

The Association Between Leaders' Workplace Loneliness and Members' Organizational Trust: A Cross-level Moderated Mediation Model*

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In an era marked by the rapid expansion of Internet communication, unmediated interpersonal relationships are increasingly rare. In the workplace, however, loneliness can have a range of negative consequences. This study investigated the impact of workplace loneliness on organizational trust in a Chinese context. For data collection, 65 work teams (65 leaders and 240 members) were recruited from two private and two state-owned enterprises. Team leaders took the Loneliness at Work Scale (LAWS) while team members completed the LAWS, the Leader-Member Exchange Scale (LMX-7), and the Organizational Trust Scale. A cross-level moderated mediation model was applied using hierarchical linear modeling (HLM). Results show that members' workplace loneliness is a cross-level mediator between leaders' workplace loneliness and members' organizational trust. In addition, leader-member exchange (LMX) was a cross-level moderator in the association between leaders' and members' workplace loneliness. These findings enhance our understanding of the negative impact of workplace loneliness on organizations and shed light on the influence that team leaders exert on their members, providing valuable insights into work team management.

Keywords: cross-level moderated mediation model, leader-member exchange, organizational trust, work team, workplace loneliness.

Highlights

- Workplace loneliness negatively impacts organizational trust.
- Members' workplace loneliness is a cross-level mediator between leaders' workplace loneliness and members' organizational trust.

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- Members' LMX is a cross-level moderator in the relationship between leaders' and members' workplace loneliness.

Workplace loneliness refers to the emotions that arise when there are disparities, whether in quantity or quality, between the interpersonal relationships individuals expect, along with an individual's incapacity to compensate for such discrepancies (Wright, 2005). This translates into disregarding employees' emotional needs, leading to a diminished sense of identification with the organization, and giving rise to various adverse outcomes (Wright et al., 2006). Recent technological advances had a profound impact on both work practices and individuals' lives. Turkle (2017) suggests that the internet hampers face-to-face socialization and the resulting intimacy. In addition, an excessive focus on efficiency and competition can also hamper authentic communication, hindering the development of essential interpersonal relationships (Wright & Silard, 2021).

Recently, the phenomenon of workplace loneliness has gained attention due to its complex consequences (Azeem, 2024; Basit & Nauman, 2023; Cheng et al., 2023; Chung et al., 2022; Gafoor, 2020; Jha, 2023; Lam & Lau, 2012; Tian et al., 2023; Walz et al., 2023; Wright, 2005; Wright et al., 2006). Studies show that individuals' need to belong somewhere and maintain close interpersonal relationships also exists in the workplace (Wright, 2005). Unfortunately, apparently more efficient work practices can increase the distance between team members, further weakening interpersonal relationships (Turkle, 2017). Lack of meaningful workplace relationships increases the likelihood of loneliness (Wright, 2005). Workplace loneliness can rapidly erode employees' sense of closeness with their team, giving rise to the 'island effect' (Huang, 2020; Turkle, 2017). In mainland China, this phenomenon has never been thoroughly studied (Guo, 2020; Tian et al., 2023).

With the advent of the "empty-nest youth" and the urbanization trend, workplace loneliness has become common in Chinese organizations. According to the "2017 Career Data White Paper: the Lonely Economy", 61.47% of 10,000 people in the workplace responded they felt lonely, of which 27.22% said often, 51.77% occasionally, and 21.01% every day (Maimai, 2017). Moreover, Chinese culture discourages the expression of emotions, which makes team members feel ashamed of their feelings, causing them to not seek strategies to ease them (Soto et al., 2011; Wei et al., 2013). Hence, researching workplace loneliness in China is both essential and valuable, since existing studies focus more on individual experiences. Because of its advantages in analyzing the antecedents and consequences of workplace loneliness, a cross-level approach should be ecologically more valid than an individual-level approach (Chen et al., 2017). This study uses this kind of approach to examine the effect of workplace loneliness on organizational trust, as well as to explore the underlying mechanisms and boundary conditions in Chinese workplaces.

Workplace Loneliness: Antecedents and Consequences

The definition of workplace loneliness includes two dimensions: emotional deprivation and missing organizational identity. Emotional deprivation refers to a qualitative or quantitative lack of interpersonal relationships between members of the

organization. The missing organizational identity implies that members do not identify with the organization (Wright, 2005; Wright et al., 2006; Wright & Silard, 2021).

Many scholars (e.g., Bai, 2021; Wright & Silard, 2021; Zhou, 2018) have researched workplace loneliness, revealing stimulating insights. Research focusing on the consequences of workplace loneliness reveals its adverse effects on employees and organizations. Employees experiencing significant workplace loneliness exhibited declines in both their in-role and extra-role job performance (Lam & Lau, 2012), the employee approachability (Ozcelik & Barsade, 2018), subjective well-being (Basit & Nauman, 2023), perceptions of peer and supervisor support (Wax, 2022), task/job performance (Azeem, 2024; Jha, 2023; Ozcelik & Barsade, 2018), organizational commitment (Ozcelik & Barsade, 2018; Wax, 2022) and organizational citizenship behavior (Chung et al., 2022; Wax, 2022). They also showed a greater risk of burnout (Anand & Mishra, 2021; Omar et al., 2020), unethical behavior (Gentina et al., 2018), and a hostile work mood (Azeem, 2024).

Furthermore, the effects of workplace loneliness have been explored in the Chinese cultural context. Researchers claim that workplace loneliness was positively related to turnover intentions and quiet behavior (Chen et al., 2021; Chen et al., 2016) and negatively related to team performance and creativity (Cheng et al., 2023; Peng et al., 2017; Tian et al., 2023; Yang & Wen, 2021). Research on a Chinese sample reveals gender differences in the effect of workplace loneliness on organizational citizenship behavior mediated by work engagement (Tian et al., 2021). These findings suggest that the relationship between workplace loneliness and work attitudes in the Chinese cultural context aligns with that in Western contexts.

