Adolescent Online Personality Labeling and Mental Health: The Mediating Effect of Interpersonal Relationships

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Abstract: The rise of online personality assessments has drawn widespread attention, but their impact on adolescents' interpersonal relationships and mental health remains unclear. This study investigates how self-labeling from these assessments affects mental health through interpersonal relationships. This study explores the mediating role of interpersonal relationships between online personality labeling and mental health based on the usage of online personality assessments among adolescents. A questionnaire survey was conducted among 575 internet users aged 14-25 (135 males, 440 females). Online personality self-labeling, interpersonal relationships, and mental health were measured using three questionnaires. Through statistical analysis, a simple mediation model with interpersonal relationships as the mediating variable was constructed to analyze the relationship between self-labeling and mental health. The results show that interpersonal relationships significantly mediate the relationship between the cognitive-affective aspect of self-labeling and mental health, while the social performance aspect of self-labeling has a direct effect on the suppression aspect of mental health. This provides new directions for future research on self-labeling phenomena and the development of adolescent interpersonal relationships and mental health.

Keywords: Online personality assessment, self-labeling, adolescent interpersonal relationships, mental health

1. Introduction

In recent years, online personality assessments have gained popularity, helping individuals understand themselves and their behaviors, aiding personal growth. Adolescents, in a critical phase of socialization and self-identity, often turn to such tools for self-help when facing psychological challenges [1]. Labeling, a common socialization process, involves defining individuals or groups with specific traits rather than treating them as unique. Self-labeling [2] allows individuals to present themselves differently in various contexts. Over the past five years, discussions on self-labeling's impact on mental health, particularly depression and anxiety, have intensified, though its negative effects remain debated [3].

During the COVID-19 pandemic, the popularity of astrology on social media brought the Barnum effect [4] to the forefront. This study posits that the manifestation and development of the Barnum effect share commonalities with the concept of labeling. Existing research shows that the use of the Myers-Briggs Type Indicator (MBTI) can influence individual mental health through the

sequential mediation of the Barnum effect: promoting adolescent self-identity, enhancing subjective well-being, and reducing anxiety and depression [5].

This study aims to explore whether online personality assessments affect the development of adolescent interpersonal relationships and whether the use of online personality assessments can influence mental health (stress, anxiety, and depression) through the mediating role of interpersonal relationships. Additionally, it constructs a relevant questionnaire on labeling phenomena.

2. Study 1

2.1. Participants

Sample 1: Participants were randomly selected based on two criteria: "use of online personality assessments" and "depth of understanding." Four levels were created, with two participants from each level, totaling eight (average age 18±2). These participants helped determine preliminary scale dimensions.

Sample 2: A questionnaire was distributed randomly via Wenjuanxing, collecting 575 responses. Participants included 212 aged below 15, 114 aged 15-18, 153 aged 18-21, and 96 above 21. Of these, 135 were male (23.46%) and 440 were female (76.52%).

2.2. Dimension confirmation

Based on psychometric requirements, the scale items were constructed through two methods: interviews and literature review. The final dimensions were determined by statistical analysis.

2.2.1. Interviews

In the initial stage, one-on-one interviews were conducted to gather attitudes toward online personality assessments. Questions included views on assessments, agreement with results, summarizing personality in 2-3 words, applicability of adjectives, interest in related memes, and self-introduction based on assessment dimensions. Interviews, conducted via voice or text, lasted 45 minutes on average, with participants informed and consenting beforehand.

2.2.2. Literature review

Due to the small number of interviewees, we reviewed recent research on labeling and self-labeling stigmatization. We identified prerequisites for labeling from online personality assessments [6]: (1) experience with tests, (2) understanding results, and (3) accepting interpretations as "accurate." To refine the scale, we referenced Lopez et al.'s Barnum Sensitivity Level Scale and Conscious Behavioral Response Scale [4], and Yim et al.'s [7] self-report method. The scale dimensions were simplified to: (1) actions in specific situations, (2) agreement with assessment interpretations, and (3) belief in possessing certain traits. Based on interviews and literature, the dimensions were preliminarily set as social behavior performance, emotional response tendency, and self-cognitive evaluation.

