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RESEARCH ARTICLE

Interpersonal Competence and Meaning in Life for University Students: A multi-group Model

Wei Luo[1] (✉), Zhongquan Li[2]

[1] *Psychological health education center of Hunan University, Changsha 410082, China*
[2] *Department of psychology in Nanjing University, Nanjing 210008, China*

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ABSTRACT

Background: With the COVID-19 pandemic in the first half of 2020, most colleges in China delayed in-person instruction. During this period, interpersonal isolation (social isolation) emerged, which created a natural "laboratory" for examining students' attitudes and feelings toward social interaction. This study aimed to analyze the mediating effect of sense of security (SS) and the moderating effect of social perception on the associations between interpersonal competence (IC) and the presence of meaning.

Methods: A cross-sectional study was conducted among 1,161 university students after the COVID-19 lockdown in China. A structural equation modeling approach was applied to examine the mediating effect of SS on the association between the presence of meaning and IC. A multigroup analysis was used to comprehend the moderating effect of social perception on the model.

Results: SS indicated a complete mediating effect on the path from IC to the presence of meaning in the social preference group. Meanwhile, the moderating effect of social perception mainly occurred on the pathway of IC to SS between the social avoidance and social preference groups.

Conclusions: IC influences the presence of meaning through different paths for different groups. University students with social preference are more capable of obtaining SS from their IC and further experience more meaning in life.

1 Introduction

The sense of meaning in life is an acknowledged psychological resource [1]. General belief states that the sense of meaning is the meaning of life extracted from an individual's experience, which mainly includes comprehension of life, sense of coherence, life purpose, and existential mattering of one [2, 3]. Existentialist psychology holds that human beings pursue the existence of "meaning" in their relationships and that individuals seek meaningful connections all their lives [4]. People must clarify themselves, the world, and their relationship with the world, they need to know what they are and what they are going to do, and how they will strive to achieve their goals to establish their importance and sense of value in their existence [5, 6]. According to a recent global

Corresponding author: Wei Luo. Email: luowei.1994@foxmail.com

survey, meaning in life plays the most stable role among the factors that affect subjective well-being, and it has a close and consistent relationship with all subjective well-being indicators in people from all regions and ages worldwide [7]. Therefore, psychological researchers have focused on clarifying the factors that influence meaning in life and its mechanism of helping people regain their inner strength and happiness.

Previous studies have indicated that interpersonal relationship has a significant positive effect on meaning in life and that improving one's interpersonal relationship can enhance an individual's sense of meaning in life [8]. When an individual's interpersonal relationship is jeopardized, the meaning in life will be seriously affected [9]. In addition, intercourse problems can significantly and negatively predict an individual's experience of meaning in life [10, 11]. Therefore, the perspective of theories or empirical studies showing the influence of interpersonal relationships on the sense of meaning in life is relatively confirmed: better relationships simultaneously with experiencing more meaning in life [12]. Interpersonal relationships imply many hidden factors, including interpersonal competence (IC). Given that universities currently emphasize cultivating students' IC, directly examining the effect of IC on the meaning in life can be more practical. Previous studies have shown that IC can help improve the social adaptation level of adolescents [13], and good IC can relieve depression, reduce pressure, and help enhance the quality of life [14]. People manifesting low IC are prone to be rejected, excluded, isolated, or neglected by others; as their basic psychological needs for belonging and relationships are not met, they may lack positive social connection and meaning in life [15]. With age, adolescents can increasingly further develop and employ social skills to create relationships with peers that are marked by higher intimacy levels [16]. Moreover, IC can be changed through interventions, particularly in the early years of life (i.e., childhood and adolescence) [17]. Thus, in many school courses, the IC of students has been emphasized[18]. However, the recent emergence of "hollow disease" among Chinese college students has begun to challenge this statement. The "hollow disease" refers to a psychological phenomenon of "comprehensive and diversified symptoms" with "*lack of sense of meaning in life*" as the core[19]. Students with hollow disease may have strong IC, they make friends widely, know more people, and get good feedback from others[20]; however, they cannot experience the meaning of life and may even commit suicide [21]. The main characteristics of hollow disease are similar to depression in terms of symptoms, presenting low mood, decreased interest, and lack of pleasure. However, the main difference between the two is that medical treatment for hollow disease is ineffective. Depression, as a mental illness, can be healed by electroconvulsive therapy or drug treatment; however, these methods are not effective for students with hollow disease[20]. Second, most "sick" students value the establishment of interpersonal relationships and the shaping of their self-image. Mostly, they put their effort into maintaining the image of "good children," "good students" in the eyes of others rather than their internal needs. Therefore, even if they achieved their goals, they still feel exhausted internally [22]. They feel bitterness when the results do not satisfy their objectives; however, even if they reach their goal, they still feel meaningless.

From the perspective of hollow disease, emphasizing the establishment of interpersonal relationships may not necessarily bring meaning to life. Previous studies have suggested that an interpersonal relationship can help individuals construct meaning in life by reducing loneliness and increasing the sense of connection [15, 23, 24].