Although the harmful effects of loneliness have been extensively studied, research on workplace loneliness is at an early stage in the literature on organizational behavior (Ozcelik & Barsade, 2018). The relationship between workplace loneliness and organizational behavior is worthy of further research, especially in Chinese culture in which the expression of emotions is often not encouraged.

Workplace Loneliness and Organizational Trust

Organizational trust is the recognition of and dependence on members of the organization as a whole (including the organization's rules, culture, etc.) and their willingness to trust others in their work environment (Chen, 2006; Loes & Tobin, 2020). It is employees' trust in the organization, their leaders, and colleagues. There are mixed findings on the relationship between workplace loneliness and organizational trust, and the underlying mechanism remains unclear (e.g., Abdil & Taşgin, 2023; Gulzar et al., 2024; Yusuf et al., 2024). Some researchers show that employees' organizational trust was negatively related to their level of workplace loneliness (Giderler et al., 2017). Other scholars claim that there was a direct relationship between trust in colleagues and workplace loneliness (Aksoy, 2019). Therefore, further research is needed.

The lack of interpersonal relationships and a sense of belonging may lead members to develop negative organizational attitudes, avoid emotional communication with colleagues, and struggle to build trust within the organization (Chen et al., 2021; Zhou, 2018). In other words, members with high levels of workplace loneliness often have unmet emotional needs and are deprived of a

sense of belonging, resulting in emotional numbness, alienation from the team, and difficulty in building trust with others. From the perspective of cognitive resource theory, workplace loneliness is a constant reminder for employees to perform self-assessment, which should cause them to think about emotional needs, belonging in the organization, and identification. However, employees have limited cognitive resources on the work floor, and loneliness and efforts to overcome it inevitably take up a large amount of cognitive resources. This makes it challenging to have enough resources to build trust in organization and others (Wright, 2005). This is particularly pronounced in China, where members are abandoning active coping strategies (such as problem-solving) and instead resorting to passive (avoidant) coping strategies (Soto et al., 2011; Wei et al., 2013), which can substantially impact organizational confidence.

While exploring the link between workplace loneliness and organizational trust among members, this study also focuses on how leaders' workplace loneliness influences members' organizational trust and the underlying mechanisms through a cross-level moderated mediation model. The hypotheses are as follows.

Hypothesis 1: Leaders' workplace loneliness is negatively associated with team members' organizational trust.

Hypothesis 2: Members' workplace loneliness is negatively associated with organizational trust.

Relationship between Leaders' and Members' Workplace Loneliness

A team leader guides and supervises members in their daily work, formally or informally affecting members' attitudes and behaviors (Yammarino et al., 2008). The cross-level effect of the same variable (e.g., psychological capital) on the work team has been empirically confirmed (Chen et al., 2017; Jha, 2023; Walumbwa et al., 2010). Thus, it is reasonable to assume that leaders' workplace loneliness directly affects their members' loneliness.

To better understand the cross-level effect of workplace loneliness, we used social identity theory as an exploring framework. According to this theory, team members create their work "selves" based on common characteristics within the team to match with other members and leaders (Gundlach et al., 2006; Yan et al., 2011). Leaders' moods and emotions send strong signals throughout an organization (Goleman et al., 2002). Their mental and emotional state and their behavioral patterns become important work backgrounds for members to perform their work and affect their work status (Podsakoff et al., 1990). When leaders act as agents of their organizations, negative emotions (such as sadness, depression) may be seen as organizational background and trigger these same emotions and behaviors in their team (Chen et al., 2021; Maertz & Griffeth, 2004). Some studies have speculated that workplace loneliness is contagious (Li & Ye, 2015; Ozcelik & Barsade, 2018). Individual loneliness in the organization will affect other members through an emotional contagion effect.

Team leaders wield significant control over members' career advancement and benefits, making even a slight emotional display likely to trigger reactions.

In the Chinese workplace, flattering bosses and leaders to get salary increases and other benefits seems common (Yang, 2014), resulting in emotional contagion more likely to spread. Therefore, leaders' workplace loneliness may be easily perceived by their team members, causing an increase in members' workplace loneliness. The following hypothesis regarding this problem is:

Hypothesis 3: Leaders' workplace loneliness is positively associated with their team members' workplace loneliness.

Based on hypotheses 1 to 3, we infer the following hypothesis:

Hypothesis 4: Team members' workplace loneliness plays a cross-level mediating role in the relationship between leaders' workplace loneliness and members' organizational trust.

Leader-Member Exchange as a Cross-Level Moderator

Team leaders will probably use differentiated management methods and treat their subordinates differently due to time, energy, and personality constraints (Dansereau et al., 1975). Graen and Uhl-Bien (1995) proposed the concept of leader-member exchange (LMX), which reflects the amount of leadership resources available to team members. According to the strength of LMX, team members can be divided into "insiders" and "outsiders." "Insiders" enjoy high LMX with their leader, while "outsiders" do not. With a high LMX, members receive more organizational resources from their leaders (Casimir et al., 2014; Graen & Uhl-Bien, 1995) and exhibit more voluntary behavior (Hao et al., 2019). With a low LMX, members and leaders have little internal exchange and are limited to rigid, formal working relationships (Casimir et al., 2014).

