

Exploring the Relationship between Social Surrogate Use and Depressive Symptoms

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Abstract. Gabriel and her colleagues suggested that humans are flexible in fulfilling their social needs by engaging in seemingly nonsocial activities, supporting a view of humans as primarily and inextricably social beings (Gabriel et al., 2016). Although previous work has illustrated that social surrogate use is associated with some specific personality traits, little work has explored whether characteristics related to depression can promote social surrogate use. Our project collected data from 217 people from China using a comprehensive questionnaire that investigated personal health and some personality traits. Using various analytical strategies, we found that depression is positively associated with social surrogate use. Although we did not find that this association is mediated by (increased) loneliness, social isolation, rejection sensitivity, and insecure attachment, anthropomorphic tendency significantly influences the time of social surrogate use.

Keywords: Social Surrogate Use; Depressive; Nonsocial.

1. Introduction

Past research has discussed that need to belong is just as important as other life essentials, such as food and sleep, and they share the same affective system that serves these needs (Baumeister & Leary, 1995; Williams, 2007). Humans desire to consume foods high in fat, calories and sugar because they are essential. In modern society, the feeling of satiety brought by food can be satisfied by other means, such as meditation, which can suppress appetite. Just as Harlow's (1958) monkeys spent significantly more time with the terry cloth mother than they did with the wire mother, satisfying belongingness needs.

Humans are flexible in filling their basic needs and social functions. Research has shown that when real interactions are unavailable or costly, the use of seemingly non-social leisure activities such as books, television shows, movies, and the internet may serve as social surrogates by satisfying the fulfillment of the connection with human others (Gabriel et al., 2016). There was evidence that social surrogates can provide the experience of belonging and connectedness (Baumeister & Leary, 1995). Derrick (2019) found that the increase in social surrogate use corresponds to traits relevant to fear of rejection. Because interpersonal relationships in people with depressive symptoms often are fraught with difficulties, such as a lack of social skills or support from society, friends, and loved ones, those may prefer using social surrogates to meet social needs and relieve social distress. The current study examined whether severe depressive symptoms are associated with more social surrogate use in a community sample. In addition, we also investigated the impact of some traits in the depression on social surrogate use. Although many researchers have found associations between depression and loneliness, social isolation, rejection sensitivity, and attachment style respectively (e.g., Weeks et al., 1980; Libet & Lewinsohn, 1973; Downey & Feldman, 1996; Bifulco et al., 2002), there is limited research on the association between depression and social surrogate use, and the characteristics that might mediate this association.

To examine whether there are associations between depressive symptoms and social surrogate use, we employed a comprehensive questionnaire that investigated the severity of depression and retrospective reporting of social surrogate use during the past two weeks. In addition, we also tested participants' level of loneliness, social isolation, rejection sensitivity, and attachment style to examine whether these factors may mediate the relationship between social surrogate use and depression. We broadly anticipated that increased depressive symptoms might reflect the need for an interpersonal

relationship and would predict more social surrogate use. In addition, this association is mediated by (increased) loneliness, social isolation, rejection sensitivity, and insecure attachment.

2. Methods

2.1 Participants

The data were collated from the sample service of a Chinese online survey company (www.wjx.cn). Two hundred and seventeen adults (95 males and 122 females; Mean=30.69±5.76, ranging from 18 to 51) took part in and completed the study. The study is formally pre-registered at osf.io/6upyq.

2.2 Materials and Measures

Patient Health Questionnaire 9 (PHQ-9) (Kroenke, Spitzer, Williams, & Löwe, 2010) is a self-administered tool consisting of 9 items. Each item is rated on a 4-point Likert scale (0=not at all, 3=nearly every day), assessing the presence and severity of depression in subjects over the two weeks. The total score was obtained by summing each item ranging from 0 to 27. A total score greater than 10 indicates that the participant has clinically significant depressive symptoms. In the present study, the alpha coefficient of the PHQ-9 is 0.794.

Social Network Index (SNI) (Cohens et al., 1997) is a questionnaire that assesses respondents' objective social connectedness. The present study used two indexes, namely network diversity and network size. Network diversity estimates the number of different types of high contact social roles in which individuals participate. Network size is computed as the sum of all individuals with whom an individual has high contact at least once every two weeks.

