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Original Research

Trait Mindfulness Moderates the Effect of Loneliness on Depressive State: A Comparative Study of Older and Younger Adults

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Abstract

Background: This study analyses the effect on depression of the subjective perception of loneliness in groups of younger (<55 years) and older (≥55 years) adults, and the moderating role of trait mindfulness or mindfulness skill. **Methods**: A cross-sectional study is carried out in the general population with a sample of 647 people, divided into two groups according to age: younger than 55 years (323 subjects) and 55 years and older (324 subjects). The differences between these two age groups are explored. **Results**: The results reveal no significant differences in the perception of subjective loneliness according to age; significant differences were found in depressive symptoms, however, with higher rates among the younger age group. Differences are also observed in terms of trait mindfulness: in the older group this skill is more developed. **Conclusions**: Trait mindfulness does not moderate between the variables but can serve as a predictor for depression.

Keywords: loneliness; depression; trait mindfulness; older adults

Mindfulness Rasgo Modera el Efecto de la Soledad Sobre el Estado Depresivo: Estudio Comparativo Entre Adultos Mayores y Adultos Jóvenes

Resumen

Objetivo: Este estudio analiza el efecto la percepción subjetiva de soledad en grupos de personas adultas (<55 años) y mayores (≥55 años), sobre la depresión, y el papel moderador del rasgo o habilidad Mindfulness. **Método**: Se lleva a cabo un estudio transversal en población general con 647 personas, dividendo la muestra en menores de 55 años (323 sujetos) y personas de 55 años en adelante (324 sujetos). Se exploran las diferencias entre estos dos grupos de edad. **Resultados**: Los resultados muestran que no existen diferencias significativas en la percepción de soledad subjetiva en relación con la edad. Aunque sí que las hay en sintomatología depresiva, siendo el grupo de menor edad quienes muestran puntuaciones más altas. Se observan también diferencias en cuanto al rasgo Mindfulness, siendo el grupo de mayor edad las personas que presentan esta habilidad más desarrollada. **Conclusión**: El rasgo Mindfulness no modera entre las variables, pero puede servir como predictor para la depresión.

Palabras Claves: soledad; depresión; rasgo mindfulness; personas mayores

1. Introduction

The literature on loneliness in older people shows that social isolation and subjective perception of loneliness increase with age (Ma et al, 2023; Southwick et al, 2005). However, loneliness follows a U-shaped pattern, affecting people younger than 25 and older than 65 years old, which suggests that neither social isolation nor age is its only cause. In addition, there is evidence to show that subjective perception of loneliness does not always predict low levels of psychological well-being (Beridze et al, 2020). Some authors have proposed individual differences in trait mindfulness as an explanation for the lack of consistency in the effect and presence of loneliness across age groups (Ma et al, 2023). The objective of this study is to investigate whether individual differences in the trait of mindfulness affect feelings of loneliness in older adults. It examines the differences in the moderating effect between levels of subjective loneliness and depression between older adults and the rest of the adult population.

Subjective loneliness is an emotional experience defined by the perceived discrepancy between actual and desired social contact (Perlman and Peplau, 1981). This definition is most often applied in relation to older adults and centres on the individual's usual social contact. Evidence has shown that loneliness has a negative impact on mental health, especially depression (Cacioppo et al, 2006; Domènech-Abella et al, 2019), an association that is considered to be particularly relevant in older people. Although the evidence is not entirely consistent, it is justified by the presumption that old age entails lost opportunities for intimacy and close contact with the people who matter (Ma et al, 2023; Southwick et al, 2005). Research with older people has found a strong relationship between emotional loneliness and depression, but not with social loneliness (Peerenboom et al, 2015). The above findings suggest that the effect of loneliness on depression might not depend on age, as it is associated with the subjective perception of loneliness (Liao et al, 2024; Xie et al, 2024). On the other hand, loneliness in itself, regardless of age, is related to depression or anxiety states (Diehl et al, 2018; Erzen and Çikrikci Ö, 2018). The expectation that social contacts will be lost, which arises as people transition to older age, or the lack of meaningful social relationships in younger adults, might have a greater effect on loneliness than the ageing process itself.

