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# Personality Traits, Coping Strategies, and Mental Health Outcomes Among Chinese University Students During COVID-19

**Jian Zhao, Elaine Chapman * and Stephen Houghton**

Graduate School of Education, The University of Western Australia, Perth, WA 6009, Australia; jian.zhao@uwa.edu.au (J.Z.); stephen.houghton@uwa.edu.au (S.H.)
* Correspondence: elaine.chapman@uwa.edu.au

**Abstract:** While COVID-19 imposed significant risks to the mental health of individuals of all ages, research suggests that university students were particularly vulnerable to such risks in this period. This study examined whether personality traits predicted the impact of COVID-19 on Chinese university students' mental health during the COVID-19 pandemic; whether the coping strategies they used mediated such relationships; and whether the patterns of relationship differed across males and females. Participants (453 females, 374 males) completed online measures of personality, coping strategies, and of adverse shifts to mental health during the COVID-19 pandemic. Stepwise multiple regression analyses were conducted to assess the extent to which personality traits predicted mental health shifts, and path analyses were conducted to investigate whether these relationships were mediated by the coping strategies used. Neuroticism was found to be a significant predictor of more adverse mental health responses for both sexes during the pandemic, which was partially mediated by the coping strategies students used (in particular, avoidance coping strategies). Coping strategies played a weaker mediating role for females, suggesting that additional factors may influence their mental health responses. Tailored mental health support interventions should, therefore, consider both personality traits and the coping mechanisms used by individuals in response to stressful life events.

**Keywords:** mental health; Chinese university students; personality traits; COVID-19; coping strategies

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## 1. Introduction

### *1.1. Mental Health of University Students During COVID-19*

Increasing concerns have been raised regarding university students' mental health during the past few decades. Navigating the transition from adolescence to adulthood [1] while experiencing significant life changes, including moving away from home, adjusting to a new and less-structured environment, facing uncertainties with respect to the future and managing academic pressures can be daunting for many young adults. This can contribute to increased feelings of stress, anxiety, and depression [2–4].

A key factor that may affect the mental health of university students, as well as the broader population, is exposure to adverse life events, or events that have a negative impact on an individual's life in some respect. These adverse life events may include personal events such as the breakdown of romantic relationships [5] and domestic violence [6], as well as events that affect entire regions such as natural disasters [7] or even global events such as pandemics [8,9].

Extensive research has demonstrated that the global COVID-19 pandemic adversely affected the mental health and wellbeing of university students, including both international and domestic students, in different countries. A systematic review of 18 studies by Zhao et al. [10] indicated that during COVID-19, international students frequently encountered negative psychological effects, including sleep disturbances, anxiety, and depression. In a qualitative study, Gogoi et al. explored the lived experiences of undergraduate students at a public-funded university in the UK during COVID-19, and found that the pandemic heightened stress, anxiety, and feelings of isolation amongst these students [11]. Similar results have been reported in other studies [12,13]. Recent research [14,15] has also documented the enduring effects of the COVID-19 pandemic on mental health, even after all lockdown measures had been lifted.

Myriad factors that may affect individuals' mental health have been researched, including personality traits [16,17] and coping strategies [18,19]. This research, however, has not investigated how these predict responses to specific adverse events, and how they operate together to predict such responses.

### *1.2. The Role of Personality Traits in Mental Health*

The most prevalent personality framework nowadays is probably the Big Five factor model, also known as the Five-Factor Model of personality [20]. The five dimensions in this model are neuroticism ("a tendency to experience dysphoric affect-sadness, hopelessness, guilt"), extraversion ("a preference for companionship and social stimulation"), openness ("a need for variety, novelty and change"), agreeableness ("a willingness to defer to others during interpersonal conflict") and conscientiousness ("a strong sense of purpose and high aspiration levels") [20] (p. 164).

Previous research has indicated relationships between Big Five personality traits and individuals' mental health in general. In a meta-analysis of 10 cohort studies conducted by Hakulinen et al. [16], low extraversion, high neuroticism, and low conscientiousness were found to be associated with an increased risk of depressive symptoms in both cross-sectional and longitudinal analyses, even after adjusting for baseline depressive symptoms. Similar results were also found in studies conducted during COVID-19. For example, Shokrkon and Nicoladis found that extraversion was positively related to mental health, while neuroticism was negatively related to mental health among a group of Canadians ($n$ = 1096) during COVID-19 [21]. In a longitudinal study ($n$ = 588) conducted in Germany, Zacher and Rudolph found that during the early stages of the COVID-19 pandemic, individuals' perceived stress declined over time and that emotional stability (i.e., lower level of neuroticism) was associated with more pronounced declines in perceived stress [17].

