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The mediating roles of interpersonal sensitivity and rumination in the relationship between self-esteem and depression: a longitudinal study on Chinese psychiatric patients

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Abstract

This study examined the relationship between self-esteem, interpersonal sensitivity, rumination, and depression in psychiatric patients. Participants included 159 adults with major depressive disorder (MDD) or generalized anxiety disorder (GAD) (Age: $M=31.69$, $SD=11.54$; 70.4% Female). The study measured depression, self-esteem and interpersonal sensitivity at T1 and rumination and depression at T2 after 10 to 14 days. The study found that after controlling for depression at T1, age, gender, and measurement time interval, low self-esteem at T1 could impact depression at T2 through the mediation of reflection at T2, as well as through the chain mediation of interpersonal sensitivity at T1 and rumination at T2. The results indicated that for patients of MDD or GAD with low self-esteem, we could pay attention to intervening with rumination and interpersonal sensitivity, such as applying rumination-focused cognitive behavioral therapy or interpersonal psychotherapy.

Keywords MDD, GAD, Self-esteem, Interpersonal sensitivity, Rumination, Psychiatric patients, China

Introduction

Depression is one of the most common mental disorders. The World Health Organization predicts that by 2030, it may become the leading cause of disease burden worldwide, imposing a significant burden on individuals' lives and the societal healthcare system [55]. According to the vulnerability model of depression, self-esteem is closely associated with the development of depressive symptoms [28, 36]. The relationship between self-esteem and depression has been extensively studied and discussed in previous research [39, 61]. Helping patients alleviate their depressive symptoms deserves serious consideration, and a prerequisite for this is to further elucidate

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the underlying mechanisms between self-esteem and depressive symptoms. According to the social rank theory [27] and response styles theory [34], interpersonal sensitivity and rumination may serve as important variables that mediate the relationship between self-esteem and depressive symptoms, making them potential intervention targets. Therefore, this study takes a longitudinal perspective to investigate the mediating roles of interpersonal sensitivity and rumination in the relationship between self-esteem and depression.

Self-esteem refers to individuals' subjective evaluation of their worth as a person [26]. The vulnerability model of depression suggests that self-esteem negatively impacts depression [36]. Specifically, individuals with low self-esteem tend to have more negative cognitions and evaluations about themselves, which can have a negative impact on the occurrence or development of depression [2]. Accordingly, the impact of individuals' low self-esteem on depression has been extensively supported both in longitudinal studies [37, 38, 56] and meta-analyses [48].

Interpersonal sensitivity is an interpersonal style characterized by an excessive awareness of others' behaviors and feelings [4]. Boyce and Parker [4] argued that interpersonal sensitivity is correlated with the vulnerable inner self exhibited by individuals with low self-esteem. Individuals with low self-esteem are more focused on others' thoughts and feelings in the relationship, thus making them more sensitive to interpersonal dynamics [4]. However, previous studies that focused on the longitudinal relationship between self-esteem and interpersonal sensitivity were scarce. Additionally, high interpersonal sensitivity may be associated with more depressive symptoms. According to the social rank theory [27], when individuals perceive themselves as being in a lower social position in interpersonal relationships, the generation of depressive emotions can help them avoid more costly failures through submission [47]. Moreover, individuals with high interpersonal sensitivity are more likely to feel lacking in confidence when perceiving interpersonal relationship [4]. Thus, individuals with high interpersonal sensitivity are more likely to experience a lower social rank, leading to depressive states as means to avoid competition and failure. Consistent with the theory, research has shown that interpersonal sensitivity is an important risk factor for the onset, maintenance, and relapse of depression [10, 12].

Rumination may be another potential mediator. Rumination has been defined as the process of perseverative thinking about one's feelings and problems [33]. Two factors of rumination have been identified in previous studies, namely, reflection and brooding [50]. Reflection is considered an active, neutral valence process of thinking that involves analyzing problems and a tendency towards

problem-solving. On the other hand, brooding is defined as a process of moody pondering that often involves thinking anxiously or gloomily about negative events.

