

Scholars have discussed the advantages of virtual workplaces for decades. Such advantages may be offset by several factors (Cascio, 2000) that pose challenges for managers, supervisors, and human resource (HR) professionals. Twenty years ago, Wiesenfeld, Raghuram, and Garud (2001) pointed out that virtual work isolates employees and makes them independent. These factors could cause organisational fragmentation and expose organisations to risk. Such risks may be reduced if virtual workers perceive positive relationships with their key stakeholders, namely, their supervisors, co-workers, and the leading company management personnel (Wiesenfeld et al., 2001).

Along with isolation, Cascio (2000) cited the lack of trust as a factor that can diminish the advantages of virtual workplaces. The absence of social cues in videoconferencing makes trust-building challenging (The Economist, 2021). Trust is considered a driver for successful professional relationships (Scandura & Pellegrini, 2008) and is deemed a key aspect of remotely managing people (Handy, 1995). Scholars from discrete fields have recognised the significance of trust and have studied this

construct as a positive factor in diverse work settings. According to Turesky, Smith, and Turesky (2020), trust-building is essential to team operations and denotes the most important factor for the performance of virtual teams. Moreover, trust appears to be more important in virtual workplaces than in traditional work environments (Breuer, Hüffmeier, & Hertel, 2016). The difficulties of implementing traditional forms of monitoring and control heighten the significance of trust in virtual work environments (Greenberg, Greenberg, & Antonucci, 2007).

The existing research on trust in virtual workers exhibits several methodological and conceptualisation limitations (Breuer et al., 2016). To date, many empirical studies have focused on unidirectional forms of trust. Mutual trust should be accounted for in investigating the correlates of trust between subordinates and supervisors. In general terms, mutual trust may be described as a reciprocal feeling of faith between leaders and subordinates (Deutsch, 1958; Kim, Wang, & Chen, 2018; Serva, Fuller, & Mayer, 2005). Team-level trust is reported to positively affect collective performance in virtual work environments.

The present study identifies some trust-related issues and proposes a comparative investigation of the relationships between trust and performance. To our knowledge, no existing study has simultaneously examined mutual trust in virtual and face-to-face leader–employee dyads. We have organised this paper as follows: First, we introduce the leader–member exchange (LMX) theory as the conceptual basis of our study. Next, we review and problematise the extant literature on reciprocal trust and posit our hypothesis. Subsequently, we present the results of our study, which revealed differences in mutual trust between face-to-face and virtual leader–member (LM) dyads and between trust and employee performance (EP). Finally, we discuss our findings and offer directions for practitioners and researchers interested in mutual trust and performance in virtual and co-located supervisor–subordinate dyads.

LMX and trust

The LMX theory of leadership is grounded in Dansereau et al.'s (1975) seminal scholarship on vertical dyad linkages. The LMX theory of leadership focuses on the relationships between relevant actors (i.e., leader and follower). The associations between leaders and group members can be differentiated (Duchon, Green, & Taber, 1986; Osman & Nahar, 2015) given circumstantial effects (Graen & Uhl-Bien, 1995). For instance, situations of limited or strictly formal interactions could shape the relationships between LM dyads (Graen & Uhl-Bien, 1995).

Trust is necessary for diverse types of social interactions, from marriages to business relationships. The sensing of trust fosters harmonious social relations and diminishes the probability of interpersonal conflicts (Kipnis, 1996). We believe that LMX offers a suitable theoretical lens for the study of trust in virtual and face-to-face dyads. However, some scholars have suggested several improvements to the LMX approaches to trust. One such recommended improvement concerns the integration of LMX research with the literature on trust (Brower, Schoorman & Tan, 2000). In the latter domain, trust can be considered an outcome of a social exchange process (Kramer & Tyler, 1996; Powell, 1990). Reciprocity plays a paramount role (Powell, 1990) in both theoretical frameworks; however, trust is conceived as balanced in LMX but studies based on trust theory do not necessarily entail balanced or mutual trust. This distinction is noticeable in definitions portraying trust as the individual expectation that the behaviour of another person will be advantageous (Gambetta, 1988).

We use LMX as the theoretical tether of the present study to understand the relationships between leaders and members. However, we reference the definition of trust as an aspect of dyadic LM relationships (Mayer, Davis, & Schoorman, 1995) in which the feeling of trust is not necessarily balanced. This definition of trust implies that the trust a leader invests in a subordinate and the trust a subordinate assigns to a leader are two different constructs that may or may not be correlated (Brower et al., 2000). Therefore, as we elaborate below, our study is grounded in the LMX framework but conceptualises trust according to the extant trust literature. Thus, we take advantage of the overlap between both relevant bodies of scholarship (Brower et al., 2000).