Subjective loneliness in older people is a persistent global problem. However, it is more an emotional than a social phenomenon (Schutter et al, 2020; Ten Kate et al, 2024), associated with psychosocial stress factors (Hensley et al, 2012). Older people might cope with the psychosocial stress of ageing by accepting loneliness as inevitable in their situation. The discrepancy between objective and desired social contact might be greater in non-elderly persons. Older adults have had the time and opportunities to develop acceptance skills, which is a central factor in the definition of trait mindfulness.

This study differentiates between *mindfulness practice*, usually defined as training in mindfulness, that is, enhancing awareness in the present by attending to the experiences that occur in that moment, without judgement and with acceptance (Brown and Ryan, 2003; Kabat-Zinn, 1990; Linehan, 1993; Marlatt and Kristeller, 1999), and *trait mindfulness* or mindfulness skill, which the literature describes as the more stable, internal predisposition to mindfulness in life (e.g., Baer et al, 2006) that occurs without intervention or training (e.g., Brown and Ryan, 2003). The trait mindfulness construct is described as a multidimensional natural trait encompassing: observation of the present moment, fully attending to experience, the ability to describe experiences, acceptance, nonjudgement and nonreactivity (Baer et al, 2004; Dimidjian and Linehan, 2003; Segal et al, 2002). These factors have been empirically validated in multiple studies (Baer et al, 2004, 2006; Christopher et al, 2012). Trait mindfulness is associated with various improvements in health and well-being, such as life satisfaction, self-esteem and optimism (Brown and Ryan, 2003). In turn, a negative relationship has been observed with symptoms of stress, depression and anxiety (Cash and Whittingham, 2010), emotional reactivity (Raes et al, 2009), emotional disregulation (Baer et al, 2006; Coffey et al, 2010) and experiential avoidance (Baer et al, 2004).

Cacioppo et al. (2010) state that loneliness is a debilitating psychological condition which promotes depressive symptoms, regardless of age, gender or ethnicity. According to Lee et al. (2021), interventions that reduce loneliness could prevent or reduce depression in the elderly, which is a growing public health problem worldwide. In addition, research findings suggest that interventions based on meditation or mindfulness may be useful in the treatment of various disorders (Baer, 2003). Scientific evidence has shown that mindfulness training can reduce feelings of loneliness in adults (Creswell et al, 2012; Lindsay et al, 2019; Teoh et al, 2021). Research has found a positive effect of mindfulness practice in reducing depressive symptomatology (Black et al, 2015). Some studies have explored the moderating effect of trait mindfulness on loneliness and factors of psychological well-being (Coutts-Smith and Phillips, 2023; Jin et al, 2020; Klussman et al, 2022; Ma et al, 2023). Mindfulness training can break toxic patterns of perception that foster unhealthy behaviours or emotions (Brown and Ryan, 2003; Ryan and Deci, 2000), and can also directly promote psychological well-being (Brown and Ryan, 2003). According to Thompson and Waltz (2007), during mindfulness training the person lives in the present moment; their mind is focused on the immediate experience, which they neither avoid nor judge. In addition, mindfulness training involves not thinking about the past or the future (Bishop et al, 2004; Hofmann et al, 2010) synthesised the results of several studies about the impact on depression of therapy

based on full attention, finding that it has a moderate effect in improving depressive symptomatologies. This finding suggests that such interventions are beneficial in optimising psychological well-being in general.

Previous research has not analysed the direct moderating effect of trait mindfulness between loneliness and depression in comparisons of older (55 years or older) and younger (under 55 years old) adults. The present study is intended to contribute to filling this gap in the literature. First, we test the hypothesis that older people have lower rates of loneliness, and more trait mindfulness or skill than younger adults. Second, we hypothesise that trait mindfulness will have a moderating effect on the relationship between subjective loneliness and depression in both age groups.

2. Method

The research was approved by the CEISH/15/2022–200786 and was conducted according to an approved protocol and informed consent process before the study began. All participants were asked if they had any previous or current psychological or medical condition or were undergoing any treatment. None of the participants experienced cognitive deterioration and they all had the personal capacity and autonomy to understand the questions asked in the study and take the decision to participate if they so wished. All participants gave their written informed consent. The recruitment period for this study was carried out between December 1, 2022 and March 5, 2024.

A cross-sectional study is conducted to compare individual differences between the over-55 and under-55 age groups in trait mindfulness, and in risk factors for loneliness and depression. The moderating effect of trait mindfulness on the relationship between loneliness and depression is also analyzed.

