

# Using EENDEED to Measure Remote Employee Engagement: Influence of the Sense of Belonging at Work and the Leader-Member Exchange (LMX) on Virtual Employee Engagement

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## Abstract

One organizational trend inherited from the effect of the COVID-19 pandemic is the increased number of remote workers around the world. Extending and validating previous knowledge on traditional workplace employees to the growing population of remote workers is a requirement for research communities, and employee engagement is one of them. Using EENDEED, a validated instrument for measuring remote employee engagement, this study analyzed the influence of 1) belongingness or sense of belonging at work and 2) Leader-Member Exchange (LMX), on remote employee engagement. After uncovering the 2-factor structure of belongingness (positive and negative belongingness) and validating the 2-factor structure of EENDEED which includes PERFORMANCE and SELF-RELIANCE, a multiple regression analysis was conducted on a dataset of 267 participants, all remote workers within the United States of America. The results of the statistical analysis confirmed the existence of a significant positive relationship between LMX and EENDEED, as well as positive belongingness and EENDEED. Findings showed that there was no significant relationship between negative sense of belonging and remote employee engagement. The study also confirmed LMX to be a better influencer of engagement as compared to belongingness. This research contributed to knowledge by extending the relationship between LMX, belongingness, and engagement to the population of remote employees. In other words, the perceived notion of the relationship between the managers and their remote employees from the employees' perspective is of great importance in keeping the employees engaged.

## Keywords

Remote Employee Engagement, Leader-Member Exchange, Sense of Belonging, LMX, EENDEED, Belongingness, Relatedness

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## 1. Introduction

In the twilight of the coronavirus pandemic, a wave of employees quitting their work was observed around the world. This phenomenon was called “the great resignation” by some, “the great reshuffle” by others, or even “the great reprioritization”. All the same, [Drenik \(2022\)](#) explains that “tens of millions of Americans have quit their jobs in 2021, creating headaches for business leaders, driving wage increases, and putting pressure on HR departments to figure just what is causing this mass exodus of workers” (p. 1). With the recent social distancing mandates and work-from-home policies instituted by most companies during the COVID-19 pandemic, employees have increasingly adapted to remote work. In today’s post-social-distancing era, many employees require flexibility from their organizations to continue working remotely or in a hybrid setting (working from home some days of the week and in office other days). This option, as confirmed by [Lartey and Randall \(2021a\)](#) as well as [Gandhi and Robinson \(2021\)](#), is the most desired preference among employees. To that effect, remote work is here to stay, and companies are adapting to this new reality.

Only, because remote employees work away from their managers and colleagues, they are absent from the face-to-face relationship with their leaders. They also lack the fraternization opportunities that create a sense of belonging at work. This begs the question to know if remote work affects the sense of belonging and the leader-employee relationships, which could in return affect employee engagement. To that effect, this study seeks to analyze the influence of leader-member exchange and sense of belonging at work on remote employee engagement.

First, a literature review will analyze various concepts from existing literature, including employee engagement, sense of belonging, and leader-member exchange theory. This will be followed by the research question, the methodology, and the instruments used and their reliability. Looking into the collected data, data analysis will precede the model estimation and results. Finally, the discussions and limitations will be presented prior to the conclusion.

## 2. Literature Review

### 2.1. Employee Engagement

Employee engagement is a psychological devotion of an employee to the organization’s goals in performing their job. According to [Kahn \(1990\)](#), employees are engaged when they perform their job while feeling physically, emotionally, and cognitively present. [Lartey \(2021\)](#) defined employee engagement as:

a two-way relationship between an organization and a worker in which the organization provides the worker with the environment and conditions to be successful through good leadership and management, and the worker provides the organization with a positive and self-motivated performance leading to the achievement of the organizational mission, vision, purpose, and goals. (p. 137)

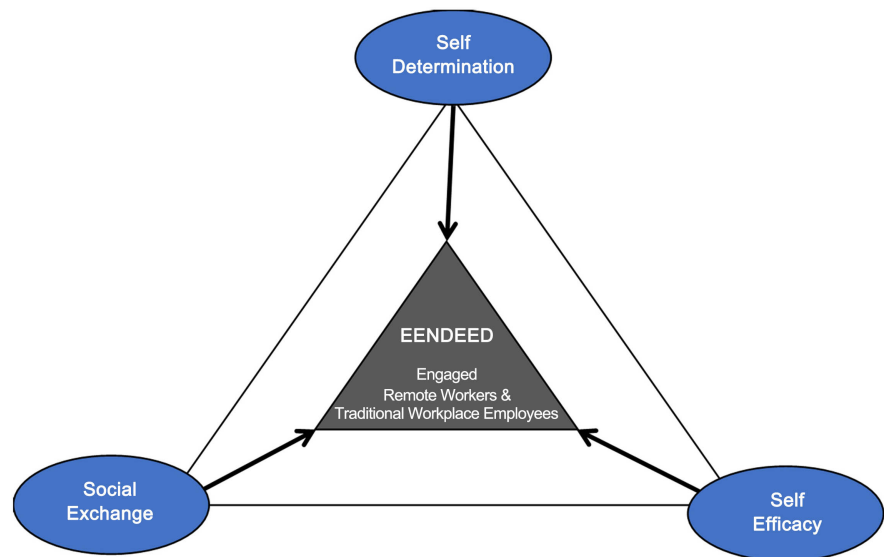
This suggests that engagement is not just coming from the employee, but the organization plays a role in it by providing the resources needed to perform the job. This is generally done through the relationship between the employees and their managers as well as the relationships with their partners and boundary partners, such as human resources, training and development, information technology (IT), and other departments that provide support and guidance to the employees (Tate et al., 2019).

