

## Original Article

## The influence of modernization, sociodemographic factors, and cultural values on depression in South Korea

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**Abstract** South Korea has held the highest suicide rate among Organisation for Economic Co-operation and Development (OECD) countries since 2003, and depression is a major risk factor for suicide attempts. This study aimed to investigate the influence of modernization on depression and explore the interplay of sociodemographic factors and cultural values in South Korea. Structured clinical interviews were conducted with 109 Korean outpatients residing in more urban regions, including the center or greater area of a large city (Mage =37.83) and 127 participants in less urban regions, encompassing small cities, towns, or villages (Mage =47.00). Our findings indicate that those in less urban regions reported significantly more severe levels of both psychological and somatic symptoms of depression compared to their counterparts in more urban areas. Further analysis revealed a significant indirect effect within the more urban sample, where older age was associated with reduced psychological symptoms of depression, potentially attributed to a stronger adherence to the values of horizontal collectivism among older people. These findings underscore the need for enhanced mental health services and resources in less urban areas of South Korea. Future research should consider these findings to develop culturally responsive services aimed at mitigating depression and suicide rates and achieving equity in South Korea.

**Keywords:** depression, symptom presentation, modernization, sociodemographic factors, cultural values, Korean

WCPRR Dec 2025: 40-60. © 2025 WACP  
ISSN: 1932-6270

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## INTRODUCTION

Depression, characterized by symptoms such as depressive mood, loss of interest, insomnia, and fatigue, is the most prevalent mental health problem worldwide (World Health Organization, 2023). In the Organization for Economic Cooperation and Development (OECD), which covers 38 countries in the Americas, Europe, and the Asia-Pacific region, South Korea has the highest suicide rate of 24.1 per 100,000 people (OECD, 2023), with depression playing a key role in suicide attempts (Choi et al., 2017). Although the cross-cultural symptom profiles of depression share certain similarities, distinct patterns in risk factors and symptom presentations can be observed across cultural contexts. (Cho & Lee, 2005; Zhou et al., 2015). Over the past few decades, Korean society has undergone rapid sociocultural changes driven by modernization. These changes have influenced the levels of distress experienced by different demographic groups, including vulnerable populations such as the elderly residing in rural areas (Cho & Lee, 2005; Jung et al., 2016). However, there is a dearth of studies examining the influence of these modernization processes on depression.

Prior studies on the relation between modernization and depression in South Korea tell a complex tale about the contributors to depression (Choi & Lee, 2005). Some studies indicate that modernization contributes to higher rates of depression. For example, Lim (2018) found a higher prevalence of depression in urban regions when compared with rural regions. Similarly, Hidaka (2012) reported a trend in the literature across several studies where modernization was associated with an increased risk for depression. Moreover, this review highlighted modernization-related risk factors for depression, such as decreased physical activity, inefficient exposure to light, sleep dysregulation, and poor diet. Other lines of research suggest that older adults are at a higher risk of depression symptoms when compared with other populations (Lee et al., 2020), especially in rural areas that are less likely to be influenced by modernization (Ham et al., 2018; Kang & Park, 2012; Kim et al., 2023). Kim et al. (2023) found that depressive symptoms were more severe in rural areas than in urban areas, specifically among South Korean adults aged 65 and older. Previous studies suggest that the higher levels of depression in rural areas may be attributed to stressors associated with rapid population decline and the subsequent decrease in income (Cho et al., 1998), as well as barriers to accessing mental healthcare services in rural regions (Kim & Lim, 2021).

A growing body of literature in cultural psychiatry and cultural-clinical psychology highlights cross-cultural variations in the presentation of depressive symptoms (e.g., Kirmayer & Ryder, 2016; Ryder et al., 2008; Ryder & Chentsova-Dutton, 2012). Cultural group differences have been observed in the extent to which psychiatric patients emphasize somatic (e.g., fatigue) versus psychological (e.g., hopelessness) symptoms of depression. Empirical findings

support a culturally-specific tendency to emphasize psychological symptoms of depression among European-origin North Americans and Australians, and in contrast, a tendency to emphasize somatic symptoms of depression among East Asians, including Chinese (Parker et al., 2001; Ryder et al., 2008), South Korean (Zhou et al., 2015), and Japanese (Kirmayer, 1993) samples. Additionally, Zhou et al. (2015) investigated the influence of modernization in depressive symptom presentation and found a negative association between societal modernization and somatic symptom reporting within a depressed psychiatric sample in South Korea. The results showed that compared to Koreans endorsing modernization values, those adhering to traditional values in the areas of family relationships, materialism, hierarchical order, rituals, and chastity tend to emphasize somatic symptoms in self-report depression questionnaires.

Many studies have exclusively used self-report scales such as the Center for Epidemiologic Studies Depression Scale (CES-D) or the Beck Depression Inventory (BDI) to examine depression symptomatology across cultures. There are, however, limitations to this approach, such as response biases associated with the use of self-report measures. For example, Koreans tend to have a higher threshold to report “experiencing symptoms” when asked about core symptoms of depression, showing a tendency towards socially desirable answers compared to North Americans (Chang et al., 2008). This tendency may partially explain findings of lower depression prevalence in Korea than in Western countries (Chang et al., 2008; Kim et al., 2020; Park & Kim, 2011), which stands in contrast to the high suicide rates observed in South Korea. Comparatively few studies have used interviews to study depression despite potential discrepancies between results obtained through self-report versus interview measures (e.g., Lee et al., 2021).

Using structured clinical interviews, the current study compared the levels of depressive symptoms experienced by residents of more urban versus less urban regions in South Korea. We also examined the influence of modernization, sociodemographic factors (such as sex and age) and cultural values (individualism-collectivism) in depression. Over the past 60 years, South Korea has undergone rapid modernization, which has brought significant changes in the country’s sociocultural landscape. Thus, this study aimed to explore the potential influence of societal modernization on mental health, with a primary focus on depression in a psychiatric outpatient sample.