Workplace loneliness is significantly negatively correlated with LMX (Arslan et al., 2020; Lam & Lau, 2012; Peng et al., 2017). Employees with high levels of workplace loneliness resort to avoidance behaviors and are reluctant to communicate with others, resulting in low levels of LMX. Once subordinates perceive a certain emotional state of their leader, they will be equally affected, and their feelings will also be fed back to the leader. After team leaders perceive their members' avoidance behavior, communication between them may decrease. With high LMX, the greater the mutual influence between the leader and members, the greater the effect of leader loneliness on member loneliness. With low LMX, the opposite is the case.

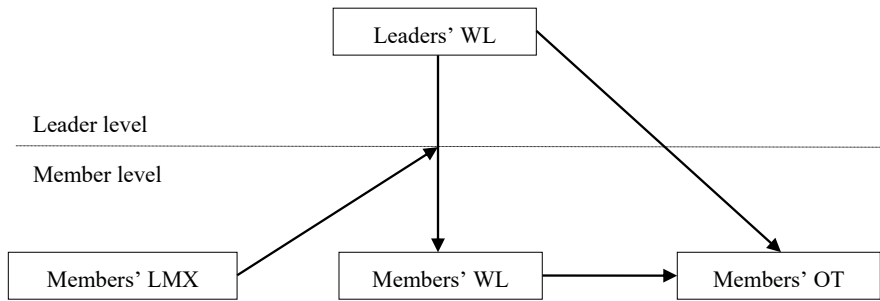
Moreover, due to the prevailing Chinese "flattery" culture in the workplace (Qiu et al., 2021; Yang, 2014), the quality of LMX has a more powerful impact on the relationship between leaders and members. When team members establish an exchange relationship with their leaders, even a few words can stimulate strong responses. Therefore, this study uses LMX as a moderator to investigate whether the cross-level effects of workplace loneliness varies with different LMX relationships. The following hypothesis is proposed:

Hypothesis 5: LMX plays a moderating role in the relationship between workplace loneliness of leaders and members. The higher the LMX, the

stronger the cross-level relationship between workplace loneliness of leaders and members.

Following the above hypotheses, we proposed a cross-level moderated mediation model (Fig. 1) and tested only this one a priori hypothesized model. Leaders' workplace loneliness (the independent variable) is the leader-level variable, while members' workplace loneliness (the mediator variable), LMX (the moderator variable), and organizational trust (the dependent variable) are member-level variables.

Figure 1
The Conceptual Cross-level Moderated Mediation Model



Note. WL = workplace loneliness, LMX = leader–member exchange, OT = organizational trust.

Significance of this Study

First, this study provides insights into the relationship between workplace loneliness and organizational trust. Workplace loneliness is increasingly recognized as a common problem, especially in rapidly changing organizations such as those in China. Indeed, employees face increasing pressure and uncertainty, leading to feelings of loneliness and isolation. However, organizational trust is crucial in maintaining a healthy and productive work environment. Second, identifying the underlying mechanisms that make up the cross-level moderated mediation model provides a basis for developing targeted interventions and increasing organizational trust. Finally, existing research is largely based on Western contexts, with a relative lack of exploration within the Chinese context. This study addresses this gap, offering empirical insights into the unique dynamics of this relationship within China's cultural and organizational environment.

Methods

Participants

We used convenient cluster sampling to recruit participants as work teams (members and their immediate leaders) from two private and two Chinese state-

owned enterprises. The inclusion criteria were: the work team had four or more members, and members and leaders had been working together for at least a year. All participants had volunteered. Of the 332 questionnaires distributed, 305 (91.87%) were deemed valid. The responses came from 65 work teams (i.e., 65 direct team leaders and 240 members, with an average of five people per team). Among the participants, 55.4% were women. Regarding age, 13.4% were 20–25 years old, 39.7% 26–30 years, 25.9% 31–35 years, 12.1% 36–40 years and 8.9% over 40. Furthermore, 38.4% had tertiary education or lower, 54.4% had an undergraduate degree, and 7.2% had a master's degree or higher. On average, participants had worked at the company for 2.73 years ($SD = 1.03$).

Procedure

As mentioned, we collected data at both leader and member levels. The questionnaire for leaders included the Loneliness at Work Scale, while the one for members included the Loneliness at Work Scale, the Leader-Member Exchange Scale, and the Organizational Trust Scale. Both leader and member questionnaires use self-assessment methods.

Before the survey began, the companies' human resources department helped pair the interviewed members and their leaders. During the study, the researchers submitted the questionnaire in person on-site, explaining that the survey results would remain confidential and be used only for academic research. After asking the participants for informed consent, the questionnaire was distributed. To address participants' concerns and protect their privacy, answers and participant fees were inserted in an encrypted envelope during the testing process. The completed questionnaire was sealed and collected in the same envelope.