Individuals with low self-esteem, due to their negative self-perceptions, may engage in less self disclosure of their socially undesirable emotions and thoughts [7], which could be related with increased rumination [14]. A few studies have examined the dual dimensions of rumination and have found significant negative correlations between self-esteem and both reflection and brooding [5]. In addition, research found that low self-esteem was associated with an elevated level of rumination after 8 months [25]. Moreover, according to the response styles theory, rumination is a risk factor for developing higher depressive symptoms [34]. Specifically, the process of rumination inhibits active problem-solving actions, places individuals in a passive state and increases the severity of depression [33]. Consistently, a meta-analysis demonstrated that higher rumination significantly associated with an increase in depression [29, 35], and numerous longitudinal studies have confirmed that higher levels of rumination were associated with more severe depressive symptoms [17, 23, 49]. Some studies have separately examined the independent effects of the two dimensions of rumination (i.e., reflection and brooding). These studies found that brooding was more strongly associated with depression, whereas reflection was neither concurrently related to depression nor longitudinally associated with depression [13].

Interpersonal sensitivity and rumination may both play mediating roles in the relationship between self-esteem and depressive symptoms. However, in addition to their unique mediating roles, these two constructs could also work as progressive joint mediators. According to interpersonal-cognitive model of depression, there is a connection between interpersonal factors and cognitive factors, where individuals' interpersonal difficulties exacerbate cognitive vulnerability [20]. Considering this theory, research found that individuals with high interpersonal sensitivity were more prone to rumination [30].

In line with the above discussion, previous studies have some limitations that need to be addressed. First, although some studies have separately examined the role of rumination or interpersonal relationships in the process of self-esteem influencing depression, few studies have simultaneously included both interpersonal and cognitive variables to discuss their chain mediation effects. Moreover, the roles of different dimensions of rumination in the chain mediation are not well understood. Second, previous research on the influence of self-esteem on depression has mainly focused on depressive emotions in non-clinical populations, and it is unclear whether the findings can be generalized to clinical populations. Third, most previous studies used

a cross-sectional design, which means that conclusions about temporal associations between constructs should be interpreted with caution. Additionally, most previous longitudinal studies had long assessment intervals (e.g., monthly, yearly). However, results obtained on one timescale may not be applicable to another timescale [22]. Previous studies investigating the vulnerability model of depression and its mechanisms often utilized long assessment intervals, but it remains unknown whether the influence of self-esteem on depression differs between different timeframes [36].

Given these considerations, we aim to examine the impact of self-esteem on depression in a clinical adult population using a biweekly follow-up design. We will investigate the roles of interpersonal sensitivity and rumination in this relationship. Based on the vulnerability model of depression, the response styles theory, and the interpersonal-cognitive model, we hypothesize that self-esteem can influence depression through the separate mediating effects of interpersonal sensitivity and rumination, as well as their chain-mediated effects. Furthermore, we hypothesize that the two dimensions of rumination, namely reflection and brooding, may have unique mediating roles. See Fig. 1 for hypothetical mediation model.

Method

Participants and procedures

This study recruited adult patients diagnosed of major depressive disorder (MDD) or generalized anxiety disorder (GAD) in psychiatric hospitals in China. We contacted doctors, informed them of the aim and methods of our study, and asked for their assistance. All patients were interviewed by psychiatrists either in outpatient

service or upon intake into the inpatient ward. Once the doctors confirmed that the patient met the diagnostic criteria from the International Classification of Diseases 10th Revision (ICD-10) for either MDD or GAD, the patient was invited to take part in the current study. Patients with schizophrenia, Alzheimer's disease, bipolar disorder, or substance abuse were excluded. Ethnical approval was granted by the Research Ethics Committee of Huzhou Third Municipal Hospital, the Affiliated Hospital of Huzhou University, and the Research Ethics Committee of Zhejiang University. All participants were informed of the aim of this study and were free to decide whether to participate or withdraw at any time during the assessments. Trained psychology postgraduate students supervised the assessments by reading instructions, answering questions, and providing counseling services to those who were in need.

