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"I feel bad about myself": mediating roles of social camouflaging, self-concept clarity, and self-disgust between autistic traits and depressive symptoms

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ABSTRACT

Autistic traits are frequently associated with depressive symptoms. However, the underlying mechanisms involved in this association still need further examination. The present study explored chain mediation pathways, examining the impact of camouflaging autistic traits on the self and its subsequent influence on depressive symptoms. According to the diathesis-stress models, the dynamic interactionist model of vulnerability, the dual vulnerability model, the disconnect theory, and the unified model of depression, the present study examined two potential chain mediation pathways (i.e. social camouflaging – self-concept clarity and social camouflaging – self-disgust) of the association between autistic traits and depressive symptoms. Four hundred sixty-three undergraduate and graduate students completed an online survey measuring autistic traits, depressive symptoms, social camouflaging, self-concept clarity, and self-disgust. Autistic traits were directly and indirectly associated with increased depressive symptoms in the general population. Specifically, autistic traits were related to depressive symptoms through the chain mediation pathways of social camouflaging to self-concept clarity and social camouflaging to self-disgust. The results demonstrate the relationship between autistic traits and depressive symptoms when individuals engage in social camouflaging, particularly focusing on self-aspects (i.e. self-concept clarity and self-disgust). These findings underscore the complexities of mental health challenges associated with camouflaging autistic traits and highlight the importance of considering self-factors as critical intervention points for depressive symptoms.

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Autistic traits; autism spectrum disorder; social camouflaging; self-concept clarity; self-disgust; depressive symptoms

1. Background

Autism spectrum disorder (ASD) is a highly prevalent neurodevelopmental condition that involves social interaction and communication differences, as well as patterns of repetitive or restricted behaviours and interests (American Psychiatric Association, 2013). The term 'spectrum' emphasises that typical autistic behaviours and thinking should be considered as a continuum between autistic and non-autistic populations that are labelled as autistic traits (Lai et al., 2013). Notably, populations with high autistic

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traits exhibit cognitive and behavioural patterns similar to those observed in autistic populations (Velikonja et al., 2019). Autistic populations and populations with high autistic traits are anticipated to experience a variety of mental health challenges throughout their lives (Albantakis et al., 2020; Chaplin et al., 2021; Mason et al., 2019). Given the high prevalence and far-reaching impact on quality of life, it is crucial to identify and assess the association between autistic traits and mental health.

Mental health challenges are commonly observed among autistic individuals, with depression being one of the most prominent conditions (Croen et al., 2015; Ghaziuddin et al., 2002; Hossain et al., 2020; Lugnegård et al., 2011). The presence of depressive symptoms in autistic individuals has been widely acknowledged in extensive research on autism (Sterling et al., 2008). Compared to non-autistic individuals, autistic individuals experience a three to four times greater prevalence of depression over their lifetime (Hudson et al., 2019). Non-autistic individuals with high autistic traits are also more likely to exhibit depressive symptoms (Jackson & Dritschel, 2016; Radtke et al., 2019). Notably, a considerable number of studies have demonstrated positive correlations between autistic traits and depressive symptoms among non-autistic individuals (Albantakis et al., 2020; Stimpson et al., 2021; Taylor et al., 2021). Individuals with high autistic traits already face numerous challenges in their social lives (Davidson & Henderson, 2010). The co-occurrence of depressive symptoms exacerbates the marginalisation experiences of individuals with high autistic traits (Burns et al., 2019; Ghaziuddin et al., 2002; Sterling et al., 2008). Moreover, depression is frequently underdiagnosed and inadequately treated due to stigma or insufficient mental health services. Compared to other mental health conditions, depression has emerged as a leading global cause of disability and mortality (Smith, 2014). Consequently, understanding the association between autistic traits and depressive symptoms could help develop more effective predictions, assessments, and support strategies for both autistic individuals and individuals with high autistic traits. Therefore, it is crucial to investigate the relationships between autistic traits and depressive symptoms.

The distinct sensory perceptions, cognitive processes, and life experiences of autistic and non-autistic individuals make it challenging for both groups to communicate and share understanding (Milton, 2012; Milton et al., 2022). This mutual difficulty in understanding has contributed to the use of labels such as 'ASD' and 'autistic traits' to describe this minority group. The stigma and discrimination associated with these labels, in turn, negatively influence the mental health of autistic individuals (Botha & Frost, 2020). Autistic individuals are more likely to encounter interpersonal stressors and rejection (Cage & Troxell-Whitman, 2019; Cage et al., 2018), and such persistent exposure to interpersonal exclusion may contribute to increased depressive symptoms over time (Bernardin et al., 2021). Within the framework of diathesis-stress theories, these interpersonal stressors can be understood as interacting with individual differences such as autistic traits (Hames et al., 2013; Segrin, 2000, 2019). Notably, the dynamic interactionist model of vulnerability to depression further suggests that individuals facing vulnerability may adopt interpersonal strategies to engage in social interactions (Zuroff et al., 2004). In this context, individuals with high autistic traits are not indifferent when they encounter with interpersonal pressure and stigma; rather, they are more likely to consciously or unconsciously employ adaptive strategies to adjust to social environments, such as by employing social camouflaging (Pearson & Rose, 2021; Perry et al., 2022).