Measures

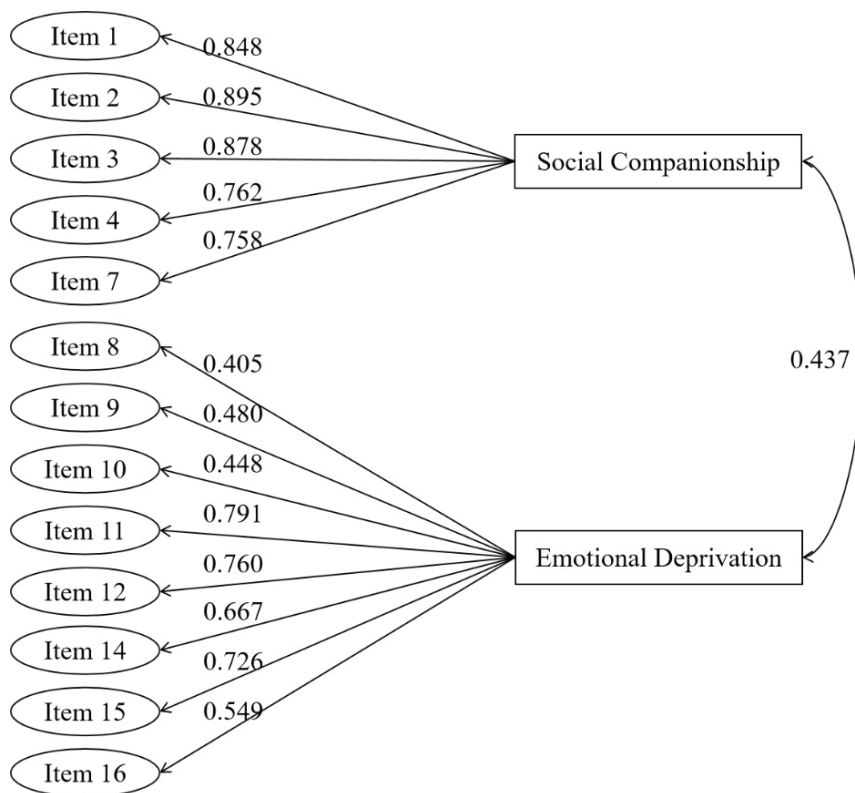
Three questionnaires were adapted from the Loneliness at Work Scale (LAWS), Leader-Member Exchange Scale (LMX-7), and Organizational Trust Scale. The Chinese version of these questionnaires was developed using back-translation to ensure language accuracy.

Workplace Loneliness

The Loneliness at Work Scale (LAWS; Wright, 2006) comprises two dimensions: missing organizational identity with seven items (e.g., "I often feel that my colleagues are distant.") and emotional deprivation with nine items (e.g., "When I work, I feel a general sense of emptiness."). The items were rated using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Confirmatory factor analysis (CFA, Fig. 2) showed that after removing items 5 ("I am satisfied with the relationships at my workplace"), 6 ("There is camaraderie at my workplace"), and 13 ("No one can share personal thoughts with me at work"), the factor loadings of the other items were higher than .40. The following goodness-of-fit indices were acceptable: TLI (Tucker-Lewis index) = .895, CFI (comparative

fit index) = .918, and SRMR (standardized root mean square residual) = .060. The correlation between original and revised scales was .981. From the standpoint of representativeness, after removing these three items, the scale could still effectively measure workplace loneliness (Hughes et al., 2004). The Cronbach's α for the two dimensions (missing organizational identity and emotional deprivation) was .76 and .96 for the leaders and .84 and .91 for the members.

Figure 2
CFA Results of the Loneliness at Work Scale



Note. CFA = confirmatory factor analysis.

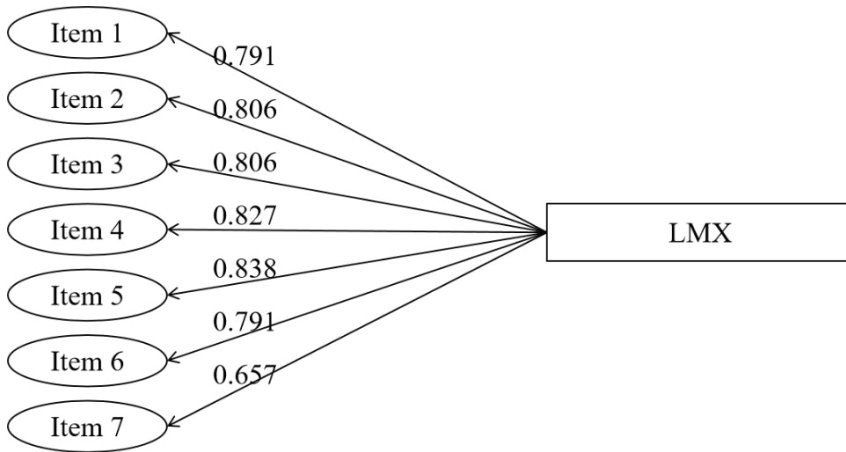
LMX

The LMX was measured using the Leader-Member Exchange Scale (LMX-7; Graen & Uhl-Bien 1995), consisting of seven items rated on a five-point Likert scale ranging from 1 to 5. An example is "I think the team leader regards me as a promising employee." This scale was used only for team members. A CFA showed that the factor loading of all items was higher than .40, so all items were retained for

research (Fig. 3), and the following goodness-of-fit indices were acceptable: TLI = .895, CFI = .930, and SRMR = .039. The Cronbach's α was .92.