Considering the characteristics of hollow disease, we contend that some university students sometimes have social needs that are not formed spontaneously "from the inside out" but are affected by external social evaluations. They feel obligated to maintain a good social relationship. These students tend to feel anxious about social relations and fear rejection. They are not good at using their IC to solve problems alone. In this situation, emphasizing the importance of social relations may bring them more panic. Social anxiety showed a significant negative correlation with the sense of security (SS) [25]. According to Maslow's hierarchy of needs, social motivation arises when people's safety needs are met. People who lack SS have difficulty trusting others, are easily irritated, and feel rejected and not accepted. We hypothesize that IC can help build meaning in life by internalizing an SS; although people can use IC to develop interpersonal relationships, they would not obtain many life-meaning experiences from these relationships in the absence of SS, which is similar to the phenomenon of "hollow disease."

Although many studies have explored the IC process on the presence of life-meaning, the level of sensitivity and diversity of groups in this process are less considered. That is, what kind of group is more likely to be affected by interpersonal relationships? What kind of group is not sensitive to interpersonal relationships when constructing their meaning in life? These are the core elements of this paper. According to the Interpersonal Psychological Theory of Suicide, suicidal desire occurs when an individual simultaneously experiences thwarted belongingness and perceived burdensomeness (i.e., interpersonal needs) [26]. It must be emphasized that this frame includes the social pressure perceived. For the perceived social pressure, previous studies have mostly used self-designed questionnaires to measure people's perceived social pressure. For example, Dejonckheere et al. measured the perceived social pressure of participants by asking them questions such as "Today, I felt a great deal of pressure from others around me" in the form of a diary for 30 consecutive days [27]. Specifically, with the emergence of the COVID-19 epidemic, Yu et al. measured the perceived effect of COVID-19 on participants by asking them questions, such as "Please assess the impact of the COVID-19 epidemic on your physical health" [28]. Some studies have also pointed out that the "social expectancies about depression and anxiety scale" can be used to evaluate participants' perceived social expectancies [29] and the fear of negative evaluation scale to assess the level of fear of a person when being negatively evaluated [30]. It appears to equate "social expectations/evaluation" with "social pressure"; however, this approach does not reflect participants' attitudes toward social interaction. Therefore, we took advantage of the COVID-19 pandemic in the first half of 2020; during that period, most colleges in China delayed in-person instruction, and online learning behaviors during the epidemic also meant less social pressure than the in-person one [31]; thus, an environment of interpersonal isolation (social isolation) was created [32], which provides a natural "laboratory" for examining college students' attitudes and feelings toward social interaction. If college students could feel a sense of belonging and be free of perceived burdensomeness in their daily social interaction, they would enjoy socializing. We try to measure this psychological construct with simple questions, taking advantage of the "laboratory."

Accordingly, this study intends to make the social feelings of college students during the home isolation period a moderating variable, assuming that the epidemic creates a context without social pressure. College students who feel relieved in this situation tend to be classified as the social avoidance group. By contrast, those who do not

think that the epidemic has helped them avoid many unnecessary social interactions (reflecting their social preferences) tend to be classified as the social preference group. Based on these perspectives, we investigated the effect of different social perceptions (SPs) on the path from the IC to the presence of meaning. The path to be verified is shown in Figure 1.

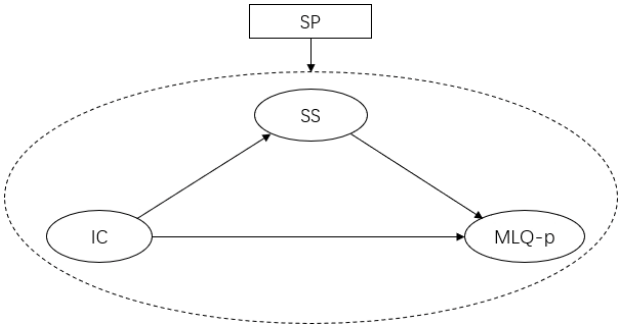

Figure 1 Basic hypothesis model in this study. IC, interpersonal competence; MLQ-p, MLQ-presence; SP, social perception; SS, sense of security.

2 Methods

2.1 Participants

Data were collected in the fall semester (September to December 2020) from a university in China. The random cluster (8 teaching classes were randomly selected by the academic affairs office) and convenient sampling method were used to recruit participants. In each class, the author showed the star QR code of the questionnaire during the break and explained the voluntary participation and security principle. In total, 1,161 students completed the questionnaire between classes. Eighteen respondents were removed from the final sample because of quality issues [Exclusion criteria: (1) The total scores of the two scales (SS and IC do not contain reverse-scoring items) are both extreme, and the overall response time was ≤70 s (1 participant was excluded); (2) the overall response time was <60 s (The questionnaire consists of 59 items, which usually takes 3–7 minutes to read and answer), and 17 participants were excluded accordingly. On closer examination, the 18 respondents always selected the same order option], and the effectiveness rate of the questionnaire was 98.45%. Thus, the results are based on responses from a sample of N = 1,143 respondents from different majors (economics, management, engineering, literature, and history) and a mean age of 19.38 (standard deviation, 0.87) years. Among them, 632 (55.29%) were male, and 511 (44.71%) were female.