Social camouflaging (SC) refers to strategies used by individuals to exhibit fewer autistic characteristics and to be more socially adept (Hull et al., 2017; Lai et al., 2017). Previous studies have demonstrated positive correlations between social camouflaging and autistic traits in both autistic and non-autistic populations (Cook et al., 2021; Hull et al., 2019; Jorgenson et al., 2020; Livingston et al., 2020; Parish-Morris, 2019; Perry et al., 2022). Hull et al. (2017) found that fitting in and building interpersonal relationships are two motivations for social camouflaging. Thus, from the perspective of interpersonal connections, social camouflaging can benefit mental well-being by enabling autistic individuals to reduce social rejection and engage in social interactions. Although social camouflaging may have potential benefits, it can also lead to adverse consequences (Cage & Troxell-Whitman, 2019; Livingston et al., 2019; Tierney et al., 2016; Tubío-Fungueiriño et al., 2021). Notably, individuals who engage in social camouflaging are more likely to report depression (Bernardin et al., 2021; Cage et al., 2018; Hull et al., 2021). Lu et al. (2023) reported that camouflaging is a key contributor to the positive association between autistic traits and depressive symptoms.

However, the impact of social camouflaging on mental health may not be straightforward. For instance, Perry et al. (2022) found that social camouflaging did not mediate the association between autism-related stigma and well-being among autistic individuals. One explanation is that social camouflaging may influence mental health differently among individuals, with different effects potentially cancelling each other out. This finding indicated that the association between social camouflaging and mental health is complex and involves a combination of factors (Mandy, 2019). Cassidy et al. (2020) found that social camouflaging was not directly related to suicidal thoughts and behaviours in non-autistic individuals but was mediated by thwarted belonging. Thus, it is valuable to investigate the mediating effect between camouflaging autistic traits and mental health challenges (depressive symptoms). Conducting such research will provide insights into the broader inquiry regarding why individuals with high autistic traits are more likely to experience mental health challenges.

To further understand how social camouflaging affects depressive symptoms, it is essential to consider the role of self-factors. According to the dual vulnerability model, the perception of self plays a crucial role in influencing individuals' depressive symptoms. A poor concept of self and elevated negative feelings towards oneself have been identified as two risk factors associated with depression (Kopala-Sibley & Zuroff, 2020; Sowislo & Orth, 2013).

Social camouflaging changes the outward expression of autistic symptoms among autistic individuals, such as masking difficulties in interacting with others, while the internal essential autistic profile remains unchanged (McQuaid et al., 2022). This creates a mismatch between external self-presentation and internal self-experience. According to the disconnect theory, this mismatch can result in individuals experiencing a sense of self-tearing and self-identity fragmentation, which can impede the development of a clear, stable, and coherent self-concept (Cage & Troxell-Whitman, 2019; Ragins, 2008). As the structural aspect of self-concept, self-concept clarity is the degree of clarity, stability, and internal consistency of individuals' self-concept (Campbell et al., 1996). Hence, self-identity fragmentation resulting from social camouflaging can potentially hinder the development of self-concept clarity. Notably, a clear and stable perception of the self could benefit mental health and improve social adaptations (Rodgers et al., 2018).

Previous studies have also indicated a negative correlation between self-concept clarity and depression (Butzer & Kuiper, 2006; Lee-Flynn et al., 2011; Wong et al., 2019). Given the potential link between social camouflaging and self-concept clarity and the established negative correlation between self-concept clarity and depression, we hypothesise that social camouflaging is negatively associated with self-concept clarity and that self-concept clarity may serve as a crucial mediator in the relationship between camouflaging autistic traits and depressive symptoms.