Lartey and Randall (2022) view engagement from the perspective of three main theories as shown in **Figure 1**: self-determination, self-efficacy, and social exchange. Their conceptualization of engagement suggests that employees need intrinsic motivation (self-determination), belief in their abilities to accomplish the expected tasks (self-efficacy), and the expectation of something in return, such as a salary, reward, or promotion (social exchange). When all three requirements are met, the employee is generally engaged in their work environment, be it remote or in the traditional office space.

## 2.2. Sense of Belonging at Work

Belongingness or the sense of belonging is a fundamental human need. It was identified by Maslow (1954) as a key factor in mind and body wellness. In his book titled *Toward a psychology of being*, Maslow (1968) shows the importance of belongingness in human existence by placing this construct at the third level of needs, after 1) psychological needs (food, drink, oxygen, rest, elimination, sex, temperature regulation) and 2) safety needs (protection from danger, familiarity). Belongingness includes receiving and giving love, affection, trust, and acceptance. It represents affiliation and being part of a group such as family, friends, and work. In Maslow's hierarchy of needs, belongingness comes prior to esteem needs (self-esteem, self-respect, esteem and respect for others, sense of competence); cognitive needs (knowledge and understanding, curiosity, exploration); aesthetic needs (beauty in art and nature, symmetry, balance, form, order); and self-actualization (realizing full potential, becoming what or who one expects to become). Belonging is the feeling of being part of something greater than oneself, such as a group or subgroup, a tribe, a culture, an organization, or a country.

In a study of the relationship between the use of enterprise social media and employee belongingness, Randall et al. (2020) defined belongingness as "a relationship between an individual and group of people" (p. 117). After surveying 115 participants the authors conducted a multiple regression statistical analysis.



**Figure 1.** Triadic Model of Employee Engagement as depicted by EENDEED developed by Lartey and Randall (2022). Reprinted with permission from Lartey and Randall, 2022: p. 8.

Their findings confirmed that the use of internal social media technology for work-related activities had the potential of helping employees feel as part of the social makeup of the organization. Based on these findings, the current study hypothesizes the following:

**Hypothesis 1:** In the virtual working environment, the sense of belonging is positively related to remote employee engagement.

This hypothesis is aligned with the affirmation by Carr et al. (2019), suggesting that 40% of people expressed the feeling of isolation in their workplace, resulting in lower organizational commitment and employee engagement. This statement implies that not feeling isolated at work could potentially increase commitment and engagement, which will be investigated by testing hypothesis 1.

Workplace belongingness can be influenced by managers and team leaders. As explained by Herbert (2020), prior research shows that organization leaders have a direct influence on the feeling of belonging within their teams. This suggests that employees who trusted their managers had a higher sense of belonging. The relationship between employees and their leaders can be analyzed through the lens of the LMX theory.

### 2.3. Leader-Member Exchange (LMX) Theory

The LMX theory is an approach to the understanding of leadership based on the quality of the individual relationships between the leader and each follower. Created by Graen and Uhl-Bien (1995), this theory describes how effective relationships are formed between the leader and each subordinate in dyads. LMX considers that leaders establish different types or levels of association with each of their employees through an exchange system. According to Thompson (2008), LMX explains the quality of the relationship between a leader and each of their

followers. The quality of the relationship is different from one follower to another and can be either positive (in-group) or negative (out-group). To that effect, House and Aditya (1997) posited that in a dyadic representation, when the LMX quality perceived by the subordinate or employee is high, and that perceived by the leader is also high, a positive and trusting attitude is observed from the employee and leader in this relationship. Any other combination is considered out-group and the trusting relationship does not exist.

LMX describes in-group members as highly motivated and trusted performers who have the attention of their leaders. Out-group members on the other hand have a low-quality relationship with their leader (DeChurch et al., 2010). As such, LMX focuses on understanding the quality of the relationship between the dyads of leader and follower. In essence, the LMX theory looks at leadership not from the standpoint of the leader or that of the followers, but from the interactions among both leader and followers. It is based on the premise that exchange between managers and employees varies from one employee to another, and the manager changes behavior in interacting with different employees (Gerstner & Day, 1997). Based on this concept from the LMX theory, it is hypothesized in this study that:

**Hypothesis 2:** The higher the LMX score of a remote employee, the higher their engagement level.

In other words, it is suggested that there is a positive direct correlation between the LMX score and the employee level of engagement. LMX encompasses transformational leadership principles seeking to motivate and inspire employees by communicating the organization's vision. Managers need to incite employees to accept the team's goals while demonstrating how these goals align with the organization's vision (Avolio, Bass, & Jung, 1999; Graen & Uhl-Bien, 1995; Sutanto & Hendarto, 2020).

