



# The effects of teacher's emotional intelligence on team-member exchange and job performance: the moderating role of teacher seniority

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## Abstract

This study aims to examine the effects of teachers' seniority, emotional intelligence (EI), and team-member exchange (TMX) quality on their job performance in primary schools. In particular, the mediating role of TMX on the relationship between EI and job performance, and the moderated mediating effect of teacher seniority on EI-TMX-job performance relationships were scrutinised. Data were collected from 387 teachers of primary schools in Taiwan. The SPSS PROCESS macro and structural equation modelling (SEM) were applied to test the hypotheses using SPSS 26.0. The research findings indicated that primary teachers' EI positively affected their TMX and job performance. The findings also provide empirical evidence for the positive mediating effect of TMX on the relationship between EI and job performance, as well as the negative moderating effect of teachers' seniority on the linkage between EI and TMX. Recommendations are made on the enhancement of teachers' EI and the relationship of TMX in teachers' professional development programs, educational policies, and practice.

**Keywords** Emotional intelligence · Team-member Exchange · Job performance · Seniority · Primary Teachers

## Introduction

Teachers' emotional intelligence (EI) is extremely important in delivering knowledge to students and influencing their behaviour. EI prevents stress and helps teachers deal with complicated situations that come with problematic students in the classroom. Teaching is not only a relational communication process but also an emotional process to manage and regulate students' emotions to create a proper learning environment and achieve effective teaching (Tsang &

Kwong, 2017). Based on the concepts of Social Intelligence proposed by Thorndike in 1920, as well as the Intrapersonal and Interpersonal intelligence proposed by Gardner in 1994 (Rodrigues & Machado, 2019), EI refers to the ability to conduct self-emotion with others, realise one's emotions and others, and reflectively control emotions (Chen & Guo, 2020; Mayer & Geher, 1996; Zhoc et al., 2020).

EI has gained much attention in education, which is considered a crucial capability in reinforcing academic achievement. Teachers with high EI can help students enhance their abilities to construct self-perceptions and self-esteem (Curci et al., 2014) and generate positive emotions in their students. If teachers effectively manage their EI, students will have a high intention to learn and achieve better performance (Chen & Guo, 2020). Specifically, teachers' EI is positively related to their professional performance and success in education implementation (Chen et al., 2007). Previous studies have evidenced that EI positively influences teachers' performance and efficiency (Chen et al., 2007; Chan, 2004; Pishghadam & Sahebjam, 2012).

Despite a growing number of research on the impact of emotions in learning and its influence on teacher's or

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student's performance (e.g., Austin, 2004; Chen et al., 2007; Garg et al., 2016; Petrides et al., 2004; Trad et al. 2022; Zhoc et al., 2020), researchers are rarely considering team-member exchange (TMX) as EI's outcome (except Oh & Jang, 2020 and Zhao & Cai, 2021). It is inauspicious because TMX is equally important as EI in predicting teacher outcomes (Oh & Jang, 2020; Zhao & Cai, 2021). TMX represents horizontal aspects of teacher interpersonal interactions in the school. Interactions between teachers involve various social exchange behaviour, such as creating common standards of student assessment, sharing teaching materials workload, teaching jointly in the same class, and providing feedback and learning from each other. TMX is an important source of resources for teachers. In particular, in a team-based workplace, support from TMX may have a multiplier effect on school improvement and student achievement in a school (Goddard et al., 2007; Peterson & Aikens, 2017). TMX refers to "the reciprocity between a member and his or her team with respect to the member's contribution of ideas, feedback, and assistance to other members and, in turn, the member's receipt of information, help, and recognition from other team members" (Seers, 1995, p.21). High-quality TMX is postulated to be more than reciprocation processes among different teams (Maslyn & Uhl-Bien, 2001) and leads employees or workers to improve their job performance (Hargreaves, 2001; McLaughlin & Talbert, 1993; Rosenholtz, 1989; Seers, 1989). For example, teachers with low TMX quality would exchange with others for the purpose of completing tasks. In contrast, teachers with high TMX quality would exchange extra resources and supports beyond the requirements of particular tasks. Thus, TMX plays a significant role in teacher achievement, particularly job performance.

Furthermore, the relationships between EI and interpersonal interactions have not been thoroughly investigated. While for the linkage between EI and TMX, only a few extant studies (e.g., Oh & Jang, 2020; Zhao & Cai, 2021) have generally examined the relationship simply without exploring the context. EI was found to be highly correlated with interpersonal relationships, team cooperation, and personal social ability (Schutte et al., 2001). Relatively few studies have been specifically devoted to examining TMX as the mediating variable between a teacher's EI and his work performance. Understanding TMX in primary schools is especially critical given that educational services are required to have frequent interactions with other team members to respond to principals', students' and parents' questions, manage time pressures to update teaching materials and deliver lectures for students. Thus, a high-quality TMX is a crucial factor in increasing teachers' job performance.

A large number of studies have explored that EI had significant differences in terms of individual years of

working experience (Goleman, 2006; Kumar & Muniandy, 2012; Karani et al., 2017; Kareem & Kin, 2019), that is, the seniority. EI was found to be positively related to work experience because people are able to improve their competency by accumulating more experience to manage their emotions in decision-making and social problem-solving (Kareem & Kin, 2019). However, prior research has mostly treated EI as an essential dimension influencing job performance and TMX without exploring the effect of individual seniority on interpersonal interactions. Das and Sahu (2014) research showed that EI did not vary with the experience of an individual. Researchers are unable to identify the moderating effect of individual seniority, while different work experiences may influence job performance and interactions among teachers differently. To fill this gap, this research aims to empirically examine the mediating role of TMX on the relationship between teachers' EI and job performance, which is significantly moderated by their seniority in primary schools.

## EI and job performance

Job performance refers to an overall expected value within an organisation and a collection of personally different behaviour occurring over a certain period of time (Motowidlo & Keil, 2013). Prior studies divided job performance into two types: in-role and extra-role (Hui et al., 1999; Borman & Motowidlo, 1997). In-role behaviour refers to an individual's behaviour under the rules of formal organisations. Teachers must comply with employment contracts, protect students' rights, implement suitable teaching activities, guide students' appropriate development of good sound personality, engage in educational research, participate in administrative and academic works, and complete other duties (Ministry of Education in Taiwan, 2014). On the other hand, the extra-role job performance is the informal achievement of extra working behaviour beyond the organisational requirements (Hui et al., 1999; Rodrigues et al., 2015; Yao et al., 2009).

A growing number of past researches have examined the linkage between EI and job performance (Lengnick-Hall & Stone, 2019; Joseph & Newman, 2010; O'Boyle et al., 2011; Joseph et al., 2015; Rodrigues et al., 2015; Trad et al., 2022). Some studies addressed that EI positively predicted group task performance and organisational citizenship behaviour (Michinov & Michinov, 2022; Yaghoubi et al., 2011; Wong & Law, 2002). Rodrigues et al. (2015) stressed the importance of EI on helping subordinates acknowledge and organise their emotions, work efficiently under pressure as well as be adoptive for the changes. In the educational sector, studies found that teachers' EI was highly related to students' classroom, academic, and team performance

(Jordan et al., 2002; Lam & Kirby, 2002; Chen et al., 2007) clarified the performance of extra-role and in-role as two different domains in explaining teachers' working performance and found that teachers' in-role and extra-role performances in primary schools were positively correlated with their EI.

Relevant studies have found linkages between EI and task performance (Austin, 2004), as well as student's academic performance and group performance (Petrides et al., 2004; Rapisarda, 2002). Although several research studies discussed how EI influenced teaching effectiveness or teaching efficacy (Judge et al., 2001; Penrose et al., 2007), only a few in the field of education considered work performance in terms of performance outside class (extra-role) and teachers' teaching performance (in-role) (Chen et al., 2007). Thus, this study posits the following hypothesis:

H1a: Teachers' EI positively affects their job performance.