Trust can be conceptualised as a unidimensional or multidimensional construct (Legood, van der Werff, Lee, & Den Hartog, 2021). McAllister's (1995) division of trust into cognitive and emotional aspects is widely employed in the literature. Cognitive trust is related to rational assessments of the abilities or qualifications of the person being trusted; the affective component of trust is based on personal emotional associations with the individual. Thus, the affective dimension depends in part on the way one perceives the motives of the other person and the amount of help and support one receives from that individual (Legood et al., 2021).

A study conducted by Yang and Mossholder (2010) reported that affective trust in the leader is related to performance. Their study found no evidence of a relationship between cognitive trust in the leader and performance. More recent research findings have contradicted these results, suggesting an association between performance and both dimensions of trust (Asad et al., 2021; Kim et al., 2018). The new meta-analytic findings indicate that both affective and cognitive trust in the leader are positively related to performance (Legood et al., 2021). However, studies have reported that trust works differently in virtual environments. Trust could assume a 'swift, depersonalised, action-based' form in virtual teams (Jarvenpaa & Leidner, 1999) and cognitive trust would thus predominate in virtual work environments. In fact, the determinants of cognitive trust are vital in the early stages of virtual teams, while the determinants of affective trust are paramount in the later phases of the life cycles of virtual teams (Greenberg et al., 2007).

Although trust is an integral component of the literature on LMX, opportunities remain to contribute further to the apprehension of LM relationships. Specifically, meta-analyses performed on LMX, and trust and performance have demonstrated that the existing research in these fields suffers from methodological biases (Breuer et al., 2016; Martin, Guillaume, Thomas, Lee, & Epitropaki, 2016). In both cases, the results show that the reported conclusions may not be definitive given method biases even if the relationships between LMX and trust with performance-related variables actually exist. Martin et al.'s (2016) meta-analytic study found that trust mediates the effects of LMX on citizenship performance. The results disclosed that the relationship between LMX and performance is higher when the information is obtained using the same method or from the same rater. Similarly, another meta-analysis revealed that previously reported research results regarding the relationship between team trust and team performance in virtual teams could be inflated because of common method biases (Breuer et al., 2016). Conceptual imprecisions are also apparent in studies on LM trust: as previously mentioned, authors specifically mention the mutual nature of trust as a pillar of LMX relationships in their discussions of this critical aspect (Scandura & Pellegrini, 2008). However, scholars have tended to study trust from a single perspective and collect data using singular raters, despite the reciprocal nature of this definition.

The authors of another more recent meta-analysis included only studies that measured performance using different raters and reported that trust in the leader mediates the relationship between leadership styles and performance-related outcomes (Legood et al., 2021). This finding is promising given the aforementioned methodological and theoretical issues. The stated meta-analysis was experimental but only considered the trust of followers towards their leaders. Also, only one of the studies mentioned in the stated meta-analysis attended to virtual and physical environments (Hoyt & Blascovich, 2003).

Trust in virtual environments

The extant studies on trust in virtual teams lack sound theoretical contexts (Hacker, Johnson, Saunders, & Thayer, 2019). Nevertheless, research has revealed that geographically dispersed teams suffer from failures pertaining to mutual knowledge, which cause problems related to cohesion and learning (Cramton, 2001). Cohesion and trust are highly related (Breuer et al., 2016); thus, trust would be more necessary for virtual workers. That traditional, cultural, and social norms and forms of monitoring and control are not available also heightens the importance of trust in virtual (Greenberg et al., 2007). Evidence of this significance is inconsistent but it is plausible to cognise that the relationships

between trust and performance are also intensified in virtual teams. A meta-analysis performed by Breuer et al. (2016) implied that team trust and team effectiveness are positively linked in virtual environments and that this association is stronger for virtual teams than for co-located teams. However, these results could be inflated because of method biases (i.e., data provided by a single rater, cross-sectional designs and subjective measures of performance). Particularly, the authors emphasise that the relationship between team trust and some effectiveness criteria may be biased given the use of self-reported data from the same source (Brahm & Kunze, 2012; Breuer et al., 2016). Notably, Goh and Wasko (2012) adopted a different theoretical perspective and did not find that trust influenced performance in virtual work teams. However, their study presented the limitation of utilising a small sample size and collecting data from a single team. Moreover, their study was not conducted in situ. The authors apprehended the dyadic nature of LMX by measuring LMX in leaders and members. However, they did not account for reciprocal trust in the LM dyads. Furthermore, the study did not compare the relevant relationships between virtual and face-to-face dyads.