Other findings, however, present a more complex picture of the potential links between personality traits and mental health in adulthood. For instance, in contrast to the results reported by Hakulinen et al. [16], Kendler and Myers [22] found that higher conscientiousness was associated with a *higher* likelihood of depression in university students. A meta-analysis conducted by Kotov et al. identified conscientiousness as the second most potent predictor among the Big Five for unipolar mood disorders, encompassing major depression and anxiety disorders [23]. In a later study, Getzmann et al. found that more agreeable people showed a higher level of the feeling of missing out (i.e., missing social activities such as meeting friends or dining out) and an increase in perceived stress during COVID-19; openness and conscientiousness were positively correlated with an increase in stress [24].

These complexities highlight the need for a more nuanced approach to understanding how personality traits influence mental health, particularly in situations where individuals are confronting adverse life events.

### 1.3. Coping Strategies as Possible Mediators

Coping strategies are defined as "cognitive and/or behavioural effort to manage crises or chronic stressors that are perceived as distressing or exceeding one's ability to adapt" [25]. The Health Theory of Coping by Stallman [26] offers a functional framework for understanding how individuals manage distress and unpleasant emotions. According to the Health Theory of Coping, all coping reactions are initially adaptive but can be categorised as either healthy or unhealthy, depending on their potential to cause negative consequences.

Research has indicated that people's mental health outcomes when experiencing adverse life events might be affected by the coping strategies adopted by them to deal with these challenges [19]. For example, Saxon et al. [19] examined the relationship between coping strategies and mental health outcomes among a group of conflict-affected individuals in Georgia following the 1992 and 2008 armed conflicts. They found that coping strategies such as humour, emotional support, and active coping were linked to better mental health outcomes, whereas coping strategies such as disengagement, denial, and substance abuse were associated with poorer mental health outcomes. In another study, Yaacob et al. [27] examined how negative life events impact mental health among adolescents from divorced families and explored the moderating role of coping strategies in this relationship. They found that while negative life events increase the risk of mental health problems among adolescents from divorced families, the choice of coping strategy significantly influences this relationship. Specifically, adaptive coping strategies can mitigate the negative impact of such events on mental health, whereas maladaptive strategies can exacerbate this impact.

### 1.4. Sex Differences in Personality Traits and Coping Strategies

Sex differences, interchangeably called gender differences within the literature, have been widely recognised as an important factor that is not only correlated with personality factors, but can also influence coping strategies. Research has indicated that males and females often exhibit distinct patterns in both personality traits and coping strategies [28–30], which might lead to differences in how they experience and respond to stress, particularly during adverse events such as the COVID-19 pandemic. This, in turn, could suggest differences in the impact of such events on mental health.

For example, Schmitt et al. explored sex differences in personality traits using the Big Five model across 55 nations, and found that women generally scored higher than men on neuroticism, extraversion, agreeableness, and conscientiousness across most cultures [29]. Similarly, Weisberg et al. indicated that women reported higher Big Five extraversion, agreeableness, and neuroticism scores than men [30]. In a recent study, Furnham and Treglown examined sex differences in personality traits across six widely used tests, including the Myers-Briggs Type Indicator and the Five Factor NEO Personality Inventory-Revised (NEO-PI-R). They found that women generally scored higher on neuroticism and agreeableness, and that men generally scored higher on traits like ambition and risk approach [28].

Sex differences have also been reported to relate to the coping strategies that individuals choose to adopt. Several studies have shown that women are more likely to employ coping strategies that focus on modifying their emotional reactions to stress, while men tend to use problem-focused or practical approaches to manage stressful situations [31–33]. A recent study by Cholankeril et al. conducted during the COVID-19 pandemic indicated similar results [34]. They found that women were more likely to use coping strategies such as acceptance, self-distraction, positive reframing, and seeking emotional support

compared to men. Other research such as the study by Graves et al. also highlighted gender differences in coping strategies [35]. However, while Graves et al. found that females were more likely to use emotion-focused coping strategies, such as self-distraction, emotional support, instrumental support, and venting, they reported no significant gender differences in the use of problem-focused or avoidant coping strategies [35].