### EI and TMX

As mentioned above, the quality of emotional intelligence plays a crucial role in the relationship of TMX. EI not only significantly impacts interpersonal relationships but also predicts personal team cooperation and social skills (Schutte et al., 2001). People with high EI are sensitive to others' emotional changes and can respond to them appropriately (Zhao & Cai, 2021). Such abilities reinforce them to develop high-quality TMX relationships with their team members (Chen, 2018). Employees' positive emotion is an important element in promoting TMX (Tse & Dasborough, 2008; Zhao & Cai, 2021). An individual with high EI can strengthen the relationship between TMX and work engagement (Liao et al., 2013). Similarly, high-EI teachers and colleagues interact with each other frequently and rely on each other, which facilitates creating a high-quality TMX. Accordingly, this study posits the following research hypothesis:

H1b: Teachers' EI positively affects their TMX.

### TMX and job performance

Drawing on the theory of social exchange (Blau, 1986), extant research has explored the importance of TMX in work performance (Kamdar & Dyne, 2007; Seers, 1989). Moorman et al. (1993) and Zeinabadi and Salehi (2011) stated that the relationship among members characterised by social exchange could motivate organisation citizenship behaviour (OCB) among employees and achieve organisational goals. TMX was found to be related to employee job satisfaction and organisational commitment (Sherony & Green, 2002; Tse & Dasborough, 2008). Past studies have emphasised the relationship between TMX and job

performance in particular industries (Wang & Hollenbeck, 2019; Zhao & Cai, 2021). However, it seems relatively little educational research investigated the influence of TMX on teacher job performance. High-quality TMX enables teachers to receive emotional support from colleagues. When TMX is high, colleagues are likely to provide care, support, and teaching-related knowledge and feedback to the focal teachers. These supports provide teachers with the useful and necessary information to achieve their job tasks effectively. TMX help employees to achieve high job performance (Banks et al., 2014). This study postulates the following hypothesis:

H2a: Teachers' TMX positively affects their job performance.

### The mediating effect of TMX on EI and job performance

A growing number of studies have explored the direct influence of EI on job performance (e.g., Chen et al., 2007; Jordan et al., 2002; Lam & Kirby, 2002; Rodrigues et al., 2015). Related works have demonstrated the significant effects of EI on TMX, such as helping behaviour, constructive suggestions, and understanding of colleagues' needs (Chen, 2018; Liao et al., 2013; Rodrigues et al., 2015; Seers et al., 1995; Schutte et al., 2001; Tse & Dasborough, 2008), as well as the positive effects of TMX quality on job performance (Kamdar & Dyne, 2007; Seers, 1989). However, the TMX underlying the relationship between EI and job performance still needs to be clarified, especially in the educational field.

The theoretical reason behind the linkage between TMX and job performance can be figured out by drawing on the social exchange theory (Kamdar & Dyne, 2007). According to this theory, high TMX in a school could be developed when each teacher reciprocates—in turn, leading to increased job performance (Seers, 1989). A high-quality TMX allows teachers to achieve their job goals efficiently, especially when they feel that they have valuable sources of working information, support, experience, and knowledge from their colleagues in a primary school. Oh and Jang (2020) revealed that TMX plays a mediating role in the relationship between EI and job performance at full-service restaurants in the U.S. Accordingly, the following hypothesis is proposed:

H2b: Teacher's TMX quality mediates the relationship between EI and job performance.

## The moderating role of teacher seniority on EI and TMX

An important demographic characteristic that may affect the EI-TMX relation and teacher's performance is seniority, or years of working experience at the school. Kareem and Kin (2019) found the differences in principals' leadership and emotional intelligence in terms of school seniority in Malaysian secondary schools. School principals with seniority of more than 20 years had the highest EI. However, those with seniority of fewer than 10 years achieved higher EI than those with seniority of 11 to 20 years. Past studies suggested that senior teachers may have had more opportunities and networks to develop and strengthen relationships than junior teachers (Moolenaar et al., 2014). Senior teachers who have worked for a longer period tend to seek out others to share knowledge more and develop more networks than junior teachers with fewer years of experience at a school. Teachers who have more experience in their school have higher team member relationships than those who have less experience in the school. Nevertheless, Moolenaar et al.'s (2014) study did not support this postulation by a significant level.

Trad et al. (2022) verified that teachers' experiences positively related to their performance in Lebanese private education institutions. However, Tran and Do's (2022) study did not support a significant correlation between teachers' seniority and teaching effectiveness at a public university in Vietnam. While there were no consistent results of the influence of teacher seniority on EI, TMX, and performance, we argue that teacher seniority plays a moderating role in the relation between EI and TMX, as well as a moderated mediation effect on teacher's job performance. Accordingly, the following hypotheses are proposed:

H3a: Teacher's seniority moderates the EI-TMX relation. That is, teacher seniority significantly influences the EI-TMX relation.

H3b: A teacher's seniority moderates the indirect effect of EI on job performance via TMX. That is, teacher seniority significantly influences the indirect effect of EI on job performance.

## Methodology

### Participants

The data collection process consisted of several phases. First, a preliminary questionnaire was developed via personal interviews with 15 primary school teachers and 5 principals. This phase was used to refine the items and constructs used in the survey and to clarify the wording, content, and survey instrument. Second, 35 primary schools

were selected as the samples in this research by using a stratified sampling method based on the target population of 209 primary schools and 10,424 teachers in Tainan City in Taiwan (Tainan Education Bureau, 2018). As the second largest city in the southern Taiwan, Tainan City has been promoting the movement of teachers' professional learning community (PLC) for decades. The valid PLC requires teachers to actively share, support and collaborate with their learning group members (DuFour, 2004), which is highly related to teachers' extent of TMX. In order to ensure the effectiveness of samples represent the population, a chi-square test was performed (Bearden et al., 1982a, b). In the applications of this test, the samples are classified into four groups based on the size of classroom number. The value of chi-square was 0.265, with a p value of 0.967, interpreting that the sample data matched the population. According to the responses of schools, 25 schools accepted our invitation to participate in this research. Data collection process took place from December 2018 to January 2019. The response rate achieved was high (76.8%), with 384 being the total number of respondents.

Participants in the current research consisted of 29% male and 71% female. The majority of the respondents' ages (76%) ranged between 31 and 50 years and 74% of the respondents had more than 10 years of experience in primary school. Of the 384 respondents, 217 (57%) of the respondents had a master's degree or above and 155 (40%) had administrative work. In terms of team participation, the respondents consisted of 51% classroom teachers, 30% administrators, and 19% subject teachers.

### Measures

EI was derived and modified from the studies of Mayer et al. (1999, 2008). Four EI dimensions were identified based on twenty items: emotional stability and persistence, emotional transition, emotional autonomy and assistance, and emotional adjustment. Cronbach's alpha value is commonly used to identify the internal reliability among attributes in a single scale. Cronbach's alpha for each EI dimension was 0.886, 0.877, 0.915, and 0.874, respectively. According to Cortina's (1993) study, Cronbach's alpha value for the items and constructs was well above 0.7.

TMX was adapted from Seers et al.'s (1995) ten-item scale that measures the teacher's perception of the relationship with their colleagues. To meet the requirement of the Likert-scale, the content of the questionnaire is revised from question sentences (e.g., "How often do you make suggestions about better work methods to other team members?") to Likert-scaled statements (e.g., "I often suggest better work methods to my co-workers in my workgroup"). Cronbach's alpha for aggregated TMX was 0.896.

Job performance was measured using Chen et al.'s (2007) twenty-item scale that examines a teacher's current job performance level. We adopted self-reported measures for job performance. Noteworthy, systematic bias was not concerned in the present study (Oh & Jang, 2020). Two dimensions were identified based on past studies, namely: in-role performance and extra-role performance (Hui et al., 1999; Borman & Motowidlo, 1997). The Cronbach's alpha for each job performance dimension was 0.901 and 0.801, respectively. The Cronbach's alpha is greater than 0.7, implying these two dimensions' well reliability (Cortina, 1993).