### **The Current Study**

This study employed face-to-face structured clinical interviews to examine potential differences in symptom presentation between Korean outpatients residing in less urban areas and those residing in more urban areas. Participants were recruited from two psychiatric clinics in South Korea and categorized into two groups, to compare outpatients from less urban vs. more

urban regions. Considering the mixed findings in existing literature regarding the association between modernization and depression (Purtle et al., 2019), we explored the directionality between these two variables. Outpatients living in more urban regions may show evidence of more (Lim, 2018)—or, conversely, less (Kim et al., 2023)—depressive symptom reporting than those living in less urban regions. Moreover, we assessed the degree to which Korean outpatients living in more urban areas present more psychological symptoms of depression (relative to somatic symptoms) than those living in less urban areas, as a function of modernization. We hypothesized that outpatients living in more urban regions would emphasize psychological symptoms of depression compared to those living in less urban areas. Conversely, outpatients living in less urban areas would emphasize somatic symptoms of depression compared to their counterparts in more urban areas.

We also explored whether sociodemographic factors and cultural values influence the presentation of depressive symptoms experienced by Korean outpatients residing in different areas. Our hypotheses for the impact of each sociodemographic factor were: (1) age, with older adults in rural areas reporting greater levels of depression than those at a younger age (Kim et al., 2020), and older adults presenting more somatic symptoms of depression than younger adults (Hegeman et al., 2012); (2) sex, with females reporting greater levels of depressive symptoms compared with males (Weissman & Klerman, 1977); (3) childhood locale, with growing up in rural areas predicting higher levels of depressive symptoms in later life, potentially due to the socioeconomic challenges experienced during childhood (Murchland et al., 2019); (4) living situation, with Korean adults living alone presenting more depression symptoms than those living with others (You et al., 2009); (5) marital status, with adults who are divorced, separated, or widowed reporting higher levels of depressive symptoms compared to married adults (Jeon & Lee, 2011); (6) education, with lower education predicting greater levels of depressive symptoms (Park et al., 2012); (7) school/employment status, with people who are not involved in school or employment reporting higher levels of depression symptoms than those who are employed or studying (Kim et al., 2012); and (8) individualism-collectivism, with self-reported adherence to values consistent with horizontal collectivism potentially mitigating depressive symptoms. This last prediction aligns with the findings of a previous study that highlighted the positive impact of horizontal collectivism on subjective well-being within collectivist countries (Oishi, 2000).

## METHOD

### Study design and recruitment

This study was conducted using the same sample of depressed psychiatric outpatients previously described by Zhou and colleagues (2015). Whereas the data reported in that paper were based solely on self-report questionnaires, the

current study focused on data from clinician-administered structured interviews. The study sample comprised 236 psychiatric outpatients from two clinics in South Korea: 116 outpatients from the clinic of Yonsei University Severance Hospital, located in the metropolitan area of Seoul; and 120 outpatients from the clinic of Yonsei Wonju College of Medicine, located in Wonju City. All participants met the following inclusion criteria to participate in this study: no history of psychosis, mania, or neurocognitive deficits; a diagnosis of depression from their primary clinician. All participants who met the inclusion criteria provided written informed consent of voluntary participation.

### ***Background of Recruitment Sites***

The Severance Hospital of the Yonsei University Health System (<https://sev.severance.healthcare>), located in Seoul, South Korea (with a population of approximately 10 million), was founded in 1885 as the first Western-style medical institution in Korea. This hospital is one of Korea's oldest and largest university hospitals, with a population of approximately 1.7-2.0 million outpatients at the time of data collection (2008 to 2010) and 2.6 million outpatients as of 2023.

The Wonju Severance Christian Hospital (<https://www.ywmc.or.kr>) was established in 1959 as a general hospital in Wonju City, South Korea (with approximately 360,000 inhabitants) as one of the expansions of Severance Hospital of the Yonsei University Health System. Wonju Severance Hospital is a 900-bed university hospital that serves the residents of Wonju City and the surrounding areas (with approximately a million inhabitants). In the past, 20 to 30 years ago, Wonju Severance Hospital's patient population was dominated by miners from the mining area and fishermen and farmers from the Yeongdong region, but in recent years, these characteristics have been greatly diluted. Currently, the hospital is characterized by a combination of urban and rural areas, with more elderly patients than in large cities.

## **Measures**

### ***Sociodemographic Factors***

During interviews, we collected a range of sociodemographic information, including age, sex, place of residence, living situation, marital status, education history, current education and employment status. The recruitment site of each participant was also noted. To examine the potential association between modernization and depression symptoms, participants were categorized into two groups based on their place of residence. Participants who reported living in the center or greater area of a large city were categorized as residents of more urban areas, and participants who reported living in a small city, towns, or villages were categorized as residents of less urban areas.

### *Depressive Symptom Reporting*

Participants' depressive symptoms were assessed through structured clinical interviews using standardized assessments commonly employed in both research and clinical settings. Interview items were developed based on DSM-IV Axis I Disorders, Research Version, Patient Edition (SCID-I/P) modules for mood disorders, which included questions for assessing symptoms of a current major depressive episode with atypical and melancholic subtypes (First et al., 1997).

These items were further expanded to include symptoms from the International Classification of Diseases 10th Revision (ICD-10; World Health Organization, 1992) and the Chinese Classification of Mental Disorders Version 3 (CCMD-3; Chen, 2002), which provided additional criteria for evaluating symptoms of major depressive episodes incorporating atypical and somatic subtypes (ICD-10) and neurotic depression (CCMD-3). All symptoms were assessed, regardless of whether or not diagnostic criteria were met, as suggested by Ballenger et al. (2001).