Figure 3

CFA Results of the Leader-Member Exchange Scale

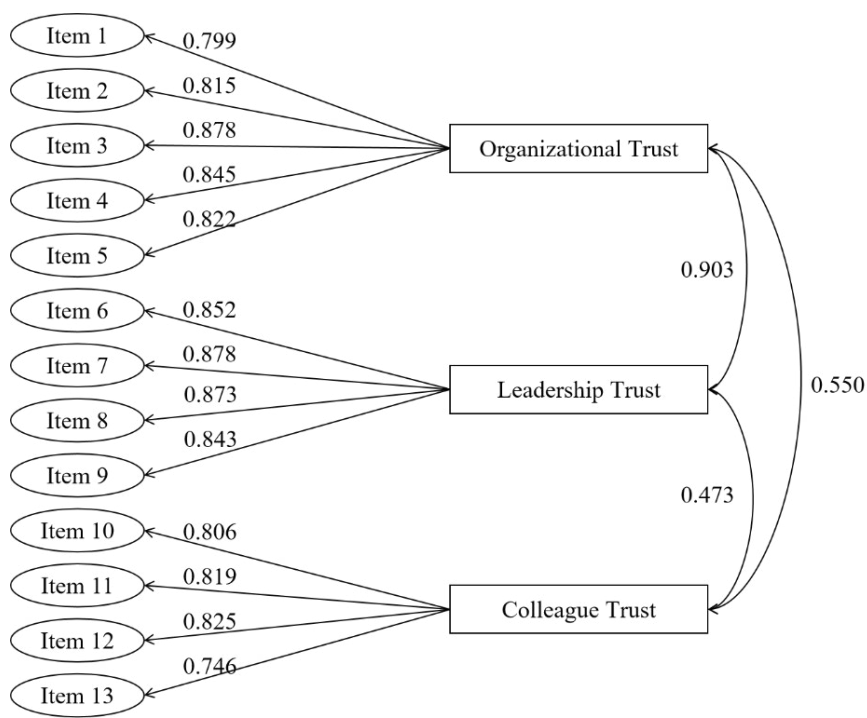


Note. CFA = confirmatory factor analysis.

Organizational Trust

We also used the Organizational Trust Scale (Chen, 2006). It consists of thirteen items that analyze three dimensions: trust in organization (five items, such as “I believe that the company can provide benefits to employees and take care of employees.”), trust in leadership (four items, such as “I believe that what my superiors say to me is true and reliable.”), and trust in colleagues (four items, such as “When I encounter difficulties in my work, I believe I can get help from my colleagues.”). The items were rated using a five-point Likert scale from 1 to 5. The scale was used only for team members. A CFA showed that the factor loading of all items was higher than .40, so all items were kept for the study (Fig. 4), and the following goodness-of-fit indices were acceptable: TLI = .914, CFI = .932, and SRMR = .043. The Cronbach's α for the dimensions of trust in organization, trust in leadership, and trust in colleagues were .91, .93, and .88, respectively.

Figure 4
CFA Results of the Organizational Trust Scale



Note. CFA = confirmatory factor analysis.

Data Analysis

Three software systems were used for data analysis: SPSS 23.0, Mplus 8.0, and HLM 6.0. SPSS 23.0 was used for descriptive statistics, correlation, and reliability analyses. Mplus 8.0 was used for measurement invariance and CFA. HLM 6.0 was used for analyzing the cross-level moderated mediation model.

Measurement Invariance

Both team leaders and members completed LAWS. Therefore, it was necessary to examine whether the structure of the measurement tool was the same for both types of participants. Multi-group confirmatory factor analysis was used to examine the morphological equivalence of Model A (MA), then investigate the factor load invariance of Model B (MB), and finally establish the cross-group invariance of parameters through model comparison. The results showed that the change from MA to MB increased the limit of load equality, $\Delta\chi^2/\Delta df = 45.5/11 = 4.1 < 5$. Furthermore, the changes of the goodness-of-fit indices TLI, CFI, RMSEA (root-mean-square error of approximation), and SRMR were all less than .02, showing that the fitting of MB was not significantly worse than that of MA, and we find MB acceptable (Nagengast & Marsh, 2014). Therefore, LAWS was deemed sufficiently fit for assessing team leaders and members.

Common Method Bias

Harman's single-factor test was used to examine common method bias (CMB) for the team member questionnaire. CFA showed that the single-factor model did not have a good model fit: $\chi^2 = 3844.246$, $df = 495$, $TLI = .421$, $CFI = .457$, $RMSEA = .168$, and $SRMR = .173$. The variance contribution rate of the single-factor model was 31.28%, indicating no substantial CMB (Podsakoff et al., 2003).

Hypothesis Testing

The analysis of the cross-level moderated mediation model was conducted stepwise. First, the HLM null model analysis tested whether member-level variables—workplace loneliness (mediator variable), LMX (moderator variable), and organizational trust (dependent variable)—were appropriate for cross-level research (Wen, 2009). Second, for the cross-level moderated mediation model, the path coefficients in the model were tested sequentially (Muller et al., 2005): (1) the path coefficient from the independent to the dependent variable was tested; (2) after adding the mediator, the mediation model was tested; (3) after adding the moderator, the path coefficients of the moderated mediation model were tested. If all path coefficients were significant, this supported the cross-level moderated mediation model (Muller et al., 2005).

Results

Descriptive Analysis

Table 1 demonstrates a significant negative correlation between members' workplace loneliness and organizational trust ($r = -.30$, $p < .01$). Variables such as gender, age, degree, and work experience at the company had to be controlled because they significantly correlated with members' workplace loneliness and/or organizational trust. Therefore, we performed a regression analysis of members' workplace loneliness and organizational trust on gender, age, academic degree, and work experience at the company, respectively, and the residuals were treated as the observation values of members' workplace loneliness or organizational trust to reduce spurious effects in the subsequent analysis (Wen, 2017).

Table 1
Descriptive Statistics

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Leaders' WL ^b	2.32	.71	—						
2. Gender ^a	.56	.50	—	—					
3. Age ^a	28.66	1.09	—	-.12	—				
4. Degree ^a	1.66	.60	—	-.12	.08	—			
5. Work experience at the company ^a	2.71	1.07	—	.06	.49**	.00	—		
6. Members' workplace loneliness ^a	2.33	.72	—	-.14*	.00	.12	-.26**	—	
7. Members' LMX ^a	3.47	.89	—	-.13*	-.05	.11	-.18**	-.11	—
8. Members' OT ^a	3.70	.80	—	-.07	.14*	.20**	.06	-.30**	.65**

Note. $N = 240$. * $p < .05$; ** $p < .01$. ^a These variables were measured for team members; ^b This variable was measured for team leaders. WL = workplace loneliness; LMX = leader-member exchange; OT = organizational trust.

