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Associations of Trait Emotional Intelligence with Social Support, Work Engagement, and Creativity in Japanese Eldercare Nurses[1]

Associations between EI and creativity in the JD-R model

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Abstract:

Work-related resources can be positive antecedents of employee work engagement (WE) and creativity. Although trait emotional intelligence (EI) and social support may be crucial resources in nursing, their relationships with WE and creativity remain unclear. Hence, with special focus on the role of trait EI, we examined this relationship by applying the job demands-resources (JD-R) model. The participants were 489 eldercare nurses in Japan (female: $n = 401$; male: $n = 88$; age $= 39.5 \pm 11.0$ years). The results showed positive associations between EI and the other studied variables. Furthermore, moderated mediation analyses revealed that higher trait EI enhanced the positive association between the triad of social support, WE, and creativity. The findings provide additional evidence that, in nurses, trait EI may be a noteworthy personal resource for creativity in the relationship between social support and WE.

Creativity in health-care work can be considered essential for improvement in care quality, innovation, and patient benefits (Isfahani, Hosseini, Khoshknab, Peyrovi, & Khanke, 2015; Tsai, Liou, Hsiao, & Cheng, 2013). In the health-care context, work-related (job and personal) resources are crucial promoters of work engagement and creativity (Bakker & Xanthopoulou, 2013; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). In particular, trait emotional intelligence (EI) and social support have received increasing attention as noteworthy resources in nursing work (Othman & Nasurdin, 2013; Zhu, Liu, Guo, Zhao, & Lou, 2015).

Nevertheless, less is known about the combined effects of trait EI and social support on creativity, and whether work engagement is a mediator in this relationship. Furthermore, most previous studies examining these phenomena and their inter-relations have been conducted in Western countries; therefore, the generalizability of their findings to other cultural settings is unclear. Thus, the present study has two main goals: first, to investigate the direct and indirect relationships between trait EI, social support, work engagement, and creativity; and second, to examine whether trait EI moderates the triadic relationship among social support, work engagement, and creativity. We used

data obtained from Japanese eldercare nurses ($n = 489$). The job demands-resources

(JD-R) model provides the theoretical underpinning of our study and is described next.

1.1.1. The JD-R Model, Social Support, and EI

The (revised) JD-R model provides a heuristic and parsimonious framework in which to

explore the relationship among various occupational psychological factors (Schaufeli &

Taris, 2014). The model focuses on two distinct psychological processes: job stress and

motivation. Here, we focus on the latter. For the development of work motivation, the

model assumes that job and personal resources can enhance employees' positive

motivational state—work engagement (henceforth WE), which facilitates successful job

performance and well-being (see the revised JD-R model in Schaufeli & Taris, 2014).

Job resources refer to the physical, social, or organizational aspects of job

characteristics that actively promote the achievement of work goals, personal growth

and progress (Bakker & Xanthopoulou, 2013). In the nursing profession, social support,

which is defined as social resources provided by formal support groups or informal

helping relationships in daily living (Gottlieb & Bergen, 2010), was found to be a strong

facilitator of nurses' WE (Othman & Nasurdin, 2013). Employees generally receive

social support from supervisors, coworkers, and non-work related (e.g., family and

friends) individuals (Madjar, 2008; Othman & Nasurdin, 2013).

Likewise, personal resources—representing aspects of the self that are linked to

resiliency and the ability of successful management (Hobfoll, Johnson, Ennis, &

Jackson, 2003)—are also regarded as significant resources in the workplace

(Xanthopoulou et al., 2009). In particular, trait EI (or trait emotional self-efficacy),

defined as "a constellation of emotional self-perceptions located at the lower levels of

personality hierarchies and measured via the trait emotional intelligence questionnaire" (Petrides, 2010, p. 137), has been shown to a significant positive predictor of WE (Zhu et al., 2015) and an essential personal resource for the creative process in nurses (Akerjordet & Severinsson, 2004). Accordingly, trait EI (henceforth EI) is attracting increasing research attention in the nursing field.

Moreover, these two types of resources seem to mutually reinforce their positive effect on outcomes such as WE (Xanthopoulou et al., 2009), which can also facilitate further resource gain (see the conservation of resources theory; Hobfoll et al., 2003). Hence, it is important to consider the detailed relationship among the different resources in the JD-R model. In this study, we focus on social support and EI in relation to WE and creativity.