To our knowledge, no extant study has simultaneously probed the reciprocal nature of trust in virtual and face-to-face LM dyads. Webster and Wong (2008) compared perceptions of co-located or face-to-face and semi-virtual and virtual teams. They did not find any perceptual differences between face-to-face and virtual team members, including apropos the construct of trust. Webster and Wong (2008) measured cognitive trust in other team members and did not evaluate reciprocal trust in LM dyads. In addition, they used (Analysis of Variance) ANOVA-type analyses, implying the use of sub-optimal scale or factor scores (Marsh, Morin, Parker, & Kaur, 2014). Our study investigated reciprocal trust in dyads rather than trust at the team level. Several scholars have opined that trust is individually perceived and is thus not an objective reality (Mayer et al., 1995). Only a leader can account for the trust placed on a single subordinate and vice versa (Brower et al., 2000).

Mutual trust can be defined as a feeling of confidence or faith sensed by both leaders and subordinates towards each other at a given time point (Deutsch, 1958; Kim et al., 2018; Serva et al., 2005). Based on this conceptualisation, Kim et al. (2018) recently investigated the relationships between mutual trust between leaders and subordinates of a Chinese restaurant chain operating in China and evaluated employee outcomes. They employed hierarchical linear modelling after validating their measures using confirmatory factor analyses. They found that mutual cognitive trust was partially related to task performance. However, their study sample did not include virtual workers.

We believe that studies such as ours that use larger samples and simultaneously compare virtual and face-to-face dyads can better elucidate the relationships between reciprocal LM trust and EP in discrete work environments. We also think that our study contributes to this research domain by utilising information on reciprocal cognitive trust reported by different sources and evaluating EP not via self-reported data but through the reports of other raters to validate our hypothesis. Our study responds to previous critics targeting trust measurement in LMX theory and our operationalisation of reciprocal cognitive trust indicates that the cognitive trust of leaders in their subordinates and the cognitive trust of subordinates in the leaders should be conceived as separate constructs (Brower et al., 2000). Therefore, we posit the following hypothesis:

Hypothesis 1: Mutual cognitive trust exhibits a stronger relationship with individual performance in virtual LM dyads than in face-to-face LM relationships.

Method

We are aware of the limitations of cross-sectional studies in research on trust in virtual work environments (Breuer et al., 2016). Nonetheless, in some cases, cross-sectional designs can legitimately help to advance theory. Such designs are useful when scholars probe a new variable in a mature field and are unsure about the patterns of relationships and time frames between the constructs they are studying (Spector, 2019). Trust has been studied in virtual environments under the LMX umbrella but to our knowledge, no study has yet simultaneously investigated the reciprocal nature of trust in

virtual and face-to-face work environments. It is difficult to establish a time frame for the relationship between reciprocal trust and EP. Workers who trust their leaders and feel that they are trusted by them could display productive behaviours. However, EP could also lead to leaders investing trust in their subordinates which, in turn, could result in mutual trust (Kim et al., 2018). Therefore, we posited and validated a bidirectional hypothesis and accordingly opted for a cross-sectional study design.

Participants and procedures

We conducted our study in a financial multilatin organisation operating in eight countries. The company is headquartered in Colombia. Overall, 359 leaders were asked to respond to a questionnaire about at least one virtual employee and one face-to-face worker. In total, 180 leaders responded to the survey and delivered data on 561 subordinates. In turn, 565 subordinates were invited to rate, among other variables, their cognitive trust in their leaders. We analysed data corresponding to 319 subordinates, handling the missing data as detailed in the analysis section.

All questionnaires began with an informed consent form that specified participation was voluntary, the information provided by the participants would remain anonymous and the study was being conducted by the university to which the researchers were affiliated. Codes were assigned to both leaders and employees to ensure the anonymity of the information and to cross the information provided by both parties in the LM dyads. Only members of the research group could access the responses to the two questionnaires.