Attachment Style Questionnaire-Short Form (ASQ) (Chui & Leung, 2016) is a 15-item scale that measures four attachment styles: secure, fearful-avoidant, preoccupied and dismissing attachment. Each item is rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). In the present study, the alpha coefficient of the AS_secure, AS_fear, AS_preoccupied and AS_dismiss is 0.511, 0.842, 0.866, and 0.701, respectively.

Rejection Sensitivity RS-Adult Questionnaire (A-RSQ) (Berenson et al., 2013) is a 9-item scale that measures individual differences in rejection sensitivity in adults. Each item describes a situation in which respondents face possible social rejections. The respondents are instructed to report how concerned or anxious they are on a 6-point Likert scale from 1 (very unconcerned) to 6 (very concerned). They also rate their acceptance expectancy on a 6-point Likert scale ranging from 1 (very unlikely) to 6 (very likely). A rejection sensitivity score is calculated for each item by multiplying rejection concern and rejection expectancy (i.e., the reverse coding of acceptance expectancy). The total rejection sensitivity score is the mean of the rejection sensitivity scores for the nine situations. In the present study, the alpha coefficient of the A-RSQ is 0.826.

Autism Spectrum Quotient–10 items (AQ-10) (Adult version) (Allison, Auyeung, & Baron-Cohen, 2012) is a short self-report questionnaire used in clinical and research settings as a diagnostic screening tool for autism in adults. It consists of 9 items rated on a 4-point Likert-type scale ranging from 1 (Definitely disagree) to 4 (Definitely agree). In the present study, the alpha coefficient of the AQ_10 is 0.359

Anthropomorphism Questionnaire - 9 items (AnthroQ) (Clutterbuck et al., 2021) assess the tendency to assume that non-human objects have thoughts, feelings and motivations. The questionnaire contains nine items, five addressing childhood thoughts relating to toys and four addressing adult beliefs and behaviors. Each item is rated on a 5-point Likert scale (0=not at all, 4=very much), and a total score is obtained by summing each subscale. In the present study, the alpha coefficient of Anthro_Q is 0.819.

Social Surrogate Use Questionnaire (SSU) (Self-developed, informed by Derrick et al., 2018) is a self-report measure of three categories of social surrogate use, which include reminders of others, the social world and parasocial relationships. Each category contains two or three items investigating the frequency and duration of using this social surrogate.

Chinese Version of 8-item UCLA Loneliness Scale (ULS-8) (Wu & Yao, 2008) contains eight items on a 4-point Likert scale (1=strongly disagree,4=strongly agree), assessing the feeling of loneliness. The total score ranges from 8 to 32 points, with higher scores suggesting a higher degree of loneliness. In the present study, the alpha coefficient of the ULS-8 is 0.786.

3. Results

3.1 Descriptive Statistics

The means and SDs of all the measures are presented in Table 1.

Table 1. The means and SDs of all the measures

	Mean	Std. Deviation	2	3	4	5	6	7	8	9	10	11	12	13
1. PHQ-9	6.8157	4.14920	0.017	.244**	.355**	.499**	-.243**	.393**	.249*	.165*	.316**	-0.041	-0.091	.226*
2. SSU-frequency	27.8894	10.06446		.610**	-.185**	-0.090	0.099	-1.60*	-0.014	0.006	-0.053	.444**	.489**	.289**
3. SSU-duration	12.7788	5.02189			-0.062	0.024	-0.030	0.081	-0.009	.146*	0.080	.342**	.296**	.329**
4. RS	8.6011	3.46668				.542**	-.340**	.496**	.380**	0.122	.251**	-.259**	-.337*	0.081
5. ULS8	7.2811	3.94866					-.442**	.558**	.290**	.305**	.313**	-.237**	0.248**	0.127
6. AS-secure	12.8111	1.58881						-.422**	-0.024	-.319**	-.240**	.218**	.211**	-0.069
7. AS-Fear	13.1106	4.53655							.269**	.417**	.315**	-.241**	-.272**	0.046
8. AS-Preoccupied	9.1198	3.05117								-0.146	.279**	-0.088	-0.084	0.156*
9. AS-Dismiss	12.7696	3.10054									0.136*	-.143*	-0.154*	0.032
10. AQ10-sum	3.3687	1.68944										-0.094	-0.143*	.171*
11. SNI-diversity	7.0691	2.14946											.769**	.236**
12. SNI-size	20.1244	9.25204												.183**
13. AnthroQ	12.6774	6.61977												