## Data procedure

This study adopted the IBM SPSS and AMOS Version 26.0 software for the statistical analysis. The sources of data were collected through a questionnaire survey. The first step was to identify the measurements and constructs of EI, TMX, and job performance. The current research conducted a comprehensive literature review and interviews with teachers to ensure the instrument's accuracy and the questionnaire's content validity (Hair et al., 2019). The second step of the research method consists of data collection, descriptive statistics, correlation analysis, exploratory factor analysis, and reliability tests. An exploratory factor analysis using principal component analysis with Varimax rotation and Cronbach's alpha was used to test the construct validity and internal consistency reliability. Confirmatory factor analysis (CFA) was employed in the third step to assess the convergent validity, unidimensionality, discriminant validity, and composite reliability of constructs to further achieve higher levels of measurement quality (Wang et al., 2017).

Second, in order to examine the relationships between EI, TMX, and job performance of primary school teachers (H1a, H1b, H2a), a structural equation modelling (SEM) approach was conducted. The absolute fit indices determine how well a model fits the sample data and show which proposed model has the best fit. These fit indices include Comparative Fit Index (CFI), Good-of-Fit Index (GFI), Adjust Good-of-Fit Index (AGFI), Tucker-Lewis Index (TLI), root means square residual (RMSR), and Root Mean Square Errors of Approximation (RMSEA) (Khine, 2013; Wang et al., 2017). Values greater than 0.90 for GFI, CFI, TLI, and IFI indicate a good fit (Hair et al., 2019), while AGFI values higher than 0.80 suggest a good fit for the hypothesized model. For RMSEA, a value less than 0.08 is considered a good fit for the model data (Wang et al., 2017; Hair et al., 2019). Finally, we used SPSS PROCESS Macro developed by Hayes (2014, 2022) to testify the mediating role of TMX (H2b), the moderating role of teacher seniority (H3a) and

the moderated mediation effect of teacher seniority among linkages of EI, TMX, and job performance (H3b).

## Common method bias (CMB)

This study used survey data collected from primary school teachers. There is potential for common method biases resulting from multiple sources, such as consistency motif and social desirability (Podsakoff et al., 2003). Thus, we performed statistical analyses to assess the common method bias.

First, a Harmon one-factor test was conducted on the seven conceptually main *variables in the research model, including emotional stability and persistence, emotional transition, emotional autonomy and assistance, emotional adjustment, TMX, in-role performance, and extra-role performance*. Results from this test showed that seven factors are present, and the most covariance explained by the first factor is 20.55 per cent, indicating that CMB is not a likely contaminant of the results.

Second, we also examined the fit of a model in which all indicators loaded on one factor (Mossholder et al., 1998). A confirmatory factor analysis (CFA) was used to compare the fit and Chi-square differences between a single-factor model and a multiple-factor model. We used the overall Chi-square, comparative fit index (CFI), and the root mean square error of approximation (RMSEA) to assess the fit of the model. Results indicated that a single-factor CFA model did not fit well ( $\chi^2 = 1190.623$ ,  $df = 104$ ,  $CFI = 0.722$ ,  $RMSEA = 0.165$ ), while the multiple-factor CFA model ( $\chi^2 = 252.804$ ,  $df = 99$ ,  $CFI = 0.961$ ,  $RMSEA = 0.064$ ) fits the data. The Chi-square difference test comparing these two models was significant ( $\Delta\chi^2 = 937.82$ ,  $df = 5$ ). These results indicate that common method biases are not a major concern in this study.

## Results

### Descriptive statistics and correlation analysis

The means, standard deviations, composite reliability, and bivariate correlations between the factors involved in this research are presented in Table 1. Pearson correlation coefficient value ( $r$ ) is considered a substantial association when its value is between 0.50 and 0.69 (Davis, 1971). The result revealed that all factors had a significant positive bivariate correlation with others ( $r > 0.51$ ,  $p < 0.01$ ). A higher correlation between factors could establish a better linear relation. As shown in the result, the correlation between emotional transition and emotional autonomy and assistance was the highest ( $r = 0.86$ ) among other variables. On the other hand,



**Table 1** Means, standard deviations, and correlations between main variables

Constructs	1	2	3	4	5	6	7
1. Emotional stability and persistence	—						
2. Emotional transition	0.78**	—					
3. Emotional autonomy and assistance	0.78**	0.86**	—				
4. Emotional adjustment	0.72**	0.79**	0.82**	—			
5. Team-member exchange	0.53**	0.53**	0.51**	0.51**	—		
6. In-role job performance	0.58**	0.60**	0.61**	0.60**	0.54**	—	
7. Extra-role job performance	0.58**	0.58**	0.57**	0.56**	0.66**	0.67**	—
Mean	4.02	4.08	4.10	4.03	3.78	4.10	3.80
Standard deviation	0.48	0.54	0.53	0.52	0.50	0.44	0.50
Composite reliability	0.88	0.88	0.91	0.87	0.89	0.90	0.86

Note: \*\*Correlation is significant at the 0.01 level (2-tailed); TMX: Team-member exchange; Indicator measurement error can be calculated as  $1 - (\text{standardized loading})^2$ ; Composite reliability =  $(\text{sum of standardized loadings})^2 / [(\text{sum of standardized loadings})^2 + (\text{sum of indicator measurement error})]$ . Indicator measurement error can be calculated as  $1 - (\text{standardized loading})^2$ .

the factor of TMX is correlated with in-role performance ( $r=0.54$ ) and extra-role performance ( $r=0.66$ ). Construct reliability was assessed through composite reliability (Hair et al., 2019). As shown in Table 1, the composite reliability values range from 0.86 to 0.91, all being more than the commonly accepted value of 0.70, therefore reflecting reliability.

### Preliminary analysis and measurement model

A confirmatory factor analysis (CFA) calculated by AMOS 21 software examined the validity of the measurement model. The four-factor CFA model of EI consisting of these four dimensions was tested (i.e.,  $\chi^2=421.90$ ,  $df=149$ ,  $p<0.001$ ,  $\chi^2/df=2.83$ ,  $GFI=0.90$ ,  $CFI=0.95$ ,  $RMSEA=0.07$ ,  $TLI=0.94$ ,  $IFI=0.95$ ) for further analysis as it indicated better goodness-of-fit than a single-factor CFA model (i.e.,  $\chi^2=884.19$ ,  $df=16$ ,  $p<0.001$ ,  $\chi^2/df=5.67$ ,  $GFI=0.83$ ,  $CFI=0.88$ ,  $RMSEA=0.11$ ,  $TLI=0.85$ ,  $IFI=0.88$ ) (Byrne, 2001; Wang et al., 2017). Moreover, the single-factor CFA model of TMX was tested (i.e.,  $\chi^2=70.10$ ,  $df=31$ ,  $p<0.001$ ,  $\chi^2/df=2.26$ ,  $GFI=0.96$ ,  $CFI=0.98$ ,  $RMSEA=0.06$ ,  $TLI=0.97$ ,  $IFI=0.98$ ).

Regarding job performance, a single-factor CFA model and two-factor (i.e., in-role and extra-role performance) CFA model of job performance were tested. Results indicated that the two-factor CFA model (i.e.,  $\chi^2=209.18$ ,  $df=83$ ,  $p<0.001$ ,  $\chi^2/df=2.52$ ,  $GFI=0.94$ ,  $CFI=0.96$ ,  $RMSEA=0.09$ ,  $TLI=0.94$ ,  $IFI=0.96$ ) had better goodness-of-fit than a single-factor CFA model (i.e.,  $\chi^2=817.43$ ,  $df=104$ ,  $p<0.001$ ,  $\chi^2/df=7.86$ ,  $GFI=0.73$ ,  $CFI=0.77$ ,  $RMSEA=0.13$ ,  $TLI=0.73$ ,  $IFI=0.77$ ) (Byrne, 2001; Wang et al., 2017). Thus, the four factors of EI, one factor with 10 items of TMX, and two factors of job performance were used in the research model.