The mean age of the leaders was 44.84 years ($SD = 6.71$), 57% of them were females, and their average organisational tenure was 18.97 months ($SD = 6.67$). With respect to the subordinates in the LM dyad, their average age was 39.72 years ($SD = 7.97$), 71% were females, and their average organisational tenure was 14.51 months ($SD = 7.13$). The leaders were designated by the company to the senior (86%) and middle (14%) levels of the organisational structure. Wages represent functional information and were classified by the company into four levels. A large proportion (80.5%) of the LM dyads had worked together for more than 12 months. Of the rest, 12.5% had worked together between 6 and 12 months, 4.3% between 3 and 6 months, and 2.3% for less than 3 months. As stated, most LM dyads had worked together for more than 12 months; however, a significant percentage (around 20%) had interacted for a relatively short period of time. This limited interface time represented one reason why we chose to study cognitive trust. Also, as previously mentioned, cognitive trust is a determinant in the early phases of the life cycle of virtual teams.

Measures

We collected data on reciprocal trust from different raters to assess reciprocal cognitive trust. We measured employee cognitive trust in the leader using Yang and Mossholder's (2010) scale. We then adapted the scale to assess leader cognitive trust in employees. We followed the back translation procedure recommended by Schaffer and Riordan (2003) for both measures to avoid cultural and language-related biases. Participants responded to the scale items on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Sample items included 'Given my supervisor's track record, I see no reason to doubt his/her competence' and 'I'm confident in [name employee] because he/she approaches work with professionalism'.

We used an *ad hoc* measure of EP in virtual teams. We concluded after meeting with the HR staff of the company that much heterogeneity existed *vis-à-vis* the teams and job functions and with respect to the teams, employees, and virtual and traditional work environments. We asked the leaders to rate employee contributions to the company objectives instead of using a self-reported measure of EP. Leaders recorded their responses to four items on our measure using a 5-point Likert scale: 'The way this employee performs his/her specific tasks adds value to the company'; 'With respect to the purpose of the company, the performance of this employee is satisfactory'; 'To achieve the company's goals, this employee strives every day to improve his work'; 'This employee adapts to the company's goals'.

In terms of the operationalisation of the control variables, the leaders reported the duration/period of the LM relationships, while the HR staff downloaded information about the tenures of the employees, the wages of the leaders and employees, and the organisational levels of the supervisors from the company registers and delivered this data to the research team.

Analysis

We used the Mplus statistical package to analyse our data (v.8; Muthén & Muthén, 2017). Instead of measuring perceived reciprocal trust, we modelled reciprocal cognitive trust as the covariance between cognitive trust in the leader and cognitive trust in the subordinate. A significant relationship between the cognitive trust of leaders in their subordinates and the cognitive trust of subordinates in their leaders would indicate a balanced reciprocal or mutual trust. The stronger the link found in one of the groups under analysis, the higher the mutual trust between the dyads working in face-to-face or virtual environments. We handled the missing data using the full-information method and analysed missingness by evaluating the covariance coverage matrix. By default, Mplus sets the acceptable covariance coverage to 10 per cent (Geiser, 2013). We selected the exploratory structural equation modelling (ESEM) approach to model the covariance between cognitive trust in leaders and cognitive trust in subordinates and explore the link between reciprocal cognitive trust and EP to test our hypothesis. Unlike the ANOVA-type analyses or two-step procedures used by previous studies in the relevant domain (i.e., Kim et al., 2018; Webster & Wong, 2008), this analytical approach allowed us to validate the trust and EP scales while we tested our hypothesis. Moreover, exploratory structural equation modelling offers several advantages over confirmatory techniques and confirmatory factor analyses and delivers more unbiased estimates of factor covariances than confirmatory analyses (Fischer & Karl, 2019). In addition, the cognitive trust measures we selected have not been used in Colombian studies to our knowledge and we used an *ad hoc* EP measure. Therefore, we thought an exploratory technique was more suited to our study.