2.3. Item development and adjustment

Initially, seven items were developed for each dimension, totaling 21 items, using a 5-point Likert scale (1= completely disagree, 5= completely agree). Participants were asked to answer based on their actual situation. The final scale included 10 items for social behavior performance, 9 items for emotional response tendency, and 10 items for self-cognitive evaluation, totaling 29 items.

2.4. Measurement tools

2.4.1. Self-labeling questionnaire

The self-labeling questionnaire developed in this study consists of 29 items, including dimensions of social behavior, emotional response tendency, and self-cognitive evaluation. All items were scored on a 5-point Likert scale, from 1 (completely disagree) to 5 (completely agree). Higher scores indicate stronger self-labeling.

2.4.2. Interpersonal relationship scale

The interpersonal relationship scale used in this study was developed by Zheng Richang et al. in 1999, consisting of 28 items across four dimensions: conversation, friendship, social interaction, and heterosexual interaction. In this study, the Cronbach's α coefficient was 0.912.

2.4.3. Depression-Anxiety-Stress Scale

The Depression-Anxiety-Stress Scale was developed by Lovibond et al. in 1995 and revised by Gong Xiang et al. in 2010. The scale consists of 21 items, including three subscales: depression, anxiety, and stress. In this study, the Cronbach's α coefficient was 0.943, with subscale coefficients of 0.894 (depression), 0.866 (anxiety), and 0.830 (stress).

2.5. Results

2.5.1. Item analysis

First, an item-total correlation analysis was conducted on all valid questionnaires (totaling 218). The results (Table 1) showed that all items were significantly correlated with the total score ($P < 0.01$), indicating good discrimination of the questionnaire.

Table 1: Labeling scale item-total correlation analysis

	Spurious correlation	Net correlation		Spurious correlation	Net correlation		Spurious correlation	Net correlation
1	0.477**	0.422**	11	0.589**	0.543**	21	0.618**	0.580**
2	0.551**	0.499**	12	0.581**	0.545**	22	0.304**	0.255**
3	0.511**	0.450**	13	0.565**	0.515**	23	0.280**	0.222**
4	0.701**	0.667**	14	0.508**	0.455**	24	0.292**	0.229**
5	0.481**	0.431**	15	0.625**	0.583**	25	0.605**	0.566**
6	0.366**	0.304**	16	0.726**	0.690**	26	0.557**	0.513**
7	0.445**	0.380**	17	0.653**	0.609**	27	0.636**	0.601**
8	0.386**	0.325**	18	0.673**	0.632**	28	0.358**	0.301**
9	0.593**	0.552**	19	0.640**	0.596**	29	0.562**	0.522**
10	0.591**	0.540**	20	0.515**	0.473**			

2.5.2. Reliability analysis

The Cronbach's α coefficient of the self-labeling questionnaire was 0.908, with sub-dimension coefficients of 0.788 (social behavior performance), 0.848 (emotional response tendency), and 0.765 (self-cognitive evaluation), indicating good reliability.

2.5.3. Validity analysis and exploratory factor analysis

An exploratory factor analysis was performed on valid questionnaires. The Bartlett's test (χ^2=2322.885, P<0.001) and KMO measure (0.891) confirmed the data's suitability for analysis. Principal component analysis with varimax rotation was applied to the component matrix. Items with dual or no loadings were removed iteratively, resulting in 24 items with a cumulative variance contribution of 47.76%. Four factors emerged: Factor 1 (9 items, "cognitive emotion"), Factor 2 (6 items, "interpersonal reactivity"), Factor 3 (5 items, "social performance"), and Factor 4 (4 items, "cognitive appraisal").