The rating scale of clinical symptoms was expanded to a 4-point Likert scale (0: completely absent; 3: present and severe) to allow for dimensional assessment of symptom severity, following the rating system used by the Present State Examination (Wing et al., 1998). Two Korean-English bilingual team members (HL and AJ) coded a total of 24 symptoms of depression as either psychological or somatic, following the approach of Ryder and colleagues (2008).

The psychological class included 12 symptoms ("depressed mood"; "loss of interest"; "worthlessness/guilt"; "concentration/decision problems"; "suicidality"; "hopelessness"; "lack of emotions"; "low self-esteem"; "lack of reactivity"; "social avoidance"; "mental fatigue"; "affective symptoms") and the somatic class also included 12 symptoms ("weight change"; "insomnia/hypersomnia"; "psychomotor retardation"; "fatigue/loss of energy"; "loss in sexual desire"; "leaden paralysis"; "bodily fatigue"; "agitation"; "bodily pain"; "sleeping problems"; "dizziness"; "other somatic problems").

Internal consistencies for the psychological symptoms ( $\alpha = .91$ ) and physical symptoms ( $\alpha = .91$ ) were excellent among the Korean sample. An overall depressive symptom index was computed by averaging scores from these classes, with higher scores signifying more severe depressive symptoms.

### *Individualism-Collectivism*

According to Triandis and Gelfand's (1998) values framework that encompasses the vertical and horizontal aspects of individualism and

collectivism: (1) horizontal individualism emphasizes personal uniqueness and autonomy; (2) vertical individualism highlights hierarchical independence but also incorporates traits of competitiveness; (3) horizontal collectivism prioritizes cooperation between the individual and their community; and (4) vertical collectivism is characterized by submission and dutifulness to figures of authority within one's community. A total of 32 items were used to measure four dimensions of individualism and collectivism (Singelis et al., 1995), which includes 8 items for each subscale: Horizontal-Individualism (HI) – e.g., “I often do my own thing”; Vertical-Individualism (VI) – e.g., “It is important that I do my job better than others”; Horizontal-Collectivism (HC) – e.g., “I feel good when I cooperate with others”; and Vertical-Collectivism (VC) – e.g., “I usually sacrifice my self-interest for the benefit of my group”.

Participants indicated their level of agreement for each item on a 7-point Likert scale (1: strongly disagree; 7: strongly agree). The individualism and collectivism scores were calculated by averaging participants' responses on the 8 HI items ( $\alpha = .68$ ), the 8 VI items ( $\alpha = .68$ ), the 8 HC items ( $\alpha = .73$ ), and the 8 VC items ( $\alpha = .68$ ). This measure has been used to delineate health-related cognitive patterns and behaviors, not only within non-clinical populations (e.g., Vargas et al., 2019), but also among clinical populations including patients diagnosed with depression and anxiety (e.g., Hofmann et al., 2010).

### *Translation of assessments*

All interview items were initially developed in English. In accordance with the translation approach used by Ryder et al. (2008), we translated the items into Korean, first by a Korean-English bilingual sociologist. Translations were then validated by two bilingual students and a final discussion was held with the principal investigator (AR).

### **Analysis**

Quantitative data were analyzed using SPSS (version 30) and R (version 4.3.1). We used descriptive statistics (i.e., mean, standard deviation, frequencies, proportions, percentages) to summarize participants' sociodemographic information, individualism-collectivism, and depressive symptom reporting. Categorical data were shown as frequencies and proportions and compared by Fisher's exact test (due to expected frequencies of  $<5$  in some cells). We conducted these analyses to explore the associations between current locale and sociodemographic factors, and between current locale and outpatients' psychiatric history and help-seeking behaviours at the .05 p-value level (two-tailed test). Continuous data were presented as the means, standard deviations and ranges and compared using independent-samples t-tests. We specifically compared the mean differences of study variables between the more urban and less urban samples (Table S2), as well as the estimated correlations

between the variables for each sample (Table S3). We conducted a Monte Carlo power analysis (Schoemann et al., 2017) to estimate the statistical power given the sample size, and then performed mediation analyses (PROCESS Model 4) with 5,000 bootstrapping procedures to test whether sociodemographic factors and patterns of depressive symptom reporting were mediated by cultural values (i.e., individualism-collectivism) (Preacher & Hayes, 2008).

### Ethics Statement

The study was approved by the Research Ethics Board of Concordia University and Yonsei University College of Medicine.

## RESULTS

### Demographics, Cultural Values, and Clinical Characteristics

Among the 116 participants recruited from the Seoul research site, the majority (91%, 106/116) reported living in more urban areas, with 9% (10/116) living in less urban areas. Of the 120 participants recruited from the Wonju research site, most reported living in less urban areas (98%, 117/120), with 3% (3/120) living in more urban areas. Participants residing in more urban areas were younger and more educated than those in less urban areas, with a similar proportion of sex (69-70% females vs. 30-31% males) included in each group.

In terms of cultural values, people residing in more urban areas ( $M = 5.33$ ,  $SD = 0.79$ ) reported more adherence to values of horizontal individualism compared to those residing in less urban areas ( $M = 5.00$ ,  $SD = 0.87$ ),  $t(234) = -3.024$ ,  $p = .003$ , Cohen's  $d = -0.395$ , 95% CI [-0.653, -0.136]. In contrast, people residing in less urban areas ( $M = 5.33$ ,  $SD = 0.84$ ) reported more adherence to values of vertical collectivism than those residing in more urban areas ( $M = 5.04$ ,  $SD = 0.89$ ),  $t(234) = 2.584$ ,  $p = .010$ , Cohen's  $d = 0.337$ , 95% CI [0.079, 0.595]. Details of the comparison of sociodemographic characteristics and cultural values between participants in different regions are presented in Tables 1 and S1.