The survey was conducted at two time points with a 10–14-day interval. Analyses were conducted with a sample of 159 participants who finished all two waves of assessments. Of the final sample, 47 were male (29.6%) and 112 were female (70.4%). The average age of the participants was 31.69 years ($SD=11.54$), ranging from 18 to 60 years. The clinical and demographic information about participants is presented in Table 1.

Measures

Self-esteem

Self-esteem was measured using the Chinese version of the Rosenberg Self-Esteem Scale at T1, which based on the original scale developed by Rosenberg and colleagues [44]. The scale consists of 10 items, including 5 positively worded and 5 negatively worded items. Example items are “On the whole, I am satisfied with myself” and “At

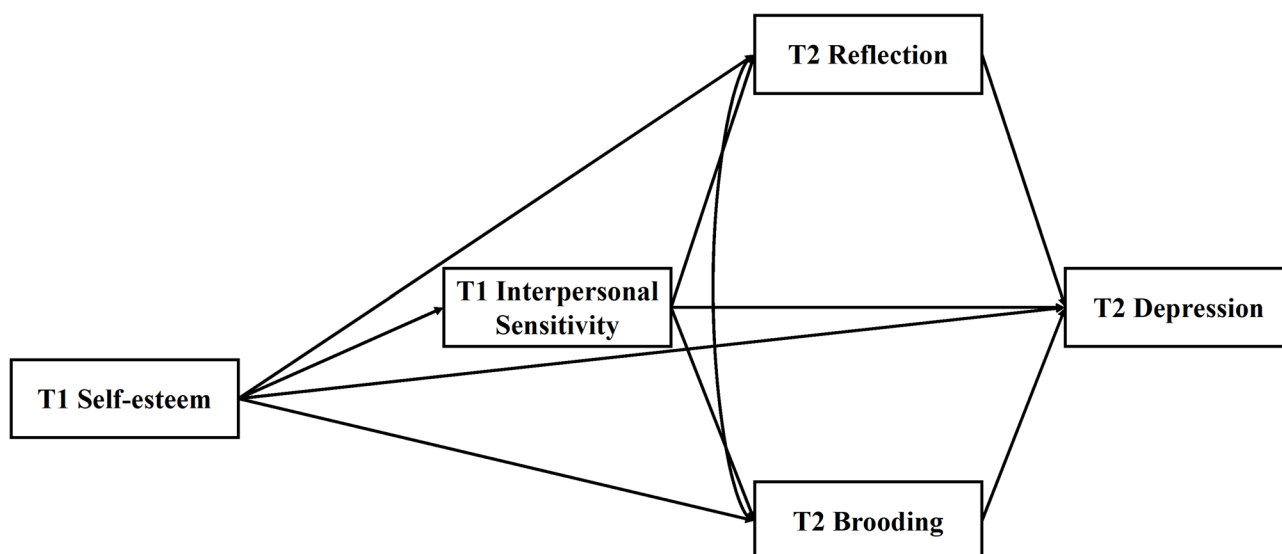


Fig. 1 The hypothetical mediation model

Table 1 The clinical and demographic information of participants

| | M | SD |
|-------------------------------------------|----------|----------|
| Age at Baseline | 31.69 | 11.54 |
| Age at Psychiatric Condition Onset | 28.25 | 11.93 |
| | N | % |
| Sex at Birth | | |
| Male | 47 | 29.60% |
| Female | 112 | 70.40% |
| Primary Diagnosis | | |
| Depressive disorders | 104 | 65.40% |
| Anxiety disorders | 47 | 29.60% |
| Treatment Status | | |
| Inpatient | 75 | 47.20% |
| Outpatient | 52 | 32.70% |
| Number of Hospitalizations | | |
| 0 to 2 | 130 | 81.80% |
| 3 to 5 | 16 | 10.00% |
| More than 6 | 4 | 2.50% |
| Family Monthly Income | | |
| < 10,000 CNY | 78 | 49.00% |
| 10,000 CNY to 20,000 CNY | 49 | 30.80% |
| > 20,000 CNY | 24 | 15.10% |
| Marital Status | | |
| Single | 73 | 45.90% |
| Married | 70 | 44.00% |
| Divorced | 8 | 5.00% |
| Highest Education | | |
| Primary school | 4 | 2.50% |
| Junior or senior high school | 60 | 37.80% |
| University or college | 82 | 51.50% |
| Postgraduate | 5 | 3.10% |

Note Frequencies may not add up to 159 and percentages may not add up to 100% due to missingness

times, I think I am no good at all". Responses were rated on a Likert scale ranging from 1 ("totally disagree") to 4 ("totally agree"). Higher total scores indicate higher levels of self-esteem. The revised scale has demonstrated good reliability and validity in the Chinese population [18]. In this study, the Cronbach's α for the scale was 0.88.