LMX has been used in various studies. Cropanzano, Prehar, and Chen (2002) used it in measuring the relationship between justice workers and their supervisors. As explained by Cropanzano et al. (2002), "High-LMX relationships are supportive and informal. Supervisors and their employees report high degrees of trust in these relationships and often go the extra mile to help each other out. In contrast, supervisors who act with interactional injustice tend to engender low-quality LMX relationships" (p. 329). In another study, Löfgren and Lanneborn (2013) used LMX to analyze the relationship between managers and their employees in a virtual environment where the geographical distance separating them adds challenges to their collaboration. Using this theory, the authors' findings confirmed that geographical distance had an impact on the relationship between managers and employees as confirmed by their low LMX scores.

### 3. Research Question, Hypotheses, and Conceptual Framework

The main research question asked in this study seeks to know the influence of 1)

sense of belonging at work and 2) Leader-Member Exchange (LMX), on remote employee engagement. This omnibus question was subdivided into two research questions:

**RQ1:** What is the relationship between LMX and remote employee engagement?

**RQ2:** What is the relationship between the sense of belonging and remote employee engagement?

To answer RQ1, the following hypothesis was identified from the literature:

**H1:** The higher the LMX score of a remote employee, the higher their engagement level.

The related null hypothesis suggests that:

**H1<sub>0</sub>:** There is no significant relationship between LMX and remote employee engagement.

To answer RQ2, the following hypothesis was identified in the literature:

**H2:** In the virtual working environment, the sense of belonging is positively related to remote employee engagement.

The related null hypothesis suggests that:

**H2<sub>0</sub>:** There is no relationship between the sense of belonging and remote employee engagement.

The conceptual framework that represents this research setting is presented in **Figure 2**, which depicts the hypothesized relationships between belongingness, LMX, and remote employee engagement as measured by EENDEED.

## 4. Methodology

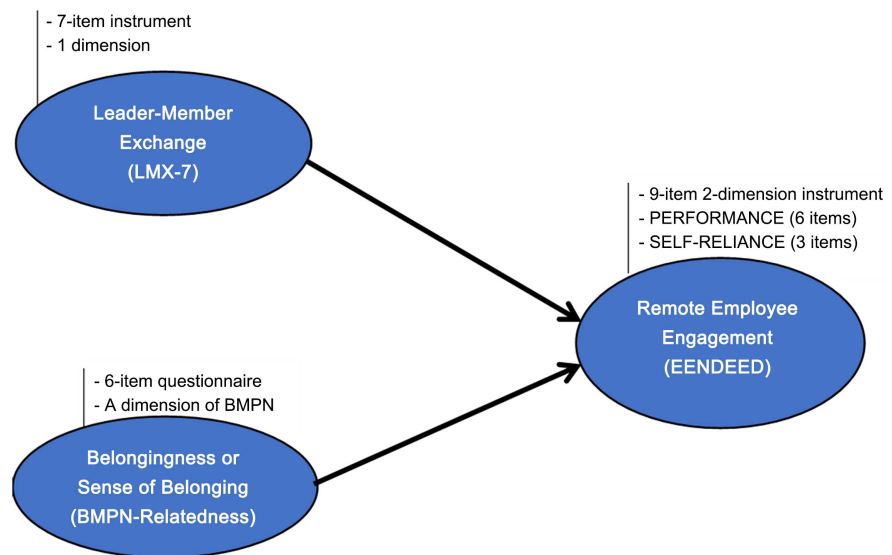
### 4.1. Research Approach

This study used a quantitative non-experimental correlation approach to analyze the relationships between LMX, Belongingness, and remote employee engagement. A survey questionnaire was completed online by randomly selected participants. All respondents were employees who work remotely at least 50 percent of the time. This condition was imposed by a filter used as an opening question.

### 4.2. Population and Sample Size

The target population for this study included those remote workers who had a leader to whom they reported. As such, self-employed workers were not included in the study. This was a condition to implement the LMX from the remote employee's perspective.

For this study, data were collected using an online survey questionnaire. A total of 267 participants responded to the survey, of which 125 were males and 133 were females, and 9 selected other as their gender. Males thus represented 46.82% of the sample; females represented 49.81%, and other represented 3.37%. Like the target population, all participants were remote workers in the United States of America who had a leader to whom they reported.



**Figure 2.** Diagram depicting the conceptual view of the hypothesized relationships between LMX, Belongingness, and remote employee engagement.

## 5. Measurement Instruments

The three main constructs of this study were 1) engagement, 2) belongingness, and 3) leader-member exchange. Each of these constructs was measured by a different instrument. As such, the main survey questionnaire included three survey instruments.

### 5.1. Employee Engagement as Measured by EENDEED

In this study, employee engagement was measured using a validated instrument called EENDEED. The name EENDEED stands for Enhanced Engagement Nurtured by Determination, Efficacy, and Exchange Dimensions. Created by [Lartey and Randall \(2022\)](#), EENDEED is a 9-item instrument that measures engagement levels of both remote employees and traditional office employees. It is based on the implementation of three theories, namely 1) self-determination theory; 2) self-efficacy theory; 3) social exchange theory.

The first six items of the EENDEED scale represent the construct of PERFORMANCE, and the last three represent the construct of SELF-RELIANCE. All nine items of EENDEED were added in the overall questionnaire as follows:

- 1) At work, my choices express my “true self”;
- 2) I look forward to sitting down at my computer to write to others or do my daily work;
- 3) I use a lot of expressive symbols in my communication messages, such as: -) or ☺ for “smile”, lol for “laugh”, etc.;
- 4) I am satisfied with the recognition I receive from my supervisor;
- 5) At my job, I am doing what really interests me;
- 6) I had a career-planning discussion with my manager;
- 7) I have control over the quality of my work;



8) I successfully complete difficult tasks and projects;

9) I show concern and interest in the person I am conversing with, in my communication messages.