1.1.2. Definition of Creativity

Creativity research in work has mainly addressed two constructs, the creative process (e.g., creative behavior) and performance (Montag, Maertz, & Baer, 2012). Creative behavior refers to "the set of interdependent observable and unobservable activities that occur in response to a non-algorithmic task or project and that purportedly constitute the creative process" (Montag et al., 2012, p. 1365). Accordingly, engaging in a creative process is essential for creative performance (Montag et al., 2012). Despite its importance, creative behavior has not been examined in relation to the JD-R model in the Japanese context. Thus, we investigate creative behavior (henceforth creativity) as an employee outcome.

A recent review study identified two distinct approaches to creativity research (Zhou & Hoever, 2014). The actor-centered approach focuses on personality traits and their

interaction with multiple within-individual factors (e.g., self-efficacy). The context-centered approach in turn considers creativity to depend on social contextual interplay (e.g., social relationships). Nevertheless, modern creativity research emphasizes the importance of considering both perspectives simultaneously since personal and contextual factors often interact in their relationships with creativity (Zhou & Hoever, 2014). Accordingly, we also underline the importance of interaction between the personal and contextual in focusing specifically on EI (personal resource) and social support (contextual resource) as factors explaining creativity at work.

1.1.3.   Relationships between EI, Social Support, WE, and Creativity

Several studies have reported a direct positive influence of EI on social support (e.g., Kong, Zhao, & You, 2012; Montes-Berges & Augusto, 2007) and WE (e.g., Akhtar, Boustani, Tsivrikos, & Chamorro-Premuzic, 2015; Zhu et al., 2015). Similarly, numerous studies have documented social support as one of the important facilitators of WE (e.g., Caesens, Stinglhamber, & Luypaert, 2014; Xanthopoulou et al., 2009), and some have also demonstrated a robust relationship over time (e.g., Xanthopoulou et al., 2009).

Further, both resources (EI and social support) can directly impact on employees' creativity. A study conducted in the Asian tourism industry reported a strong positive impact of EI on employees' creative behavior (Tsai & Lee, 2014). Lassk and Shepherd (2013) further documented that employees with higher EI generated several creative ideas, which subsequently improved their job performance. Likewise, some studies have found a significant effect of social support in promoting a person's creative behavior (De Jonge, Gevers, & Dollard, 2014) and performance (Madjar, 2008).

In addition, WE, referring to a positive work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli, Bakker, & Van Rhenen, 2009), can also benefit creativity. Specifically, positive emotions and motivation, which form the essence of WE (Schaufeli et al., 2009), seem to play a key role in this relationship. Oldham (2003), for example, indicates that positive emotions—which broaden one's momentary thought-action repertories (Fredrickson, 2004)—can facilitate creative performance. In the componential theory of creativity, intrinsic motivation is also a crucial element for promoting creative behavior and performance (Amabile, 1997).

1.1.4.   Potential Benefit of EI in the JD-R Model

To date, only a few studies have examined the relationship among work-related resources, WE, and creativity by applying the JD-R model. For example, Bakker and Xanthopoulou (2013) demonstrated that higher levels of job and personal resources (e.g., social support, self-efficacy) in school principals were significant predictors of higher WE, which, in turn, promoted their creative performance. In nursing samples, Salanova, Lorente, Chambel, and Martínez (2011) found that self-efficacy facilitated nurses' better role performance by fully mediating WE. These findings suggest that work-related resources have a positive role in creativity through the process posited by the JD-R model.

On the inter-relationship between EI and social support, a recent meta-analysis indicated that EI is a positive predictor of support-seeking behavior (Peña-Sarrionandia, Mikolajczak, & Gross, 2015). Furthermore, Montes-Berges and Augusto (2007) found earlier that higher EI enhanced the perception of social support and its availability. Such evidence indicates that EI can add to the effect of social support. In turn, this positive

relationship can be crucial for WE. Williams, Wissing, Rothmann, and Temane (2009) found that higher EI was associated with higher job resources (e.g., growth opportunity) and higher WE. They concluded that improving EI might be indispensable for maximizing the positive effects of job resources on WE. In light of the findings detailed above, it would be reasonable to expect EI to be beneficial to, and even play a critical role in, the social support-WE relationship, which, if so, might then be positively related to employee creativity.

On the basis of the literature review presented above, we propose the following five hypotheses:

Hypothesis 1 (H1): EI shows a positive, direct relationship with social support, WE, and creativity.