Valid N (listwise)

Note: PHQ_9 = Patient Health Questionnaire 9; SSU = Social Surrogate Use; RS = Rejection Sensitivity RS-Adult Questionnaire; ULS8 = Chinese Version of 8-item UCLA Loneliness Scale; AS = Attachment Style Questionnaire; AQ10 = Autism Spectrum Quotient–10 items; SNI = Social Network Index Questionnaire; AnthroQ = Anthropomorphism Questionnaire - 9 items.

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

3.2 Confirmatory Analysis

To evaluate whether depressive symptoms are associated with more frequent or more social surrogate use, we collapsed the frequency and length of participants' daily social surrogate use. As shown in Table 1, the relationship between depressive symptoms and the time people spends on social surrogates ($r=.244, p<0.01$) was significant, while the correlation between depressive symptoms and frequency of social surrogate use was not significant ($r=.017, p=.807$).

To test whether (increased) loneliness, social isolation, rejection sensitivity, and insecure attachment play a mediating role respectively between the time of social surrogate use and depression, we conducted a mediation analysis with each of these variables as the mediators and the frequency of social surrogate use as the outcome.

As shown in Fig. 1., the relationship between depression and rejection sensitivity ($a=.2799, SE=.0537, p<.001, 95\% CI [.1740 .3857]$) and the relationship between rejection sensitivity and social surrogate use ($b=-.2349, SE=.1006, p<.05, 95\% CI [-.4332 -.0365]$) were significant. However, the relationship between RS and SSU is negative. After controlling for rejection sensitivity, the relationship between depression and social surrogate use ($c'=.3616, SE=.0841, p<0.001, 95\% CI [.1958 .5273]$) and the indirect effect of depression on social surrogate use through rejection sensitivity was also significant ($ab=-.0657, SE=.0321, 95\% CI [-.1363 -.0082]$).

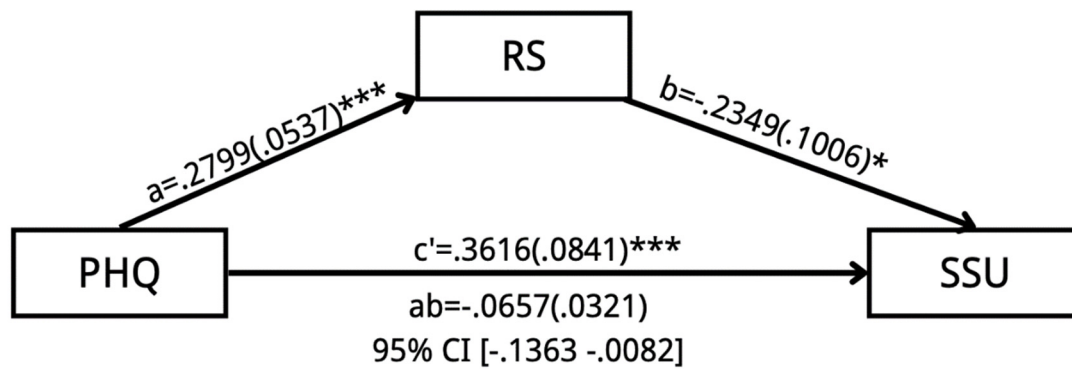


Figure 1. Mediation Analysis. PHQ=Patient Health Questionnaire 9, RS=Rejection Sensitivity Adult Questionnaire, SSU=Social Surrogate Use Questionnaire.
Note: $***p < .001$, $*p < .05$

As shown in Fig. 2., the relationship between loneliness and social surrogate use ($b = -.1653$, $SE = .0966$, $p = .0884$, $95\% \text{ CI } [-.3557 \text{ } .0250]$) was not significant. Depression also had no significant indirect effect on social surrogate use through the mediation of loneliness ($ab = -.0784$, $SE = .0453$, $95\% \text{ CI } [-.1747 \text{ } -.0076]$).