2.2 Instruments

2.2.1 Meaning in Life Questionnaire (MLQ)

The MLQ includes two subscales: the presence of meaning (MLQ-p) and the search for meaning (MLQ-s) [6]. The MLQ-p has five items measuring how meaningful are the respondents' lives (e.g., "I understand my life's meaning"). The MLQ-s subscale has five items measuring how engaged and motivated the respondents are in terms of efforts to find meaning or deepen their understanding of meaning in their lives (e.g., "I am looking for something that makes my life feel meaningful"). All items are scored by points ranging from 1 to 7. For example, "absolutely untrue" scored 1 point, whereas "absolutely true" scored 7 points. Except for the item "My life has no clear purpose," the higher the score of other items, the stronger the sense of having meaning or the motivation to pursue meaning. In this study, the internal consistency coefficients of the two subscales were 0.814 and 0.819. According to the research purpose, the MLQ-p was used for the subsequent analysis.

2.2.2 College Students' IC Questionnaire (ICQ)

IC was measured by the brief version of the ICQ for Chinese college students revised by Zeng (2009), which was simplified from the original version by Buhrmester et al. [33]. The scale consists of 15 items divided into five dimensions:

initiative, rights protection, honesty, emotional support, and managing conflict. It adopts five levels of scoring: 1 = very difficult and 5 = very easy. The higher the scores, the stronger the individual's IC. The ICQ-15 demonstrated satisfactory internal consistency reliability among Chinese adolescents in previous studies [34]. The Cronbach's α coefficient measured using the full scale in this study was 0.881.

2.2.3 SS Scale

SS is defined as an individual's physical or mental feelings toward the level of danger and risk in the surroundings and their sense of power or powerlessness to address such threats. It is mainly manifested in terms of interpersonal security and feelings of control, namely, interpersonal security and certainty in control [25]. The interpersonal security subscale (8 items) assesses feelings of security during interpersonal communication, whereas the certainty in control subscale (8 items) assesses the sense of control over life and life's uncertainty. Items are presented using a 5-point Likert scale, with responses ranging from 1 (not at all true for me) to 5 (extremely true for me). The higher the score, the weaker the SS of a person [35]. In this study, the internal consistency coefficients of the two subscales were 0.868 and 0.890.

2.2.4 Measurement of SP

SP is measured by two questions shortly after social isolation: (1) "During the lockdown period of the epidemic, were you eager to socialize?" (2) "Do you think the COVID-19 pandemic has helped you avoid many useless social interactions?" The first question measures the social motivation of university students, and the second question may reflect the implicit perception of social pressure because this question does not directly ask about social attitude but indicates it. We assumed that if the answer was "yes," the respondents felt obvious social pressure in daily interactions (so they thanked the social isolation environment that created delayed in-person instruction). If the answer was "no," the respondents felt cozy in daily social interactions (so they did not appreciate the social isolation environment). Accordingly, students can be divided into the social avoidance group (325 respondents selected "no" for the first question and "yes" for the second question) and social preference group (335 respondents selected "yes" for the first question and "no" for the second question).

2.3 Statistical Analysis

Data were analyzed by IBM SPSS version 22.0 (Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp), MPlus 7.0 and IBM Amos 24.0. First, the common method bias test was conducted, and factor analysis and descriptive statistics were employed. Finally, the structural equation model was established. The regression path was established with the MLQ-p as the dependent variable (Y), IC as the independent variable (X), SS as the mediating variable (M), and SP as the moderating variable (Z, Z = 1 as the social avoidance group, Z = 2 as the social preference group): (1) X regressed to Y, (2) X regressed to M, (3) X and M regressed to Y to analyze the mediating effect, and (4) establishing a structural equation model about X, Y, and M by MPlus 7.0. According to a previous study [36], the following criteria were used to assess fit indicators: comparative fit index (CFI) > 0.90, Tucker–Lewis index (TLI) > 0.90, and root-mean-square error of approximation (RMSEA) < 0.08. (5) The multigroup analysis was conducted to test the moderating effect of Z using Amos 24.0 [37]. This study hypothesized that the interrelationships among variables X, Y, and M will differ between groups with different SPs (variables Z) (Figure 1). A multigroup SEM analysis can test this hypothesis by fitting a model in which the path

coefficients are constrained to equality for the different SP groups and then evaluate the change in the fit of this model compared with a model without constraints. Metric invariance exists when the differences between unconstrained and constrained multigroup analyses are not significant (Chi-square difference, $\Delta\chi 2 \geq 0.05$) [38]. Furthermore, pairwise parameter comparisons were conducted to test the difference in the path coefficients between the two groups (*z-score*). The significance of the moderating effect was tested according to the following: absolute *z-score* value = 1.64, $p = 0.1$; absolute *z-score* value = 1.96, $p = 0.05$; and absolute *z-score* value = 2.58, $p = 0.01$.