Interpersonal sensitivity

The Interpersonal Sensitivity subscale of Symptom Checklist-90 (SCL-90) was used to measure the participants' levels of interpersonal sensitivity at T1. It was originally developed by Derogatis [11] and revised by Jin and colleagues [19]. This subscale consists of 9 items, and participants rated their experiences on a 5-point scale ranging from 1 ("not at all") to 5 ("extremely"). Higher total scores indicate higher levels of interpersonal sensitivity. Example items are "Feel that others don't understand myself" and "Feel inferior to others". The revised subscale is widely used in the Chinese adult population with good reliability and validity [59, 62]. In this study,

the Cronbach's α for the Interpersonal Sensitivity subscale was 0.92.

Rumination

The Chinese version of the Rumination Response Scale (RRS-CV), revised by Han and Yang [57] based on the original scale [32] was used to measure participants' rumination tendencies at T2. We used 2 subscales of RRS-CV, namely, reflection (e.g. "I often think about my feelings of fatigue and pain") and brooding (e.g. "I often wonder why I'm always like this"). Participants rated their experiences on a Likert scale ranging from 1 ("never") to 4 ("always"). Higher total scores indicate more severe rumination tendencies. The revised scale has demonstrated good reliability and validity in the Chinese adult population [16]. In this study, the Cronbach's α s for reflection and brooding, were 0.92 and 0.89, respectively.

Depression

The Patient Health Questionnaire nine-item depression scale (PHQ-9) was used to measure the participants' levels of depression at T2. The PHQ-9 is a brief and efficient self-report tool for assessing depression [24]. It consists of 9 items, and participants rated the frequency of their experiences on a 4-point scale ranging from 0 ("never") to 3 ("almost every day"). Higher total scores indicate higher levels of depression. Example items are "Lack of enthusiasm or interest when doing things" and "Feel down, depressed or desperate". The Chinese version of the PHQ-9 has demonstrated good reliability and validity [60]. In this study, the Cronbach's α for the PHQ-9 at T1 measurement was 0.88, and at T2 measurement was 0.93.