**TABLE 1. Demographic Characteristics by Current Locale (N=236)**

Characteristic	Total N (%)	Less urban <sup>a</sup> (n = 127)	More urban <sup>b</sup> (n = 109)	p <sup>c</sup>
Age (M±SD years, range)	42.77±13.15, range 18-72	47.00± 11.06	37.83±13.71	<.001
Sex				1.000
Female	164 (69)	88 (69)	76 (70)	
Male	72 (31)	39 (31)	33 (30)	
Childhood locale				<.001
Less urban <sup>a</sup>	143 (61)	113 (89)	30 (28)	
More urban <sup>b</sup>	93 (39)	14 (11)	79 (72)	
Site <sup>a</sup>				<.001
Seoul	116 (49)	10 (8)	106 (97)	
Wonju	120 (51)	117 (92)	3 (3)	
Living situation				.325
With others (spouse/children/parents/friend/ acquaintance/other)	207 (88)	114 (90)	93 (85)	
Alone	29 (12)	13 (10)	16 (15)	
Marital status				<.001
Married	143 (61)	95 (75)	48 (44)	
Never married	70 (30)	20 (16)	50 (46)	
Divorced/Widowed/Separated	23 (10)	12 (9)	11 (10)	
Education <sup>d</sup>				<.001
Secondary school or below	152 (66)	99 (78)	53 (50)	
Vocational training/University or above	80 (34)	28 (22)	52 (50)	
School and/or employment status				.068
School and/or Employment	108 (46)	51(40)	57 (52)	
Not involved in school or employment	128 (54)	76 (60)	52 (48)	

<sup>a</sup>Less urban = A small city/large town or village/small, isolated village.

<sup>b</sup>More urban = A large city/suburb of a large city.

<sup>c</sup>Age:  $t(234) = 5.683$ , Cohen's  $d = 0.742$ , 95% CI [0.477,1.006]; Sex, Childhood Locale, Site, Living situation, Marital status, Education, School and/or employment status: Fisher's exact tests were used due to expected frequencies of <5 in some cells.

<sup>d</sup>Percentages were calculated excluding missing data on the level of education in 4 cases (2%).

Most participants had accessed psychiatric services for current symptoms. Participants in less urban areas notably reported more use of psychiatric medication and professional support from healthcare workers (mainly from psychiatrists), than participants in more urban areas. Participants in less urban areas also reported seeking more social support from family or relatives than those in more urban areas. Table 2 details the participants' psychiatric history and help-seeking.

**TABLE 2. Psychiatric History and Help-Seeking by Current Locale (N=236)**

Psychiatric History and Help-Seeking	Total N (%)	Less urban (n = 127)	More urban (n = 109)	<i>p</i> <sup>a</sup>
Current use of psychiatric medication				<.001
Yes	211 (89)	122 (96)	89 (82)	
No	25 (11)	5 (4)	20 (18)	
Past use of psychiatric medication				.276
Yes	200 (85)	111 (87)	89 (82)	
No	36 (15)	16 (13)	20 (18)	
Seeking Psychological Support from Healthcare Professionals (% , n)				<.001
Yes	196 (83)	125 (98)	71(65)	
No	39 (17)	2 (2)	37 (34)	
If yes, from whom (or where) did you seek professional help? <sup>a</sup>				<.001
Psychiatrists	188 (80)	123 (97)	65 (60)	
Doctors other than psychiatrists (family doctors)	60 (25)	22 (17)	38 (35)	
Traditional Korean medicine doctors	17 (7)	8 (6)	9 (8)	
Emergency Room	9 (4)	7 (6)	2 (2)	
Counselors/Clinicians	8 (3)	1 (1)	7 (6)	
Other (Nurses)	4 (2)	2 (2)	2 (2)	
Seeking psychological support from family, relatives, volunteers, or leaders past 3 months				.004
Yes	104 (44)	67 (53)	37 (34)	
No	132 (56)	60 (47)	72 (66)	
If yes, from whom (or where) did you seek help? <sup>a</sup>				.018
Family or Relatives	76 (32)	51 (40)	25 (23)	
Friends	46 (19)	29 (23)	17 (16)	
Religious/spiritual/community leader	25 (11)	8 (6)	17 (16)	
Other	6 (3)	4 (3)	2 (2)	
Have you asked help from any of the following? <sup>b</sup>				<.001
Psychiatrists	165 (70)	117 (92)	48 (44)	
Family or Relatives	105 (44)	61 (48)	44 (40)	
Friends	77 (33)	42 (33)	35 (32)	
Doctors other than psychiatrists (family doctors)	69 (29)	25 (20)	44 (40)	
Traditional Korean medicine doctors	38 (16)	16 (13)	22 (20)	
Religious/spiritual/community leader	37 (16)	19 (15)	18 (17)	
Emergency Room	21 (9)	11 (9)	10 (9)	
Counselors/Clinicians	7 (3)	2 (2)	5 (5)	
Other (Nurses)	9 (4)	6 (5)	3 (3)	

<sup>a</sup>Fisher's exact tests were used due to expected frequencies of <5 in some cells.

<sup>b</sup>More than one answer possible.

## Modernization and Depressive Symptom Reporting in Structured Clinical Interviews

As illustrated in Figure 1, the results from independent-samples *t*-tests showed that participants in less urban areas ( $M = 1.98$ ,  $SD = 0.53$ ) had significantly higher clinical levels of depression than participants in more urban areas ( $M = 1.20$ ,  $SD = 0.44$ ),  $t(234) = 12.167$ ,  $p < .001$ , Cohen's  $d = 1.589$ , 95% CI [1.294, 1.881]. Through comparisons of psychological and somatic symptom reporting between these groups, we found that participants in less urban areas showed

more severe psychological and somatic symptoms of depression than participants in more urban areas (mean differences of psychological symptoms: 1.97 vs. 1.29,  $t(234) = 9.967$ ,  $p < .001$ , Cohen's  $d = 1.301$ , 95% CI [1.018, 1.582]; mean differences of somatic symptoms: 1.99 vs. 1.10,  $t(234) = 12.912$ ,  $p < .001$ , Cohen's  $d = 1.686$ , 95% CI [1.387, 1.983]) (see Table S1). These findings suggest that the overall severity of depression is higher among depressed psychiatric outpatients in less urban areas than in more urban areas. See the details of comparisons of each symptom reporting by participants' current locale in Table S2.