HLM Null Model Analysis

Before testing the hypothesized model, member-level variables were analyzed with null models (Table 2). The results showed that the intra-group correlation coefficients (ICC) of members' workplace loneliness, organizational trust, and LMX were .65, .45, and .27, respectively. These values were all greater than .06, meaning that the variables were suitable for multi-level analysis (Wen, 2009).

Table 2
Zero Model Analysis

Variables	γ_{00}	σ^2	τ_{00}	ICC
Members' WL	2.33***	.21***	.39***	.65
Members' LMX	3.55***	.54***	.20***	.27
Members' OT	3.79***	.31***	.25***	.45

Note. $N = 240$. *** $p < .001$. γ_{00} is the intercept term; σ^2 is the intra-group variance; τ_{00} is the inter-group variance; ICC is the ratio of the inter-group variance to the total variance. WL = workplace loneliness; LMX = leader-member exchange; OT = organizational trust.

Cross-Level Effect of Workplace Loneliness on Organizational Trust

For the cross-level moderated mediation model, the path coefficients in the model were sequentially estimated and tested with four models (Muller et al., 2005), as shown in Table 3. The group mean centralized member-level arguments, placed in the leader-level equation, accurately estimate the cross-level moderated mediation effect (Hofmann & Gavin, 1998).

Table 3
Test the Cross-Level Moderated Mediation Model

Variables		Model 1 (Members' OT)	Model 2 (Members' WL)	Model 3 (Members' OT)	Model 4 (Members' WL)
Independent variable	Leaders' WL	$\gamma_{01}^{c1} = -.40^{***}$	$\gamma_{01}^{a1} = .69^{***}$	$\gamma_{01}^{c1'} = -.28^{***}$	$\gamma_{01}^{a1'} = .69^{***}$
	Members' WL			$\gamma_{02}^b = -.35^{***}$	
Mediator	Members' WL				
Moderator	Members' LMX	$\gamma_{10}^{c2} = .37^{***}$	$\gamma_{10}^{a2} = -.12^*$	$\gamma_{20}^{c2'} = .33^{***}$	$\gamma_{10}^{a2'} = -.10^*$
	Members' WL * Members' LMX				$\gamma_{11}^{a3} = .12^+$
Interaction	γ_{00}	3.79***	2.32***	3.79***	2.32***
	σ^2	.23***	.20***	.21***	.20***
	τ_{00}	.19***	.14***	.20***	.14***

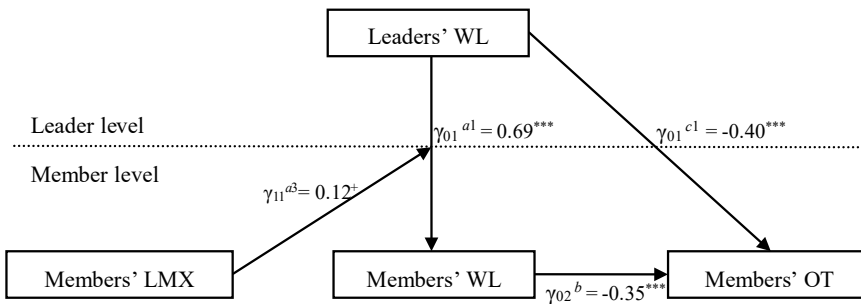
Note. $N = 305$. + $p < .1$; * $p < .01$; ** $p < .005$; *** $p < .001$. γ_{01} , γ_{02} , γ_{10} , γ_{20} and γ_{11} are the standardized coefficients; γ_{00} is the intercept term, σ^2 is the intra-group variance, τ_{00} is the inter-group variance. WL = workplace loneliness; LMX = leader-member exchange; OT = organizational trust.

The first step was to test the standardized coefficient γ_{01}^{c1} in model 1: leaders' workplace loneliness had a statistically significant negative effect on members' organizational trust ($\gamma_{01}^{c1} = -.40$, $p < .001$), which supports Hypothesis 1. The second step was to test the standardized coefficient γ_{01}^{a1} in model 2: workplace loneliness of leaders had a statistically significant positive effect on workplace loneliness of members ($\gamma_{01}^{a1} = .69$, $p < .001$), which supports Hypothesis 3.

The standardized coefficient γ_{02}^b was tested in model 3: workplace loneliness of members had a statistically significant negative effect on their organizational trust ($\gamma_{02}^b = -.35, p < .001$), which supports Hypothesis 2. Moreover, the direct effect of leaders' workplace loneliness on members' organizational trust was statistically significant ($\gamma_{01}^{c1'} = -.28, p < .001$). Hypothesis 4 was also supported, and the proportion of indirect effects in the total effect was $\gamma_{01}^{a1} \times \gamma_{02}^b / (\gamma_{01}^{a1} \times \gamma_{02}^b + \gamma_{01}^{c1'}) = 46.31\%$. The fourth step involved testing the standardized coefficient γ_{11}^{a3} , which examined the impact of the interaction between leaders' workplace loneliness and members' LMX on members' workplace loneliness. The results showed that this interaction approached statistical significance ($\gamma_{11}^{a3} = .12, t = 1.94, p = .054$), with a significant moderating effect size of R^2 changing by 5.0% when compared to Model 2 without the interaction (Preacher & Kelley, 2011). Since significance was affected by sample size, the marginal significance of the moderating effect was acceptable if the effect was significant (Wu & Wen, 2011), so Hypothesis 5 was also supported. The range of values after centralizing the moderator was between -2.14 and 1.86 . When the centralized moderator assumed the maximum value (1.86), the mediating effect was $(\gamma_{01}^{a1} + \gamma_{11}^{a3} * 1.86) * \gamma_{02}^b = (.69 + .12 * 1.86) * (-.35) = -.32$ and at the minimum value (-2.14), the mediating effect was $(\gamma_{01}^{a1} + \gamma_{11}^{a3} * -2.14) * \gamma_{02}^b = (.69 - .12 * 2.14) * (-.35) = -.15$. The difference between the two was statistically significant. Therefore, the cross-level moderated mediation model was supported (Fig. 5).