We assessed the goodness of fit of different exploratory multigroup models using the following coefficients: χ^2 , Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). We also employed Hu and Bentler's (1999) cut-off values to evaluate the goodness of fit. First, we fitted a configural invariance model in which the factorial structure was constrained to equality across the groups under analysis. Second, we tested a low measurement invariance in which factor loadings were fixed to remain equal across groups. If this model was accepted, researchers could compare the correlations between the constructs across groups (Fischer & Karl, 2019). Finally, we specified a strong measurement invariance. In addition to the constraints of the previous models, item intercepts were fixed to equality. Strong measurement invariance enables comparisons at the latent variable level (Fischer & Karl, 2019). When comparing degrees of invariance, the fit of a more constrained model should not get worse than the model with more free parameters. We used the Δ CFI and Δ RMSEA coefficients to compare the Configural Invariance Model (CIM) with the Low Invariance Model (LIM) and, subsequently, the Low Invariance Model (LIM) with the Strong Invariance Model (SIM). Changes lower than .01 in Δ CFI and Δ RMSEA indicate that the model fit is not worse and hence the more constrained model with the higher degree of invariance could be accepted (Cheung & Rensvold, 2002). We selected Hair, Anderson, Tatham, and Black (2008) rule of thumb with respect to the factor loadings.

We controlled for the duration/period of the LM relationships, employee tenures, wages of leaders and employees, and designated organisational levels of the leaders. We believe that the first control variable is particularly important because mutual trust evolves when LM relationships develop towards more mature phases (Graen & Uhl-Bien, 1995; Scandura & Pellegrini, 2008).

Results

Our invariance models displayed satisfactory goodness-of-fit results (see Table 1) according to two of the three coefficients. We examined the residual correlations of the selected invariance model because

Table 1. Goodness of fit of the ESEM models

| Model | χ^2 | df | p-value | CFI | RMSEA | Δ CFI | Δ RMSEA |
|-------|----------|-----|---------|------|-------|--------------|----------------|
| CIM | 187.29 | 104 | <.05 | .965 | .053 | | |
| LIM | 235.88 | 137 | <.05 | .958 | .051 | .007 | .002 |
| SIM | 250.43 | 148 | <.05 | .957 | .050 | .001 | .001 |

Note: N virtual dyads = 274, N face-to-face dyads = 287; MLR estimator; Oblimin rotation; non-standardised factor loadings; and intercepts constrained to equality. By default, in exploratory structural equation modelling, factor variances are constrained to 1 and factor means for one of the groups of employees (face-to-face) are fixed to zero. Thus, double headed arrows represent the correlations between constructs. The figure portrays standardised coefficients.

Table 2. Correlation matrix and estimated means of latent variables

| Variable | Virtual | | Face-to | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------|---------|------|---------|------|-------|-------|-------|------|-------|-------|-------|-------|
| | M | SD | M | SD | | | | | | | | |
| 1. LCT | -.28 | .85 | -.29 | 1.01 | | .58** | -.06 | .00 | -.17* | 00 | -.01 | -.03 |
| 2. EP | .10 | 1.05 | .45 | 1.01 | .54** | | .06 | -.02 | -.06 | .14 | .14 | .09 |
| 3. ECT | 1.50 | 1.19 | 1.76 | 1 | .35** | .22** | | .12 | .02 | .17 | .12 | .13 |
| 4. TimeLM | 3.76 | .61 | 3.74 | .59 | .12 | .13 | -.11* | | -.07 | .06 | .01 | .17 |
| 5. TenureE | 16.28 | 6.14 | 12.87 | 7.07 | .09 | .05 | .05 | -.02 | | -.01 | .42** | .17* |
| 6. Joblevel | 1.84 | .36 | 1.87 | .33 | .05 | .12 | .03 | .00 | .28** | | .22** | .53** |
| 7. WageE | 2.04 | .93 | 1.92 | .81 | .16 | .04 | .16** | .03 | .35** | .32** | | .59** |
| 8. WageL | 3.09 | .80 | 3.11 | .79 | .16 | .14 | .20** | .12* | .19* | .57** | .63** | |

Notes: ** Significant at the $p < .01$ level. * Significant at the $p < .05$ level. Correlations of virtual dyads below the diagonal; correlations of face-to-face dyad below the diagonal; LCT = leader cognitive trust; ECT = employee cognitive trust; EP = employee performance.

χ^2 was significant but we took into account that this coefficient is highly sensitive to sample size. Such an evaluation enables the detection of eventual local sources of a model misfit in terms of the response of dependency.

Both Δ CFI and Δ RMSEA indicated that the fit did not significantly worsen with the invariance constrictions that we specified gradually. We retained the latter invariance model after comparing the CIM with the LIM and the LIM with the SIM. Positive residual correlations higher than .30 suggest response dependency (Heffernan, Weinstein, & Ferguson, 2020). We found after evaluating the residual correlations of the SIM model that all the values in the matrix were below .30. We discovered with respect to the missing values that the omissions in the covariance coverage matrix were all above the default value and ranged from .54 to 1. Therefore, at least 54% of the observations contributed to the calculation of the covariances. In other instances, the covariances were calculated based on 100% of the sample. Table 2 presents the correlations and estimated means of the latent variables. Figure 1 illustrates the specific standardised results of the SIM model.