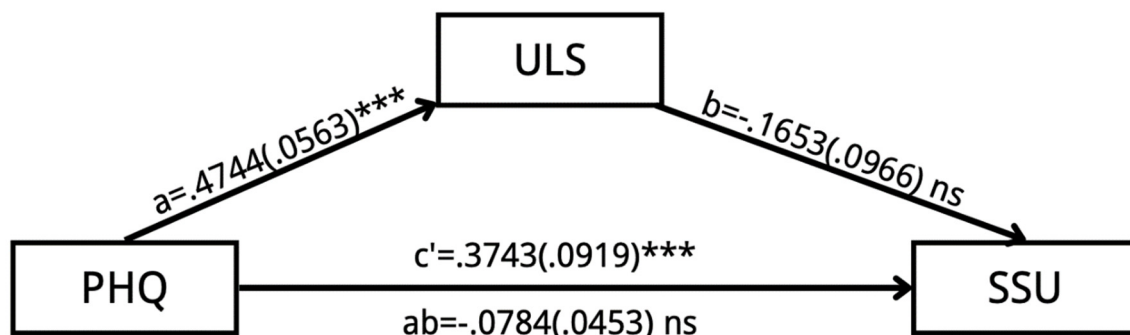
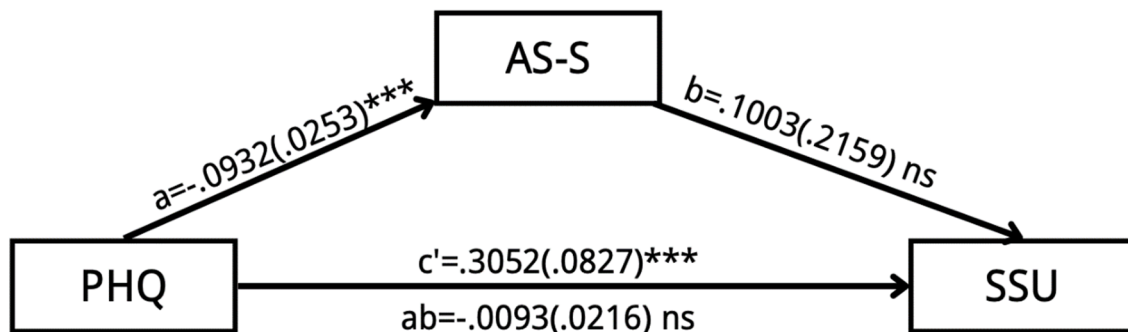


Figure 2. Mediation Analysis. PHQ=Patient Health Questionnaire 9, ULS=Chinese Version of 8-item UCLA Loneliness Scale, SSU=Social Surrogate Use Questionnaire.
Note; $***p < .001$

No significant connection was found between depression and social surrogate use through the mediation of any attachment style (Secure attachment: $b = .1003$, $SE = .3159$, $p = .6426$ $95\% \text{ CI } [-.3252 \text{ } .5359]$; Fear attachment: $b = -.0203$, $SE = .0798$, $p = .7995$ $95\% \text{ CI } [-.1776 \text{ } .1370]$; Preoccupied attachment: $b = -.1219$, $SE = .1122$, $p = .2790$, $95\% \text{ CI } [-.3434 \text{ } .0995]$; Dismiss attachment: $b = .1760$, $SE = .10082$, $p = .1053$, $95\% \text{ CI } [-.0373 \text{ } .3892]$), results were shown in Fig. 3.