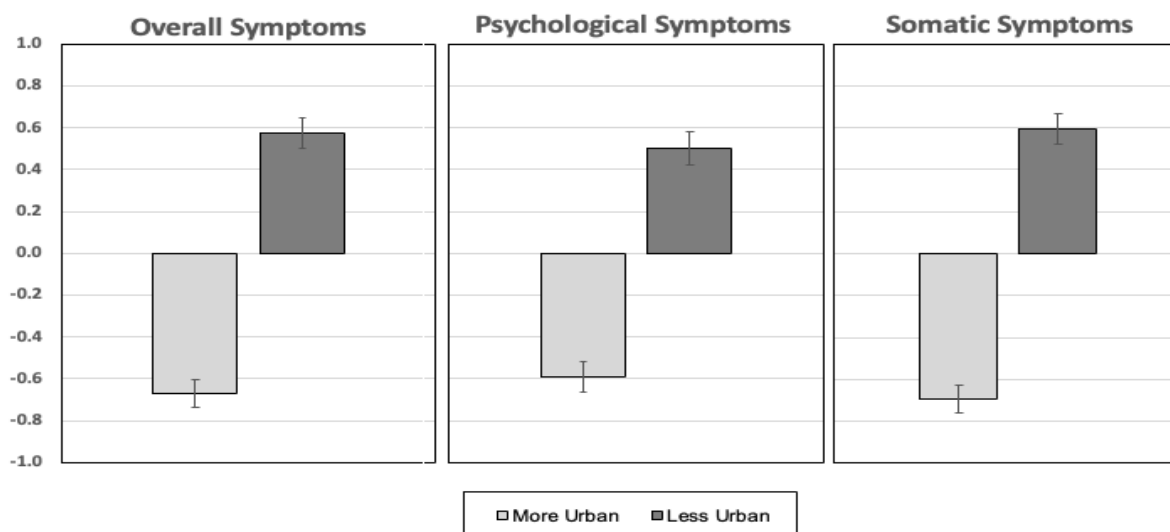


FIGURE 1. Mean z scores for depressive symptom reporting of structured interviews separated by current locale among Koreans.

Note. Error bars represent the standard error of the mean.

### Correlations between Depressive Symptoms, Demographic Factors, and Cultural Values

We explored the associations between depressive symptoms and sociodemographic factors in the less urban and more urban groups. These exploratory analyses revealed that in more urban areas, younger participants reported greater psychological symptoms than older participants ( $r = -.199$ ,  $p = .039$ ). In less urban areas, participants educated at or below the secondary level reported greater overall depressive symptoms than those with vocational training or university degrees ( $r = -.222$ ,  $p = .012$ ); in particular, education was significantly associated with more somatic symptom reporting ( $r = -.305$ ,  $p < .001$ ). Moreover, people who endorse values of horizontal collectivism reported less severe depressive symptoms (more urban:  $r = -.205$ ,  $p = .033$ , less urban:  $r = -.227$ ,  $p = .010$ ), especially for psychological symptoms (more urban:  $r = -.298$ ,  $p = .002$ , less urban:  $r = -.284$ ,  $p = .001$ ). No significant associations were observed between the severity of depressive symptoms and sex, childhood locale, living situation, marital status, or school/employment status (see Table S3).

## Mediating Role of Cultural Values in the Association between Age and Psychological Symptom Reporting among People Living in More Urban Areas

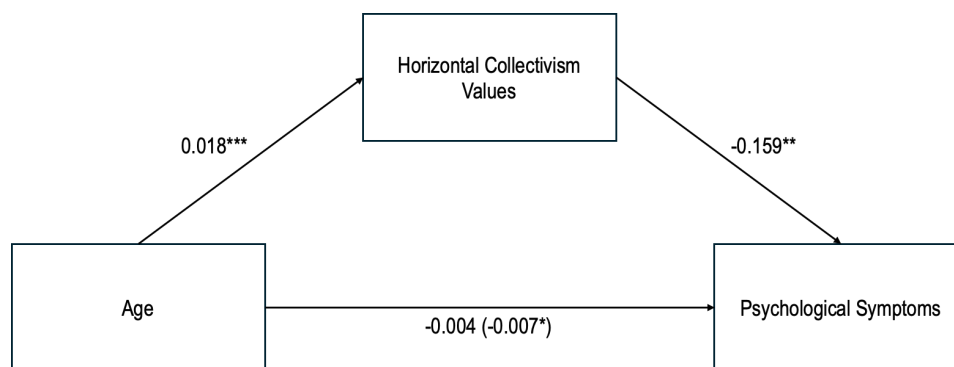
A Monte Carlo power analysis (Schoemann et al., 2017) indicated that a sample size of 109 participants living in more urban areas could detect an indirect effect with one mediator at 69% power, slightly below the recommended guideline of .80 (Cohen, 1988). As part of our exploratory aims to better understand significant associations among the variables of interest, we conducted a mediation analysis to assess the extent to which cultural values (i.e., individualism and collectivism) mediate the significant negative association between age and psychological symptom reporting among participants in more urban areas. The results based on the unstandardized regression coefficients indicated that there was a positive association between age and values of horizontal collectivism,  $b = 0.018$ ,  $p = .001$ , 95% CI = [0.007, 0.029]. That is, older participants exhibited higher adherence to values of horizontal collectivism.