The SIM model allows comparisons of the correlations between factors and the means of latent variables across groups. As displayed in Figure 1, when virtual and face-to-face LM dyads were compared, the relationships implied by reciprocal cognitive trust changed. A positive significant relationship was found between the cognitive trust of leaders and employees in virtual LM dyads but this association was absent in face-to-face LM dyads. We also found differences related to the relationship between LM dyads and EP: only the cognitive trust of leaders was found to be associated with EP in face-to-face LM dyads; however, the cognitive trust of both leaders and employees was linked with EP in virtual LM dyads. In other words, we found that mutual cognitive trust was related to EP in virtual LM dyads, while co-located LM dyads did not evince any mutual cognitive trust and therefore, we found no association between mutual cognitive trust and EP. Consequently, the results of the SIM support our hypothesis about stronger relationships being revealed between mutual cognitive trust and EP in virtual LM dyads.

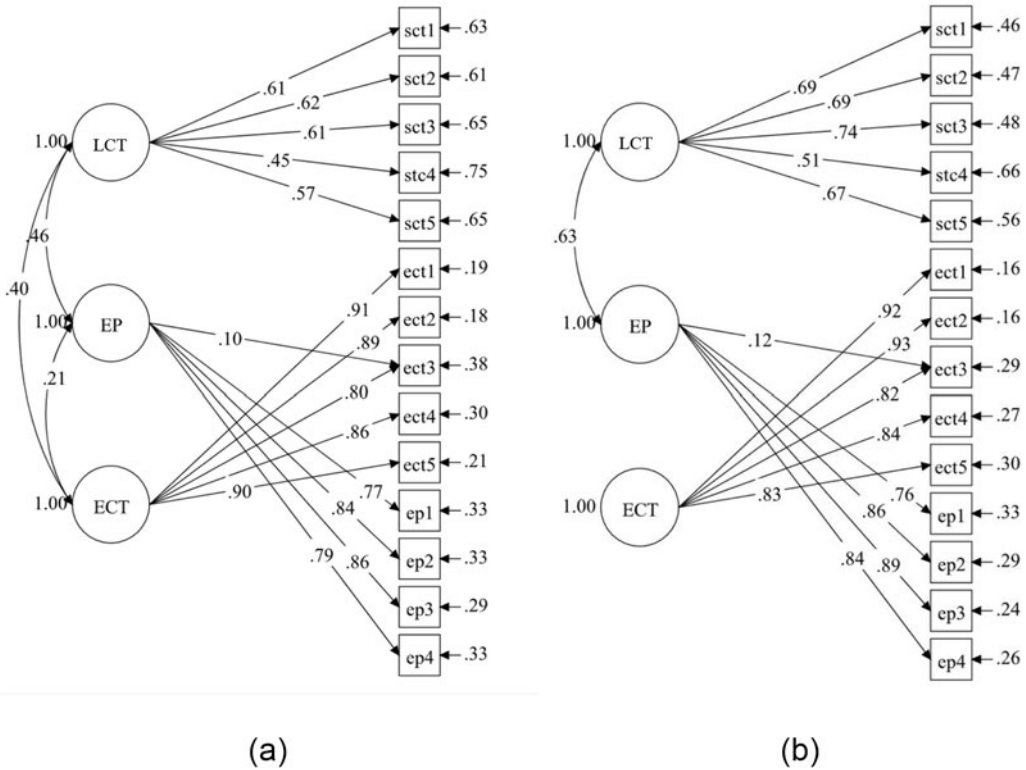


Figure 1. Strong invariance model of trust and performance. (a) Virtual dyads. (b) Face-to-face dyads.

We retained the SIM after our analyses. Therefore, we could compare the scores of the latent variables. We did not find differences in cognitive trust levels in virtual and face-to-face LM dyads in this regard. Conversely, our results revealed that leaders rated EP significantly lower in virtual LM dyads ($M = -.31, p < .01$). Finally, after introducing the control variables into the SIM, the relationship between the latent variables remained significant in both virtual and face-to-face dyads. We noted that the employee organisational tenure exerted a significant effect on the cognitive trust of face-to-face leaders ($\beta = -.21, p < .05$), while duration/period of the LM relationship ($\beta = -.14, p < .05$) and the wage-level of leaders ($\beta = .28, p < .05$) influenced EP in virtual LM dyads.