Figure 5

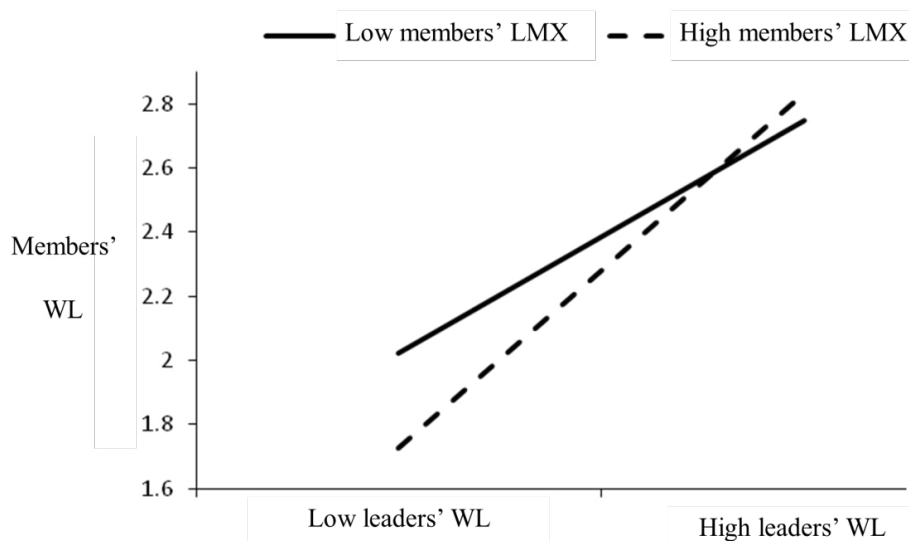
Results of the Moderated Mediation Model



Note. WL = workplace loneliness, LMX = leader–member exchange, OT = organizational trust.

For the moderating effect in the cross-level model, a simple slope test (Aiken & West, 1991) was performed based on the standard deviations above and below the mean (Fig. 6). The higher the level of workplace loneliness among leaders, the greater the level of workplace loneliness among members. At different levels of LMX, however, the effect varied. When team members had high LMX, their workplace loneliness increased significantly as that of the leaders increased ($\beta^1 = .77, p < .001$). For team members with low LMX, the cross-level effect of workplace loneliness was lower ($\beta^2 = .61, p < .01$). Thus, LMX between team leaders and members enhanced the cross-level effect of workplace loneliness.

Figure 6
Results of the Moderating Effect



Note. WL = workplace loneliness; LMX = leader–member exchange.

Discussion

In the current study, we constructed a cross-level moderated mediation model by examining 65 work teams to investigate the effect of workplace loneliness on organizational trust. The results show that leaders' workplace loneliness was positively associated with members' workplace loneliness and reduced members' organizational trust. Members' level of LMX enhanced this cross-level effect, leading to the following four findings.

First, at the member level, workplace loneliness and LMX changed significantly with gender and work experience at the company. In terms of gender, both workplace loneliness and LMX were significantly higher for male than for female members. Members with less than one year of work experience showed the highest workplace loneliness, followed by the group with 1–3 years and 3–5 years. Those with over five years of experience exhibited the lowest levels. Members' workplace loneliness decreases as work experience in the company increases (Bai, 2021; Wright & Silard, 2021; Zhou, 2018). Additionally, among the members, those with 1–3 years of experience had the highest LMX scores. They were followed by those with less than one year of experience and those with 3–5 years. Those with more than five years of work experience had the lowest LMX. Moreover, confidence in the organization changed significantly with an academic degree. Organizational trust was lowest when members had a junior university degree or lower and was highest when members had a master's degree or higher. Organizational trust among those with a bachelor's degree was in the middle. As

the level of education increases, so does members' organizational trust. Moreover, organizational trust was significantly positively correlated with age. The older the members are, the higher the level of organizational trust.

Second, workplace loneliness was negatively associated with organizational trust. This finding is consistent with previous findings on organizational variables (e.g., Azeem, 2024; Basit & Nauman, 2023; Cheng et al., 2023; Chung et al., 2022).

Third, there was a positive correlation between leaders' and members' workplace loneliness. This, in turn, had a negative impact on the members' organizational trust (Giderler et al., 2017). Leaders' workplace loneliness affected members' organizational trust primarily through members' workplace loneliness.

According to social identity theory, leaders are essential to the team, and their workplace loneliness may spill over to the organizational environment, affecting members' emotional experiences and provoking negative behaviors (Li & Ye, 2015; Maertz & Griffeth, 2004; Ozelik & Barsade, 2018). This can also be explained from the perspective of group dynamics theory (Lewin, 1945), according to which each individual behaves like the other team members and acts in concert with the team to achieve consensus. In the workplace, members tend to follow their leaders in behavior and psychology. When leaders exhibit high levels of workplace loneliness, their team members perceive this and have similar emotions. When members exhibit emotions different from those of their leaders, they are perceived as outsiders, which may cause intense pressure from the leader and other members. Therefore, when members perceive high workplace loneliness in their leaders, they tend to display similar emotional experiences to reduce team pressure.