The sample is divided into two groups: one group of individuals under the age of 55 and another group over the age of 55. The comparison between these two groups aims to capture differences in the effects of mindfulness in relation to key life cycle changes that distinguish them. The cutoff point at 55 years of age for the beginning of older adulthood is adopted as it marks a turning point associated with the transition toward retirement, active aging, or the pre-old age stage (Atchley, 1997, 2009; Bjorklund and Earles, 2014; WHO, 2015). These changes generate uncertainty, vulnerability, and above all, a strong need to make sense of what is happening and how to integrate it into one's life. Mindfulness fosters greater awareness of emotional states without the need to avoid or overreact to them, which can serve as a valuable resource for managing and self-regulating these changes. Mindfulness may reduce emotional reactivity and prevent depressive rumination, which can be particularly useful in mediating the feeling of loneliness that often begins at this stage and the depression that could potentially result from it.

2.1 Procedure and Participants

Snowball sampling was used to recruit participants. A group of 50 people, including students and personal contacts of the research team members, were approached to participate by completing a questionnaire. They were then asked to invite four people—two under the age of 55 and two aged 55 or older—from their social environment to complete it as well. In turn, these four people were instructed to do the same with their contacts.

A minimum sample of 245 adults was required to detect a mean effect of (f_2 = 0.15), a theoretical statistical power of 0.95 and an alpha with a statistical significance of = 0.001, for a linear regression with six predictors, using G*Power software version 3.1 9.7-Bavaria (Heinrich Heine University Düsseldorf, Düsseldorf, Germany) (Faul et al, 2009). However, given the possibility of obtaining a larger sample, recruitment was extended to 647 subjects. Of these, 323 were between 20 and 54 years old, and 324 were between 55 and 89 years old. The mean age was 50.82 years. Thirty-eight percent (N = 246) had university level education, 40.5% (N = 262) had non-university level education, and 21.5% (N = 139) had no formal education. Women represented 56.3% (N = 364) of the sample and men, 43.7% (N = 283).

2.2 Subjective Perception of Loneliness

The reduced 6-item version of the De Jong Gierveld Loneliness Scale (DJGLS) (De Jong-Gierveld and Kamphuls, 1985) was used. Each item has three response categories (1 = no, 2 = more or less, 3 = yes), and ask whether respondents experience situations in which the number of interpersonal relationships is lower than they would like. To obtain loneliness scores, responses were dichotomised by combining *more or less* and *no* responses. The total score ranges from 0 (not lonely) to 6 (extremely lonely), the sum of positive or negative responses for all the items (α = 0.736; M = 1.54; SD = 0.40).

2.3 Level of Depression

The Beck Depression Inventory (BDI-II) (Beck et al, 1996) was used. This questionnaire consists of 21 groups of statements rated from 0 to 3, with a maximum score of 45; the higher the score, the more severe the depressive symptoms (α = 0.901; M = 0.58; SD = 0.43).

2.4 Trait Mindfulness

Trait mindfulness was measured with the 15-item Mindfulness and Attention Awareness Scale (MAAS), developed by Brown and Ryan (2003). The items are rated on a 6-point Likert scale from 1 (almost always) to 6 (almost never) and each item describes a situation of inattention. Higher scores therefore reflect higher trait mindfulness. In this sample, the scale showed good internal consistency (α = 0.797; M = 4.24; SD = 0.69).

3. Results

Table 1 presents the correlations between the variables. Age has a significant relationship with subjective feeling of loneliness, depressive state and trait mindfulness.

Table 1. Correlation matrix.

MEASURE	1	2	3
1. Age	-		
2. DJGLS	–0.078*	-	
3. BDI-II	–0.229***	0.571***	-
4. MAAS	0.323***	–0.199***	–0.325***

Notes. *Correlation significant at 0.05. ***Correlation significant at 0.001. DJGLS, De Jong Gierveld Loneliness Scale; BDI-II, Beck Depression Inventory; MAAS, Mindfulness and Attention Awareness Scale.

A χ^2 test was performed to detect any significant differences in the distribution of gender and education in each age group. No differences in the distribution of gender were found ($\chi^2 = 0.131$; $df = 1$; $p = 0.718$); however, there are differences in the level of education ($\chi^2 = 58.47$; $df = 2$; $p \leq 0.001$). In the group aged 55 and older, the sample frequency for *no education* was higher than in the group of younger adults, in which the majority of respondents had university level studies.