### 1.5. The Present Study

While the relationships between personality traits and mental health, as well as coping strategies and mental health, have been researched previously, the mediating role of coping strategies in the relationship between personality traits and mental health is still not well understood. Furthermore, given the known sex differences in personality traits and coping strategies, it is important that their impact on mental health be examined for males and females separately. Understanding these nuances could guide the development of more tailored mental health interventions that consider individual personality traits, coping strategies, and sex differences, ultimately enhancing the effectiveness of support provided during and after crises such as the COVID-19 pandemic.

This study aimed to investigate the predictive role of personality traits on mental health outcomes among Chinese university students during the COVID-19 pandemic, and how coping strategies mediated these relationships. Two questions were addressed:

Q1: To what extent did personality measures predict the impact of the COVID-19 pandemic on mental health, and did these relationships differ across males and females?

Q2: To what extent were any relationships between personality traits and shifts in mental health during the COVID-19 pandemic mediated by the coping strategies that participants used, and did these differ across males and females?

## 2. Materials and Methods

### 2.1. Participants

The initial sample comprised 828 Chinese university students (453 females, 374 males, and one identifying as "Other"). Given that the analysis focused on comparing males and females, and the "Other" category contained only a single case, this participant was excluded from all analyses. Of the remaining 827 students, 731 were enrolled in universities in mainland China, while 96 were from Australian universities. The average age of the participants was 22.52 years, with a standard deviation of 4.29 years.

### 2.2. Instruments

#### 2.2.1. The Brief Big-5 Personality Inventory (BBPI)

Personality traits were assessed using the Brief Big-5 Personality Inventory (BBPI), which was developed by the authors of this paper. The 15-item BBPI was based on the measure developed by Lim and Chapman, which has been validated in Chinese populations [36]. The BBPI has three bipolar items for each of the 'Big Five' factors (conscientiousness, agreeableness, neuroticism, extraversion and openness). An example item is "I am a person who tends to worry about things that might happen" vs. "I rarely worry about things that haven't happened yet". Respondents rate each item on a scale from 1 to 7 and the three items that measured each factor were averaged to produce a score for that specific trait. All items of the BBPI align well with other established five-factor personality scales in this domain [37,38].

The development process included data collection from 827 Chinese students, which was split into two groups for validation: Group A (413 students, $M$ = 22.480 years old, $SD$ = 4.159) for Exploratory Factor Analysis (EFA) and Group B (414 students, $M$ = 22.570 years old, $SD$ = 4.420) for Confirmatory Factor Analysis (CFA). The EFA results supported a five-factor structure, accounting for 69.027% of the total item variance, with items loading strongly on their respective factors. The model was further cross-validated using CFA, where fit indices demonstrated acceptable model fitting. To be more specific, the Comparative Fit Index (CFI) analyses the model fit by examining the discrepancy between the data and the hypothesised model, and the CFI of 0.927 indicates an acceptable fit [39]. The Root Mean Square Error of Approximation (RMSEA) measures how well the model approximates the data per degree of freedom, and the RMSEA of 0.088 was slightly below the commonly accepted cutoff of 0.08, indicating a fair fit [40]. Other fit indices include a Non-Normed Fit Index (NNFI) of 0.904, which meets the threshold for acceptable model fit ($\geq$0.90), and a Comparative Fit Index (CFI) of 0.927, also indicating an acceptable model fit ($\geq$0.90) [41,42].

Reliability was evaluated using Cronbach's alpha, with Group A yielding an alpha of 0.916 and Group B an alpha of 0.912, indicating good internal consistency for both groups. These results confirm that the BBPI is a fairly reliable and valid instrument for measuring personality traits among Chinese university students, offering a more efficient alternative to longer scales, while retaining good psychometric properties.