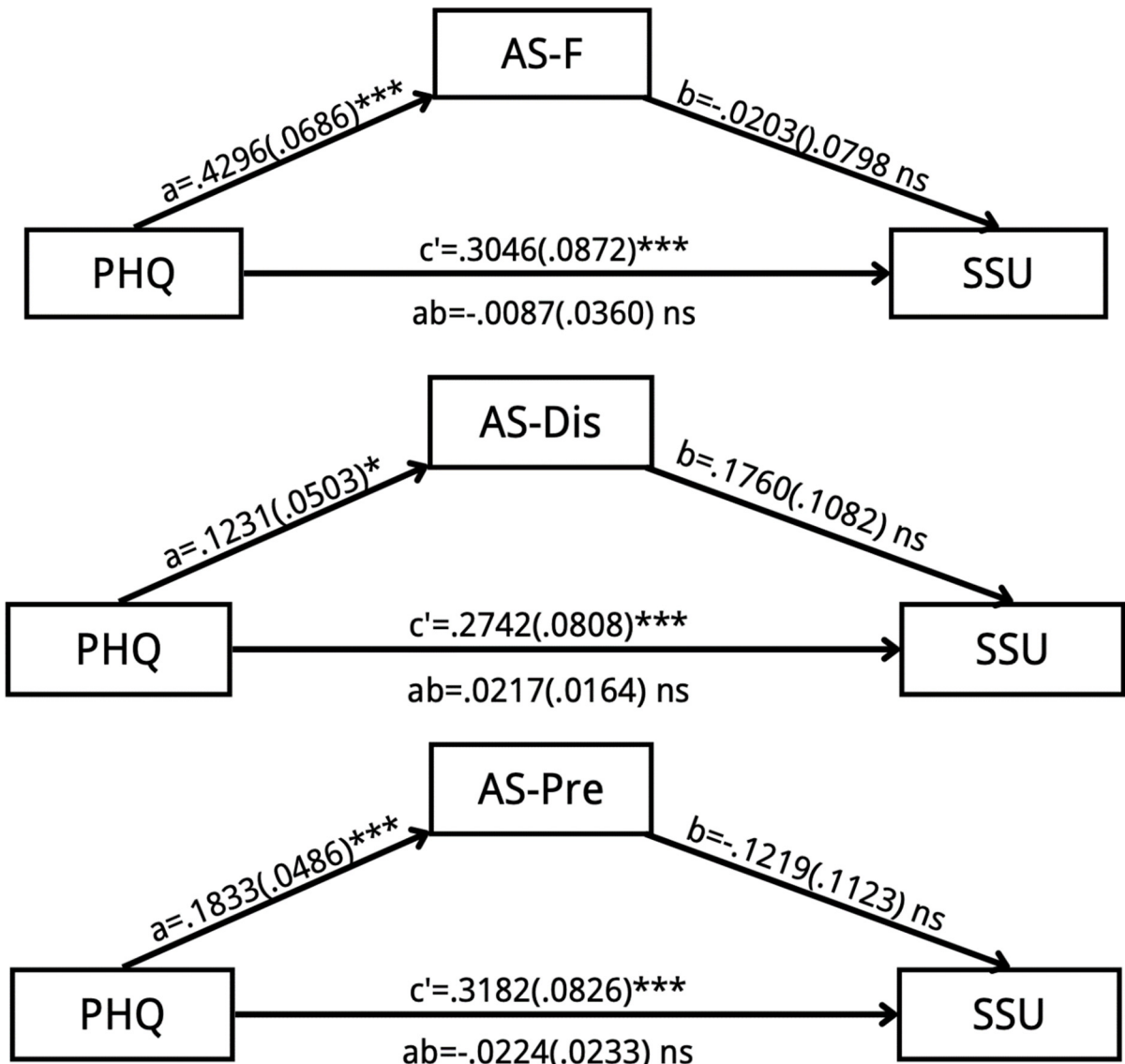
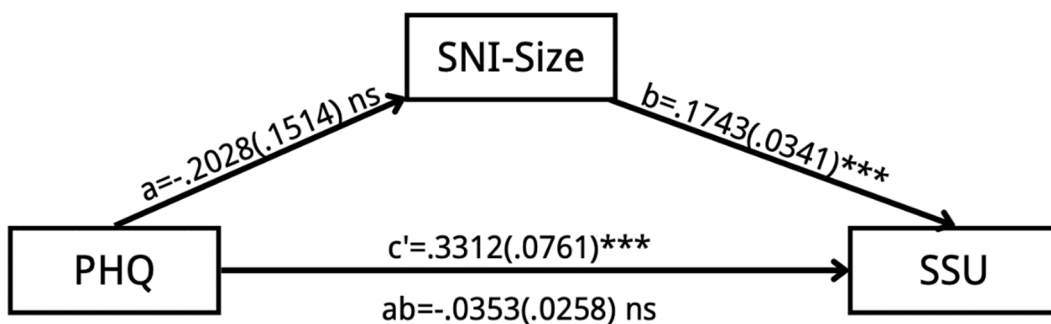