3 Results

3.1 Preliminary Analyses

Since IC, SS, and meaning in life are measured by the self-reported method, this may lead to common method bias. To avoid this, first, the procedure should be standardized as perfectly as possible, such as utilizing measurement tools with high reliability and validity, answering anonymously, and using reverse-scoring statements for questionnaire items. In addition, the homogeneity of variance test and Harman single factor method were used to test the common method bias by IBM SPSS 22.0. The eigenvalues of nine factors were >1. The variance explained by the first factor was 23.30%, far less than the critical standard of 40%, all of which confirmed no obvious common method bias in this study.

3.2 Factor Analysis

Before constructing the structural model, exploratory factor analysis and confirmatory factor analysis (CFA) were performed to check the measurement structure of the scales by MPlus 7.0. The fit index of CFA is shown in Table 1. The factor loadings for all variables were >0.50, which is acceptable in the CFA [31]. These results for factor loadings can also be seen in Supplementary Materials.

Table 1 Fit index of the ICQ, SS, and MLQ scales

Scale	RMSEA	CFI	TLI
Interpersonal competence questionnaire (5-factor model)	0.064	0.958	0.945
Sense of security scale (2-factor model)	0.069	0.938	0.926
Meaning in life questionnaire (2-factor model)	0.073	0.949	0.933

3.3 Descriptive Statistics of Major Variables

The independent sample t-test was performed with SP as the independent variable and IC, SS, and MLQ-p as dependent variables (Table 2). The results illustrated that the social preference group had more SS ($T = 7.227$, $p < 0.001$), better IC ($T = 6.171$, $p < 0.001$), and higher MLQ-p subscale scores ($T = 4.373$, $p < 0.001$). This statistics preliminarily verified the hypothesis that SP would affect the original model.

3.4 Structural Equation Model

3.4.1 Mediating Role of Security

According to the path hypothesis in the Introduction, the first step is to use the regression equation $Y = cX + e1$ (Equation 1) to test whether the direct effect of IC on MLQ-p is significant. The test result of Equation 1 showed that IC significantly affected MLQ-p, $c = 0.295$, $p < 0.001$. The second step is to establish a regulated intermediary model using regression equations: $M = aX + e2$ (Equation 2) and $Y = c'X + bM + e2$ (Equation 3), to test whether coefficients a and b are significant. The test result of Equation 2

Table 2 Descriptive statistics of the major variables

Group	MLQ-p	IC	SS
Social avoidance ($N = 325$)	21.93 ± 5.35	49.51 ± 8.59	45.59 ± 11.11
Social preference ($N = 335$)	23.74 ± 5.27	53.54 ± 8.20	39.31 ± 11.21

Note: The data were represented as mean ± standard deviation.

showed that the regression effect of IC on the SS is significant, a = −0.382, $p < 0.001$. The test result of Equation 3 showed that the effect of IC on MLQ-p is significant, $c' = 0.167$, $p < 0.001$. SS has a significant effect on having meaning, b= −0.313, $p < 0.001$. In the third step, ab and c' have the same sign, indicating a partial mediation effect. BOOTSTRAP was set to 1000, and a structural equation model was established, as shown in Figure 2. The model fitting index was within an acceptable range. College students' SS partially mediated the association between IC and MLQ-p, and the mediating effect accounted for 37.41% of the total effect.

3.4.2 *Moderating Role of SP*

To explore whether SP plays a moderating role in the relationship of IC, SS, and presence of meaning, a multigroup analysis was conducted to compare the differences in variable relationships between the social avoidance and social preference groups and explore whether the path coefficient in Figure 2 satisfies the measurement invariance in these two groups. We set the following: (1) free estimation of factor loadings and intercepts (model A, configural invariance), (2) invariance of factor loadings (model B, metric invariance), (3) invariance of factor loadings and item intercepts (model C, scalar invariance), and (4) invariance of factor loadings, item intercepts, and residuals (model D, strict invariance). Models D, C, B, and A were nested in turn: based on model A, model B restricted the factor loadings of the measurement model parts (Figure 3, blue lines) of different groups to be equal. Based on model B, model C restricted the path coefficients of the structural model parts (Figure 3, green lines) of different groups to be equal. Based on model C, model D restricts the residuals of factors (Figure 3, red lines) of different groups to be equal. The results show no significant difference between the social avoidance and social preference groups in the measurement model but a significant difference in the structural model (Table 3).