Second, the horizontal collectivism score was negatively linked to the psychological symptom score, showing that the more a person adheres to values of horizontal collectivism, the lower the psychological symptom score they would present during interviews,  $b = -0.159$ ,  $p = .004$ , 95% CI = [-0.266, -0.053]. Finally, the indirect effect [age  $\square$  horizontal collectivism  $\square$  psychological symptoms] was significant (indirect effect = -0.003, 95% CI = [-0.006, -0.001]).<sup>1</sup>

There was also an indirect effect of horizontal collectivism values on the relationship between age and psychological symptoms. Age differences in psychological symptoms were fully mediated by endorsement of horizontal collectivism values (see Figure 2). There were no indirect effects of individualism and collectivism values between education and somatic symptoms among participants in less urban areas.

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<sup>1</sup>The indirect effect of age on psychological symptoms via horizontal collectivism was statistically significant, albeit with a confidence interval that comes close to crossing zero (indirect effect = -0.002, 95% CI = [-0.0047, -0.0002]), after controlling for potential confounding variables including sex, childhood locale, living situation, marital status, education, and school/employment status.



**FIGURE 2. Age Effect on Psychological Symptom Reporting and Horizontal Collectivism Values as a Mediator among People Living in More Urban Areas**

*Note.* The values displayed in the figure represent unstandardized regression coefficients. The unstandardized indirect effect from age to psychological symptoms via horizontal collectivism =  $-0.003$ , 95% CI =  $[-0.006, -0.001]$ . The number inside the brackets is the total effect (c), and the number outside the brackets is the direct effect (c'). Additionally, standardized coefficients were as follows: age to horizontal collectivism (.313), horizontal collectivism to psychological symptoms ( $-.261$ ), and age to psychological symptoms ( $-.199$ ). The standardized indirect effect of age on psychological symptoms via horizontal collectivism was  $-.082$ , 95% CI =  $[-0.165, -0.021]$ .

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$  (two-tailed).

## DISCUSSION

### Principal Findings

Our findings provide clarity to the relation between modernization and depression in the context of the previous literature, with its mixed findings (Choi & Lee, 2005). Specifically, in comparison to people living in more urban areas, those residing in less urban regions reported experiencing higher levels of depression, including both psychological and somatic symptoms of depression. This observation is consistent with their increased utilization of psychiatric medication and professional support. These findings align with the literature (e.g., Kim et al., 2023) which indicates a link between low urbanicity and increased depression; and partially support our hypotheses regarding symptom presentation, specifically demonstrating more somatic symptoms among outpatients in less urban areas, while not necessarily indicating more psychological symptoms among outpatients living in more urban areas.

Considering the higher prevalence of depression among the elderly residing in rural areas (Jung et al., 2016; Kim et al., 2023; Park et al., 2012), we conducted additional analyses to explore the associations between sociodemographic factors, cultural values, and depressive symptoms. First, we observed that older South Koreans were less likely to report psychological symptoms, especially in more urban regions. Second, we observed that more educated South Koreans were less likely to report somatic symptoms, especially in less urban regions. Third, the relation between age and psychological

symptom reporting was attributable at least in part to horizontal collectivism values in more urban areas. That is, older people tended to express fewer psychological symptoms of depression, because of their stronger adherence to the values of horizontal collectivism (which emphasizes interdependence, communal goals, and cooperation). These results suggested that horizontal collectivism served as a protective factor against psychological symptoms of depression among older adults living in more urban areas, where individualism was more prevalent and collectivism was less emphasized (see TABLE S1 for details; Park et al., 2015).

Notably, these findings contrast with those reported in a recent study conducted by Vargas and colleagues (2019). This discrepancy could be attributed to sample and methodological variations. Vargas and colleagues (2019) illustrated the indirect effect of horizontal collectivism on the relation between cultural groups and emphasis on psychological symptoms using non-clinical student samples of Chinese Canadians and European Canadians. This symptom presentation was evaluated using a self-report survey, where participants read scenarios about a person exhibiting depressive symptoms. Conversely, our study focuses on a Korean clinical sample, where participants describe their own experiences with depression through structured clinical interviews.

### Practical Implications

This study highlights the need for increased mental health services and resources for South Koreans residing in less urban areas. A report assessing South Korea's mental health system by the World Health Organization (2006) supports this notion, revealing an unequal distribution of healthcare resources in South Korea. More urban areas have a disproportionately high concentration of healthcare professionals, despite the heightened demand for mental health services due to increased prevalence of more severe depression in less urban areas.

Furthermore, this study underscores the need for health system and policy changes in South Korea to improve mental health literacy and promote health equity by, for example, providing incentives to clinicians to encourage their practice in less urban areas. According to the 2021 mental health survey conducted by the Ministry of Health and Welfare of South Korea, approximately 8% of the adult population have experienced depressive disorders at least once in their lifetime, with risk factors including gender (women) and older age. Despite the high prevalence of mental health problems, only 21% of those experiencing such disorders have accessed mental health services (National Center for Mental Health, 2021). This disparity may suggest a lack of awareness regarding mental health problems and a societal stigma against seeking professional help (Choi, 2023), especially among the elderly Korean population in less urban areas. This vulnerable group has demonstrated limited mental health literacy (Kim et al.,

2017) and a greater stigma of mental illness (Park et al., 2015), which negatively influence their utilization of mental health services.