All items were scored using a five-point Likert scale ranging from 1 to 5 as follows: 1) Strongly disagree; 2) Disagree; 3) Neither agree nor disagree; 4) Agree; 5) Strongly agree.

## **5.2. Leader-Member Exchange as Measured by the LMX-7 Instrument**

LMX-7 is a 7-item instrument developed by Scandura and Graen (1984). It was used in this study to measure the perceived organizational support through the relationship between the leader and the employee as explained by Cropanzano and Mitchell (2005). Items of LMX as presented by Northouse (2012: p. 180) were included in the questionnaire and scored on a 5-point Likert scale.

## **5.3. Measurement of the Sense of Belonging**

Sheldon and Hilpert (2012) developed the Balanced Measure of Psychological Needs (BMPN). This 18-item instrument was validated to measure three main dimensions: 1) competence, 2) autonomy, and 3) relatedness (Lartey & Randall, 2021b). Ryan and Deci (2000) view relatedness as the need for the sense of belonging; the need of being connected to other people. Similarly, Legault (2017), as well as Randall et al. (2020), see relatedness as the need to feel a connection with others, which they say creates a sense of belonging. Hence, the construct of relatedness is related to that of belongingness. To that effect, the relatedness dimension was selected from the BMPN for measuring belongingness in this study. Of the 18 items of the BMPN instruments, the six representing relatedness were selected for this study and included in the questionnaire as they were all aligned with the need to belong to a group or to be related to others.

## **5.4. Reliability of the Survey Questionnaire**

In the investigation of the influence of the sense of belonging and leader-member exchange (LMX) on remote employee engagement, a survey questionnaire was created using three validated instruments namely EENDEED for remote employee engagement, BMPN for belongingness, and LMX-7 for leader-member exchange. Various Cronbach alpha tests were performed on the collected data to ascertain the reliability and internal consistency of the individual instruments as well as the resulting survey questionnaire.

Cronbach's alpha score represents the mean coefficient obtained for all possible split-half combinations of a dataset (Cronbach, 1951). In other words, it represents the value that would most likely be produced if any random subset of the sample was used. As explained by Taber (2018), Cronbach's alpha is "commonly used in studies as an indicator of instrument or scale reliability or internal consistency" (p. 1284). After being presented in 1951 by Cronbach, this measure



has since been widely used in various studies to ascertain the internal consistency and reliability of the implemented instruments and datasets.

In the preliminary analysis of this study, the Cronbach alpha value of internal consistency of each instrument was estimated. The acceptable reliability for each scale would require an alpha of .70 or above.

The EENDEED scale featured a Cronbach alpha of .791; a reliability score above the suggested minimum of .70, thus confirming the reliability of the EENDEED instrument. Each of the two dimensions of EENDEED (PERFORMANCE and SELF-RELIANCE) was also evaluated. Performance had an alpha of .725 and self-reliance scored .776. Both scores were above the recommended minimum of .70, confirming the reliability and internal consistency of the EENDEED scale.

The LMX-7 scale obtained a Cronbach alpha score of .818. This was well above the recommended minimum of .70. The scale was thus deemed reliable and good to use in this study.

Finally, the belongingness scale represented by the relatedness subscale of the BMPN instrument resulted in a Cronbach alpha of .56. The Cronbach alpha “if item deleted” of each component did not result in any acceptable alpha value. Further analysis of this scale showed that it could be subdivided into two sub-scales: positive sense of belong (BELONG\_POS) and negative sense of belonging (BELONG\_NEG). With this observation, the factor structure of the construct needed to be validated. An exploratory factor analysis confirmed the 2-factor structure of belongingness as presented in **Table 1**.

Based on these new findings, the construct of belongingness would be a multi-dimension construct. Because the combined belongingness Cronbach alpha was below the recommended .7, it was decided to include each of its subconstructs as independent variables in the study. In this case, each of them had a Cronbach alpha greater than .7, with BELONG\_POS scoring .745 and BELONG\_NEG .714, confirming their good level of self-consistency and making them fit to be considered as independent variables in the study.

**Table 1.** Pattern matrix<sup>a</sup> of the factor analysis confirming belongingness as a 2-factor construct.

	Factor <sup>b</sup>	
	1 BELONG_POS	2 BELONG_NEG
BMPN17_RELATEDNS_05	.707	
BMPN15_RELATEDNS_03	.691	
BMPN13_RELATEDNS_01	.683	
BMPN16_RELATEDNS_04r		.686
BMPN18_RELATEDNS_06r		.671
BMPN14_RELATEDNS_02r		.631

<sup>a</sup>Extraction Method: Maximum Likelihood. <sup>b</sup>2 factors extracted. 3 iterations required.

Finally, a Cronbach alpha was computed on the 22-item survey questionnaire using the 267 responses to the survey. The results showed an alpha coefficient of .87. Being well above the minimum of .70, such value indicates a high level of internal consistency and reliability of the collected dataset, allowing the analysis to proceed without any variable reduction.