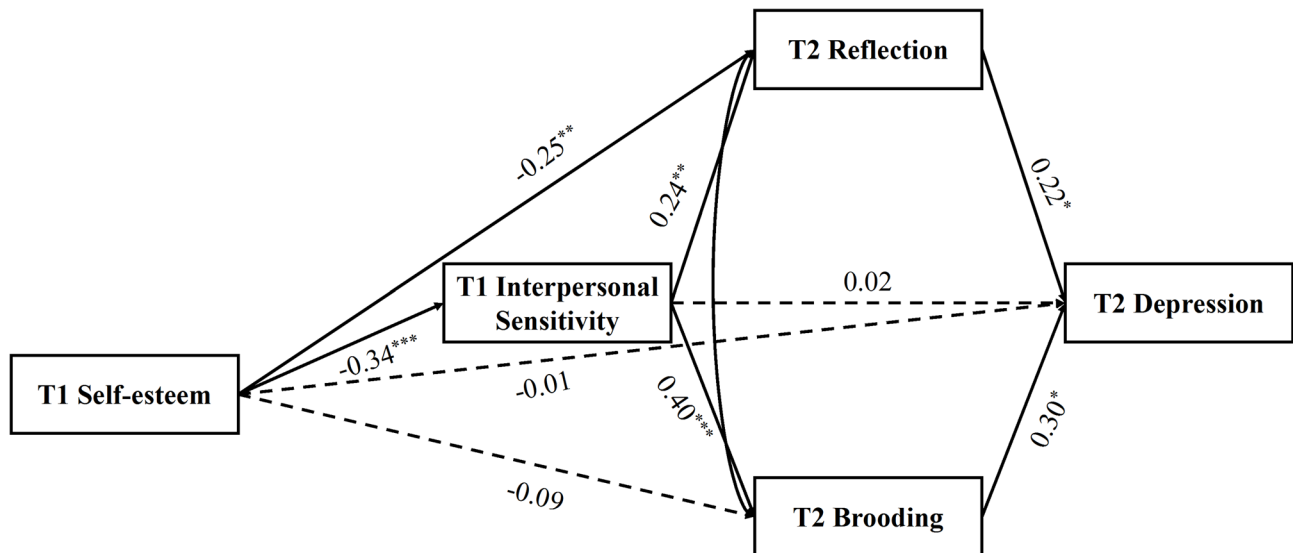
Statistical analyses

Data analysis was conducted using SPSS 17.0 and Mplus 8.4. Descriptive statistics and correlation analysis were first performed. Then, structural equation modeling (SEM) was employed to examine the effects of self-esteem, interpersonal sensitivity, and rumination on depression using Mplus. First, we constructed a direct effect model of the effect of self-esteem at T1 on depression at T2. Next, we examined the mediating mechanism of the mediator variables (i.e., interpersonal sensitivity, symptom rumination, reflection, and brooding) in the relationship between self-esteem and depression. Considering the possible influence of depression at T1, age, gender, and measurement time interval on the main study variables, we controlled for these variables in the models. Finally, the study used the Bias-Corrected Bootstrap procedure to test the significance of the mediating effects.

Table 2 Descriptive statistics and partial correlations among the main study variables

| | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 |
|--------------------------------|----------|-----------|-----------|----------|----------|----------|-------|
| 1 T1 Self-esteem | 24.86 | 5.54 | 1.000 | | | | |
| 2 T1 Interpersonal Sensitivity | 22.04 | 8.98 | -0.379*** | 1.000 | | | |
| 3 T2 Reflection | 12.37 | 4.08 | -0.34*** | 0.319*** | 1.000 | | |
| 4 T2 Brooding | 11.14 | 4.10 | -0.222** | 0.392*** | 0.785*** | 1.000 | |
| 5 T2 Depression | 10.27 | 6.70 | -0.172* | 0.225** | 0.496*** | 0.515*** | 1.000 |

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Controlled for age, gender, depressive symptoms at T1, and time interval between assessments

**Fig. 2** The mediation model. Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Results

Descriptive statistics and correlations among main study variables

Table 2 shows the results of the descriptive statistics and partial correlations among the main variables after controlling for depression at T1, age, gender, and measurement time interval. From Table 1, it can be observed that T1 self-esteem was significantly negatively correlated with interpersonal sensitivity at T1, reflection and brooding at T2, and depression at T2. Interpersonal sensitivity at T1 was significantly positively correlated with T2 reflection, T2 brooding, and T2 depression. The two dimensions of rumination at T2 were significantly positively correlated with each other and each dimension was also significantly positively correlated with T2 depression.