Discussion

This paper presents a study comparing the relationship between mutual cognitive trust and EP in leader-subordinate dyads working at a multinational Latin American company. We posited that this relationship is stronger in virtual LM dyads than in co-located or face-to-face dyads. We compared both types of LM dyads and simultaneously validated the scales of reciprocal trust and EP. Our principal findings indicate that cognitive trust between leaders and employees is positively related to EP in virtual environments. Conversely, we did not find mutual trust in co-located LM dyads and thus cannot report a relationship between mutual trust and EP in face-to-face LM dyads.

Our findings align with previous literature: trust is more important in virtual LM dyads than in co-located leader-subordinate relationships (Breuer et al., 2016). Leaders rated their trust in at least one virtual and one co-located subordinate in our study and subordinates rated their trust in the same leaders. Therefore, these results could result from differences in social cues and traditional monitoring and control systems (Greenberg et al., 2007). For instance, LM dyads may rely more on mutual trust

to support their work relationship in the absence of physical and behavioural evidence to monitor subordinates and/or evaluate the professional qualities of leaders. The existing research has shown that interactions assessed as the documentation of exchanges between team members moderate the relationship between team trust and team performance (Breuer et al., 2016). Thus, the absence of psychosocial aspects of relationships (i.e., social cues) and variants of monitoring and control systems should be further studied to determine why mutual trust is more important in virtual LM dyads.

Our identified differences in mutual cognitive trust also probably result from what some scholars label presumptive trust. This term refers to substitution in the absence of direct knowledge in virtual environments (Webster & Wong, 2008). This explanation of the presence of mutual cognitive trust in virtual LM dyads and not in co-located leader–subordinate relationships is possible. However, this aspect was controlled to some extent by surveying LM dyads working together for 12 months and more. After controlling for this variable, we did not find any differences in our results and the relationships of mutual cognitive trust remained significant in virtual LM dyads.

Our results also suggest that trust in subordinates and EP are positively associated in co-located teams. However, trust in the leader is not associated with trust in the subordinate or with EP. This outcome seems to represent a case of what previously conducted studies have labelled mismatched mutual trust. In fact, a recent study has stated that mismatched mutual trust can reduce employee effort (Kim et al., 2018). We must recognise that the significant relationship between trust in subordinates and EP could be explained by the fact that we used the same raters for both variables. However, trust in leaders and EP as reported by different raters was also significant in the group of virtual teams, which indicates that common method bias did not significantly impact our model. In light of our findings on face-to-face dyads, companies should provide LM dyads with opportunities to develop mutual cognitive trust by changing traditional managerial control systems that are focused primarily on eliciting the determinants of trust (Long, 2018). This strategy could enhance felt trust in employees and stimulate mutual trust in co-located LM dyads.

The discovery of strong invariance in the EP *ad hoc* measure enabled us to compare the latent means of the constructs. We did not find any differences in leader and employee cognitive trust. Conversely, we found that leaders rated EP lower in the case of employees working in virtual environments. This finding supports the results of previous research that suggest that the ways in which supervisors rate performance vary according to intra-organisational contexts. Some contextual factors explaining this variance relate to social, task, and physical characteristics (Ellington & Wilson, 2017). We compared employees working in both virtual environments (where social interactions differ and physical contact is absent) and face-to-face milieux. Such contextual factors could explain the differences our study found apropos EP.

The results concerning the control variables presented at the end of our results section suggest that employee organisational tenure exerts a negative influence on the cognitive trust of face-to-face leaders. Put differently, our findings indicate that the longer an employee's organisational tenure, the lower the cognitive trust of leaders in co-located teams. The cognitive trust of leaders was positively associated with EP in co-located LM dyads. Previous studies have suggested that organisational tenure moderates the influence of several variables on job performance in a manner that decreases their effects (Kim, Liu & Diefendorff, 2015). Given that evidence indicates that trust mediates the effect of LMX on performance (Martin et al., 2016), it becomes plausible to think that organisational tenure interacts with LMX and/or cognitive trust and reduces positive effects.