## 6. Data Analysis

### 6.1. Variables Used in the Study

Prior to performing a multiple regression analysis to determine the influence, if any, of LMX and belongingness on remote employee engagement, it was necessary to review and understand the variables to use and the process by which they were obtained. This study had one dependent variable (DV) and three independent variables (IV).

The DV identified for this study is the remote employee engagement score as measured by EENDEED. This variable named EENDEED\_SCORE, later referred to as EENDEED, was computed as the average of the scores of the two factors of EENDEED: PERFORMANCE and SELF-RELIANCE. Each of these factors was first calculated as the average of their associated items, with PERFORMANCE having six items and SELF-RELIANCE having three. The following formulas show how the scores were computed to obtain the remote employee's engagement score as measured by EENDEED:

PERFORMANCE

$$= \frac{\text{Authenticity} + \text{Motivation} + \text{Expressiveness} + \text{Recognition} + \text{Interest} + \text{CareerPlan}}{6}$$

$$\text{SELF\_RELIANCE} = \frac{\text{Autonomy} + \text{Confidence} + \text{Empathy}}{3}$$

$$\text{EENDEED\_SCORE} = \frac{\text{PERFORMANCE} + \text{SELF\_RELIANCE}}{2}$$

The independent variables, LMX\_SCORE or LMX, BELONG\_POS, and BELONG\_NEG were each computed using a similar process as that of the DV. The remote employee's LMX score representing the relationship with their manager was computed as the average of all the seven measured items of the LMX-7 scale. BELONG\_POS and BELONG\_NEG were also calculated as the average of each of their three items.

### 6.2. Assumptions of Multiple Regression

This study had three IVs and one DV, all measured using a scale measurement level in SPSS. In addition to the measurement level, the assumptions of multiple regression were validated. These assumptions, as suggested by [Tabachnick and Fidell \(2013\)](#), include: 1) univariate outliers or the absence of outliers among the IVs and the DV; 2) absence of multicollinearity and singularity; 3) multivariate outliers or absence of outliers in the solution; 4) ratio of cases to independent

variables; and 5) normality, linearity, homoscedasticity of residuals, and independence of errors.

For this study, data were collected from 267 participants, all remote workers within the United States of America with a manager to whom they report. There were no missing values, hence no record was removed. A post-hoc power analysis was conducted using GPower 3.1.7. It confirmed power of .99, well above the .8 recommended, suggesting the appropriateness of the sample for a multiple regression analysis.

The number of cases was well over the minimum of  $104 + 3$  suggested by [Tabachnick and Fidell \(2013\)](#), and the number of cases to independent variables was 89; well over the minimum requirements of 8 to 1 suggested by the same authors. The z-scores of all variables were within the range of  $-3$  to  $+3$ , confirming the absence of univariate outliers in the dataset. All variables were confirmed to be normally distributed based on the Shapiro-Wilk test and the Kolmogorov-Smirnov test. This was also validated visually with the histogram of each variable. In addition, multivariate outlier detection was done using the Mahalanobis distance computed as MAH1. The function  $1 - CDF.ChiSq(MAH1, 3)$  was used to calculate the probability that a value from the chi-square distribution with three degrees of freedom (representing the IVs) would be less than the obtained Mahalanobis distance. This resulted in none of the values being below .001, suggesting the absence of multivariate outliers in the dataset. Analysis of the residuals was conducted during the estimation of the multiple regression. It confirmed normality, linearity, homoscedasticity, and independence of residuals. Indeed, the scatter plot showed standardized predicted residual values within the  $-3$  to  $+3$  range and the P-P plot of standardized residuals confirmed their normal distribution. All VIF values (variance inflation factor) were well below 10, confirming the absence of multicollinearity and singularity.

### 6.3. Confirmation of the Factor Structure of EENDEED

EENDEED, the instrument used to measure remote employee engagement, was presented as a two-factor scale by [Lartey and Randall \(2022\)](#). This factor structure was validated in another study by [Randall and Lartey \(2022\)](#), along with its convergent validity and concurrent validity. All the same, decision was made to confirm the factor structure of EENDEED based on the new dataset, prior to proceeding with further analysis. This was done using two methods: 1) an exploratory factor analysis (EFA) and 2) a confirmatory factor analysis (CFA), even though one or the other would be sufficient for this purpose.

#### 6.3.1. Exploratory Factor Analysis (EFA)

An EFA was conducted using IBM SPSS version 24. The Maximum likelihood extraction method with a Promax (non-orthogonal) rotation was selected. The Promax rotation was selected to allow the factors to correlate. The selected number of factors to extract was “based on Eigenvalues greater than 2”. An eigenvalue

value, as explained by Randall et al. (2020), is “a measure of how much of the variance of the observed variables is explained by a factor” (p. 118). This meant that any identified factor was required to explain as much variance as any combined 2 items of its number of variables. In fact, it would have been good to select “Fixed number of factors to extract” and specify the number as 2 because the number of factors is well known. All the same, that was also done, and it provided the same results.

The factor analysis yielded two factors as presented in Table 2, confirming the 2-factor structure of EENDEED.

The goodness-of-fit test ( $\chi^2/df = 19.29; p = .438$ ), confirms that the relationships among the variables are adequately described by the factor model. In other words, the resulting model adequately fits the data.