Hypothesis 2 (H2): Social support shows a positive, direct relationship with WE and creativity.

Hypothesis 3 (H3): EI is positively associated with creativity via WE.

Hypothesis 4 (H4): EI moderates the relationship between social support and WE. WE is higher when both EI and social support are high.

Hypothesis 5 (H5): A conditional effect of social support on creativity is mediated by WE. In this relationship, creativity is stronger when EI is high.

Figure 1 provides a visual representation of these hypotheses.

1.2.   Method

1.2.1.   Participants and Procedure

We recruited 500 eldercare nurses working in special nursing homes for the elderly in

Japan. First of all, we explained the protocol of the present study to the participants. Later, all of them voluntarily offered their participation and gave their fully informed consent. Participants were assured that their privacy and all personal information contained in their documents would be protected.

We distributed a set of survey questionnaires to the participants via the director of each nursing institute. The respondents completed it in their own time, with close attention to avoiding omissions. They then returned it in a sealed envelope to their director before the predetermined deadline (1 month from the distribution date). The survey comprised two main sections. The first part included demographic questions (e.g., age, gender) and job information (e.g., employment type, shift type). The second section consisted of questionnaires on EI, social support, WE, and creativity.

Surveys were delivered to all 500 participants, and 494 of them were retrieved, yielding a response rate of 99.0%. Invalid surveys (e.g., too many missing values, low response reliability of the EQS) were discarded. Finally, we analyzed 489 surveys. Mean sample age was 39.5 years, $SD = 11.0$ (male: age = 34.5, $SD = 8.0$; female: age = 39.0, $SD = 11.4$). The sample was female-dominated: females accounted for 82.0% ($n = 401$) and males for 18.0% ($n = 88$). The majority of the nurses (78.5%) had permanent posts. More than half (66.3%) worked irregular day/night shifts and the second largest group (23.9%) worked a regular day shift.

1.2.2. Measures

EI was measured with the Emotional Intelligence Scale validated in Japan (EQS; Otake, Shimai, Uchiyama, & Utsuki, 2001). It comprises 65 items classified into three major dimensions each containing 21 items (except for two lie scales): "intrapersonal EI"

refers to being aware of one's own emotions, an ability that effectively supports various behaviors (e.g., "I know how I am feeling even at times when I become emotional"); "interpersonal EI" describes the ability to maintain a positive interpersonal relationship through recognition and empathy with others' feeling and emotions (e.g., "I am careful not to say anything that would hurt someone else's feelings"); and "situational EI" represents the flexibility and controllability of the other EI dimensions needed to cope with diverse environmental changes (e.g., "I cope successfully with change"). The items are scored on a 4-point Likert scale from 0 (*totally disagree*) to 4 (*totally agree*). The Cronbach's alpha was .97.

WE was measured with the Japanese version of Utrecht Work Engagement Scale (J-UWES; Shimazu et al., 2008). The scale comprises 17 items divided among three sub-factors: vigor refers to high levels of psychological energy and mental resilience in working (e.g., "At my job, I feel strong and vigorous"); dedication describes involvement in one's work and experiencing a sense of significance, enthusiasm, and challenge (e.g., "I am enthusiastic about my job"); and absorption refers to being totally immersed in and focused on one's work (e.g., "When I am working, I forget everything else around me"). The items are scored on a 6-point Likert scale from 0 (*never*) to 6 (*always feel*). The Cronbach's alpha was .94. We used the total score of the EQS and the J-UWES in the process analyses.

Social support and creativity were measured with the New Brief Job Stress Questionnaire (New BJSQ; Inoue et al., 2014). Social support was assessed with nine items concerning work-related support from superiors, coworkers and family/friends (e.g., "How much can you count on your superior when you encounter difficulties?"). Creativity was assessed with the three items on the realization of creativity (e.g., "I

made improvements and demonstrated creativity in my work"). The reason for using this scale is that the items were considered to reflect an employee's creative behavior rather than performance, in line with the critique by Montag et al. (2012). This scale has shown acceptable reliability ($\alpha = .87$; Inoue et al., 2014). The items of both scales are scored on a 4-point Likert scale from 1 (*totally disagree/never*) to 4 (*totally agree/very*). The Cronbach's alpha in this study was .81 for both. Table 1 provides descriptive statistics and correlation matrix.