Before testing the hypothesis of the age group effect on the variables studied, we analysed the possible effect of the variables gender and education level. Results of a MANOVA showed that neither gender (Pillai's trace = 0.008; $p = 0.147$; $\eta^2 = 0.008$) nor education level (Pillai's trace = 0.016; $p = 0.117$; $\eta^2 = 0.008$) has an effect. Consequently, there was no need to study the interaction of these variables with the age group variable.

To test the hypothesis of the effect of age groups on subjective loneliness (DJGLS), depressive state (BDI-II) and trait mindfulness (MAAS), a multivariate analsysis of variance (MANOVA) for related samples was performed (Table 2). The results of the MANOVA showed that some indicators met the statistical assumptions (Tabachnick et al, 2013). Box's M test = 60.09, $p < 0.001$ confirmed that the homoscedasticity of the covariance matrices was not in question. Pillai's trace = 0.112 was significant ($F = 27.065$; $df = 3$; $p < 0.001$; $\eta^2 = 0.112$). Levene's test for equality of variances was significant for MAAS (Levene = 14.74; $p < 0.001$) and BDI (Levene = 6.27; $p = 0.013$). The results show that age groups explain differences in depressive state and trait mindfulness, but not subjective loneliness.

The hypothesis on the moderating effect of trait mindfulness between loneliness and depressive state was tested following the three steps suggested by Baron and Kenny (1986) to perform a moderation analysis, regardless of the age of the subjects. Gender, age and educational level were used in the regression in step 1. The independent variables (DJGLS) and the potentially moderating variable, trait mindfulness (MAAS), were added in step 2. Finally, the DJGLS × MAAS interaction was included in step 3 (Table 3).

Table 2. Multivariate analsysis of variance (MANOVA) age up to 54 years × 55 years and over.

	M	*SD*	F	*p*	η^2
DJGLS			1.62	0.204	0.002
Up to 54 years	1.56	0.42			
55 and above	1.52	0.39			
BDI-II			24.74	<0.001	0.037
Up to 54 years	0.65	0.45			
55 and above	0.48	0.38			
MAAS			69.14	<0.001	0.097
Up to 54 years	4.03	0.52			
55 and above	4.46	0.76			

The results suggest that age, subjective loneliness and trait mindfulness have a strong influence on depressive state, which is largely explained by these variables. They also indicate that adults below the age of 55 are more at risk of presenting depressive symptoms; and, that both loneliness and age are risk factors for increasing rates of depression. However, trait mindfulness does not moderate this relationship; it acts independently of loneliness.

4. Discussion

The aim of the study was to analyze the role of two age groups and subjective loneliness in interaction with trait mindfulness or mindfulness skill on depressive state. The main hypothesis predicted that age would explain differences in rates of subjective loneliness, with higher rates in the younger age group, and higher rates of trait mindfulness in the older age group. The second hypothesis expected that mindfulness skill would moderate the relationship between subjective loneliness and depressive state.

The results showed that the younger age group (<55 years) had higher rates of depression than the older group (≥55 years), although the low error size limits this finding. More significant is the result that older people have greater mindfulness skill, while there is no difference between the two groups in subjective perception of loneliness. The hypothesis of the differential factor of age on these variables thus yielded mixed effects. The younger group presented a higher rate of depression and lower trait mindfulness; however, age is not a differential factor for subjective loneliness. Results from previous studies suggesting that there might be differences in the subjective perception of loneliness according to age (e.g., Barreto et al, 2021; Ma et al, 2023) have not been replicated in this study.

The second hypothesis was not confirmed: trait mindfulness does not moderate the relationship between loneliness and depression. However, age, subjective loneliness and trait mindfulness have a combined effect that adds pre-

Table 3. Hierarchical regression of the moderating effect of trait mindfulness between feeling of loneliness and depressive state.