Furthermore, although social camouflaging is beneficial for maintaining interpersonal relationships to some extent, individuals are more likely to treat their camouflaging strategies as deception rather than interpersonal adaptation mechanisms (Hull et al., 2017); thus, they tend to perceive themselves as inauthentic and regard relationships built through camouflaging as hypocritical and deceptive (Hull et al., 2017; Tubío-Fungueiriño et al., 2021). This perception can lead to a sense of internal guilt and exhaustion while camouflaging autistic traits (Bargiela et al., 2016; Hull et al., 2017), resulting in elevated negative feelings towards the self. Self-disgust is a negative feeling that reflects disgust directed towards the self (Overton et al., 2008). The guilt of external relationship deception and internal inauthentic self-feelings from social camouflaging may contribute to disgust towards oneself (Hull et al., 2017). Hence, the negative view of the self resulting from social camouflaging may increase self-disgust. According to the unified model of depression, one of three schemas in the cognitive triad leading to depression is 'a negative view of self', such as the feeling of disgust towards oneself (Beck & Bredemeier, 2016). Previous studies broadly confirmed the positive correlations between self-disgust and depressive symptoms (Powell et al., 2013; Ypsilanti et al., 2019). Thus, self-disgust could be a potential consequence of social camouflaging, which may contribute to depressive symptoms. Therefore, we hypothesise that social camouflaging is positively associated with self-disgust and that self-disgust may serve as a mediator in the relationship between camouflaging autistic traits and depressive symptoms.

In summary, the present study examined the potential pathways linking autistic traits and depressive symptoms in the general population (see Figure 1). We hypothesise that individuals with high autistic traits are more prone to use social camouflaging as an interpersonal strategy to engage in social interactions. Social camouflaging may decrease self-concept clarity, contributing to an increased risk of depressive symptoms. Social camouflaging may also increase self-disgust, leading to an increased risk of depressive symptoms.

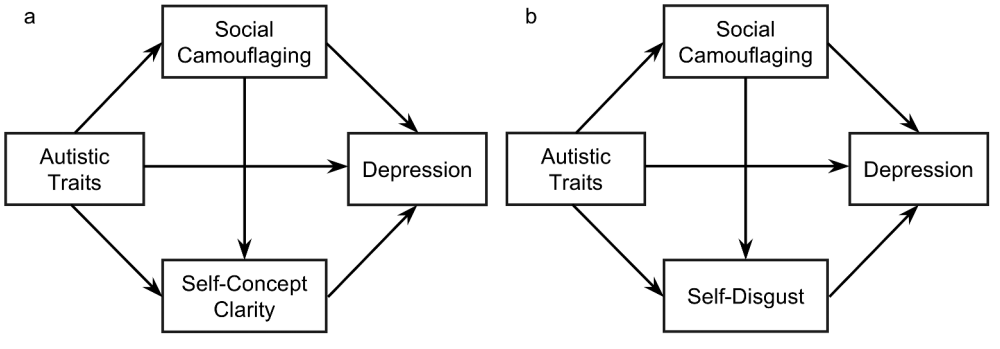

Figure 1. The proposed model.

2. Methods

2.1. Participants

We recruited a total of 565 undergraduate and graduate students from China via online advertisements. The recruitment advertisement explicitly stated that the present study would recruit only undergraduate and graduate students with no current diagnosis of any known neurodevelopmental or psychiatric conditions. We also outlined these criteria in the informed consent form. All participants provided informed consent before participating. After completing the experiment, participants received monetary compensation. The university's bursary required experimenters to verify the participants' identification before issuing the monetary compensation. Therefore, participants were required to provide their student ID or some other certification before participating. We informed all participants that their data would be anonymized and their certification information would not be stored.

The present study used instructional manipulation checks (IMCs), such as embedding attention-check items within the measures items, for example, 'Please fill 5 for this item', as proactive measures to detect individuals who did not carefully read the measurement questions (Anduiza & Galais, 2016). After excluding participants (n = 102; 18.05%) who did not pass all the screening questions, 463 valid questionnaires remained for analysis. The average age of the participants was 22.22 years (SD = 2.30), ranging from 18 to 38 years. For sex assigned at birth, 32.40% of the participants were male, and 67.60% were female. Additionally, 60.50% of the participants were undergraduate students, and 39.50% were graduate students. All measurement questions were presented in Chinese, and all participants were native Chinese speakers.

2.2. Measures

2.2.1. Broad autism phenotype questionnaire (BAPQ)

The present study used the Broad Autism Phenotype Questionnaire (BAPQ) to screen for autistic traits among participants (Hurley et al., 2007). The Chinese version of the BAPQ has demonstrated good reliability and acceptable validity in the Chinese population as a screening tool for autistic symptoms and traits (Shi et al., 2015). The BAPQ consists of 36 items. For each of the 36 items, participants rated their agreement on a 6-point Likert scale from 'very rarely' to 'very often'. After reversing the scores for specific items, we calculated the total BAPQ score by adding and averaging all the scores. The total scores ranging from 0 to 6. Higher scores on the BAPQ indicate higher levels of autistic traits. Lin et al. (2021) provided new cut-off scores for the Chinese version that were higher than those in the original scale. Specifically, the cut-off scores for the total scale were 3.68 for males and 3.65 for females in the Chinese version (Lin et al., 2021). The BAPQ was originally developed to screen for potential autism symptoms in relatives of autistic individuals. However, its use has extended beyond the original purpose to include the measurement of autistic-like traits in both autistic and non-autistic populations (Ingersoll et al., 2011). In the present study, the internal consistency of the BAPQ was good (Cronbach's alpha = 0.88).