Figure 3. Mediation Analysis., AS=Attachment Style Questionnaire-Short Form (Secure, Fearful-avoidant, Preoccupied, Dismissing attachment style).

Note: *** $p < .001$, * $p < .05$

As shown in Fig.4., the relationship between depression and social network diversity or size (Diversity: $a = -.0213$, $SE = .0353$, $p = .5467$, 95% CI [-.0909 .0483]; Size: $a = -.2028$, $SE = .1514$, $p = .1820$, 95% CI [-.5013 .0957]), and the indirect effect of depression on social surrogate use through social network diversity or size (Diversity: $ab = -.0176$, $SE = .0301$, 95% CI [-.0808 .0384]; Size: $ab = -.0353$, $SE = .0258$, 95% CI [-.0903 .0112]) were not significant.



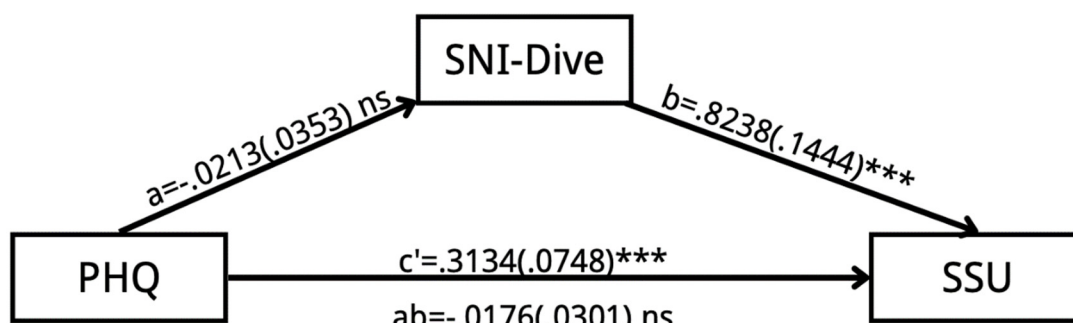


Figure 4. Mediation Analysis., SNI-Dive=Social Network Diversity; SNI-Size=Social Network Size.

Note: ***p<.001

3.3 Exploratory Analysis

To test whether other factors play a mediation effect between depression and social surrogate use, we tested anthropomorphic tendency as a mediator. The results indicate that it played a significant mediating role in this relationship. As shown in Fig.5., the relationship between depression and anthropomorphic tendency ($a=.3606$, $SE=.1060$, $p<.001$, 95% CI [.1517 .5696]) and relationship between anthropomorphism and social surrogate use ($b=.2185$, $SE=.0494$, $p<.001$ 95% CI [.1211 .3159]) were significant. After controlling for rejection sensitivity, the relationship between depression and social surrogate use ($c'=.2170$, $SE=.0788$, $p<0.001$, 95% CI [.0616 .3724]) and the indirect effect of depression on social surrogate use through anthropomorphism were also significant ($ab=.0788$, $SE=.0307$, 95% CI [.0239 .1442]).