1.2.3. Statistical Analysis

1.2.3.1. Preliminary analysis

To confirm the distinctive validity of EI, social support, WE, and creativity, we performed confirmatory factor analyses (CFA) with the maximum likelihood estimation using AMOS 21.0. The fit of the four-factor model was compared to the fit of the alternative one- to three-factor models.[1]

Overall model fit was comprehensively evaluated by the Chi-squared value (χ^2), the χ^2/df, Hoelter's Critical N, and the goodness of fit index. Non-significant χ^2, χ^2/df less than 3.0 (Kline, 1998), and goodness of fit index higher than .95 (Toyota, 2007) indicate a better model fit. Hoelter's Critical N above 200 ($p < .05$) indicates that the model has sufficient statistical power (Hoelter, 1983). The CFI, root mean square error of

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[1] The one-factor model was defined by loading the items onto the same factor. In the JD-R model, EI and social support can be resources for WE and creativity. Therefore, a two-factor model was estimated by loading the items of EI and social support onto the first factor and the other items onto the second factor. Further, because these resources should be theoretically distinct, we estimated a three-factor model by loading the items of EI and social support onto the first and second factor, respectively, and the other items onto the third factor.

approximation (RMSEA), and AIC were applied as auxiliary criteria to compare the two

models (see Toyota, 2007). A CFI above .95 indicates a better model fit than that to an

independent model. An RMSEA value less than .08 indicates acceptable model fit.

Smaller RMSEA and AIC values indicate a better model fit than that of a competing

model.

1.2.3.2. Multiple mediation analysis

All the process analyses described below were estimated with PROCESS macro[2]

(Hayes, 2013) in SPSS 21.0. We used model 6 to examine the direct and indirect

relationship between EI, social support, WE, and creativity. In this model, only

demographics that were significantly associated with the explained variables (age,

gender, employment type) were controlled for.

1.2.3.3. Moderation and moderated mediation analyses

First, we performed moderation analysis with model 1 in order to examine the effect

of EI on the relationship between social support and work engagement. In this model,

the same demographics were adjusted for as in model 6. Each level of the moderator

(EI) was generated by the pick-a-point method (Hayes, 2013): high (standardized

variable +1 SD), moderate (standardized variable: 0), and low EI (standardized variable

−1 SD).

Second, to examine the conditional effect of social support on creativity via WE, we

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[2] The original SPSS program has several limitations when estimating intricate process models (e.g., multiple mediation model, moderated mediation model). Therefore, we used a versatile computational tool of PROCESS macro that enables various process models to be comprehensively computed. Model 6 premises a process model containing two mediators. Model 1 assumes a simple moderation model involving one moderator. Model 7 estimates a mediation model containing one variable which moderates the link between an explanatory variable and a mediator.

performed moderated mediation analysis with model 7. Social support, WE, and

creativity were processed as independent, mediator, and outcome variables, respectively.

EI was treated as a moderator of the social support-WE relationship. As well as model 1,

we controlled for the same demographics. The significance of the overall moderated

mediation effect was evaluated using *the index of moderated mediation* (see Hayes,

2015).

In these process analyses, the variables were standardized to minimize potential bias

due to widely ranging variances. As a criterion of statistical significance, we used the

95% confidence interval (CI) generated by the bias-corrected bootstrap method set to

10,000 reiterations.

1.3.   Results

1.3.1.   Preliminary Analysis (CFA)

Table 2 shows the model fit indices for each model. The four-factor model showed the

best model fit of all the tested models,[3] indicating that the four constructs (EI, social

support, WE, and creativity) were empirically distinct.

1.3.2.   Multiple Mediation Analysis

The multiple mediation analysis revealed significant and positive direct effects of EI on

social support ($\beta = .23$, 95% CI [0.140, 0.325]), WE ($\beta = .36$, 95% CI [0.275, 0.454]),

and creativity ($\beta = .31$, 95% CI [0.215, 0.409]). Likewise, we found significant and

positive direct effects of social support on WE ($\beta = .18$, 95% CI [0.098, 0.256]).

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[3] The factor loadings and correlations are available from the author.

However, the effect on creativity was non-significant ($\beta = -.01$, 95% CI [−0.010, 0.080]). Accordingly, the results supported H1 and partially supported H2. These results indicate that EI can be a direct positive resource for social support, WE, and creativity, whereas social support may be a direct positive resource only for WE. Table 3 presents the direct and indirect associations between the variables.