2.2.2. Camouflaging of autistic traits questionnaire (CAT-Q)

The present study used the Camouflaging Autistic Traits Questionnaire (CAT-Q) to measure social camouflaging among participants (Hull et al., 2019). Dr Laura Hull provided the Chinese version of the CAT-Q used in the present study. Previous studies have demonstrated that the Chinese version of the CAT-Q exhibits good reliability in the Chinese population (Lu et al., 2023). The CAT-Q consists of 25 items, including three sub-dimensions (i.e. compensation, masking, and assimilation). For each of the 25 items, participants rated how much they agreed it was relevant to them on a 7-point Likert scale from 'strongly agree' to 'strongly disagree'. After reversing the scores for specific items, we calculated the total CAT-Q score by summing all the scores. The total scores ranged between 25 and 125. Higher scores on the CAT-Q indicate higher levels of camouflaging. In the present study, the internal consistency of the CAT-Q was good (Cronbach's alpha = 0.87).

2.2.3. Self-concept clarity scale (SCC)

The present study used the Self-Concept Clarity Scale (SCC) to assess self-concept clarity among participants (Campbell et al., 1996). The Chinese version of the SCC has demonstrated good reliability and validity in the Chinese population (Zhou et al., 2024). The SCC consists of 12 items. For each of the 12 items, participants evaluate their sense of self on a 5-point Likert scale from 'strongly agree' to 'strongly disagree'. After reversing the scores for specific items, we calculated the total SCC score by summing all the scores. The total scores ranged from 12 to 60. Higher scores on the SCC indicate a greater level of self-concept clarity. In the present study, the internal consistency of the SCC was good (Cronbach's alpha = 0.84).

2.2.4. Self-disgust scale (SDS)

The present study used the Self-Disgust Scale (SDS) to assess disgust and repulsion towards oneself (Overton et al., 2008). The Chinese version of the SDS has demonstrated good reliability and validity in the Chinese population (Shen et al., 2024). The SDC consists of 18 items. Among these items, six serve as filler items, while the remaining twelve reflect disgust towards the self. Participants rated each item on a 7-point Likert scale from 'strongly agree' to 'strongly disagree'. After reversing the scores for specific items, we calculated the total SDS score by summing all scores. The total scores ranged between 12 and 84. Higher scores on the SDS indicate greater self-disgust. In the present study, the internal consistency of the SDS was good (Cronbach's alpha = 0.93).

2.2.5. The center for epidemiological studies depression scale (CES-D)

The present study used the Center for Epidemiology Scale for Depression (CES-D) to assess depressive symptoms among the general population (Lewinsohn et al., 1997; Radloff, 1977). The Chinese version of the CES-D has demonstrated good reliability and validity in the Chinese population (Yang et al., 2018; Zhang et al., 2010). The CES-D consists of 20 items. For each of the 20 items, participants assess the frequency of depressive symptoms they experienced over the past week on a 4-point Likert scale: 1 (not at all or less than 1 day), 2 (1 to 2 days), 3 (3 to 4 days), and 4 (5 to 7 days). After reversing the scores for specific items, we calculated the total CES-D score by summing all scores. The total scores ranged between 20 and 80. Higher scores on the CES-D

indicate more severe depressive symptomatology. In the present study, the internal consistency of the CES-D was good (Cronbach's alpha = 0.93).

2.3. Analyses

The present study employed a cross-sectional design, utilizing R version 4.0.5 and SPSS version 25.0 for data analysis. Before hypothesis testing, we examined common method bias using Harman's single-factor test. We used Harman's single-factor test because it is one of the most widely applied diagnostic techniques to detect potential common method bias in self-report data (Podsakoff et al., 2003). The proportion of variance explained by the first factor serves as an indicator of potential bias in this test. If the variance explained by the first factor is less than 40%, it suggests that common method bias is unlikely to have significantly impacted the findings of the present study. It should be noted that although the 40% cutoff threshold is widely used in empirical studies, it is not considered a definitive standard (Ji et al., 2025; Li et al., 2023; Lu et al., 2023; Luo et al., 2024; Podsakoff et al., 2003). Subsequently, we calculated descriptive statistics. We also assessed the normality of the data by evaluating skewness and kurtosis values. The skewness and kurtosis values of variables between −2 and +2 can be considered to be normally distributed, similar to previous studies (Perry et al., 2022). Then, we conducted correlation analysis to explore the preliminary associations between the main variables.