Mediating effects of interpersonal sensitivity and rumination dimensions

Controlled for T1 depression, age, gender, and measurement time interval, we first established a direct effect model of self-esteem on depression without mediating variables. The direct effect of self-esteem at T1 on depression at T2 was significant ($\beta = -0.162$, $SE = 0.067$, $95\%CI -0.292, -0.027$).

In the indirect effect model of T1 self-esteem on T2 depression, interpersonal sensitivity at T1 and two dimensions of rumination at T2 were added, and a multiple indirect effects model was established (see Fig. 1). The results of path analysis showed that, after controlling for depression at T1, age, gender and measurement time interval, self-esteem at T1 was significantly associated with interpersonal sensitivity at T1 ($\beta = -0.34$, $p < 0.001$), as well as reflection at T2 ($\beta = -0.25$, $p = 0.005$). Interpersonal sensitivity at T1 was significantly associated with reflection ($\beta = 0.24$, $p = 0.005$) and brooding ($\beta = 0.40$, $p < 0.001$) at T2. Reflection ($\beta = 0.22$, $p = 0.04$) and brooding ($\beta = 0.30$, $p = 0.01$) at T2 were both significantly associated with depression at T2. All other paths were statistically non-significant (see Fig. 2).

Based on the above analysis, the significance of the mediating effects was tested using the Bias-Corrected Bootstrap procedure, and the results are shown in Table 3. The results indicated that self-esteem at T1 was significantly associated with depression at T2 via reflection at T2. Additionally, self-esteem at T1 was significantly associated with depression at T2 through the multiple mediating effects of interpersonal sensitivity at T1 and reflection at T2 or through the multiple

Table 3 Bootstrap tests of mediating effects

| Paths from T1 self-esteem to T2 depression ⁱ | β | SE | 95% bootstrap | |
|--------------------------------------------------------------------------------------|---------------|--------------|---------------|---------------|
| | | | Low | High |
| Total | -0.162 | 0.067 | -0.292 | -0.027 |
| Direct | -0.014 | 0.071 | -0.142 | 0.133 |
| Total indirect | -0.148 | 0.054 | -0.262 | -0.049 |
| T1 Self-esteem → T1 Interpersonal Sensitivity → T2 Depression | -0.007 | 0.030 | -0.066 | 0.052 |
| T1 Self-esteem → T2 Reflection → T2 Depression | -0.056 | 0.035 | -0.151 | -0.005 |
| T1 Self-esteem → T2 Brooding → T2 Depression | -0.026 | 0.030 | -0.108 | 0.017 |
| T1 Self-esteem → T1 Interpersonal Sensitivity → T2 Reflection → T2 Depression | -0.018 | 0.012 | -0.054 | -0.003 |
| T1 Self-esteem → T1 Interpersonal Sensitivity → T2 Brooding → T2 Depression | -0.041 | 0.020 | -0.094 | -0.012 |

Note Controlled for age, gender, depressive symptoms at T1, and time interval between assessments. Standardized results are presented

mediating effects of interpersonal sensitivity at T1 and brooding at T2.

Discussion

Based on the vulnerability model of depression, the study discussed the mediating mechanism of low self-esteem on depression, and introduced two mediating variables, interpersonal sensitivity and rumination. The findings found that low self-esteem at T1 could influence depression at T2 through the mediating of reflection at T2, as well as through the chain mediating effects of interpersonal sensitivity at T1 and rumination (both reflection and brooding) at T2. The results of the study partially support our hypothesis.