## LIMITATIONS

We should reiterate that our sample includes the same depressed psychiatric outpatients studied by Zhou and colleagues (2015). However, this study differs in that it employed interview measures instead of self-report measures and had a broader research scope, focusing on the link between sociodemographic characteristics of the Korean population and depressive symptomatology. Especially considering the practical difficulties implicated in using structured interviews to examine psychiatric symptoms across multiple sites, we believe that our study uniquely contributes insight regarding the associations between modernization, a comprehensive range of sociodemographic factors, cultural values, and depression symptomatology within a diverse, cross-regional, clinical sample. In particular, we expect that between-variable associations, especially as these associations were replicated across more and less urban samples, should be stable in the time elapsed since the data were originally collected. That said, considering the ongoing and substantial shifts in South Korean society's attitudes toward mental health, we should nonetheless be cautious when interpreting mean levels and the relationships among factors contributing to depression and applying our findings to the present situation and further encourage future studies to examine the replication of such findings within the current Korean population.

## IMPLICATIONS/FUTURE DIRECTIONS

This study establishes a foundation for future research and data collection on depression in South Korea, addressing the existing gap in comprehensive information about the societal landscape of mental health in the country. We encourage researchers to employ the current methodological approach to examine depression symptoms in South Korea, allowing replication of these findings and cross-temporal analysis. Sun and Ryder (2016) have described how depression symptoms have changed over time in China, raising the possibility that a broadly similar phenomenon might be observed in South Korea as well. Future research should also incorporate a wider range of samples within and across different East Asian countries to add nuance to existing literature that too often treats 'East Asia' as a single cultural zone. In addition to more comprehensive quantitative investigations of cross-cultural symptom presentation, we also want to encourage more qualitative and mixed-methods research on how local contexts foster consensually held beliefs about depression in South Korea and how those beliefs might, in turn, shape symptom presentation (see Chentsova-Dutton & Ryder, 2020).

These findings can also inform future research and implementation of integrated or holistic interventions that combine practical resources (e.g., access to equitable education) with mental health services, particularly for socially disadvantaged populations (Karasz et al., 2021). Taking a symptom-based approach helps move us away from generic evidence-based treatments based on broad diagnostic categories that were developed in Western cultural contexts toward patient-centred and culturally contextualized practice (Chentsova-Dutton & Ryder, 2019). Attention to contextual and demographic variation within specific cultural settings points us in a similar direction. Ultimately, attention to the specific symptoms of specific patients in specific cultural contexts will allow us to deliver treatments that are more culturally appropriate and more effective.

## ACKNOWLEDGEMENTS

The authors gratefully acknowledge the contributions of the late Samuel Noh, without whom this study would not have been possible.

## FUNDING

The original data collection was funded by an operating grant from the Canadian Institutes of Health Research. The funder played no role in study design, data collection, analysis and interpretation of data, or the writing of this manuscript.

## CONFLICTS OF INTEREST

All authors declare no conflicts of interest.

## DATA AVAILABILITY

The data from the current manuscript are not publicly available due to their containing information that could compromise the privacy of research participants but are available from the corresponding authors upon reasonable request.

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## ELECTRONIC SUPPLEMENTARY MATERIAL

TABLE S1. Descriptive Statistics of the Primary Variables among Participants Separated by Current Locale: Less Urban ( $n = 127$ ) vs. More Urban Areas ( $n = 109$ )

Variable	Less Urban ( $n = 127$ )	More Urban ( $n = 109$ )	$t$	$p$	Cohen's $d$ (95% CI)
	M (SD)	M (SD)			
Horizontal individualism	5.00 (0.87)	5.33 (0.79)	-3.024	.003	-0.395 (-0.653, -0.136)
Vertical individualism	4.67 (0.91)	4.63 (0.80)	0.368	.713	0.048 (-0.208, 0.304)
Horizontal collectivism	5.24 (0.80)	5.08 (0.78)	1.518	.130	0.198 (-0.059, 0.454)
Vertical collectivism	5.33(0.84)	5.04 (0.89)	2.584	.010	0.337 (0.079, 0.595)
Depression	1.98 (0.53)	1.20 (0.44)	12.167	<.001	1.589 (1.294, 1.881)
Psychological symptoms	1.97 (0.56)	1.29 (0.48)	9.967	<.001	1.301 (1.018, 1.582)
Somatic symptoms	1.99 (0.56)	1.10 (0.48)	12.912	<.001	1.686 (1.387, 1.983)
Psychological – somatic symptoms	-0.02 (0.34)	0.18 (0.37)	-4.408	<.001	-0.576 (-0.836, -0.314)

Abbreviations: CI = Confidence Interval.

TABLE S2. Depressive symptoms assessed by structured interview rated on a 4-point scale from 0 = absent, 1 = subclinical, 2 = clinical/moderate, 3 = clinical/severe ( $N=236$ )