3. Study 2

3.1. Mediation effect analysis

This study aims to explore the impact of self-labeling on individual mental health development. Based on a review of relevant literature and theoretical research, interpersonal relationships were used as the mediating variable, and it was predicted that self-labeling would affect adolescents' mental health (depression, anxiety, and stress) through interpersonal relationships.

3.1.1. Labeling and mental health

In recent years, adolescents have used personality assessments to better understand themselves and others, and to seek psychological counseling and help when necessary [8]. Taking the popular online personality assessment MBTI [9] as an example, recent literature and research show that the use of MBTI can influence individual mental health through the Barnum effect and self-identity, enhancing subjective well-being and reducing anxiety and depression [5].

3.1.2. Interpersonal relationships as the mediating variable

Interpersonal relationships have long been regarded as a type of interaction and behavioral tendency between individuals and others, influenced by different types of objects, and have a significant impact on mental health [10]. This study uses interpersonal relationships as the mediating variable to explore whether self-labeling behavior affects individual mental health (depression, anxiety, and stress) through the mediating effect of interpersonal relationships.

3.1.3. Mediation model construction

In summary, this study uses the four dimensions of self-labeling (cognitive-emotion, interpersonal reactivity, social performance, and cognitive appraisal) as independent variables, interpersonal relationships as the mediating variable, and the three dimensions of mental health (depression, anxiety, and stress) as dependent variables to construct a simple mediation model, as shown in Figure 1 to Figure 4.
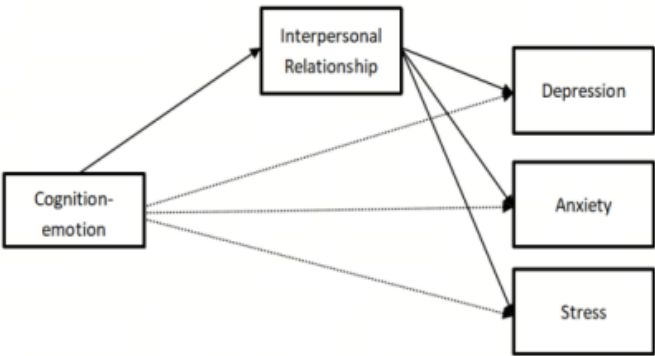
Figure 1: Simple mediation model of interpersonal relationships on cognitive emotion and mental health relationships
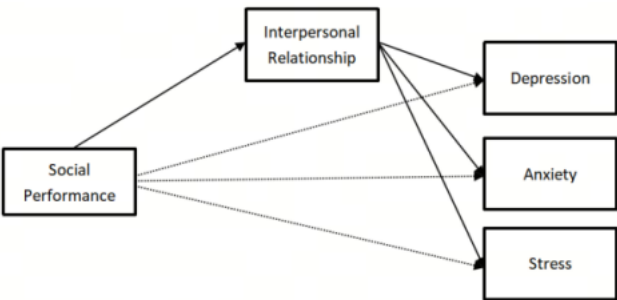

Figure 2: Simple mediation model of interpersonal relationships on social performance and mental health relationships
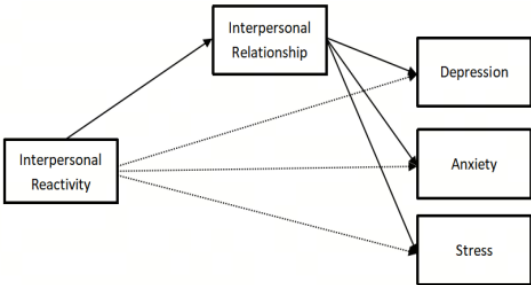

Figure 3: Simple mediation model of interpersonal relationships on interpersonal reactivity and mental health relationships
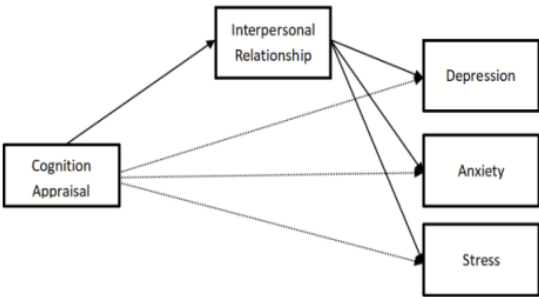

Figure 4: Simple mediation model of interpersonal relationships on cognitive appraisal and mental health relationships

3.2. Results

3.2.1. Correlation analysis

A correlation analysis was conducted between the four dimensions of the self-labeling scale and the interpersonal relationship scale and the three subscales of the Depression-Anxiety-Stress Scale. The results are shown in Table 2.