Our study found that, although self-esteem at T1 was significantly associated with interpersonal sensitivity at T1, interpersonal sensitivity at T1 wasn't directly related with depression at T2. The mediating effect of interpersonal sensitivity at T1 between self-esteem at T1 and depression at T2 was not significant. Low self-esteem was significantly associated with greater interpersonal sensitivity, consistent with previous research [58]. In the case of low self-esteem, low self-evaluation and low sense of value would be related with the sense of security in interpersonal relationships [43] and higher interpersonal sensitivity. However, this study found that interpersonal sensitivity did not directly predict depression, which may be because interpersonal sensitivity had a more significant effect on depression through rumination. According to the social rank theory of depression [27], patients who were sensitive to interpersonal relationships tended to pay too much attention to relationships, and this excessive attention would be constantly amplified in the process of rumination, which would be transformed into frustration, and then significantly influenced depression [54]. In addition, it could be that the relationship between interpersonal sensitivity and depression only unfolds in a longer period. For example, a previous study found that interpersonal sensitivity was associated with depression in a 24-month follow-up (Van et al. [51]). However, the measurement interval of our study was relatively short.

Future research could compare the association between interpersonal sensitivity and depression with different measurement intervals.

This study found that reflection could be the mediating of the relationship between self-esteem and depression, whereas brooding could not. On the one hand, self-esteem was negatively associated with reflection, but the relationship between self-esteem and brooding was not significant. There were two hypotheses for the association between low self-esteem and rumination. The first hypothesis was that individuals with low self-esteem would have more negative feelings when experiencing themselves, and subconsciously avoiding such negative content would increase the ironic effect of rumination [53]. The second hypothesis was that individuals with low self-esteem would tend to conceal their subjective perceived bad qualities in interpersonal relationships, and "non-disclosure" in such relationships would increase the rumination process of individuals [14]. Reflection was more related to the self-related rumination process of the former, while brooding might be a process closely related to interpersonal relationships [8]. Self-esteem was not significantly associated with brooding, perhaps because self-esteem had a more significant indirect influence on brooding through interpersonal sensitivity than its direct effect on brooding. On the other hand, in the influence of rumination on depression, this study found that both reflection and brooding were significantly related with depression. According to the response styles theory of depression, rumination was an important risk factor for depression [34]. When an individual indulged in thinking about the possible causes and consequences of depression through rumination, he or she was in a relatively passive state, which inhibited the active problem-solving behavior and thus aggravated the depressive state [21]. In line with this, previous research has found that brooding, as more emotional and passive rumination, often pointed to greater depression [35, 46]. However, some studies have found that reflection had no significant effect on depression in the short term [3], and alleviated depression in the long term [6], which was inconsistent with the

results of this study. This may be because the object of this study is clinical patients, and it is difficult for individuals in a depressed state to transform self-analytical reflection into active adaptive actions [17], so reflection would still mediate the relationship between self-esteem and depression in the short term.

This study found that self-esteem could influence depression through the chain mediation of interpersonal sensitivity and reflection or brooding. The chain mediation of interpersonal sensitivity and rumination validated the interpersonal-cognitive model of depression [20]. Joiner et al. (2000) suggested that rumination may act as a “motor” in the interpersonal cognitive model that influenced depression, which means that interpersonal sensitivity or other negative interpersonal patterns reinforced rumination, and rumination promoted the chronic development of depression [41]. Additionally, overly sensitive individuals were more likely to experience rejection and setbacks, and they found it more difficult to adjust in real life, which was accompanied by an increase in rumination behaviors [45]. Specifically, patients’ low self-esteem triggered amplified and heightened attention to negative feelings about others or relationships, which was associated with rumination about events and negative emotions, and finally influenced depression.

Interestingly, the relationship between self-esteem and depression was mediated by reflection and the chain mediation of interpersonal sensitivity and both reflection and brooding. Considering the different roles of reflection and brooding, we noticed that self-esteem could directly predict reflection at a later timepoint, whereas self-esteem was linked with interpersonal sensitivity and then indirectly associated with brooding. It could be that individuals with low self-esteem routinely engage in more neutral active rumination, as characterized by reflection [8], whether they encounter interpersonal or non-interpersonal circumstances. Compared with reflection, brooding was characterized with more emotional processes, such as blame and self-blame [40], which could be a direct consequence of interpersonal sensitivity [1]. According to our results, individuals with low self-esteem may not engage in brooding except for when they encounter circumstances that elicit their interpersonal sensitivity. In such circumstances, individuals with low self-esteem are predisposed to be more concerned about their interpersonal relationships, and such concerns drive them to engage in brooding. Taken together, it may be that individuals with low self-esteem are generally more likely to engage in neutral reflection, but they engage in both reflection and brooding after experiencing the insecurity and negative emotions associated with interpersonal sensitivity.