### Measurement validity and reliability

Construct validity estimates whether the scale can truly measure the construct it was intended to measure (Mills & Gay, 2018). It can be evaluated through discriminant and convergent validity. Therefore, if both convergent and discriminant validities are supported by evidence, construct validity is supported.

The convergent validity of the data can be explained by confirmatory factor analysis. The validity exists when all factor loadings are statistically significant (Hair et al., 2019). Factor loading in the AMOS output text can be expressed by the corresponding value of the critical ratio (C.R.) and compared with their standard errors (Bollen, 1989). The value of the C.R. needs to be higher than 1.96 or smaller than  $-1.96$  to accept the estimate (Byrne, 2001). As shown in Table 2, all C.R. values in the text were greater than 2.00 and at a significant level ( $p<0.01$ ). The result provided evidence supporting the convergent validity and the confirmed consistency of the construct; the indicators are primarily measuring tools.

### Hypotheses testing

In order to examine the multicollinearity of the variables, we applied SPSS regression function. The Variable Inflation Factors (VIF) result is 1.468, which implies that the multicollinearity does not exist. Hereinafter, we employed AMOS software structural equation modelling (SEM) to examine H1a, H1b and H2a. After confirming the reliability and validity of the model, we examined a model that EI as an independent variable, TMX as a mediator, and job performance as the dependent variable. The overall measurement model indicates an acceptable fit (Chi-Square = 1717.32,  $p<0.05$ ; Chi-square/df = 1.90;  $CFI=0.93$ ;  $TLI=0.92$ ;  $RMR=0.02$ ;  $RMSEA=0.05$ ). The Chi-square of the model had a statistically significant difference. It was not

**Table 2** Assessment of the convergent validity

Constructs/Items	SFL <sup>a</sup>	UFL <sup>b</sup>	Standard Error	Critical Ratio	P value
<b>Emotional intelligence</b>					
Emotional stability and persistence	0.84	---	---	---	
Emotional transition	0.91	1.08	0.04	24.24	***
Emotional autonomy and assistance	0.93	1.11	0.04	24.97	***
Emotional adjustment	0.88	1.04	0.05	22.23	***
<b>Team-member exchange</b>					
I advise members for the improvement of their works	0.69	---	---	---	
Members give me feedback	0.72	1.03	0.08	12.96	***
I give members feedback	0.70	1.00	0.08	12.64	***
Member’s know of my potential	0.74	1.07	0.08	13.21	***
Member’s understanding of my needs	0.70	1.00	0.08	12.37	***
I transfer job responsibility flexibly for members	0.66	0.94	0.08	11.77	***
Members ask me for help	0.61	0.89	0.08	11.12	***
I ask members for help	0.61	0.88	0.08	10.92	***
I am willing to complete member’s work	0.65	0.94	0.08	11.62	***
Members are willing to complete my work	0.66	0.95	0.08	11.66	***
<b>Job performance</b>					
In-role performance	0.79	---	---	---	
Extra-role performance	0.85	1.06	0.06	16.65	***

Note: (a) SFL: Standardized factor loading; (b) UFL: Unstandardized factor loading.

surprising because Chi-square and p-value are influenced by the sample size. The p-value will be significant ( $p < 0.05$ ) if the sample size is over 200 (Bearden et al. 1982a, b; Satorra & Bentler, 2001).

Results shown in Table 3 indicate that EI had a significant and positive influence on job performance ( $\beta = 0.48$ ,  $p < 0.01$ ). The confidence interval associated with the direct effect does not include zero (lower = 0.39, upper = 0.560). Thus, H1a was supported. The result suggests that teachers with high level of EI show higher job performance. The results were consistent with preceding studies (Rapisarda,

2002; Petrides et al., 2004; Chen et al., 2007; Trad et al., 2022).

A positive relationship between EI and TMX was found ( $\beta = 0.61$ ,  $p < 0.01$ ); thus, H1b was supported. This reflects that EI plays a positive role in helping teachers develop a high-quality TMX with colleagues. These research findings were consistent with previous studies (Tse & Dasborough, 2008; Banks et al., 2014; Zhao & Cai, 2021).

Table 3 also indicates that TMX had a positive effect on teacher job performance ( $\beta = 0.50$ ,  $p < 0.01$ ). Thus, H2a was supported. This result suggests that high level of TMX among teachers improves their job performance. The results were consistent with the studies of Wang and Hollenbeck (2019) and Zhao and Cai (2021).

Furthermore, we used SPSS 26.0 and PROCESS (Hayes, 2022) to verify the mediation and moderation effects among variables (Hayes, 2022). By following Preacher and Hayes’ (2008) guidelines, PROCESS Macro was employed to test the indirect effects of EI, TMX, and job performance (H2b), and the moderating role and moderated mediating effect of teacher seniority (H3a, H3b).

A bootstrap approach was conducted for estimating the mediation effect, moderation effect and mediated moderation effect using the 95% confidence interval. Table 4 shows the standardized and unstandardized indirect effect of EI on job performance via TMX ( $\beta = 0.21$ ,  $p < 0.01$ ). It also depicts that the confidence interval associated with the indirect effect does not include zero (lower = 0.13, upper = 0.24), supporting that TMX played a mediating effect on the relationship between EI and job performance. This result is consistent with earlier work findings (Oh & Jang, 2020). Thus, H2b is supported in the current research. Hypothesis 3a predicts that a teacher’s seniority would have a moderating effect on the relationship between teacher EI and teacher TMX. Table 4 indicates that the interaction between teacher EI and teacher seniority was negatively and significantly related to TMX ( $\beta = -0.12$ ,  $p < 0.01$ ). Thus, H3a was supported.

Figure 1 illustrates the interaction effects. The slope analysis shows that teachers with lower EI had a stronger effect on TMX in the group of novice teachers (below the mean); in the group of experienced teachers (above the mean), the

**Table 3** Results of the direct effects

Paths		$\beta 1^a$	$\beta 2^b$	S.E. <sup>c</sup>	95% Confidence Interval	
					Lower	Upper
H1a	EI → Job performance	0.48*** <sup>d</sup>	0.50**	0.06	0.39	0.56
H1b	EI <sup>e</sup> → TMX	0.61**	0.75**	0.07	0.55	0.68
H2a	TMX → Job performance	0.50**	0.43**	0.05	0.41	0.58

Note: a.  $\beta 1$  standardized coefficients were presented

b.  $\beta 2$  unstandardized coefficients were presented.

c. S.E. is an estimate of the standard error of the covariance.

d. \*\*  $p < 0.01$ .

e. EI: Emotional intelligence; TMX: Team-member exchange.

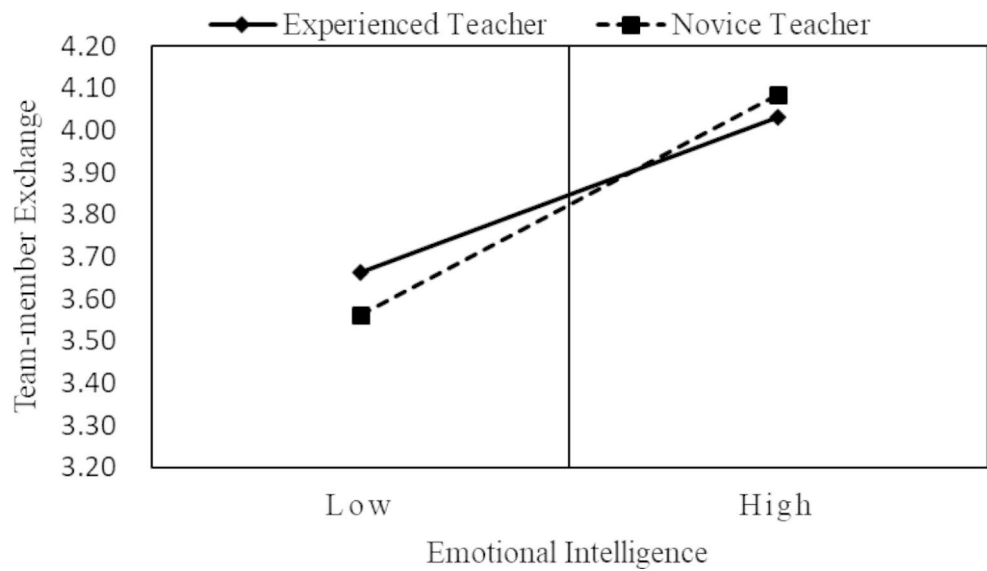
**Table 4** Results of the indirect effect and moderation Effect