#### 2.2.2. The Mental Health Change Indicator Scale (MHCIS)

The Mental Health Change Indicator Scale (MHCIS) is a 10-item self-report instrument developed to measure changes in mental health in response to a negative event, such as the COVID-19 pandemic [13]. The MHCIS is relatively brief, easy to understand, and focuses specifically on cognitive, emotional, physiological, and behavioural changes that signal a negative shift in mental health due to specific events, rather than measuring general mental health states over time. Each item is rated on a 5-point scale, capturing a specific indicator of negative mental health shifts, with higher scores indicating greater changes in mental health. Examples of items from the MHCIS include "Finding my thinking distracted a lot of the time".

The MHCIS has been validated with Chinese university students in China and Australia, demonstrating that the scale is unidimensional and psychometrically sound [13].

#### 2.2.3. The Coping Strategies Scale

The Coping Strategies Scale (CSS) [43] is a culturally tailored tool designed to assess coping strategies among Chinese adults. The Coping Strategies Scale (CSS) is scored using a five-point Likert scale ranging from 1 (Never) to 5 (Always) for each of its 30 items, which are divided into seven dimensions: Positive Adaptation, Problem-Solving, Withdrawal, Seeking Emotional Support, Prosocial Focus, Disengagement, and Self-Regulation. Example items include "I see the event as a chance for development or growth" (Positive Adaptation), "I search for information (e.g., on the internet) on how to solve any problems that the situation brings" (Problem-solving). To score the CSS, responses for items within each dimension are summed, and an average score calculated, with higher scores indicating more frequent use of a particular coping strategy.

The CSS has been validated using responses from 734 Chinese university students, and has demonstrated strong validity and reliability, establishing itself as a relevant instrument for evaluating coping strategies in Chinese contexts, especially in response to adverse psychological events like the COVID-19 pandemic.

To explore the mediating roles of coping strategies in the relationship between personality traits and mental health, the seven coping dimensions identified by the CSS were merged into three broader categories: problem-focused coping [44], emotion-focused coping [44], and avoidance [45]. Problem-focused coping encompasses strategies like Problem-Solving, where individuals actively seek to address the source of stress by finding solutions or taking direct action. Emotion-focused coping includes Positive Adaptation, Prosocial Focus, Seeking Emotional Support, and Self-Regulation, reflecting efforts to manage and adjust emotional responses to stress, often aiming to derive constructive outcomes or improve emotional wellbeing without necessarily altering the stressor itself. Avoidance coping combines the Withdrawal and Disengagement strategies, characterised by efforts to evade dealing with the stressor or the emotions it elicits.

This categorisation allows for a more streamlined analysis of how different coping strategies mediate the relationship between personality traits and mental health outcomes. For instance, individuals high in neuroticism may gravitate towards avoidance coping, which could worsen mental health outcomes, whereas those who are more open to experiences or extravert might employ problem-focused coping, thereby enhancing their mental health. By merging the coping strategies into broader categories, the study aims to provide a clearer understanding of how coping strategies influence the impact of personality traits on mental health across sex differences.

### *2.3. Data Collection and Analysis*

Data collection was conducted through an online survey created in Qualtrics among Chinese students from late 2020 to early 2021, who were enrolled in either Chinese or Australian universities. After ethics approval was secured from the authors' University Ethics Committee, participants were recruited through an open invitation on *WeChat*. Participation was entirely voluntary, and no financial incentives were offered for participation. Participants could withdraw at any time without any consequences. Two stepwise multiple regression analyses (MRAs) were then conducted to explore the extent to which these personality traits predicted the effects of COVID-19 on mental health, highlighting any sex differences in these relationships (Question 1). Two path analyses were then conducted to assess whether any significant links between the personality traits and shifts in mental health were mediated by the coping strategies employed by males and females (Question 2). The MRAs were performed using SPSS 29.0.0.0 and the path analyses performed using LISREL 11.0.

## 3. Results

### *3.1. Correlations Among Personality Traits, Coping Strategies and Mental Health*

Two stepwise multiple regression analyses (MRAs) were first conducted to explore the extent to which these personality traits predicted the effects of COVID-19 on mental health, indicating any sex differences in these relationships.

Table 1 presents descriptive statistics and correlations between the factors within the MHCIS, the five personality traits, and the three types of coping strategy. Females ($n$ = 453) and males ($n$ = 374) showed similar mean scores for conscientiousness, agreeableness, and openness, but females had higher neuroticism ($M$ = 3.905, $SD$ = 1.463) compared to males ($M$ = 3.494, $SD$ = 1.518), and slightly lower extraversion (females: $M$ = 3.946, $SD$ = 1.671; males: $M$ = 4.113, $SD$ = 1.634). Problem-focused and emotion-focused coping were similarly used by both sexes, while males reported slightly higher avoidance coping (males: $M$ = 2.851, $SD$ = 0.728; females: $M$ = 2.738, $SD$ = 0.656).