The same analysis revealed a significant indirect effect of EI on creativity via WE ($\beta = .06$, 95% CI [0.028, 0.111]). Moreover, we observed another significant indirect pathway from EI through social support and WE to creativity ($\beta = .01$, 95% CI [0.003, 0.015]). As shown in Table 3, the direct main effects between these variables were significant, excluding the relationship between social support and creativity. The total effects of EI on creativity were also significant ($\beta = .38$, 95% CI [0.292, 0.471]). The overall model accounted for 19% of the total variance of creativity, $F(6, 482) = 16.81$, $p = .000$. These results supported H3, proposing that EI can enhance both social support and WE, which, in turn, is positively related to creativity.

1.3.3. Moderation Analysis

Moderation analysis showed a significant interaction effect between EI and social support on WE ($\beta = .07$, $p = .038$, 95% CI [0.004, 0.143]; see Table 4 and Figure 1). The interaction effect accounted for 1% of the overall variance of WE, $F(1, 482) = 3.88$, $p = .038$. A post-hoc simple slope test revealed that when EI was at a high level, the effect of social support on WE was significant in a positive direction and also reached its highest level ($\beta = .24$, 95% CI [0.138, 0.345]). Likewise, this effect was significant when EI was at a moderate level ($\beta = .17$, 95% CI [0.087, 0.249]). However, when EI was at a low level, the effect was non-significant ($\beta = .09$, 95% CI [−0.021, 0.210]).

Therefore, the results supported H4, suggesting that higher EI can strengthen the positive relationship between social support and WE. Figure 2 shows the moderation effect of EI.

1.3.4. Moderated Mediation Analysis

Table 4 summarizes the results of moderated mediation analysis.

The index of moderated mediation was significant ($\beta = .02$, 95% CI [0.003, 0.047]), indicating that the indirect effect of social support was moderated: Any two conditional indirect effects estimated at different levels of EI were significantly different from each other. When EI was at a higher level, the conditional indirect effect of social support on creativity via WE was significant in a positive direction and reached its highest level ($\beta = .07$, 95% CI [0.042, 0.108]). This effect was also significant when EI was at a moderate level ($\beta = .05$, 95% CI [0.027, 0.080]). In contrast, when EI was at a low level, the effect was non-significant ($\beta = .02$, 95% CI [−0.005, 0.067]). In addition, the direct effect of social support on creativity was non-significant ($\beta = .03$, $p = .501$, 95% CI [−0.059, 0.120]). Hence, this model was a full mediation model. In sum, the results supported H5, indicating that EI can be a moderator of the positive pathway from social support through WE to creativity: Higher EI can boost the positive effect of social support on WE, which may be related to improved creativity.

1.4. Discussion

The primary purposes of this study were, first, to investigate the direct and indirect relationships between EI, social support, WE, and creativity, and second, to examine

whether EI moderates the triadic relationship among social support, work engagement, and creativity among 489 Japanese eldercare nurses by applying the JD-R model (Schaufeli & Taris, 2014).

With respect to the first aim, model 6 of PROCESS macro allowed us to estimate a process model containing multiple mediators simultaneously. The results showed that EI was directly and positively associated with social support, WE, and creativity, which supported H1. These findings are congruent with prior evidence proposing that EI can be a positive predictor of these psychological constructs (Akhtar et al., 2015; Montes-Berges & Augusto, 2007; Tsai & Lee, 2014). Further, we found a significant positive effect of social support on WE, which is also consistent with previous findings indicating its notable contribution to WE (Madjar, 2008; Othman & Nasurdin, 2013; Xanthopoulou et al., 2009). However, we failed to detect a significant relationship with creativity. Therefore, H2 was only partially supported. This result is inconsistent with earlier studies reporting a significant positive association (e.g., De Jonge et al., 2014; Madjar, 2008). A recent study among eldercare nurses suggested that the effectiveness of social support on creativity depends on the degree to which certain types of job resources correspond with specific types of job requirements (De Jonge et al., 2014). Therefore, our broad definition of social support, combining multiple elements, might be a potential cause of the discrepancy.