	Effect (standardized)	Effect (unstandardized)	SE	t value	p-value	LLCI	ULCI
Total effect of EI on job performance	0.71	0.64	0.03	19.59***		0.58	0.70
Direct effect of EI on job performance	0.49	0.45	0.36	12.58***		0.38	0.52
Indirect effect of EI on job performance	0.21	0.19	0.29			0.13	0.24
TMX							
Predictor	Beta Coefficient (standardized)	Beta Coefficient (unstandardized)	t-value	p-value	F	R <sup>2</sup>	
EI	0.54	0.89	8.58	0.00	64.63	0.34	
Teacher seniority	0.02	0.40	3.28	0.00			
EI x Teacher seniority	-0.12	-0.10	-3.20	0.00			
Teacher seniority	Conditional Effect (standardized)	Conditional Effect (unstandardized)	SE	t-value	p-value	LLCI	ULCI
Junior teacher	0.66	0.69	0.55	12.60	0.00	0.59	0.80
Senior teacher	0.48	0.59	0.52	9.65	0.00	0.40	0.60
Index of moderated mediation	Index	BootSE	BootLLCI				
Teacher seniority	-0.31	0.02	-0.07				

Note: Bootstrap sample size = 5,000; Level of confidence for all confidence intervals is 95%; EI: Emotional intelligence; TMX: Team-member exchange; SE: Standard Error; LL = Lower Limit; CI = Confidence Interval; UL = Upper Limit; N = 384; \*\*\**p* < 0.01



**Fig. 1** The moderation effect of teacher seniority on the relationship between EI and TMX



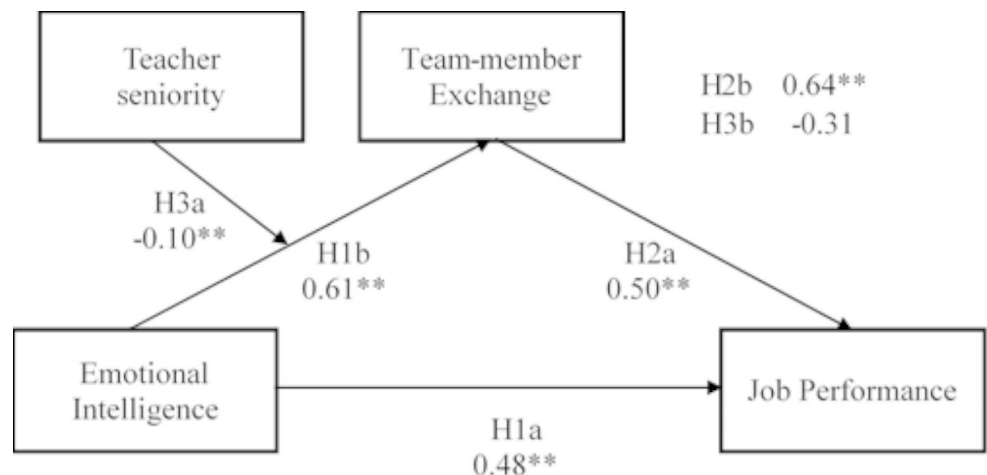
relationship between teacher EI and teacher TMX became weaker. Overall, EI played a positive role in helping teachers develop a high-quality TMX with colleagues.

We further examined the moderated mediation effect of teacher seniority on the indirect effect of EI on job performance via TMX. As indicated in Table 4, the result was not significantly different from the moderated mediation of teacher seniority ( $\beta = -0.31, p > 0.05$ ). The change of a positive moderating effect of teacher seniority on EI-TMX relation into a negative effect may be evidence of a suppression effect due to the inclusion of TMX, and in particular, the significant effect of TMX. TMX and teacher seniority at school may be correlated, which may explain why TMX would suppress an individual-level effect of seniority. This led to teacher seniority negative moderating the EI-TMX relation. Thus, H3b was not supported. The final model shows paths between the relationship of EI, TMX, teacher seniority, and job performance (see Fig. 2).

### Discussion

This study proposed three hypotheses to investigate the linkages between teachers’ EI, TMX and job performance, and the moderating role of teachers’ seniority among those linkages. As expected, teachers’ EI was found to be significantly influenced job performance in primary schools. The first hypothesis, along with its two sub-hypotheses (H1a, H1b), was supported. The results showed that the four dimensions of EI (i.e., emotional stability and persistence, emotional transition, emotional autonomy and assistance, and emotional adjustment) were significantly correlated with teachers’ job performance. Interestingly, the result of SEM indicated that primary school teachers’ EI had direct and indirect impacts on job performance, which implies that teachers with higher EI levels can not only complete their job tasks successfully, but also involve in additional school works beyond their normal workloads. This finding is consistent with previous research which also found the positive

**Fig. 2** The final model



effect of EI on job performance in different career sectors (e.g. Ali et al., 2012; Gondal, & Husain, 2013; Pulido-Martos et al., 2013; Shanta & Connolly, 2013; Sy et al., 2006, cited by Rodrigues et al., 2015) and the research under the educational context (e.g. Penrose, 2007; Chen et al., 2007).

In addition, we found a positive influence of teachers' TMX on job performance (H2a). The finding is consistent with previous studies, indicating that relationship quality between team members improves co-worker's extra-role performance (Farmer, 2015; Liao, 2008). This study particularly examined the influence of the TMX quality between primary school teachers in teams and its influence on job performance. The result showed that TMX played a mediating role in the relationship between EI and job performance (H2b), implying that the influence of EI on job performance can be accomplished by TMX. This finding aligns with On and Jang's (2020) research which found restaurant servers' TMX mediated the linkage between their EI and job performance. Notably, the finding of this study reflects that teachers' EI can predict their job performance via the quality of TMX between teachers.

Furthermore, this study examined the moderating role of teacher seniority in the relationships between EI and TMX (H3a). Previous literature suggested that teachers are continuously developing their EI (Goleman, 2006) yet have fewer interactions with their colleagues when being more experienced in the job (Moolenaar et al., 2014). The finding confirms the statements above and provides a new perspective on teacher seniority in teachers' EI and interpersonal relationships. In terms of the moderated mediating effect of teacher seniority on the interactions of EI, TMX and job performance (H3b), the current research found that there was no scientific significance. One possible explanation for the lack of support for moderated mediating role of teacher seniority is that teacher seniority might be a driver to strengthen the impact of EI on TMX but it might not be sufficient to explain the indirect effect of EI on job performance via TMX. It is possible that a teacher's performance might not be influenced by his/her years of working experience (Tran & Do, 2022). Perhaps teacher seniority cannot produce desirable outcomes such as enrich the knowledge of teaching, keep teaching pace, actively engage in the development of school affairs, etc.

## Implications

Several implications are provided from the research findings. From the theoretical perspective, this study attempts to explore the importance of exchange quality between teachers in schools. While previous relevant research studies have discussed how school management is affected by social exchange quality (i.e., leader-member exchange) from the principal's perspective, the current study provides

a new direction of social exchange among team members in educational studies. Furthermore, our findings confirm that TMX quality plays a mediating role in the linkage between EI and job performance. Previous studies have explored an understanding of the consideration of the possible linkage between EI and job performance and that of TMX and job performance, ignoring the official relationship between these three constructs. Thus, this study is seeking to integrate these three structures, which provides a helpful implication for further research in other sectors. Third, the findings reveal the negative moderating effect of teacher seniority on the linkage between EI and TMX. That is, the influence of a teacher's EI on his/her TMX might be weakened as he/she being more experienced in the position.