Table 2: Correlation between self-labeling scale and interpersonal relationship scale and Depression-Anxiety-Stress Scale

	Interpersonal Relationship	Depression	Anxiety	Stress
cognitive-emotion	0.177**	0.091	0.060	0.120
interpersonal reactivity	0.029	0.000	0.047	0.061
social performance	0.072	0.122	0.145*	0.162*
cognitive appraisal	-0.024	-0.022	0.033	0.067
Interpersonal Relationship	-	0.652**	0.651**	0.655**

3.2.2. Simple mediation analysis of interpersonal relationships

The simple mediation model tested the relationships between factors. The "cognitive-emotion" dimension significantly influenced interpersonal relationships [β= 0.185, 95% CI= (0.047, 0.323)] but had no direct effect on depression, anxiety, or stress. Interpersonal relationships significantly impacted depression [β=1.009], anxiety [β=0.927], and stress [β=0.902].

Using the Bootstrap method (5000 times), the "cognitive-emotion" dimension indirectly influenced depression [95% CI= (0.030, 0.347)], anxiety [95%CI= (0.025, 0.317)], and stress [95% CI= (0.020, 0.321)] through interpersonal relationships, showing significant mediation.

Similar analyses for "interpersonal reactivity," "social performance," and "cognitive appraisal" revealed no significant mediation effects.

The same method was applied to the remaining three dimensions: "interpersonal reactivity," "social performance," and "cognitive appraisal." The results are as follows:

- The "interpersonal reactivity" dimension had no significant effect on interpersonal relationships [β= 0.023, 95% CI= (-0.081, 0.127)], depression [β= -0.023, 95% CI= (-0.144, 0.099)], anxiety [β= 0.030, 95% CI= (-0.081, 0.141)], or stress [β=0.045, 95%CI=(-0.064, 0.154)]. Interpersonal relationships significantly influenced depression [β= 1.003, 95% CI= (0.846, 1.160)], anxiety [β= 0.912, 95% CI=(0.769, 1.055)], and stress [β= 0.901, 95% CI=(0.761, 1.041)]. The indirect effects of the "interpersonal reactivity" dimension on depression [95% CI= (-0.073, 0.122)], anxiety [95% CI= (-0.068, 0.111)], and stress [95% CI=(-0.064, 0.111)] through interpersonal relationships were not significant, indicating no mediation effect.

- The "social performance" dimension had no significant effect on interpersonal relationships [β= 0.064, 95% CI= (-0.055, 0.182)], but significantly influenced stress [β= 0.141, 95% CI= (0.019, 0.264)]. It had no significant effect on depression [β= 0.103, 95% CI= (-0.035, 0.242)] or anxiety [β= 0.123, 95% CI=(-0.003, 0.248)]. Interpersonal relationships significantly influenced depression [β= 0.994, 95% CI= (0.837, 1.150)], anxiety [β= 0.903, 95% CI= (0.761, 1.045)], and stress [β= 0.891, 95% CI= (0.753, 1.030)]. The indirect effects of the "social performance" dimension on depression [95% CI= (-0.080, 0.202)], anxiety [95% CI= (-0.071, 0.182)], and stress [95% CI= (-0.072, 0.176)] through interpersonal relationships were not significant, but the direct effect on stress [95% CI= (0.019, 0.264)] was significant, indicating no mediation effect.