Moreover, we found that EI had a positive effect on creativity by mediating WE, which supports H3. In addition, we also discovered another positive pathway from EI through social support and WE to creativity. These results extend an empirical finding indicating that vigor, as an essential component of WE, can mediate the association between EI and creativity (Carmeli, McKay, & Kaufman, 2014). Thus, these findings

replicate the JD-R model positing that job and personal resources can promote employees' WE and subsequent job performance (Schaufeli & Taris, 2014). Moreover, it is noteworthy that EI may even strengthen social support as a job resource in this relationship. This finding is in line with existing evidence suggesting that EI has a beneficial role in promoting the search for, and perception and availability of, social support (Montes-Berges & Augusto, 2007; Peña-Sarrionandia et al., 2015). Nevertheless, it should be noted that the indirect effects of EI were relatively small compared to the direct effects. A conceivable explanation for this result could be that the stronger direct associations of EI with WE and creativity might decrease the amount of the variance of creativity that could be accounted for by WE (see Frazier, Tix, & Barron, 2004). To summarize, our findings so far suggest that higher EI may not only directly, but also indirectly facilitate employee creativity by improving social support and WE.

With respect to the second aim, we investigated the more complicated relationships between these variables by focusing on the interplay between EI and social support. The moderation analysis revealed, in support of H4, that the higher the value of EI, the stronger the positive association between social support and WE. This finding extends prior evidence indicating that higher EI can improve the effectiveness of social support (Montes-Berges & Augusto, 2007; Peña-Sarrionandia et al., 2015). In work settings, resources are intricately intertwined: Higher personal resources can strengthen job resources and vice-versa (e.g., Xanthopoulou et al., 2009). Such a positive link between resources can trigger the resource gain spiral (Hobfoll et al., 2003), which may then lead to enhanced employee WE (Xanthopoulou et al., 2009).

Furthermore, the moderated mediation analysis revealed that the higher the value of EI, the more pronounced the positive pathway from social support through WE to

creativity, a finding which supported H5. In particular, it is noteworthy that higher EI

along with higher social support was associated with the highest WE and creativity. This

result supports the basic assumption of the conservation of resources theory that greater

resources can promote the acquisition of additional resources (Hobfoll et al., 2003).

Moreover, these findings highlight the theoretical possibility that in explaining

creativity it is crucial to take into account the interaction between personal and

contextual factors (Zhou & Hoever, 2014), a condition that may also apply in the

framework of the JD-R model (Schaufeli & Taris, 2014). In sum, our findings indicate

that EI can enhance the link between social support and WE, which subsequently

facilitates employee creativity.

However, particular attention should be given to the fact that the conditional effects

of social support on creativity were small and fully mediated by WE. As discussed

already, the degree to which social support matches job requirements may be of especial

importance for improving creativity (De Jonge et al., 2014; Madjar, 2008). Therefore,

our broad definition of social support could have also attenuated the contribution to the

variance of WE and subsequent creativity. A further potential reason could stem from

the narrow response scale (range 1–4) used in our creativity measure, as it could have

exacerbated the reduction in statistical power (Frazier et al., 2004).

This study has several limitations. First of all, owing to the cross-sectional research

design, no inferences on causal relationships can be drawn. In addition, due to the small

number of participants, the reproducibility of our findings needs to be confirmed with a

larger sample. Moreover, since we assessed creativity with only three items, it is unclear

whether the creativity measure satisfactorily reflected creativity among nurses, as this is

a complex phenomenon. Finally, the fact that all of the measures were self-reports may

have inflated the relationship among creativity and the other factors. However, the constructs formed separate factors, as shown by CFA. Despite these limitations, this study provides the first evidence, obtained by applying the JD-R model, on the role of EI in explaining creativity in nurses.

On the practical level, the findings indicate the potential of the INTEMO program in facilitating WE and creativity in nurses. This program aims at enriching EI holistically in accordance with the EI theory (Castillo, Salguero, Fernández-Berrocal, & Balluerka, 2013). For example, the debating, brainstorming, and emotion work induced by music and stories are used to foster human abilities, such as creativity and decision-making (Castillo et al., 2013). Thus, an intervention with this program may be a next step in this research domain.

1.5.   Conclusion

In eldercare nurses, EI may be a salient personal resource that may not only directly but also indirectly facilitate their creativity by improving social support and WE. Furthermore, EI may also play an important role in enhancing the positive relationship between social support and WE, which, in turn, promotes employee creativity. Thus, interventions aiming at improving EI may be useful in seeking to foster creativity in eldercare nurses.