### 6.3.2. Confirmatory Factor Analysis (CFA)

A CFA was conducted to ascertain the structure of EENDEED’s latent variables as presented in Figure 3. The goal of the CFA was to test the null hypothesis suggesting that there is no relationship between the factors of EENDEED and their underlying structure based on the collected data. The assumptions of CFA had been validated with the assumption of multiple regression. In addition, because there were nine observed variables in this model, the ratio of cases to variables was 30 to 1, well above the acceptable ratio of 8 to 1 suggested by Tabachnick and Fidell (2013).

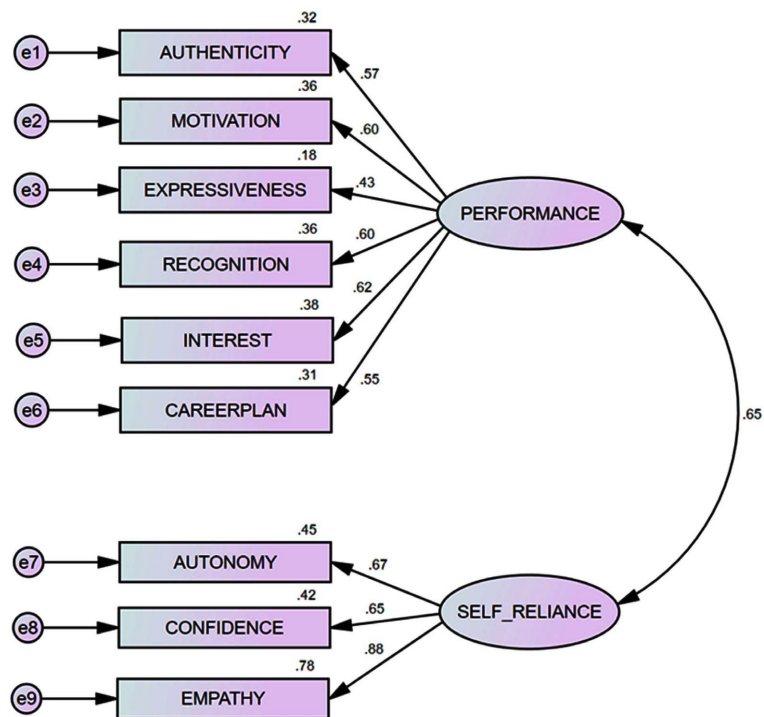


Figure 3. Hypothesized CFA model depicting the observed variables of EENDEED and their latent structure, with significant coefficients in standardized form.

**Table 2.** Pattern matrix<sup>a</sup> of the factor analysis confirming the factor structure of EEND-EED.

	Factor	
	1 SELF_RELIANCE	2 PERFORMANCE
AUTHENTICITY		.336
MOTIVATION		.591
EXPRESSIVENESS		.645
RECOGNITION		.511
INTEREST		.408
CAREER		.546
AUTONOMY	.623	
CONFIDENCE	.905	
EMPATHY	.716	

<sup>a</sup>Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization. Rotation converged in 3 iterations.

The CFA was conducted using IBM Amos version 20. The output of the resulting model is represented on **Figure 3**. The model's fitting indices were all good ( $\chi^2 = 48.7$ ,  $\chi^2/df = 1.87$ ; CFI = .961; GFI = .959; AGFI = .929; RMSEA = .057; NFI = .92; TLI = .945; PCLOSE = .291). As a reminder, the acceptable fit values are as follows:  $\chi^2/df < 5$ ; CFI > .8; GFI > .95; AGFI > .8; RMSEA < .08; NFI > .90; TLI > .90; PCLOSE > .05 (Byrne, 1994; Fan, Thompson, & Wang, 1999; Hair et al., 2006). It should be noted that some studies consider lesser values to be acceptable. With these positive results, it was confirmed that the hypothesized EENDEED model fitted the data for this study. As such, the study could proceed and implement the multiple regression analysis.

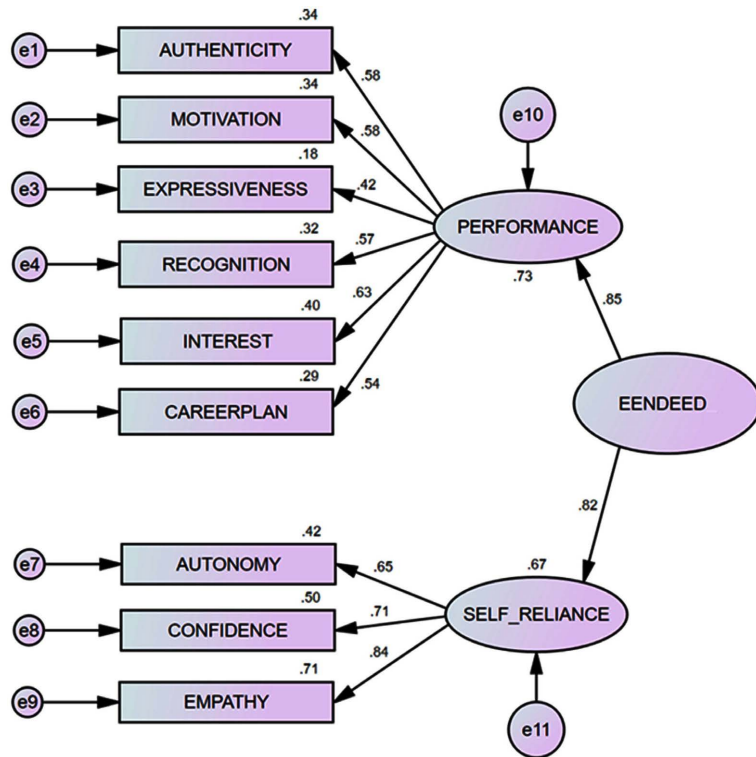
A second order factor analysis model was also created. **Figure 4** shows the results of the second order model. All fit indices stayed the same for this new model as for the previous ( $\chi^2 = 48.7$ ,  $\chi^2/df = 1.87$ ; CFI = .961; GFI = .959; AGFI = .929; RMSEA = .057; NFI = .92; TLI = .945; PCLOSE = .291), consolidating the appropriateness of the EENDEED model.