- The "cognitive appraisal" dimension had no significant effect on interpersonal relationships [β= -0.024, 95% CI= (-0.161, 0.112)], depression [β= -0.010, 95% CI= (-0.170, 0.150)], anxiety [β= 0.070, 95% CI= (-0.076, 0.215)], or stress [β= 0.115, 95% CI= (-0.027, 0.257)]. Interpersonal relationships significantly influenced depression [β= 1.002, 95% CI= (0.845, 1.159)], anxiety [β= 0.915, 95% CI= (0.772, 1.057)], and stress [β= 0.906, 95% CI= (0.766, 1.045)]. The indirect effects of the "cognitive appraisal" dimension on depression [95% CI= (-0.173, 0.123)], anxiety [95% CI= (-0.160, 0.119)], and stress [95% CI= (-0.152, 0.114)] through interpersonal relationships were not significant, indicating no mediation effect.

In summary, the following effective mediation models were obtained (Figures 5-6):
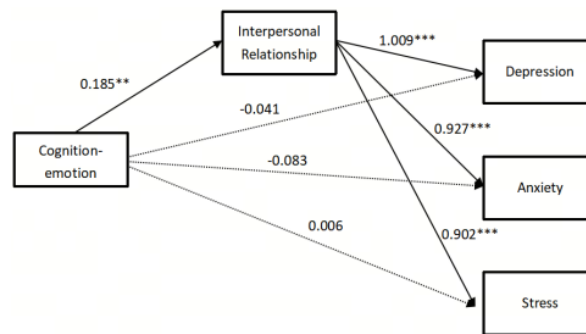

Figure 5: Simple mediation model of interpersonal relationships on cognitive-emotion and mental health relationships
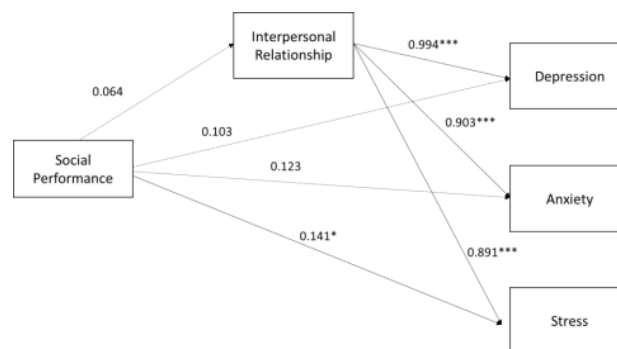

Figure 6: Simple mediation model of interpersonal relationships on social performance and mental health relationships

4.   Conclusion

This study found that interpersonal relationships fully mediate the link between the cognitive-affective aspect of self-labeling and mental health, while partially mediating the relationship between the social performance aspect and mental health. This supports the hypothesis that the cognitive-affective aspect influences interpersonal relationships, while the social performance aspect directly impacts mental health stress levels. Interpersonal relationships significantly mediate the cognitive-affective aspect's effect on mental health, with self-labeling in this area affecting interpersonal relationships, which in turn influence mental health (depression, anxiety, stress). Accepting online personality assessment results may provide psychological benefits through user feedback, impacting emotional processes [11]. Social networks and online memes also shape interpersonal relationships beyond real-life contexts [12]. Additionally, the social performance aspect significantly affects mental health stress, as labels and language influence identity formation [13],

shaping attitudes and behaviors. Therefore, individuals should use personality assessments as tools for self-awareness, interpreting results rationally rather than definitively.

Recent research on self-labeling has focused on stigmatization [14], mental health discrimination [15], and cultural differences [16, 17], with limited exploration of self-labeling from online personality assessments. Other studies have analyzed text features or used longitudinal tracking to examine labels' impact on mental health [18, 19]. This study employed a cross-sectional survey, limiting insights into how self-labeling affects interpersonal relationships and mental health over time or at key developmental stages. The survey was conducted during final exams, potentially skewing results due to participants' stress. Future research could use technology to analyze social media posts for deeper insights into user behavior. Additionally, improving the scale's representativeness by adding more items could better explore self-labeling's formation and its effects on interpersonal relationships and mental health.

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