All variables were standardized (z scores) prior to conducting regression and mediation analyses to place them on a comparable scale. Specifically, we subtracted each participant's value from the mean value of that variable across all participants. Then, the difference was divided by the standard deviation of the variable. Standardizing variables transform the data on a unified scale, with a mean of 0 and a standard deviation of 1. To examine the ability of social camouflaging to predict self-concept clarity and self-disgust, we performed hierarchical multiple regressions with self-concept clarity and self-disgust as the outcome variables. Hierarchical regression analyses allow variables to be entered in theoretically meaningful steps, enabling the evaluation of whether social camouflaging explains additional variance in the outcome variables beyond that accounted for by autistic traits. Hierarchical regression analyses can provide preliminary evidence for the direct associations among the key variables (Cassidy et al., 2020). Finally, to investigate the chain mediation effects between autistic traits and depressive symptoms, we employed the PROCESS() function from the bruceR package (Bao, 2024) in R. This function implements mediation and moderation analyses by integrating functions from mediation, interactions, and lavaan packages, and links the specified model to Hayes's (2012) PROCESS numbering system. Specifically, we tested Model 6, following prior studies (Cassidy et al., 2020; Pelton & Cassidy, 2017). Five thousand samples were randomly drawn from the 463 data points through repeated sampling to calculate the average path coefficient.

3. Results

3.1. Common method bias

Harman's single-factor test results for the model involving self-concept clarity indicated that 22 factors had initial eigenvalues exceeding 1, with 19.04% of the variance explained

by the first factor. For the model involving self-disgust, the test showed that 20 factors had initial eigenvalues greater than 1, and the explained variance of the first factor was 21.90%. These rates were well below the commonly used 40% cut-off threshold, suggesting that common method bias did not significantly impact the findings of the present study.

3.2. Descriptive statistics

The means, standard deviations, skewness, and kurtosis of all variables are displayed in Table 1. All the data in the present study followed a normal distribution.

3.3. Correlation analysis

The data in the present study were normally distributed. Therefore, we performed correlation analysis using Pearson product-moment correlation. The correlations between the variables are shown in Table 2. Autistic traits are significantly correlated with social camouflaging. Social camouflaging is significantly correlated with self-concept clarity and self-disgust. All the variables (autistic traits, social camouflaging, self-concept clarity, and self-disgust) were significantly correlated with depressive symptoms. The findings from the correlation analysis of these variables provided preliminary support for the hypotheses proposed in the present study.

3.4. Hierarchical multiple regressions

3.4.1. The prediction of social camouflaging to self-concept clarity

The present study first conducted hierarchical multiple regressions with self-concept clarity as the outcome variable. We entered autistic traits in the first step and social camouflaging in the second step (see Table 3). In step 1, autistic traits explained a significant percentage (24.400%) of the variance in self-concept clarity, $F(1,461) =$

Table 1. Means, standard deviations, skewness, and kurtosis of all variables.

	Mean (*SD*)				
	Male	Female	Total	Skewness	Kurtosis
Autistic traits	3.18 (0.49)	3.17 (0.50)	3.18 (0.50)	0.03	−0.12
Social camouflaging	104.11 (18.01)	102.08 (18.55)	102.74 (18.38)	−0.13	−0.03
Self-concept clarity	35.14 (7.27)	34.01 (8.06)	34.37 (7.82)	0.16	−0.15
Self-disgust	34.29 (12.60)	35.77 (12.52)	35.29 (12.55)	0.57	−0.24
Depressive symptoms	35.69 (12.30)	35.11 (11.20)	35.3 (11.56)	1.09	0.76

Table 2. Bivariate correlations between all variables.

Variables	1	2	3	4	5	6
1. Autistic traits	–					
2. Social camouflaging	.462***	–				
3. Self-concept clarity	−.494***	−.566***	–			
4. Self-disgust	.668***	.466***	−.577***	–		
5. Depressive symptoms	.525***	.331***	−.476***	.635***	–	

***$p < 0.001$.

148.488, $p < 0.001$. In step 2, social camouflaging explained significantly more of the variance (14.500%) in self-concept clarity, $F(2,460) = 146.344$, $p < 0.001$.