## 7. Model Estimation and Results

A standard multiple regression analysis was conducted to assess the influence of LMX and belongingness on remote employee engagement. The analysis of variance (ANOVA) in the final model output as shown in **Table 3** confirmed that the regression model was significant [ $F(3, 263) = 248.18$ ,  $p < .05$ ]. As a reminder, ANOVA tests the null hypothesis that the R-square is not significantly different from zero. The  $p$ -value being less than .05, this null hypothesis is rejected, suggesting that the R-square of the model is significantly different from zero. In other words, there is a statistically significant effect of LMX and belongingness (BELONG\_POS and BELONG\_NEG) on remote employee engagement as represented by EENDEED, the dependent variable. In summary, the predictors

LMX, BELONG\_POS, and BELONG\_NEG account for an amount of variance in predicting remote employee engagement. As such, it is confirmed that the LMX score and the sense of belonging influence remote employee engagement.

The summary of the final multiple regression model using 1) EENDEED as DV and 2) LMX, BELONG\_POS, and BELONG\_NEG as IVs is shown in **Table 4**. As presented, this model was statistically significant ( $p < .001$ ) and had an  $R^2$  of .739. In other words, the model accounts for 73.9% of variability in the remote employee engagement.



**Figure 4.** Hypothesized second-order model depicting the observed variables of EENDEED and their latent structure aggregated as one main latent variable, with standardized significant coefficients.

**Table 3.** Analysis of variance (ANOVA).

Model <sup>a</sup>	Sum of Squares	df	Mean Square	F	Sig.
Regression	58.614	3	19.538	248.177	.000 <sup>b</sup>
Residual	20.705	263	.079		
Total	79.319	266			

<sup>a</sup>Dependent Variable: EENDEED. <sup>b</sup>Predictors: (Constant), BELONG\_NEG, BELONG\_POS, LMX.

**Table 4.** Model summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1 <sup>a</sup>	.860a	.739	.736	.28058

<sup>a</sup>Predictors: (Constant), BELONG\_NEG, BELONG\_POS, LMX.

To answer the research questions previously formulated for this study, further analysis of the model output was required. All research questions were answered using information in **Table 4**, which contains the coefficients of the regression model. As a reminder, the two research questions were:

RQ1: What is the relationship between LMX and remote employee engagement?

RQ2: What is the relationship between the sense of belonging and remote employee engagement?

RQ1 was answered by assessing the LMX line in **Table 5**. It shows a beta value of .719; a significance value of .000 ( $p < .001$ ); and a 95% confidence interval of [.624 to .777] which does not include zero. It thus confirms the existence of a strong statistically significant positive relationship between LMX and remote employee engagement. The null hypothesis of no relationship was rejected, and the alternate hypothesis was retained, confirming that “*the higher the LMX score of a remote employee, the higher their engagement level*”.

Belongingness was refactored into two variables: positive sense of belonging (BELONG\_POS) which contained positively worded questions, and negative sense of belonging (BELONG\_NEG) containing negatively stated questions that were reversed-coded. To that effect, RQ2 was answered from two viewpoints: that of BELONG\_POS and that of BELONG\_NEG.

BELONG\_POS, as shown on **Table 5**, had a beta of .206; a significance of .000 ( $p < .001$ ); and a 95% confidence interval that did not include zero. As such, there was a positive and statistically significant relationship between BELONG\_POS and engagement. The null hypothesis of no relationship was rejected, and the alternate hypothesis was retained, confirming that “*in the virtual working environment, the positive sense of belonging is positively related to remote employee engagement*”.

Regarding BELONG\_NEG, the significance was .099 ( $p > .05$ ) and the 95% confidence interval was between  $-.002$  and  $.021$ , which included zero. This means BELONG\_NEG could be zero. Hence, the null hypothesis of no significant

**Table 5.** Model coefficients showing all predictors, their unstandardized and standardized coefficients<sup>a</sup>, their significances, and other statistics. The LMX and BELONG\_POS predictors are statistically significant in predicting the outcome variable (remote employee engagement), but BELONG\_NEG is not significant.

Model	Unstandardized coefficients		Stdz coef. Beta	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error				Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.416	.137		3.03	.003	.146	.687		
1 LMX	.700	.039	.719	18.05	.000	.624	.777	.625	1.60
BELONG_POS	.054	.010	.206	5.167	.000	.033	.074	.626	1.60
BELONG_NEG	.010	.006	.052	1.66	.099	-.002	.021	.998	1.00

<sup>a</sup>Dependent Variable: EENDEED ENGAGEMENT.



relationship between BELONG\_NEG and engagement was retained, suggesting that “*in the virtual working environment, there is no significant relationship between the negative sense of belonging and remote employee engagement*”.