Several practical implications from these findings are recommended for policymakers and educational institutions. First, this research suggests that schools should consider applicants' EI when recruiting new teachers. Furthermore, the schools could develop an incentive system and activities to reinforce teachers' TMX quality so as to improve their working performance. The schools could be aware of experienced teacher's interpersonal relationships, especially for those with lower EI. Psychological counselling could be involved if necessary. Finally, a teacher's emotional conditions and quality of team-member exchange relationship are suggested to be considered in establishing new educational policies, such as teacher performance assessment, curriculum design, and recruiting criteria.

## Limitations and future research

Although this research provides comprehensive implications, there are several limitations in this study helpful for future research. Firstly, this study is only based on cross-sectional research, which collected data in a specific and short period. Cross-sectional studies have no dimension of time. Thus, it is difficult to estimate the transition of teacher seniority, EI, TMX, and job performance along with the time in this research. Therefore, a longitudinal study could be considered in future studies to confirm the durability of the conceptual model. Furthermore, this research only used a self-report survey, which may introduce some research bias since self-report data are not objective enough and may not reflect the reality of teachers' behaviour (Atwater et al., 1998).

## Conclusions

This study examined the relationships between teacher seniority, EI, TMX, and job performance in primary schools and found that teachers' EI and TMX were positively related to their job performance. Emotional intelligence can be

nurtured through training. Thus, school principals should train teachers to develop EI to maintain high-quality TMX with their colleagues and increase job performance. In the development programs for teachers, emotional intelligence should be included in their academic formation to develop EI capacities and allow them to achieve their professional activities effectively. Our mediation analysis showed that school principals who wish to enhance teachers' job performance must understand the importance of the quality of teachers' exchange relationships, which emotionally intelligent team members increase. Also, the analysis of moderating mediated effect reveals that even though teachers' job performance might not be influenced by their years of working experience, the influence of their EI on TMX is lower when they become experienced in their work. Thus, training programs, such as social gatherings and exchanges among teachers, should be emphasized as these social activities were found to develop positive effects, friendships, and socialization.

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## Declarations

**Conflict of interest** The authors declare no conflict of interests occurs in this research. This research involves no direct or indirect financial interests or conflicts in any way.

**Ethics consideration** The implementation of this research followed the ethical research guidelines. All of the participants joined the research voluntarily. They have been fully informed their response are anonymous and only for research purposes, and they have the right to drop off the survey at any time without penalty.

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## References

- Ali, O., Garner, I., & Magadley, W. (2012). An exploration of the relationship between emotional intelligence and job performance in police organizations. *Journal of Police and Criminal Psychology*, 27, 1–8. <https://doi.org/10.1007/s11896-011-9088-9>
- Atwater, L. E., Ostroff, C., Yammarino, F. J., & Fleenor, J. W. (1998). Self-other agreement: Does it really matter? *Personnel Psychology*, 51(3), 577–598. <https://doi.org/10.1111/j.1744-6570.1998.tb00252.x>
- Austin, E. J. (2004). An investigation of the relationship between trait emotional intelligence and emotional task performance. *Personality and Individual Differences*, 36(8), 1855–1864. <https://doi.org/10.1016/j.paid.2003.07.006>
- Banks, G. C., Batchelor, J. H., Seers, A., O'Boyle Jr, E. H., Pollack, J. M., & Gower, K. (2014). What does team–member exchange bring to the party? A meta-analytic review of team and leader social exchange. *Journal of Organizational Behaviour*, 35(2), 273–295. <https://doi.org/10.1002/job.1885>
- Bearden, W. O., Sharma, S., & Teel, J. E. (1982a). Sample size effects on chi square and other statistics used in evaluating causal models. *Journal of Marketing Research*, 19(4), 425–430.
- Bearden, W. O., Sharma, S., & Teel, J. E. (1982b). Sample size effects on chi-square and other statistics used in evaluating causal models. *Journal of Marketing Research*, 19(4), 425–430. <https://doi.org/10.1177/002224378201900404>
- Blau, P. M. (1986). *Exchange and Power in Social Life*. (1st ed.). Routledge. <https://doi.org/10.4324/9780203792643>
- Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, 17(3), 303–316. <https://doi.org/10.1177/0049124189017003004>
- Borman, W. C., & Motowidlo, S. J. (1997). Task performance and contextual performance: The meaning for personnel selection research. *Human Performance*, 10(2), 99–109. [https://doi.org/10.1207/s15327043hup1002\\_3](https://doi.org/10.1207/s15327043hup1002_3)
- Byrne, B. M. (2001). Structural equation modelling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument. *International Journal of Testing*, 1(1), 55–86. [https://doi.org/10.1207/S15327574IJT0101\\_4](https://doi.org/10.1207/S15327574IJT0101_4)
- Chan, D. W. (2004). Perceived emotional intelligence and self-efficacy among chinese secondary school teachers in Hong Kong. *Personality and Individual Differences*, 36(8), 1781–1795. <https://doi.org/10.1016/j.paid.2003.07.007>
- Chen, J., & Guo, W. (2020). Emotional intelligence can make a difference: The impact of principals' emotional intelligence on teaching strategy mediated by instructional leadership. *Educational Management Administration and Leadership*, 48(1), 82–105. <https://doi.org/10.1177/1741143218781066>
- Chen, M. T., Li, S. M., & Hung, S. H. (2007). The relationship among practical intelligence, emotional intelligence and professional performance of taiwanese elementary school teachers. *Bulletin of Educational Psychology*, 39(2), 295–316. (In Chinese) <http://epbulletin.epc.ntnu.edu.tw/contents/manage/detail.asp?id=1766>
- Chen, Z. (2018). A literature review of team-member exchange and prospects. *Journal of Service Science and Management*, 11(04), 433–454. <https://doi.org/10.4236/jssm.2018.114030>
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 98–104. <https://doi.org/10.1037/0021-9010.78.1.98>
- Curci, A., Lanciano, T., & Soleti, E. (2014). Emotions in the classroom: The role of teachers' emotional intelligence ability in predicting students' achievement. *The American Journal of Psychology*, 127(4), 431–445. <https://doi.org/10.5406/amerjpsyc.127.4.0431>
- Das, R. P., & Sahu, L. T. (2014). Relationship Between Age and Emotional Intelligence of Bank Employees-An Empirical Study. *Sumedha: Journal of Management*, 3(4), 103–110. <https://indian-journals.com/ijor.aspx?target=ijorsjm&volume=3&issue=4&article=008>
- Davis, J. A. (1971). *Elementary survey analysis*. Prentice-Hall.
- DuFour, R. (2004). What is a “professional learning community”? *Educational Leadership: Journal of the Department of Supervision and Curriculum Development, N.E.A.*, 61(8), 6–11. <https://www.siprep.org/uploaded/ProfessionalDevelopment/Readings/PLC.pdf>
- Farmer, S. M., Dyne, L. V., & Kamdar, D. (2015). The contextualized self: How team–member exchange leads to coworker