We did not identify a significant effect of the organisational levels of leaders on EP, perhaps because we surveyed leaders positioned in only two organisational levels. Our use of too few categories could have affected this result (Friedman & Amoo, 1999). In addition, we found that the wages of the leaders as reported by the company predicted the ratings registered by the leaders of the performance of virtual employees. Certain leadership styles interacting with leadership status could motivate higher EP in virtual LM dyads. Prior research suggests that the servant leadership style in high-level managers augments the performance of employees positioned at lower levels of the organisational hierarchy (Stollberger, Las Heras, Rofcanin, & Bosch, 2019). Moreover, recent research results indicate that

certain leadership styles impact the performance of virtual teams by inculcating trust in the leader (Ben Sedrine, Bouderbala, & Nasraoui, 2020).

Finally, that leaders in traditional work settings spend more time correcting poor work-related behaviours in the early stages of employment could be tendered as a plausible explanation for the negative effect of virtual LM dyads on EP (Thrasher, Dickson, Biermeier-Hanson, & Najor-Durack, 2020). Other researchers have reported a negative, albeit not significant, impact of relationships of dyad contact on performance as rated by leaders in co-located dyads (Bauer & Green, 1996). This effect could be exacerbated in virtual teams in which there are fewer monitoring and control options, as previously mentioned, as well as a lesser exchange of social cues.

Based on these findings, we recommend that companies and leaders prioritise the development of mutual trust to influence EP and strategies to assess the latter. One potential strategy is to modify traditional control systems by implementing additional objective EP indicators (e.g., balance score-cards). Especially within virtual LM dyads, and despite the potential misalignment between subjective and objective EP measures (Newman, Ford, & Marshall, 2019), implementing such indicators can help mitigate potential EP rating bias in virtual contexts. Finally, since trust in virtual work environments depends on the duration or length of the relationship, organisations should implement practices to foster long-lasting virtual LM relationships. Given the absence of social clues in virtual work environments (The Economist, 2021), an effective strategy could involve creating virtual informal socialisation spaces promoting closeness and contributing to mutual trust in LM virtual work contexts.

Limitations and future research

We adopted the perspective of the LMX theory to study the relationships between mutual trust and EP in virtual and face-to-face dyads. Thus, our study does not report on mutual trust and team-level variables. The leaders assessed several employees but employees were divided into virtual and face-to-face environments, and the data pertaining to the employees were not necessarily nested within the same teams. Consequently, multilevel analyses were not conducted. Multilevel data collection and analyses should be undertaken to study reciprocal trust at the team level. The social exchange theory could be employed to delineate such a study, as in the investigation conducted by Kim et al. (2018).

Trust and performance in LM dyads should be examined by comparing pre- and post-pandemic lockdown data. Unfortunately, this attempt was beyond the scope of our study design when we began collecting our data. Also, our data did not allow us to affect such comparisons since only 52 observations were collected after the lockdowns began. Future studies should aim to establish whether mutual trust and its relationships with EP in virtual and face-to-face LM dyads changed because of the restrictions imposed by the lockdowns. Furthermore, the relationships queried in our study could be assessed using panel data of dyads that were once face-to-face but migrated to the virtual environment.

Prospective studies could include covariates such as managerial control and social cues to determine whether they function in the differences found in our study. Also, future research initiatives should control for the nationalities of the members of the LM dyads. This control variable has not been accounted for in previous studies (Kim et al., 2018) but a lack of trust could be observed among employees of different nationalities (Timming, 2009).

Future studies should control for perceived mutual trust to provide more evidence about the unbalanced reciprocal trust in co-located LM dyads that we have discussed in this study. However, researchers should be careful because using self-reported measures of perceived mutual trust could add method biases if the same raters reported trust in leaders and subordinates.

This cross-sectional study probed the direct and bidirectional links between mutual cognitive trust and EP in LM dyads, eliminating the predictors of these variables such as LMX and leadership styles. As the next step, future research initiatives with alternative research designs could allow other

researchers to test the associations of LMX and leadership styles with mutual cognitive trust and EP in virtual and face-to-face dyads.

Finally, this study evidenced the usefulness of mutual cognitive trust and our *ad hoc* EP scale in measuring the relevant constructs across virtual and face-to-face LM dyads. Our results indicate that the leaders and employees who participated in this study understood the constructs of reciprocal cognitive trust and EP in the same way. Therefore, HR researchers studying similar samples could use these scales without distinction in both face-to-face and virtual work environments. These scales could also be employed to effect comparisons between trust and EP in face-to-face and virtual supervisor–subordinate dyads.

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