The mediating effects of the two groups were analyzed. The indirect effect of SS in the social avoidance group was 0.105 ($p < 0.001$), whereas the indirect effect of SS on the social preference group was 0.174 ($p < 0.001$). Particularly, the direct effect of IC on the presence of meaning was 0.288 ($p < 0.001$) in the social avoidance group, whereas the direct effect was not significant in the social preference group (IC → MLQ-p's

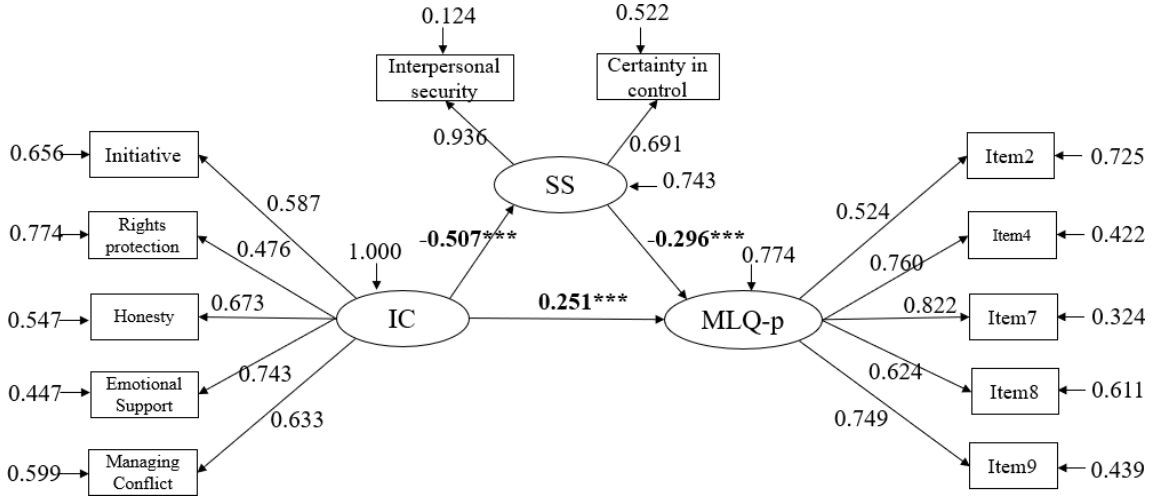

Figure 2 Mediating effect of SS between IC and MLQ-p. n = 1143, CFI = 0.929, TLI = 0.908, RMSEA = 0.075. IC, interpersonal competence; MLQ-p, presence of meaning in life; SS, sense of security. The direct effect of IC on MLQ-p was 0.251, and the indirect effect through SS was 0.150. The proportion of the indirect effect in the total effect was 0.150/(0.150 + 0.251) = 37.41%. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 3 Equivalence fitting indices of two groups of SEM (z = 1 vs. z = 2)

Model	$\chi 2$	*df*	Model comparison	$\Delta\chi 2$	Δdf	*p*-value
A. Unconstrained	293.022	102		-	-	-
B. Measurement weights	309.752	111	B vs. A	16.730	9	0.053
C. Structural weights	322.556	114	C vs. B	12.804	3	0.005
D. Structural residuals	324.184	117	D vs. C	1.628	3	0.653

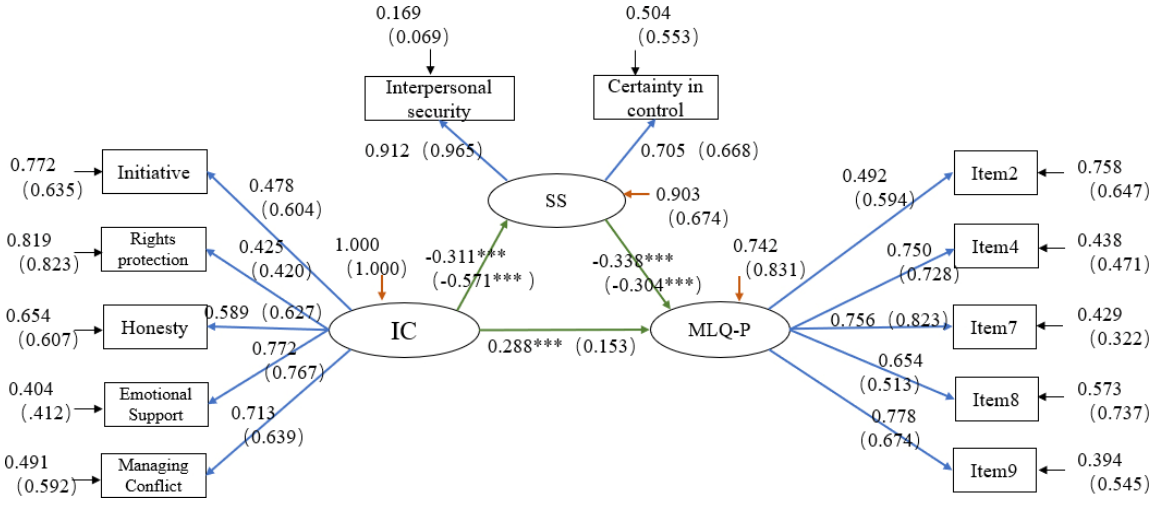

Figure 3 Mediating role of SS between IC and MLQ-p and its multigroup analysis model *Note*: IC, interpersonal competence; MLQ-p, presence of meaning in life; SS, sense of security. The standard coefficient of the social avoidance group is presented outside the brackets (Z = 1), *n* = 325, CFI = 0.897, TLI = 0.866, RMSEA = 0.087. The standard coefficient of the social preference group is provided inside the brackets (Z = 2), *n* = 335, CFI = 0.945, TLI = 0.929, RMSEA = 0.062. *** $p < 0.001$.

coefficient = 0.153, $p = 0.078$), indicating a complete mediating effect.