- identification and helping OCB. *Journal of Applied Psychology*, 100(2), 583–595. <https://doi.org/10.1037/a0037660>
- Garg, R., Levin, E., & Tremblay, L. (2016). Emotional intelligence: Impact on post-secondary academic achievement. *Social Psychology of Education*, 19(3), 627–642. <https://doi.org/10.1007/s11218-016-9338-x>
- Goddard, Y., Goddard, R., & Tschannen-Moran, M. (2007). A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools. *Teachers College Record*, 109(4), 877–896. <https://doi.org/10.1177/016146810710900401>
- Goleman, D. (2006). *Working with emotional intelligence*. Bantam Books.
- Gondal, U., & Husain, T. A. (2013). Comparative study of Intelligence Quotient and Emotional Intelligence: Effect on Employees' performance. *Asian Journal of Business Management*, 5(1), 153–162. <https://doi.org/10.19026/ajbm.5.5824>
- Hair, J., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis with Reading* (8th ed.). EMEA: Cengage Learning.
- Hargreaves, A. (2001). The emotional geographies of teachers' relations with colleagues. *International Journal of Educational Research*, 35(5), 503–527. [https://doi.org/10.1016/S0883-0355\(02\)00006-X](https://doi.org/10.1016/S0883-0355(02)00006-X)
- Hayes, A. F. (2014). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (1st edition.). Guilford Publications.
- Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (3rd edition.). Guilford Publications.
- Hui, C., Law, K. S., & Chen, Z. X. (1999). A structural equation model of the effects of negative affectivity, leader-member exchange, and perceived job mobility on in-role and extra-role performance: A Chinese case. *Organizational Behavior and Human Decision Processes*, 77(1), 3–21. <https://doi.org/10.1006/obhd.1998.2812>
- Jordan, P. J., Ashkanasy, N. M., Härtel, C. E., & Hooper, G. S. (2002). Workgroup emotional intelligence: Scale development and relationship to team process effectiveness and goal focus. *Human Resource Management Review*, 12(2), 195–214. [https://doi.org/10.1016/S1053-4822\(02\)00046-3](https://doi.org/10.1016/S1053-4822(02)00046-3)
- Joseph, D. L., & Newman, D. A. (2010). Emotional intelligence: An integrative meta-analysis and cascading model. *Journal of Applied Psychology*, 95, 54–78. <https://doi.org/10.1037/a0017286>
- Joseph, D. L., Jin, J., Newman, D. A., & O'boyle, E. H. (2015). Why does self-reported emotional intelligence predict job performance? A meta-analytic investigation of mixed EI. *Journal of Applied Psychology*, 100(2), 298–342. <https://doi.org/10.1037/a0037681>
- Judge, T. A., & Bono, J. E. (2001). Relationship of core self-evaluations traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: A meta-analysis. *Journal of Applied Psychology*, 86(1), 80–92. <https://doi.org/10.1037/0021-9010.86.1.80>
- Kamdar, D., & Dyne, L. V. (2007). The joint effects of personality and workplace social exchange relationships in predicting task performance and citizenship performance. *Journal of Applied Psychology*, 92(5), 1286–1298. <https://doi.org/10.1037/0021-9010.92.5.1286>
- Karani, A., Rajout, H., & Panda, R. (2017). Determining relationship between emotional intelligence and demographic variables. *Asian Journal of Research in Social Sciences and Humanities*, 7(2), 908–918. <https://doi.org/10.5958/2249-7315.2017.00139.3>
- Kareem, O. A., & Kin, T. M. (2019). Emotional intelligence of school principals in managing change: Malaysian perspective. *International Journal of Management in Education*, 13(3), 281–306. <https://doi.org/10.1504/IJME.2019.100414>
- Khine, M. S. (2013). *Application of structural equation modelling in educational research and practice* (7 vol.). Sense Publishers.
- Kumar, J. A., & Muniandy, B. (2012). The influence of demographic profiles on emotional intelligence: A study on polytechnic lecturers in Malaysia. *International Online Journal of Educational Sciences*, 4(1), 62–70.
- Lam, L. T., & Kirby, S. L. (2002). Is emotional intelligence an advantage? An exploration of the impact of emotional and general intelligence on individual performance. *The Journal of Social Psychology*, 142(1), 133–143. <https://doi.org/10.1080/00224540209603891>
- Lengnick-Hall, M. L., & Stone, C. B. (2019). The relationship between Emotional Intelligence and Job Performance: An evidence-based literature review with implications for scientists and engineers. In C. Machado, J. Davim, & Paulo (Eds.), *Emotional intelligence and neuro-linguistic programming - new insights for managers and engineers* (pp. 1–32). Taylor and Francis Group/CRC. <https://doi.org/10.1201/b22180>
- Liao, F. Y., Yang, L. Q., Wang, M., Drown, D., & Shi, J. (2013). Team-member exchange and work engagement: Does personality make a difference? *Journal of Business and Psychology*, 28(1), 63–77. <https://doi.org/10.1007/s10869-012-9266-5>
- Liao, Y. I. (2008). *The Study of the Effects of Workplace Friendship, In-Role Behavior and Organizational Citizenship Behavior* [Master's thesis, Chinese Culture University]. National Digital Library of Thesis and Dissertation in Taiwan. <https://hdl.handle.net/11296/zrgcay>
- Maslyn, J. M., & Uhl-Bien, M. (2001). Leader-member exchange and its dimensions: Effects of self-effort and other's effort on relationship quality. *Journal of Applied Psychology*, 86(4), 697–708. <https://doi.org/10.1037/0021-9010.86.4.697>
- Mayer, J. D., & Geher, G. (1996). Emotional intelligence and the identification of emotion. *Intelligence*, 22(2), 89–113. [https://doi.org/10.1016/S0160-2896\(96\)90011-2](https://doi.org/10.1016/S0160-2896(96)90011-2)
- Mayer, J. D., Caruso, D. R., & Salovey, P. (1999). Emotional intelligence meets traditional standards for an intelligence. *Intelligence*, 27(4), 267–298. [https://doi.org/10.1016/S0160-2896\(99\)00016-1](https://doi.org/10.1016/S0160-2896(99)00016-1)
- Mayer, J. D., Salovey, P., & Caruso, D. R. (2008). Emotional intelligence: New ability or eclectic traits? *American Psychologist*, 63(6), 503–517. <https://doi.org/10.1037/0003-066X.63.6.503>
- McLaughlin, M., & Talbert, J. E. (1993). *Contexts that matter for teaching and learning: Strategic opportunities for meeting the nation's educational goals*. Center for Research on the Context of Secondary School Teaching, Stanford University.
- Michinov, E., & Michinov, N. (2022). When emotional intelligence predicts team performance: Further validation of the short version of the Workgroup Emotional Intelligence Profile. *Current Psychology*, 41(3), 1323–1336. <https://doi.org/10.1007/s12144-020-00659-7>
- Mills, G. E., & Gay, L. R. (2018). *Educational research: Competencies for analysis and applications* (12th ed.). Pearson.
- Ministry of Education in Taiwan. (2014). *Curriculum guidelines of 12-year basic education*. <https://cirn.moe.edu.tw/WebContent/index.aspx?sid=11&mid=12528>
- Moolenaar, N. M., Daly, A. J., Slegers, P. J., & Karsten, S. (2014). Social forces in school teams: How demographic composition affects social relationships. *Interpersonal relationships in education* (pp. 159–181). Brill Sense.
- Moorman, R. H., Niehoff, B. P., & Organ, D. W. (1993). Treating employees fairly and organizational citizenship behavior: Sorting the effects of job satisfaction, organizational commitment, and procedural justice. *Employee Responsibilities and Rights Journal*, 6(3), 209–225. <https://doi.org/10.1007/BF01419445>
- Mossholder, K. W., Bennett, N., Kemery, E. R., & Wesolowski, M. A. (1998). Relationships between bases of power and