3.4.2. The prediction of social camouflaging to self-disgust

The present study conducted hierarchical multiple regressions with self-disgust as the outcome variable. We entered autistic traits in the first step and social camouflaging in the second step (see Table 4). In step 1, autistic traits explained a significant percentage (44.600%) of the variance in self-disgust, $F(1,461) = 371.762$, $p < 0.001$. In step 2, social camouflaging explained a significantly smaller percentage (3.100%) of the variance in self-disgust, $F(2,460) = 210.363$, $p < 0.001$.

3.5. Chain mediation effect analysis

3.5.1. The chain mediation effects of social camouflaging and self-concept clarity

According to the hypotheses in the present study, we further investigated the chain mediation effects of social camouflaging and self-concept clarity on the association between autistic traits and depressive symptoms. In the chain mediation model, autistic traits were treated as the independent variable, with social camouflaging and self-concept clarity as potential mediator variables and depressive symptoms as the dependent variable. The results indicated that the indirect effect of autistic traits on depressive symptoms through social camouflaging and self-concept clarity was significant (β = 0.058, 95% CI [0.035, 0.088]). The direct effect of autistic traits on depressive symptoms remained significant once the mediators were added (β = 0.386, 95% CI [0.305, 0.467]), indicating significant partial mediation. The path between autistic traits and depressive symptoms was not significantly mediated by social camouflaging (β = −0.006, 95% CI [−0.056, 0.044]), but it was significantly mediated by self-concept clarity (β = 0.086, 95% CI [0.051, 0.127]), as shown in Figure 2a.

Table 3. Hierarchical multiple regression with social camouflaging predicting self-concept clarity.

	β	*t*	R^2	*F*	ΔR^2	Δ*F*	f^2
Step 1			0.244	148.488***	0.244	148.488***	0.244
Autistic traits	−0.494	−12.186***					
Step 2			0.389	146.344***	0.145	109.298***	0.192
Autistic traits	−0.295	−7.175***					
Social camouflaging	−0.430	−10.455***					

***$p < 0.001$.

Table 4. Hierarchical multiple regression with social camouflaging predicting self-disgust.

	β	*t*	R^2	*F*	ΔR^2	Δ*F*	f^2
Step 1			0.446	371.762***	0.446	371.762***	0.446
Autistic traits	0.668	19.281***					
Step 2			0.478	210.363***	0.031	27.552***	0.056
Autistic traits	0.576	15.156***					
Social camouflaging	0.199	5.249***					

***$p < 0.001$.

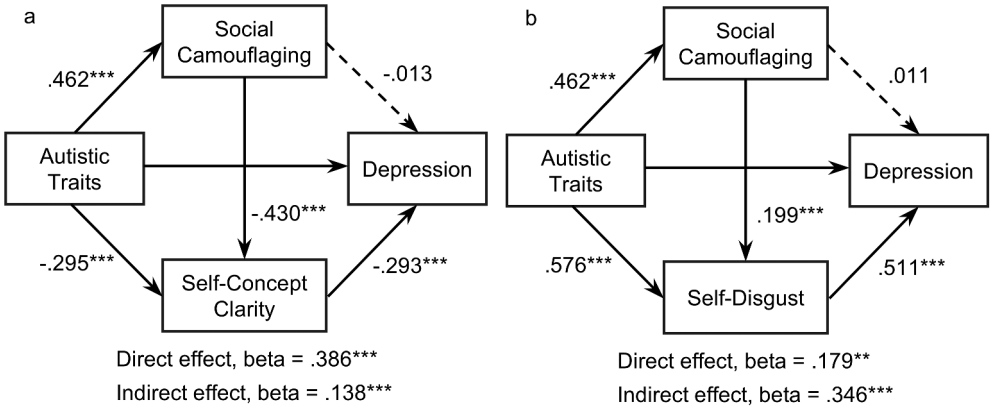

Figure 2. Standardized path coefficients for model of the indirect effect of autistic traits on depressive symptoms through (a) social camouflaging and self-concept clarity; and (b) social camouflaging and self-disgust. Solid lines represent significant paths. Dotted lines represent nonsignificant paths. ***$p < 0.001$.

3.5.2. The chain mediation effects of social camouflaging and self-disgust

We further investigated the chain mediation effects of social camouflaging and self-disgust on the association between autistic traits and depressive symptoms. In the chain mediation model, autistic traits were treated as the independent variable, with social camouflaging and self-disgust as potential mediator variables and depressive symptoms as the dependent variable. The indirect effect of autistic traits on depressive symptoms through social camouflaging and self-disgust was also significant (β = 0.047, 95% CI [0.025, 0.075]). The direct effect of autistic traits on depressive symptoms remained significant once the mediators were added (β = 0.179, 95% CI [0.087, 0.275]), indicating significant partial mediation. The path between autistic traits and depressive symptoms was not significantly mediated by social camouflaging (β = 0.005, 95% CI [−0.041, 0.049]), but it was significantly mediated by self-disgust (β = 0.294, 95% CI [0.228, 0.367]), as shown in Figure 2b.