Furthermore, the pairwise parameter comparisons (see Table 4) showed that the moderating effect of SP mainly occurs on the pathway IC to SS, whose *z* score was 1.642, greater than the rejection criteria (±1.64: $\alpha = 0.10$; ±1.96: $\alpha = 0.05$), which showed a significant modulation effect at the 90% confidence level.

Table 4 Path comparisons across social perception

	Standard path coefficient		
	IC→SS	IC→MLQ-*p*	SS→MLQ-*p*
Social avoidance group (*n* = 325)	−0.311	0.288	−0.338
Social preference group (*n* = 335)	−0.571	0.153	−0.304
Pairwise parameter comparisons (*z*)	1.642*	1.343	0.029

Note. IC, interpersonal competence; MLQ-p, presence of meaning in life; SS, sense of security. * $p < 0.05$

4 Discussion

4.1 What This Study Adds to the Existing Evidence

The results of this study support the view of existentialist psychological theory, that is, human interaction has a significant effect on life-meaning experience; however, SP plays a moderator role in it. Recent studies have shown that fear of negative evaluation can exert important effects on the presence of meaning and suicidal ideation [30]. However, recent studies regard SP as a moderating variable to directly observe how different SPs affect the path of constructing meaning in life. This reveals that the key to being good at socializing is that they can gain an SS from socializing. In SP measurement, this study used the natural non-social stress situation created

during the lockdown period of the epidemic to set indices to investigate the implicit social preferences of college students. The social avoidance group experiences more psychological insecurity and has weaker IC and less presence of meaning.

In addition, real social interaction is conducive to enhancing the sense of the meaning of life and those "useless social interactions," which inevitably have no effect on promoting the meaning in life, and excessive social interaction caused by external pressure will also bring fatigue and reduce social interest. This study shows that SS plays a complete mediating role in the association between IC and meaning of life only for the social preference group. In this group, the direct effect of IC on the presence of meaning is not significant. Specifically, the main difference between the social preference and social avoidance groups in the path of establishing meaning comes from the IC to SS. These results validate our hypothesis: for college students not in favor of socializing, the key problem lies in how to gain an SS from socializing. Social-avoidant students need more social tolerance to cultivate their sense of interpersonal security and certain control in a relatively relaxing atmosphere and exploit psychological security in improving their meaning in life experience. As suggested by the interpersonal theory, many treatments may focus on improving effective interpersonal skills to enhance social support (e.g., dialectical behavior therapy and cognitive behavioral analysis system of psychotherapy). These treatments encourage people to engage more in social activities to build meaningful social connections [26]. However, this study emphasizes that such treatments may work for social enthusiasts; however, for social evaders, it may lead to one's meaning confusion instead of reaching the meaning of life.

4.2 Limitations

This study has limitations. First, this was a cross-sectional study; thus, causal effects could not be examined. Then, the samples were limited, restricting the research objects in the same school and grade can well control confounding factors such as learning environment and social expectations; however, it also limits the external validity. Finally, as for the measurement of SP, it is difficult to accurately define people's social tendencies. Notably, perspectives based on a "problem perspective" are prone to attaching negative labels to adolescents [34], which may influence their answers, particularly under circumstances where we advocate socializing. This study took advantage of the natural "laboratory" that COVID-19 provided, in which students experienced an environment without social pressure, to evaluate their feelings during this period and then extract their SP. We used direct and indirect questions to group students' SP; however, this approach still lacks reliability and validity testing.

4.3 Implications for Practice

IC helps improve meaning in life; however, we should pay attention to establishing real relationships. This study discusses the relationship between IC and meaning in life. The two variables are measured by scales and cannot reflect the true relationship among people. Future studies could focus more on other measurement methods (e.g., behavioral measurement) of interpersonal relationships. Meanwhile, the discovery of hollow disease suggest us to not simply focus on building relationships but on enhancing internal SS. For people who have felt social pressure, we can first pay attention to their SS instead of develop their interperaonal competence directly. To improve SS, we can first think about what results in unsafe experience: the irrational belief defined in Ellis' rational-emotive therapy is "I must." Because of "I must," people have a sense of frustration, intolerance, nonacceptance of

themselves, and other psychological conflicts (Ellis, A., 1991). Besides, religiousness and cultural background often set the standard of "good man" and then influence self-reported levels of meaning in life [39, 40]. From this perspective, the interpersonal confusion of college students may also come from the conflicts between the fundamental source of their sense of meaning and social expectations. Popularity brings psychological pressure to people who are not good at interpersonal relationship, and hollow disease appears in disguise. Thus, we should not emphasize what kind of person we must be and give more tolerance and understanding to students who do not like or not dare to socialize. In that case, we would have more room for development as we are, which may update the concept of public mental health and relieve "hollow disease" in university.