In the past month...	Less Urban ( $n = 127$ )	More Urban ( $n = 109$ )	$t$	$p$	Cohen's $d$ (95% CI)
	M (SD)	M (SD)			
Depressed mood ( <i>psychological</i> )	2.18 (0.74)	1.75 (0.73)	4.455	<.001	0.582 (0.320, 0.842)
Loss of interest ( <i>psychological</i> )	2.17 (0.84)	1.52 (0.85)	5.829	<.001	0.761 (0.495, 1.025)
Weight change ( <i>somatic</i> )	1.50 (0.86)	0.68 (0.88)	7.255	<.001	0.947 (0.676, 1.216)
Insomnia/hypersomnia ( <i>somatic</i> )	1.91 (0.94)	1.22 (0.96)	5.546	<.001	0.724 (0.459, 0.988)
Psychomotor ( <i>reversed somatic</i> )	1.81 (0.87) <sup>a</sup>	1.26 (0.73)	5.227	<.001	0.684 (0.419, 0.947)
Fatigue/loss of energy ( <i>somatic</i> )	2.25 (0.87)	1.56 (0.84)	6.170	<.001	0.806 (0.539, 1.071)
Worthlessness/guilt ( <i>psychological</i> )	1.92 (0.90)	1.28 (0.84)	5.690	<.001	0.743 (0.478, 1.007)
Concentration/decisions ( <i>psychological</i> )	2.21 (0.87)	1.42 (0.79)	7.280	<.001	0.951 (0.680, 1.220)
Suicidality ( <i>psychological</i> )	1.87 (0.93)	0.69 (0.79)	10.400	<.001	1.358 (1.073, 1.641)
Loss in sexual desire ( <i>somatic</i> )	1.83 (0.93)	0.98 (0.96)	6.863	<.001	0.896 (0.627, 1.164)
Hopelessness ( <i>psychological</i> )	1.83 (0.93)	1.12 (0.87)	6.062	<.001	0.793 (0.526, 1.058)
Lack of emotions ( <i>psychological</i> )	1.86 (0.89)	1.31 (0.73)	5.111	<.001	0.667 (0.404, 0.930)
Low self-esteem ( <i>psychological</i> )	1.99 (0.88)	1.35 (0.76)	5.965	<.001	0.779 (0.513, 1.044)
Lack of reactivity ( <i>psychological</i> )	0.73 (0.44)	0.72 (0.45)	0.129	.898	0.017 (-0.239, 0.273)
Lead paralysis ( <i>somatic</i> )	1.72 (0.85)	1.21 (0.85)	4.543	<.001	0.593 (0.331, 0.854)
Social avoidance ( <i>psychological</i> )	1.92 (0.91)	1.30 (0.90)	5.254	<.001	0.686 (0.422, 0.949)
Persistent mental fatigue ( <i>psychological</i> )	2.46 (0.69)	1.45 (0.73)	10.933	<.001	1.427 (1.140, 1.713)
Body fatigue despite rest ( <i>somatic</i> )	1.97 (0.94)	1.14 (0.82)	7.161	<.001	0.935 (0.664, 1.204)
Affective symptoms ( <i>psychological</i> )	2.46 (0.72)	1.51 (0.74)	9.891	<.001	1.291 (1.009, 1.572)
Feelings of agitation ( <i>psychological</i> )	2.33 (0.74)	1.18 (0.61)	12.907	<.001	1.685 (1.386, 1.982)
Bodily pain ( <i>somatic</i> )	2.19 (0.78)	1.26 (0.94)	8.320	<.001	1.086 (0.811, 1.359)
Sleeping problems ( <i>somatic</i> )	2.31 (0.80)	1.25 (0.85)	9.832	<.001	1.284 (1.002, 1.564)
Dizziness ( <i>somatic</i> )	1.86 (0.91)	0.47 (0.71)	12.935	<.001	1.689 (1.389, 1.986)
Other somatic symptoms (e.g., chest tightness, heart palpitations) ( <i>somatic</i> )	2.21 (0.71)	1.06 (0.64)	13.115	<.001	1.712 (1.412, 2.010)

Abbreviations: CI = Confidence Interval.

<sup>a</sup>One case missing.

**TABLE S3. Correlation Matrix of the Primary Variables among Participants Separated by Current Locale: Less Urban ( $n = 127$ ) vs. More Urban Areas ( $n = 109$ )**

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	—	-.068	-.166	.127	-.217*	-.304***	-.143	.011	.071	.245**	.239**	.044	.019	.066	-.076
2. Sex (0:Male;1:Female)	.204*	—	.049	-.113	-.145	-.181*	-.464***	-.025	-.116	.018	-.046	-.021	-.035	-.004	-.052
3. Childhood locale (0:More urban; 1:Less urban)	.106	-.100	—	-.059	-.044	-.047	-.164	-.048	-.045	.001	-.036	.160	.170	.136	.055
4. Living Situation (0:With others; 1:Alone)	.068	-.291**	.071	—	.504***	.071	.094	.052	.089	-.092	-.118	.079	.121	.029	.150
5. Marital status (0:Married; 1:Never Married; 2:Widowed/Divorced/ Separated)	-.257**	-.190*	.029	.414***	—	.156	.133	.090	.002	-.129	-.222*	-.027	.016	-.068	.137
6. Education (0:Secondary school or below; 1:Vocational training/University or above )	-.015	-.006	-.020	-.049	-.182	—	.146	.046	-.068	-.036	-.005	-.222*	-.116	-.305***	.310***
7. School/employment status (0:inactive; 1:active)	-.269**	.050	.121	.137	.263**	.068	—	.140	.119	-.032	-.052	-.115	-.075	-.143	.110
8. Horizontal individualism	.096	.022	-.266*	-.038	.046	.043	-.134	—	.205*	.042	-.010	-.071	-.040	-.095	.089
9. Vertical individualism	-.133	.056	-.017	-.152	.101	.080	-.053	.235*	—	-.030	.102	-.012	-.067	.043	-.179*
10. Horizontal collectivism	.313***	.228*	-.053	.036	-.122	-.047	-.131	.258**	.244*	—	.597***	-.227*	-.284**	-.149	-.220*
11. Vertical collectivism	.383***	.122	.093	.011	-.152	.171	-.147	.130	.279**	.364***	—	-.123	-.163	-.071	-.150
12. Depression	-.090	-.006	.063	.047	.006	.097	.137	-.172	.033	-.205*	-.074	—	.952***	.952***	-.006
13. Psychological symptoms	-.199*	-.073	.051	.005	.111	.020	.133	-.174	.061	-.298**	-.177	.921***	—	.812***	.302***
14. Somatic symptoms	.032	.061	.065	.081	-.099	.152	.120	-.143	.001	-.080	.040	.922***	.700***	—	-.311***
15. Psychological – somatic symptoms	-.297**	-.172	-.019	-.098	.271**	-.156	.017	-.039	.077	-.280**	-.280**	-.009	.380***	-.394***	—

Note. Correlations above the diagonal are for the less urban sample, and correlations below the diagonal are for the more urban sample. \* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$  (two-tailed).