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Table 1 Descriptive statistics and correlation matrix ($N = 489$)

		M	*SD*	1	2	3	4	5	6	7
1	EI	112.78	34.51							
2	Social support	25.74	4.44	.22***						
3	WE	52.27	17.44	.39***	.23***					
4	Creativity	7.54	1.75	.38***	.09 *	.30***				
5	Age	39.48	11.30	$-.10^*$	$-.11^*$	.17***	.05			
6	Gender[a]			$-.19^{***}$	.05	$-.08$	$-.12^{**}$	.18***		
7	Employment type[a]			$-.01$	$-.01$	.06	$-.11^*$	.04	$-.01$	

Note. EI = trait emotional intelligence; WE = work engagement.

[a]Spearman's rank correlation coefficients based on the dummy-coded variables (gender: 1 = males, 2 = females; employment type: 1 = permanent, 2 = contract, 3 = part-time, 4 = other).

p < .05, **p* < .01, ***p* < .001.

Table 2 Comparison of model fit indices between the four models ($N = 489$)

	c^2	*df*	c^2/df	CNI	GFI	CFI	RMSEA	AIC	Dc^2	D*df*

One-factor model	1722.92	54	31.91	21	.62	.47	.25	1770.92	1556.87***	6
Two-factor model	819.69	53	15.47	43	.76	.76	.17	869.69	653.64***	5
Three-factor model	629.50	51	12.34	54	.80	.82	.15	683.50	463.45***	3
Four-factor model	166.05	48	3.46	217	.95	.96	.07	226.05		

Note. CN = Hoelter's Critical N; GFI = goodness of fit index; CFI = comparative fit index; RMSEA= root mean square error of approximation; AIC= Akaike information criterion.

All χ^2 were non-significant.

***$p < .001$ (vs. the four-factor model).

Table 3 Relationships among EI, social support, WE, and creativity in the multiple mediation model (model 6 of PROCESS macro; $N = 489$)

	Explained variables					
	Social support		WE		Creativity	
	b	*SE*	b	*SE*	b	*SE*
Constant	−.19	(.27)	.71**	(.24)	.26	(.24)
Social support			.18***	(.04)	−.01	(.04)
EI	.23 ***	(.05)	.36***	(.05)	.31***	(.05)
WE					.18***	(.05)
Age	−.01*	(.00)	.02***	(.00)	.01	(.00)
Gender	.28*	(.13)	−.14	(.11)	−.14	(.11)
Employment type	.03	(.07)	.14	(.07)	−.18**	(.07)
R^2	.07		.24		.19	
F(df)	$F(4, 484) = 8.13$ ***		$F(5, 483) = 31.82$ ***		$F(6, 482) = 16.81$ ***	

Note. EI = trait emotional intelligence; WE = work engagement.

*$p < .05$, **$p < .01$, ***$p < .001$.

Table 4 Moderated mediation model of EI, social support, and WE predicting creativity

(model 7 of PROCESS macro; $N = 489$)

	Explained variables			
	WE		Creativity	
	b	*SE*	b	*SE*
Constant	.73**	(.24)	.64 *	(.25)
Social support	.17***	(.04)	.03	(.05)
EI	.35***	(.05)		
WE			.29 ***	(.05)
EI × social support	.07*	(.04)		
Age	.02***	(.00)	.00	(.00)
Gender	−.14	(.11)	−.26 *	(.11)
Employment type	.14*	(.07)	−.20**	(.07)
R^2	.24		.12	
F(df)	$F(6, 482) = 27.12$ ***		$F(5, 483) = 10.74$ ***	

Levels of EI				95% CI
	b	*SE*	*LL*	*UL*
High (+1SD)	.07	(.02)	.042	.108
Moderate	.05	(.01)	.027	.080
Low (−1SD)	.02	(.02)	−.005	.067

Note. EI = trait emotional intelligence; WE = work engagement; CI = confidence

interval; LL = lower limit; UL = upper limit.

*p < .05, **p < .01, ***p < .001.

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Figure 1.   Overview of five hypotheses. The upper figure represents the multiple mediation model, whereas the lower figure describes the moderation and moderated mediation models. H1 and H2 indicate the direct relationship among the factors. H3, indicated by the bold line in the upper figure, represents the relationship between EI and creativity via WE (mediation model). H4 describes the moderation effect of EI on the relationship between social support and WE (moderation model). H5, shown by the overall bold line in the lower figure, indicates the moderated mediation model, which includes the interaction effect of EI and social support on WE and its subsequent effect on creativity.

Figure 2.   Moderation effect of EI on the positive association of social support with WE (model 1 of PROCESS macro; $N = 489$). EI = trait emotional intelligence.