- work reactions: The mediational role of procedural justice. *Journal of Management*, 24(4), 533–552. <https://doi.org/10.1177/014920639802400404>
- Motowidlo, S. J., & Keil, H. J. (2013). Job performance. In N. W. Schmitt, S. Highhouse, & I. B. Weiner (Eds.), *Handbook of psychology: Industrial and organizational psychology* (pp. 82–103). John Wiley & Sons, Inc.
- O'Boyle, E. H. Jr., Humphrey, R. H., Pollack, J. M., Hawver, T. H., & Story, P. A. (2011). The relation between emotional intelligence and job performance: A meta-analysis. *Journal of Organizational Behavior*, 32(5), 788–818. <https://doi.org/10.1002/job.714>
- Oh, H., & Jang, J. (2020). The role of team-member exchange: Restaurant servers' emotional intelligence, job performance, and tip size. *Journal of Human Resources in Hospitality & Tourism*, 19(1), 43–61. <https://doi.org/10.1080/15332845.2020.1672248>
- Penrose, A., Perry, C., & Ball, I. (2007). Emotional intelligence and teacher self-efficacy: The contribution of teacher status and length of experience. *Issues in Educational Research*, 17(1), 107–126.
- Peterson, T. O., & Aikens, S. D. (2017). Examining the relationship between leader-member exchange (LMX) and objective performance within higher education: An exploratory empirical study. *Journal of Leadership Education*, 16(2), 109–128. <https://doi.org/10.12806/V16/I2/R7>
- Petrides, K. V., Frederickson, N., & Furnham, A. (2004). The role of trait emotional intelligence in academic performance and deviant behaviour at school. *Personality and Individual Differences*, 36(2), 277–293. [https://doi.org/10.1016/S0191-8869\(03\)00084-9](https://doi.org/10.1016/S0191-8869(03)00084-9)
- Pishghadam, R., & Sahebjam, S. (2012). Personality and emotional intelligence in teacher burnout. *The Spanish Journal of Psychology*, 15(1), 227–236. [https://doi.org/10.5209/rev\\_SJOP.2012.v15.n1.37314](https://doi.org/10.5209/rev_SJOP.2012.v15.n1.37314)
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891. <https://doi.org/10.3758/BRM.40.3.879>
- Pulido-Martos, M., Lopez-Zafra, E., & Augusto-Landa, J. M. (2013). Perceived emotional intelligence and its relationship with perceptions of effectiveness in negotiation: Perceived emotional intelligence and perceived effective negotiation. *Journal of Applied Social Psychology*, 43(2), 408–417. <https://doi.org/10.1111/j.1559-1816.2013.01010.x>
- Rapisarda, B. A. (2002). The impact of emotional intelligence on work team cohesiveness and performance. *The International Journal of Organizational Analysis*, 10(4), 363–379. <https://doi.org/10.1108/eb028958>
- Rodrigues, A. L., & Machado, C. F. (2019). Emotional Intelligence: Telling the history and discovering the models. In Machado, C. & Davim, J. Paulo (Eds.), *Emotional Intelligence and Neuro-Linguistic Programming - New insights for managers and engineers* (pp. 33–52). Taylor and Francis Group/CRC. <https://doi.org/10.1201/b22180>
- Rodrigues, A. L., Machado, C. F., & Ferreira, A. P. (2015). Emotion and work; an innovative relationship. In C. Machado, & J. P. Davim (Eds.), *Innovation Management in Research and Industry* (pp. 149–165). Walter de Gruyter GmbH & Co. <https://doi.org/10.1515/9783110358759>
- Rosenholtz, S. J. (1989). *Teachers' Workplace: The Social Organization of Schools* Longman
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66(4), 507–514. <https://doi.org/10.1007/BF02296192>
- Schutte, N. S., Malouff, J. M., Bobik, C., Coston, T. D., Greeson, C., Jedlicka, C., & Wendorf, G. (2001). Emotional intelligence and interpersonal relations. *The Journal of Social Psychology*, 141(4), 523–536. <https://doi.org/10.1080/00224540109600569>
- Seers, A. (1989). TMX quality: A new construct for role-making research. *Organizational Behavior and Human Decision Processes*, 43(1), 118–135. [https://doi.org/10.1016/0749-5978\(89\)90060-5](https://doi.org/10.1016/0749-5978(89)90060-5)
- Seers, A., Petty, M. M., & Cashman, J. F. (1995). Team-Member Exchange under team and traditional management: A naturally occurring quasi-experiment. *Group & Organization Management*, 20(1), 18–38. <https://doi.org/10.1177/1059601195201003>
- Shanta, L. L., & Connolly, M. (2013). Using King's interacting systems theory to link emotional intelligence and nursing practice. *Journal of Professional Nursing*, 29(3), 174–180. <https://doi.org/10.1016/j.profnurs.2012.04.023>
- Sherony, K. M., & Green, S. G. (2002). Coworker exchange: Relationships between coworkers, leader-member exchange, and work attitudes. *Journal of Applied Psychology*, 87(3), 542–548. <https://doi.org/10.1037/0021-9010.87.3.542>
- Sy, T., Tram, S., & O'Hara, L. (2006). Relation of employee and manager emotional intelligence to job satisfaction and performance. *Journal of Vocational Behavior*, 68(3), 461–473. <https://doi.org/10.1016/j.jvb.2005.10.003>
- Tainan Education Bureau. (2018). *Statistical Document*. <https://www.tn.edu.tw/%E7%B5%B1%E8%A8%88%E8%B3%87%E6%96%99/>
- Trad, M., Alayoubi, M. O., Khalek, A., R., & Khaddage-Soboh, N. (2022). Assessing the influence of emotional intelligence on teachers' performance in lebanese private education institutions. *Higher Education Skills and Work-Based Learning*, 12(3), 556–573. <https://doi.org/10.1108/HESWBL-12-2020-0268>
- Tran, T. T. T., & Do, T. X. (2022). Student evaluation of teaching: Do teacher age, seniority, gender, and qualification matter? *Educational Studies*, 48(4), 443–470. <https://doi.org/10.1080/03055698.2020.1771545>
- Tsang, K. K., & Kwong, T. L. (2017). Teachers' emotions in the context of education reform: Labor process theory and social constructionism. *British Journal of Sociology of Education*, 38(6), 841–855. <https://doi.org/10.1080/01425692.2016.1182007>
- Tse, H. H., & Dasborough, M. T. (2008). A study of exchange and emotions in team member relationships. *Group & Organization Management*, 33(2), 194–215. <https://doi.org/10.1177/1059601106293779>
- Wang, J., Hefetz, A., & Liberman, G. (2017). Applying structural equation modelling in educational research. *Culture and Education*, 29(3), 563–618. <https://doi.org/10.1080/11356405.2017.1367907>
- Wang, L. C., & Hollenbeck, J. R. (2019). LMX in team-based contexts: TMX, authority differentiation, and skill differentiation as boundary conditions for leader reciprocity. *Personnel Psychology*, 72(2), 271–290. <https://doi.org/10.1111/peps.12306>
- Wong, C. S., & Law, K. S. (2002). The effects of leader and follower emotional intelligence on performance and attitude: An exploratory study. *The Leadership Quarterly*, 13(3), 243–274. [https://doi.org/10.1016/S1048-9843\(02\)00099-1](https://doi.org/10.1016/S1048-9843(02)00099-1)
- Yaghoubi, E., Mashinchi, S. A., & Hadi, A. (2011). An analysis of the correlation between organizational citizenship behavior (OCB) and emotional intelligence (EI). *Modern Applied Science*, 5(2), 119–123. <https://doi.org/10.5539/mas.v5n2p119>
- Yao, Y. H., Wang, R. T., & Wang, K. Y. (2009). September 14–16. *The influence of emotional intelligence on job performance: Moderating effects of leadership [Paper presentation]* 2009 International Conference on Management Science and Engineering. Moscow, Russia. <http://ieeexplore.ieee.org/servlet/opac?punumber=5293852>



- Zeinabadi, H., & Salehi, K. (2011). Role of procedural justice, trust, job satisfaction, and organizational commitment in Organizational Citizenship Behavior (OCB) of teachers: Proposing a modified social exchange model. *Procedia-Social and Behavioral Sciences*, 29, 1472–1481. <https://doi.org/10.1016/j.sbspro.2011.11.387>
- Zhao, D., & Cai, W. (2021). When does emotional intelligence (EI) benefit team-member exchange? The cross-level moderating role of EI-based leader-member exchange differentiation. *Career Development International*, 26(3), 391–414. <https://doi.org/10.1108/CDI-10-2020-0285>
- Zhoc, K. C. H., King, R. B., Chung, T. S. H., & Chen, J. (2020). Emotionally intelligent students are more engaged and successful: Examining the role of emotional intelligence in higher education. *European Journal of Psychology of Education*, 35(4), 839–863. <https://doi.org/10.1007/s10212-019-00458-0>

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