With the research questions answered, the influence of each IV on the DV was assessed using the standardized coefficient beta and the t-value. The item with the greater t-value (hence beta) is the greater contributor in the relationship. In this study, LMX had a greater influence on remote employee engagement as compared to belongingness. From the belongingness standpoint, only the positive sense of belongingness had an influence on engagement. The negative sense of belongingness did not contribute to the determination of remote employee engagement.

## 8. Discussions and Contributions

The purpose of this study was to identify the influence of 1) the sense of belonging at work and 2) Leader-Member Exchange (LMX), on remote employee engagement. LMX was confirmed to be positively related to remote employee engagement. This finding is aligned with prior studies between LMX and engagement but adds the remote employee dimension that was not previously explored.

In a study seeking the relationship between LMX and employees' extra-role behaviors such as organizational citizenship, knowledge sharing, and innovative work behaviors, [Khan and Malik \(2017\)](#) conducted a 3-phase longitudinal study of 367 participants in R&D and IT sectors in Pakistan. Using work engagement as a mediator, the authors confirmed that LMX was significantly positively related to the mediator, work engagement. In another study on LMX, work engagement and psychological withdrawal, [Aggarwal et al. \(2020\)](#) surveyed 454 participants and confirmed the existence of a positive relationship between LMX and employee engagement.

As presented, like many others, both studies focused on employees working in a traditional workplace. While the current study also confirmed the relationship between LMX and employee engagement, this was done for employees working remotely, away from their managers and colleagues. Deriving from these findings, it is advisable for managers to keep a warm and good relationship with their employees even when they are working in different locations. The relationship between manager and employee which is depicted in the Leader-Member Exchange theory is one that needs to be active and positive on both sides. This relationship is aligned with EENDEED which views engagement not just from the employee's perspective, but also from the organization's perspective through the leader who interacts with the employee, in alignment with the definition of engagement suggested by [Lartey \(2021\)](#).

Positive sense of belonging (or positive belongingness) as viewed in this study is the situation where an employee feels they belong to the organization by responding favorably to positively worded questions. This study found that just like LMX, positive belongingness was positively related to remote employee engage-

ment, but at a lesser influence level.

Negative sense of belonging was molded in this study through the negatively worded questions related to the sense of belonging. In this case, a high score meant the employee did not have a sense of belonging to the organization's social and professional environments; they felt excluded, interestingly, even when employees have a high negative sense of belonging that did not influence their level of engagement or disengagement.

This study made a valuable contribution to both the academic and business organizations by improving the understanding of the remote workers' perspective on engagement, sense of belonging, and leader relationships in a geographically dispersed work environment. The need for this understanding has peaked in recent months with the advent of the 2019 coronavirus pandemic and the increase in the number of remote workers.

## 9. Limitations and Recommendations for Further Research

While this study made reasonable contributions to academia and organizations, a few limitations should be noted. First, the study used a self-reported survey questionnaire without means to follow up on participants' responses. As such, it is quite possible that some biased responses made it through the data cleaning phase to the final analysis. Overall, based on the number of cases, that would have had little to no impact on the findings.

Second, this study was conducted in the United States of America. For that reason, its findings should not be generalized to other countries. While this constitutes a limitation, it is also an opportunity for further studies. The settings would include a different country or continent and the current study would be replicated. Only, that brings up a third limitation.

This study was limited to English-speaking employees and all instruments written in the English language. There exist translations of LMX and BMPN in various languages, but none of EENDEED exists. A future study could translate the EENDEED scale to see how it measures engagement in non-English speaking countries. This will provide a multi-linguistic and multi-cultural view of EENDEED.

## 10. Conclusion

In investigating the influence of sense of belonging at work and Leader-Member Exchange (LMX), on remote employee engagement as measured by EENDEED, this study identified three independent variables: LMX score, positive sense of belonging, and negative sense of belonging; and one dependent variable: engagement as measured by EENDEED, the Enhanced Engagement Nurtured by Determination, Efficacy and Exchange Dimensions. After validating the assumptions of multiple regression and the factor structure of EENDEED and belongingness, a multiple regression statistical model was created. The results confirmed the positive statistically significant relationship between LMX and EENDEED, as

well as positive belongingness and EENDEED. Findings showed that there was no statistically significant relationship between negative sense of belonging and remote employee engagement. This study contributed to knowledge by extending the relationship between LMX and engagement to the now growing population of remote employees. In other words, the perceived notion of the relationship between the managers and their remote employees from the employees' standpoint is of great importance in keeping the employee engaged. This finding is aligned with the definition of engagement as proposed by Lartey (2021), who sees engagement as a two-way relationship between the organization represented by its managers, and the employees. It is also aligned with the EENDEED model of engagement that includes social exchange for the transactions between employee and organization leadership, self-determination for the willingness of the employee to perform the assigned tasks, and self-efficacy for the belief by the employee of their capacity to perform the expected tasks. Limitations and opportunities for further research were also identified, including the need to perform similar studies for other populations with linguistic and cultural differences from the population of this study.

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### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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