More importantly, the cross-level effect of workplace loneliness between leaders and members further reduces the members' organizational trust. Individuals with high levels of workplace loneliness may be sensitive to information about the outside world and anxious about building relationships in the workplace through socialization. This can lead to increased emotional stress and a lack of belonging and identity, resulting in decreased workplace productivity (Peng et al., 2017; Promsri, 2018; Wright & Silard, 2021). Team members who experience workplace loneliness may be susceptible to a lack of organizational support and have difficulty building satisfying relationships. This leads to a reduction in emotional engagement, creating a vicious circle. When members experience intense loneliness, they sense that their social and emotional needs within the team are overlooked (Lam & Lau, 2012; Wright et al., 2006), making it challenging to establish organizational trust.

Finally, the cross-level effect of workplace loneliness between leaders and members varied with the strength of the LMX relationship. When the exchange relationship between leaders and members was close, the leader's workplace loneliness had a more significant effect on the members. When this relationship was less close, the effect was reduced.

A team is not a simple collection of individuals, but a network of relationships. LMX is an important indicator to measure this interdependence. When LMX is close, members' perception of their leader's loneliness becomes more evident. To reduce group stress and maintain consistency, members show similar emotions (Qiu et al., 2021; Yang, 2014). Based on the principle of reciprocity in social exchange

theory, “insiders”, members who are more closely related to their leader, exhibit more similar emotions and behaviors (Cook et al., 2013). However, it is easier for outsiders who do not receive the same emotional or material benefits as insiders to have negative emotions toward leaders due to this contrast, resulting in a lower emotional and behavioral similarity between outsiders and leaders.

Implications and Limitations

Our study provides evidence of a link between workplace loneliness and organizational trust. It has implications for reducing and preventing workplace loneliness in organizations. First, our findings highlight how loneliness negatively affects the entire organization. We should reevaluate the role of workplace loneliness as a negative variable for the organization in order to improve team members' work performance and productivity. Second, we should focus on the employees' emotional experiences and create a positive team atmosphere by providing an open, supportive, and united work environment. Organizations can encourage teamwork and information and knowledge sharing to create closer interpersonal relationships and prevent employees from experiencing loneliness. Organizations can also create an open feedback culture to help employees prevent and ease loneliness at work by providing positive feedback. Finally, given that exchanges between leaders and members increase the cross-level effect of workplace loneliness, team leaders should show concern for employees, respect them, and provide support to develop mutual trust, reducing workplace loneliness. Team leaders can also promote transparent communication, hold regular one-on-one meetings with employees, listen to them, help them solve problems, and provide support.

A major limitation of this study may be its cross-sectional design. Only cross-sectional data were collected, limiting the generalizability of the findings. Although our hypotheses were supported, causality between variables needs further investigation through longitudinal research. Furthermore, the use of instruments is another limitation of this study. Because there are different scales for measuring LMX and Organizational Trust, the selection and use of scales may lead to the same or different results. In the future, different scales can be used to further explore the relationship between research variables and enrich existing research. Finally, although this study attempted to control for relevant demographic and workplace variables, more variables, such as personality traits and psychological characteristics, could be considered to improve the conclusiveness of the findings. Future studies could examine the potential effect of these factors.

Conclusion

This study found that workplace loneliness negatively correlates with organizational trust. Leaders' and members' workplace loneliness can significantly predict members' organizational trust. LMX between leaders affects the relationship between leaders' and members' workplace loneliness. Our study provides evidence for a direct relationship between workplace loneliness and organizational trust. Nevertheless, the current study cannot establish a causal connection among the different variables.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Ethics approval

All procedures performed in the study were in accordance with the ethical standards of the institutional research committee (Research Ethics Committee, School of Psychology, South China Normal University). And all participants were given the opportunity to give their informed consent.

Data availability

The metadata and generated datasets of this study are available upon reasonable request from the authors.

Author Contributions

H.L. and Z.W. designed the study, analysed the results, and drafted the manuscript. X.L and H.G. revised the manuscript. H.L. and H.G. collected the data. All co-authors participated in the discussion of the results.

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Asocijacija između usamljenosti lidera na radnom mestu i organizacionog poverenja članova: model posredovanja na više nivoa

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U eri obeleženoj brzom ekspanzijom Internet komunikacije, neposredovani međuljudski odnosi su sve redi. Na radnom mestu, međutim, usamljenost može imati niz negativnih posledica. Ova studija je istraživala uticaj usamljenosti na radnom mestu na poverenje u organizaciji u kineskom kontekstu. Za prikupljanje podataka angažovano je 65 radnih timova (65 rukovodilaca i 240 članova) iz dva privatna i dva državna preduzeća. Vođe timova su popunjavali skalu usamljenosti na poslu (LAVS), dok su članovi tima ispunjavali LAVS, skalu razmene lidera i članova (LMKS-7) i skalu poverenja u organizaciji. Model posredovanja na više nivoa primenjen je korišćenjem hijerarhijskog linearnog modeliranja (HLM). Rezultati pokazuju da je usamljenost članova na radnom mestu posrednik na više nivoa između usamljenosti lidera na radnom mestu i organizacionog poverenja članova. Pored toga, razmena lider-član (LMKS) bila je moderator na više nivoa u vezi između usamljenosti lidera i članova na radnom mestu. Ovi nalazi poboljšavaju naše razumevanje negativnog uticaja usamljenosti na radnom mestu na organizacije i bacaju svetlo na uticaj koji vođe timova vrše na svoje članove, pružajući vredan uvid u upravljanje radnim timom.

Ključne reči: model posredovanja na više nivoa, razmena lider-član, organizaciono poverenje, radni tim, usamljenost na radnom mestu

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