4. Discussion

Theoretical and empirical studies have consistently demonstrated the association between autistic traits and depressive symptoms (Jackson & Dritschel, 2016; Radtke et al., 2019; Segrin & Flora, 2006). However, the underlying factors between autistic traits and depressive symptoms remain unclear. The present study revealed that the general population with high autistic traits may engage in social camouflaging as interpersonal strategies to participate in social interactions. These strategies could be associated with decreased self-concept clarity and increased self-disgust, which are linked to exacerbated depressive symptoms. The results from the present study were in line with these hypotheses. Higher levels of autistic traits were directly or indirectly associated with more depressive symptoms. The association between autistic traits and depressive symptoms was significantly mediated by social camouflaging and self-concept clarity and significantly mediated by social camouflaging and self-disgust.

Consistent with predictions and previous studies, the present study confirmed a significant positive correlation between autistic traits and depressive symptoms (Jackson & Dritschel, 2016; Radtke et al., 2019; Segrin & Flora, 2006). Importantly, this study advances our understanding by identifying potential mediators – social camouflaging, self-concept clarity, and self-disgust. These mediators have effects through two distinct chain mediation pathways: the association between autistic traits and depressive symptoms was significantly mediated by social camouflaging and self-concept clarity, as well as by social camouflaging and self-disgust. These findings are consistent with the principles of multiple theories (i.e. diathesis-stress models, the dynamic interactionist model of vulnerability, the dual vulnerability model, the disconnect theory, and the unified model of depression) and findings from previous research. Autistic traits are related to higher levels of social camouflaging (Cook et al., 2021; Hull et al., 2019; Jorgenson et al., 2020; Livingston et al., 2020; Parish-Morris, 2019; Perry et al., 2022). Social camouflaging is negatively related to self-concept clarity, in line with the principles of disconnect theory, which proposes that social camouflaging may disturb the process of forming a clear and stable self-concept (Cage & Troxell-Whitman, 2019; Ragins, 2008). Subsequently, self-concept clarity was negatively related to depressive symptoms, a finding that aligns with the dual vulnerability model and previous studies (Butzer & Kuiper, 2006; Kopala-Sibley & Zuroff, 2020; Lee-Flynn et al., 2011; Sowislo & Orth, 2013; Wong et al., 2019).

Additionally, social camouflaging was also positively related to self-disgust, consistent with previous qualitative studies suggesting that the sense of deception and guilt resulting from social camouflaging will lead individuals to experience negative feelings towards themselves (Hull et al., 2017). Self-disgust is positively related to depressive symptoms, consistent with the unified model of depression and previous research (Beck & Bredemeier, 2016; Powell et al., 2013; Ypsilanti et al., 2019). These results are consistent with the dual vulnerability model, in which self-concept clarity and self-disgust are two factors leading to depression (Kopala-Sibley & Zuroff, 2020; Sowislo & Orth, 2013).

By integrating these theoretical models, the present study advances prior research by examining not only the mediating role of social camouflaging but also incorporating self-related factors. When encountering interpersonal pressure and stigma, individuals with high autistic traits are not passive but may actively employ adaptive strategies such as social camouflaging. However, these strategies, in turn, impact individuals' perception of themselves, potentially leading to adverse mental health challenges. The present study provides a more comprehensive understanding of the relationships between autistic traits and depressive symptoms, emphasising the importance of considering both interpersonal strategies (e.g. social camouflaging) and self-related factors (e.g. self-concept clarity, self-disgust) in this relationship, thereby extending the dynamic interactionist model of vulnerability to depression to include self-aspects.

The results could have implications for depression theory, clinical practices, and further exploration. This study expands the dynamic interactionist model of vulnerability to depression by considering aspects regarding the self (Zuroff et al., 2004). This finding suggests that individuals with high autistic traits may employ social camouflaging as interpersonal strategies to fit in social situations and establish relationships that may have potential benefits in terms of relationships (Hull et al., 2017). However, the present study indicated that social camouflaging could be detrimental to self concept and feelings,

which are two factors leading to depression based on the dual vulnerability model (Kopala-Sibley & Zuroff, 2020; Sowislo & Orth, 2013), thereby exacerbating depressive symptoms. Importantly, these findings indicate that the relationships between autistic traits and depressive symptoms are complex and involve various factors and mechanisms for exploration and intervention.