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Author Contribution

W.L. analyzed the data and prepared the first draft of the manuscript. W.L. and Z.Q.L. participated in the conception and design of the study, Z.Q.L. constructively revised the manuscript; W.L. participated in data collection and organization. All authors commented on previous versions of the manuscript and approved the final version.

Declaration of conflicting interests

The authors declare no conflict of interest.

Data Availability Statement

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

Ethics approval

Not applicable.

Consent to participate

Not applicable.

References

[1] Schnell, T., Krampe, H. Meaning in life and self-control buffer stress in times of COVID-19: Moderating and mediating effects with regard to mental distress. *Frontiers in Psychiatry*, **2020**, 11: 582352.

[2] Heintzelman, S. J., King, L. A. Life is pretty meaningful. *American Psychologist*, **2014**, 69(6): 561–574.

[3] King, L. A., Hicks, J. A. The science of meaning in life. *Annual Review of Psychology*, **2021**, 72: 561–584.

[4] Heine, S. J., Proulx, T., Vohs, K. D. The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review*, **2006**, 10(2): 88–110.

[5] Aftab, A., Lee, E. E., Klaus, F., Daly, R., Wu, T. C., Tu, X., Huege, S., Jeste, D. V. Meaning in life and its relationship with physical, mental, and cognitive functioning. *The Journal of Clinical Psychiatry*, **2019**, 81(1): 19m13064.

[6] Steger, M. F., Frazier, P., Oishi, S., Kaler, M. The meaning in life questionnaire: Assessing the presence

of and search for meaning in life. *Journal of Counseling Psychology*, **2006**, 53(1): 80–93.

[7] Jebb, A. T., Morrison, M., Tay, L., Diener, E. Subjective well-being around the world: Trends and predictors across the life span. *Psychological Science*, **2020**, 31(3): 293–305.

[8] Zhang, R., Pual, T. P. W., Li, D. The Effects of Relationship and Self-Concept on Meaning in Life: A Longitudinal Study. *Psychological Science*, **2020**, 43(05): 1154–1161.

[9] O'Donnell, M. B., Bentele, C. N., Grossman, H. B., Le, Y. Y., Jang, H., Steger, M. F. You, me, and meaning: An integrative review of connections between relationships and meaning in life. *Journal of Psychology in Africa*, **2014**, 24(1): 44–50.

[10] Chao, M., Chen, X. M., Liu, T., Yang, H. B., Hall, B. J. Psychological distress and state boredom during the COVID-19 outbreak in China: The role of meaning in life and media use. *European Journal of Psychotraumatology*, **2020**, 11(1): 1769379–1769379.

[11] Yin, Y. The relationship between intercourse vexation and meaning of life: Cross-lagged regression analysis among college freshmen. *Psychological Research*, **2020**, 13(03): 275–281.

[12] Huber, L., Plötner, M., Schmitz, J. Social competence and psychopathology in early childhood: A systematic review.*European Child & Adolescent Psychiatry*, **2019**, 28(4): 443–459.

[13] Liu, J. S., Coplan, R. J., Chen, X. Y., Li, D., Ding, X. C., Zhou, Y. Unsociability and shyness in Chinese children: Concurrent and predictive relations with indices of adjustment. *Social Development*, **2014**, 23(1): 119–136.

[14] Liu, Y., Jing, L. J., Liu, Y., Wang, H. L., Yuan, T. G., Yang, J. Y. Active for life after cancer: Association of physical activity with cancer patients' interpersonal competence, quality of life, and survival beliefs. *Behavioral Sciences*, **2023**, 13(6): 449.

[15] Zhang, R., Ke, S., Lian, R., Li, D., The Association between Interpersonal Competence and Meaning in Life: Roles of Loneliness and Grade. *Psychological Development and Education*, **2020**, 36(5): 576–583.

[16] Danneel, S., Maes, M., Vanhalst, J., Bijttebier, P., Goossens, L. Developmental change in loneliness and attitudes toward aloneness in adolescence. *Journal of Youth and Adolescence*, **2018**, 47(1): 148–161.

[17] Durlak, J. A., Weissberg, R. P., Pachan, M. A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. *American Journal of Community Psychology*, **2010**, 45(3–4): 294–309.

[18] China University MOOC. 2023. Available at: https://www.icourse163.org/ (accessed 1 May 2023).

[19] Paulos, H., Xu, K. W. Investigating the causes and treatments of hollow disease through a dialogue between Finnish and Chinese education. *Theory and Practice of Psychological Counseling*, **2019**, 1(8): 329–372.

[20] Xu, K. W. Interpretation of "hollow disease" of the times. Shaanxi Education: Comprehensive Edition, 2016: 58–60

[21] Jin, Y. Research on the college students' hollow disease phenomenon affecting. Master Thesis, Lanzhou University, China, 2019.

[22] Wu, L. The Diagnosis and Treatment of Chinese Youth's "Hollow Disease" under the Perspective of Modernity. *Contemporary Youth Research*, **2018**, 352(1): 79–84.