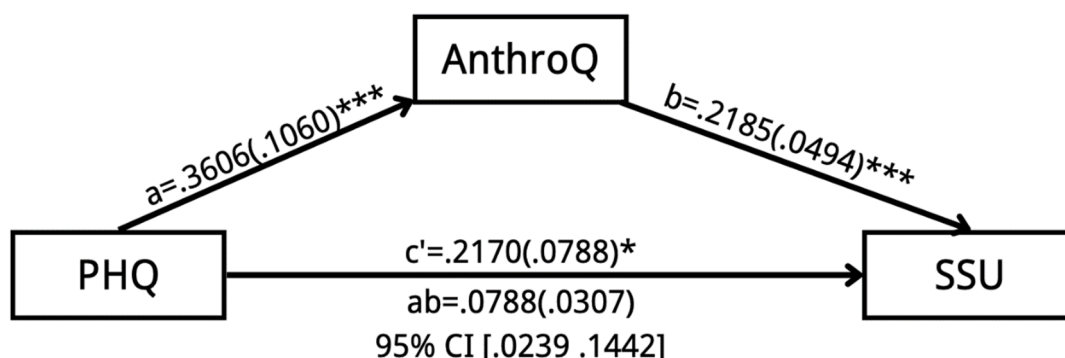


Figure 5. Mediation Analysis., AnthroQ=Anthropomorphism Questionnaire - 9 items.

Note: ***p<.001, *p<.05

4. Discussion

Our investigation of people's social surrogate use revealed that it is obviously frequent. All participants engaged in different forms of social surrogate use, and most of them often used it multiple times per day.

Although the correlation between the frequency of social surrogate use and depressive symptoms was insignificant, the results proved our first hypothesis that the length of time of social surrogate use might be associated with the degree of depressive symptoms. The reason for this discrepancy might be because that recalling the frequency of social surrogate use within two weeks may be more difficult than the average length of service per day.

Since people with depressive symptoms often have a higher rejection sensitivity, we anticipated that fears of rejection as mediators from interaction partners might predict more frequent social surrogate use. Our mediation analysis, however, suggested that the more substantial the rejection sensitivity, the fewer social surrogates use. Therefore, the result was contradictory to our second

expected hypothesis. Although past research suggested that traits relevant to fear of rejection (i.e., higher neuroticism, lower self-esteem) are associated with more social surrogate use (Derrick et al., 2019), one of the possible explanations is that social surrogates reflect the desire for social relationships, while elevated rejection sensitivity implies the fear of social interaction and social rejection, leading to less social desire.

The positive relationship between depression and loneliness is consistent with past research (e.g. Weeks et al., 1980; Kayaoğlu & Başçillar, 2022), but no evidence proved that loneliness is mediating in the relationship between depressive symptoms and social surrogate use. Although depressive symptoms were related to attachment styles, especially positively related to insecure attachment styles, none of the attachment styles mediated the relationship between depressive symptoms and social surrogate use.

Although we did not find that loneliness, insecure attachment style, social network diversity or size acted as mediators to promote the social surrogate use, people with high social and interpersonal preference, as reflected by high social network index and anthropomorphic tendency, showed significantly greater social surrogate use. The anthropomorphic tendency, in addition, did promote social surrogate use as a mediator in this relationship. We anticipated that the anthropomorphic tendency might indicate an individual's greater preference to seek out objects that imitate socialization, reflecting a desire for social connections and interaction. Studies have demonstrated that extroverts may seek and use more untraditional social strategies during the pandemic (i.e., COVID-19) when other social options are unavailable (Naidu et al., 2022). This research may help to explain some discrepancies in our investigation, suggesting that people with depression might use more social surrogates to compensate for interpersonal deficits when they have specific traits (e.g., rejection sensitivity, insecure attachment, loneliness). Furthermore, greater social network index and anthropomorphic tendencies may reflect an individual's greater preference to seek out objects to socialize with, reflecting a desire for social relationships, especially during the pandemic.

5. Conclusion

Many research argued for a fundamental and underlying need to belong and the experience of inclusion and connectedness with others (e.g., Baumeister & Leary, 1995). We anticipated that individuals would seek social substitutes when they were deficient in social life or ability. Our results indicated that people spend more time on social surrogates when their depressive symptoms are more severe, proving our first hypothesis. Our second hypothesis suggests that the association between depression and social surrogate use is mediated by (increased) loneliness, social isolation, rejection sensitivity, and insecure attachment; however, only rejection sensitivity negatively affects social surrogate use but is contradictory to our hypothesis. In addition, we did not find the relationship between depression and social surrogate use through loneliness, insecure attachment style, social network diversity or size as the mediators. However, we found that anthropomorphic tendency positively mediated the relationship between depression and social surrogate use.

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