In this study, we investigated the relationship between self-esteem, interpersonal sensitivity, reflection, brooding

and depression. The results of this study may help the design of clinical interventions. On the one hand, low self-esteem was associated with depression through reflection, so using therapies such as rumination-focused cognitive behavioural therapy to cultivate an action-centric way of thinking can significantly reduce reflection in individuals and significantly reduce the severity of depression [42, 52]. On the other hand, interpersonal-oriented psychotherapy should be incorporated to reduce interpersonal sensitivity and the brooding rumination style that could rise from interpersonal sensitivity. Taken these treatment approaches together, an integrated treatment should pay special attention to the different role of reflection and brooding. Specifically, reflection should be intervened both in cognitive behavioural and interpersonal-oriented sessions considering its relationship with self-esteem, interpersonal sensitivity, and depression, whereas interpersonal-oriented sessions should also focus on breaking the influence of interpersonal sensitivity on brooding to relieve depression. Considering that interpersonal sensitivity and rumination could act as chain mediators to influence the role of self-esteem in depression, integrative therapy that combines interpersonal and cognitive behavior may be effective in alleviating depression. For example, Interpersonal psychotherapy can be very effective in alleviating depression by helping people with depression understand their negative rumination processes activated in interpersonal situation, and providing alternative cognitive-behavioral programs to promote change [9].

Although this research has certain theoretical and practical significance, it still has some limitations. First, while the short follow-up period captures acute processes, it does not reflect long-term dynamics between self-esteem and depression and the long-term mediating mechanisms. Future studies could use multi-wave designs to track participants for a longer time. Secondly, we were unable to report detailed clinical information (e.g., treatment stage), which limits the ability to contextualise the findings. Future studies should work to gather participants’ clinical information and stratify their analyses by these factors. Thirdly, we relied on self-report questionnaires, which could introduce bias. Future studies could incorporate diversified measures, such as clinician-rated measures, or include behavioural/physiological indicators to strengthen the results. Fourthly, our participants were mainly female. The imbalance of sex assigned at birth may limit the generalizability of the results. For example, female is more likely to engage in rumination or co-rumination than male, which interferes with problem-solving and generate vulnerability to depression [15, 32]. Therefore, the correlation between rumination and depressive symptoms may be inflated in a female-dominated sample. The relationship between self-esteem and depression and

its mediating factors should be further examined using samples with more balanced sex distribution.

Conclusion

This study investigated the mediating effects of interpersonal sensitivity and rumination in the relationship between self-esteem and depression among Chinese psychiatric patients. The results indicated that low self-esteem could impact depression through the mediation of reflection, as well as through the chain mediation of interpersonal sensitivity and rumination. These findings indicate that interventions on interpersonal sensitivity and rumination may relieve the negative impact of low self-esteem on depression.

Author contributions

Yifan Li and Xifan Yin contributed to the study conception and design. Material preparation and data collection were performed by Xinyu Feng, Yingying Ye, Yibo Wang, Liang Xu and Yichang Zha, supervised by Xifan Yin. Data analysis was performed by Xiangjie Qin and Shengzhong Wei. The first draft was written by Xinyu Feng, Yifan Li reviewed and edited the manuscript. All authors read and approved the final manuscript.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the Ethical Committee of the Huzhou Third Municipal Hospital, the Affiliated Hospital of Huzhou University and the Ethical Committee of Zhejiang University and was performed by the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. Informed consent was obtained from all individual participants included in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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