Variables	*β (se)*	t	r^2	Δr^2	ΔF	*p*
Step 1			0.011		3.73	0.024
Gender	0.44 (0.03)	1.30				0.195
Education	–0.54 (0.02)	–2.43				0.015
Step 2			0.388	0.376	131.42	<0.001
Gender	0.37 (0.03)	1.40				0.161
Education	–0.35 (0.02)	–1.94				0.053
Age groups	–0.08 (0.03)	–2.69				0.007
DJGLS	0.57 (0.03)	16.79				<0.001
MAAS	–0.12 (0.02)	–5.56				<0.001
Step 3			0.382	0.000	0.13	0.718
Gender	0.38 (0.03)	1.41				0.158
Education	–0.36 (0.02)	–1.97				0.050
Age groups	–0.08 (0.03)	–2.71				0.007
DJGLS	0.64 (0.21)	3.12				0.002
MAAS	–0.09 (0.08)	–1.10				0.271
Interaction DJGLS × MAAS	–0.02 (0.05)	–0.36				0.718

dictive value to the depressive state. This implies that rather than moderating, trait mindfulness provides additional explained variance to the depressive state, albeit independently of loneliness or age.

Subjective loneliness has been consistently associated with depressive states (e.g., Diehl et al, 2018; Erzen and Çikrikci Ö, 2018). It is generally assumed that loneliness and depression are usually influenced by age, suggesting that it also affects the association between them (e.g., Southwick et al, 2005), although results have not always been consistent with this assumption (Beridze et al, 2020). In this context trait mindfulness stands out as a factor associated with improvements in rates of loneliness and psychological well-being (Baer et al, 2012; Creswell et al, 2012; Dodds et al, 2015; Lindsay et al, 2019; Ma et al, 2023; Mascaro et al, 2018; Neff, 2003; Yang, 2016; Zhang et al, 2018). However, it has not been established whether the relationship of mindfulness with loneliness and depression is linked to age. The results obtained in the present study indicate that there are differences in depressive state across age groups. The younger group presents higher rates of depressive state and the older group, higher trait mindfulness scores.

The hypothesis predicting the effect on depression induced by the interaction of loneliness and trait mindfulness was not confirmed, however. Trait mindfulness has a positive additional effect on depressive state, regardless of the subjective perception of loneliness. As the presence of trait mindfulness was more significant in the older age group, which also had lower rates of loneliness, the results suggest that trait mindfulness may protect against both loneliness and depression in older people. However, the results do not clarify what other factors may be involved and how they are related. Future research could examine under what conditions trait mindfulness may benefit older age groups in their perception of loneliness and promote improvements in psychological well-being. One of the protective factors is thinking about oneself. Because loneliness arises as an inevitable part of old age, older people may develop the cognitive skill of acceptance, which facilitates their psychological well-being. In younger groups, this acceptance may be less attainable as they might not find reasons or explanations for it, because the condition of loneliness is not related to their age.

Study Limitations

The present study has some limitations. First, it is a cross-sectional study, undertaken in a single point in time. Future studies could analyse different time points, since depressive state and subjective perceptions may vary over time. Second, only two age groups were considered. There are indications of the complexity of the differences between the groups, so comparing across different and more varied age groups could broaden understanding of how age affects the influence of trait mindfulness on psychological well-being. Third, all the variables were measured through self-reporting. Future studies could incorporate objective indicators. Fourth, the study did not collect sociodemographic information such as professional occupation, family responsibilities, or dependent children, which could affect the subjective perception of loneliness and, consequently, the moderating effect of mindfulness.

5. Conclusions

The hypothesis that trait mindfulness would moderate the relationship between loneliness and depression has not been confirmed. However, trait mindfulness affects depressive states, regardless of age or loneliness. Age does seem to facilitate an experience of acceptance and improved psychological state, while trait mindfulness may prevent loneliness and depression in older people.

Availability of Data and Materials

The de-identified data on which study conclusions are based are available and the link to access this information is provided at: https://drive.google.com/file/d/1XjRFp27OBVi5cA1x0qw9V11V9NFL8CIk/view?usp=drive_link.

Author Contributions

DP, MRA, and CME designed the research study; MRA, SA and ACMV performed the research; DP and LA analyzed de data; DP, CME and MRA provided help and advice; LA and MRA contributed to funding acquisition; DP, SA and LA writing original draft; DP and CME writing, review & editing; All authors contributed to editorial changes in the manuscript. All authors have read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The research was approved by the Universitat Jaume I Institutional Review Board (CEISH/15/2022–200786) and was conducted according to an approved protocol and informed consent process. The study adhered to the Declaration of Helsinki. All participants gave their written informed consent to participate in the study. Confidentiality of personally identifiable information has been preserved to safeguard privacy.

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Conflict of Interest

The authors declare no conflict of interest.

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