[23] Lambert, N. M., Stillman, T. F., Hicks, J. A., Kamble, S., Baumeister, R. F., Fincham, F. D. To belong is to matter: Sense of belonging enhances meaning in life. *Personality & Social Psychology Bulletin*, **2013**, 39(11): 1418–1427.

[24] Van Tongeren, D. R., Green, J. D., Davis, D. E., Hook, J. N., Hulsey, T. L. Prosociality enhances meaning in life. *The Journal of Positive Psychology*, **2016**, 11(3): 225–236.

[25] Pan, Z. X., Zhang, D. J., Hu, T. Q., Pan, Y. G. The relationship between psychological Suzhi and social anxiety among Chinese adolescents: The mediating role of self-esteem and sense of security. *Child and Adolescent Psychiatry and Mental Health*, **2018**, 12: 50.

[26] Chu, C., Buchman-Schmitt, J. M., Stanley, I. H., Hom, M. A., Tucker, R. P., Hagan, C. R., Rogers, M. L., Podlogar, M. C., Chiurliza, B., Ringer, F. B. et al. The interpersonal theory of suicide: A systematic review and meta-analysis of a decade of cross-national research. *Psychological Bulletin*, **2017**, 143(12): 1313–1345.

[27] Dejonckheere, E., Bastian, B., Fried, E. I., Murphy, S. C., Kuppens, P. Perceiving social pressure not to

feel negative predicts depressive symptoms in daily life. *Depression and Anxiety*, **2017**, 34(9): 836–844.

[28] Yu, Y. J., Yu, Y. J., Hu, J. X. COVID-19 among Chinese high school graduates: Psychological distress, growth, meaning in life and resilience. *Journal of Health Psychology*, **2022**, 27(5): 1057–1069.

[29] Dejonckheere, E., Bastian, B. Perceiving Social Pressure not to Feel Negative is Linked to a More Negative Self-concept. *Journal of Happiness Studies*, **2021**, 22(2): 667–679.

[30] Yongju, Yu. Perceived stress from interpersonal relations predicts suicidal ideation in Chinese university students: Roles of meaning in life and coping humor. *Heliyon*, **2023**, 9(3): e14106.

[31] Zhang, P. Understanding digital learning behaviors: Moderating roles of goal setting behavior and social pressure in large-scale open online courses. *Frontiers in Psychology*, **2021**, 12: 783610.

[32] Ford, M. B. Social distancing during the COVID-19 pandemic as a predictor of daily psychological, social, and health-related outcomes. *The Journal of General Psychology*, **2021**, 148(3): 249–271.

[33] Buhrmester, D., Furman, W., Wittenberg, M. T., Reis, H. T. Five domains of interpersonal competence in peer relationships. *Journal of Personality and Social Psychology*, **1988**, 55(6): 991–1008.

[34] Huang, L. Y., Huang, J. R., Chen, Z. C., Jiang, W. W., Zhu, Y., Chi, X. L. Psychometric properties of the Chinese version of the brief interpersonal competence questionnaire for adolescents. *Children*, **2022**, 10(1): 59.

[35] Cong Z., An L. Developing of security questionnaire and its reliability and validity. *Chinese Mental Health Journal*, **2004**, 18(2): 97–9.

[36] Wen, Z. L., Hau, K. T., Marsh, H. W. Structural equation model testing: cutoff criteria for goodness of fit indices and chi-square test. *Acta Psychologica Sinica*, **2004**, 36(2): 186-194

[37] Elodie, G. Effects of materialism on problematic smartphone dependency among adolescents: The role of gender and gratifications. *International Journal of Information Management*, **2020**, 54: 102134.

[38] Schmitt, N., Kuljanin, G. Measurement invariance: Review of practice and implications. *Human Resource Management Review*, **2008**, 18(4): 210–222.

[39] Davis, W. E., Hicks, J. A. Judgments of meaning in life, religious beliefs, and the experience of cognitive (dis)fluency. *Journal of Personality*, **2016**, 84(3): 291–305.

[40] Zhang, H., Sang, Z. Q., -S Chan, D. K., Teng, F., Liu, M., Yu, S., Tian, Y. Sources of meaning in life among Chinese university students. *Journal of Happiness Studies*, **2016**, 17(4): 1473–1492.

Wei Luo received her bachelor's degree in preventive medicine from Xiamen University, China (2017) and master's degree in psychology from Nanjing University, China (2020). She is now a teacher and counselor at the Psychological Health Education Center of Hunan University (China). She has published a series of high-quality papers on journals including Frontiers in Behavioral Neuroscience, Journal of Environmental Psychology, Acta Psychologica Sinica and the Chinese Mental Health Journal. Her current research has focused on cognitive neuroscience, psychometry, and mental health education for college students. Email: luowei.1994@foxmail.com.

Zhongquan Li received his degree from School of Psychology, Beijing Normal University, China (2008). He is now a professor in Nanjing University, China. He has published a series of high-quality papers on journals including BMC Geriatrics and Acta Psychologica Sinica. His current research interests focus on emotion, emotion regulation, and decision-making. E-mail: zqli@nju.edu.cn