The present study highlights the significance of self as a critical intervention point for depression. Promoting positive self-acceptance among autistic individuals is crucial. Implementing approaches such as compassion-focused therapy can significantly enhance individuals' self-acceptance levels, encouraging them to embrace their unique traits and ultimately lowering their risk of depression (Stiegler et al., 2018).

Additionally, another significant aspect involves fostering a supportive and mutual understanding environment for autistic individuals. The 'double empathy problem' highlights the challenges in social interactions between autistic and non-autistic individuals, reflecting a mutual lack of understanding (Milton, 2012; Milton et al., 2022). However, this lack of understanding from the non-autistic population can lead to social rejection, stigma, and discrimination against autistic individuals. The use of social camouflaging reveals that autistic individuals are not indifferent to interpersonal challenges but actively seek to understand and navigate the non-autistic world consciously or unconsciously (Pearson & Rose, 2021; Perry et al., 2022). However, true understanding must be mutual. Therefore, future intervention strategies could focus on fostering mutual understanding, especially from non-autistic individuals towards autistic individuals. Hence, discrimination against autistic individuals by non-autistic individuals can be reduced, as can the likelihood of autistic individuals coping with social pressures by social camouflaging. Consequently, this facilitates the authentic expression of individuals' identities, leading to a reduction in depression and other associated mental health challenges (Cassidy et al., 2020; Mitchell et al., 2019).

In summary, the present findings highlight the importance of psychosocial mechanisms in understanding depression among individuals with high autistic traits. Consistent with the biopsychosocial model (Engel, 1977), our results demonstrate how social stressors (e.g. stigma, discrimination) interact with individual coping strategies (e.g. social camouflaging) and self-related processes (e.g. self-concept clarity, self-disgust) to influence mental health outcomes. Our findings also align with stress and coping theory (Folkman, 1984), suggesting that social camouflaging can be viewed as a coping response to social adversity, albeit with potential maladaptive consequences. Moreover, the findings resonate with self-regulation models in health psychology, which emphasize the role of self-perception in psychological well-being (Cole et al., 2019). Overall, the present study extends the findings of health psychology to populations with high autistic traits and suggests that interventions should not only address individual coping strategies but also target the broader social environment to promote mental health.

The present study has several limitations. First, the participants were undergraduate and graduate students in China with no current diagnosis of any known neurodevelopmental or psychiatric conditions. Future research may benefit from including individuals from more diverse backgrounds (e.g. older populations, varied educational or social contexts, and diagnosed autistic individuals) for a more comprehensive understanding. Second, the study had a cross-sectional design. Hence, our findings could not determine causal relationships across the information collected. Third, all measures in the present

study relied on self-report, which may introduce response bias. Future research could consider incorporating more implicit measures to reduce this limitation. For example, social camouflaging can be operationalized in multiple ways, including qualitative interviews, observational methods, or discrepancy approaches that compare internal experiences with externally observed behaviors. Because social camouflaging may also involve more implicit and less conscious processes, employing multiple operationalizations could capture its multifaceted nature more comprehensively and may reveal different associations with mental health outcomes.

5. Conclusion

The present study integrates multiple theories to expand previous findings from self-aspects by indicating the mediating role of social camouflaging, self-concept clarity, and self-disgust in the association between autistic traits and depressive symptoms in the general population. The results demonstrated the mediating role of social camouflaging and self-concept clarity in the association between autistic traits and depressive symptoms. The present study also demonstrated the mediating role of social camouflaging and self-disgust in the association between autistic traits and depressive symptoms. Furthermore, the present study revealed for the first time that more social camouflaging was associated with less self-concept clarity and more self-disgust. These findings highlight the importance of adopting a comprehensive approach to understanding and addressing the mental health challenges associated with camouflaging autistic traits.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

Data for this study is available at https://osf.io/wxztn/?view_only=445b5b992136449695c3af155e535326

Ethical approval

All study procedures were approved by the Human Research Ethics Committee of Nanjing Normal University (Ethics approval number: 202106020)

CRediT authorship contribution statement

Haiyan Kong: Writing-original draft, Writing-reviewing & editing, Conceptualization, Methodology, Investigation, Formal analysis, Visualization, Data curation. **Jiushu Xie**: Writing-reviewing & editing, Conceptualization, Methodology, Supervision, and Funding acquisition. **Fen Dou**: Writing-reviewing & editing and Methodology. **Xiangning Li**: Methodology and Investigation. **Xinyu Wang**: Methodology and Investigation. **Yanli Huang**: Conceptualization, Methodology, and Supervision. All authors have read and approved the final version submitted for publication.

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