**Table 1.** Descriptive statistics, correlations between MHCIS, personality traits and coping strategies.

| Sex | Variables | M (SD) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Female ($n$ = 453) | 1-Conscientiousness | 4.831 (1.371) | 1 | | | | | | | | |
| | 2-Agreeableness | 5.006 (1.169) | 0.496 ** | 1 | | | | | | | |
| | 3-Neuroticism | 3.905 (1.463) | −0.381 ** | −0.303 ** | 1 | | | | | | |
| | 4-Extraversion | 3.946 (1.671) | 0.318 ** | 0.393 ** | −0.560 ** | 1 | | | | | |
| | 5-Openness | 4.674 (1.508) | 0.437 ** | 0.401 ** | −0.447 ** | 0.526 ** | 1 | | | | |
| | 6-Problem-focused Coping | 3.358 (0.734) | 0.274 ** | 0.180 ** | −0.113 * | 0.146 ** | 0.259 ** | 1 | | | |
| | 7-Emotion-focused Coping | 3.214 (0.591) | 0.372 ** | 0.281 ** | −0.222 ** | 0.294 ** | 0.358 ** | 0.653 ** | 1 | | |
| | 8-Avoidance | 2.738 (0.656) | 0.002 | 0.018 | −0.126 ** | 0.076 | 0.019 | 0.144 ** | 0.306 ** | 1 | |
| | 9-MHCIS | 1.822 (0.891) | −0.089 | −0.130 ** | 0.213 ** | −0.162 ** | −0.081 | −0.111 * | −0.117 * | 0.142 ** | 1 |
| Male ($n$ = 374) | 1-Conscientiousness | 4.951 (1.421) | 1 | | | | | | | | |
| | 2-Agreeableness | 5.041 (1.216) | 0.603 ** | 1 | | | | | | | |
| | 3-Neuroticism | 3.494 (1.518) | −0.542 ** | −0.537 ** | 1 | | | | | | |
| | 4-Extraversion | 4.113 (1.634) | 0.535 ** | 0.572 ** | −0.670 ** | 1 | | | | | |
| | 5-Openness | 4.684 (1.468) | 0.568 ** | 0.536 ** | −0.597 ** | 0.674 ** | 1 | | | | |
| | 6-Problem-focused Coping | 3.416 (0.729) | 0.316 ** | 0.233 ** | −0.248 ** | 0.114 * | 0.264 ** | 1 | | | |
| | 7-Emotion-focused Coping | 3.188 (0.639) | 0.335 ** | 0.336 ** | −0.352 ** | 0.293 ** | 0.332 ** | 0.663 ** | 1 | | |
| | 8-Avoidance | 2.851 (0.728) | 0.133 * | 0.176 ** | −0.220 ** | 0.309 ** | 0.247 ** | 0.218 ** | 0.498 ** | 1 | |
| | 9-MHCIS | 1.822 (0.862) | −0.222 ** | −0.223 ** | 0.227 ** | −0.098 | −0.137 ** | −0.209 ** | −0.133 * | 0.188 ** | 1 |

*: Correlation is significant at the 0.5 level (2-tailed). **: Correlation is significant at the 0.01 level (2-tailed).

#### 3.1.1. Personality Traits and Coping Strategies

Across both genders, conscientiousness, agreeableness, extraversion, and openness were positively correlated with problem-focused and emotion-focused coping. Specifically, for female students, conscientiousness ($r$ = 0.274, $p$ < 0.01), agreeableness ($r$ = 0.180, $p$ < 0.01), extraversion ($r$ = 0.146, $p$ < 0.01), and openness ($r$ = 0.259, $p$ < 0.01) were all positively associated with problem-focused coping, while conscientiousness (r = 0.372, $p$ < 0.01), agreeableness ($r$ = 0.281, $p$ < 0.01), extraversion ($r$ = 0.294, $p$ < 0.01), and openness ($r$ = 0.358, $p$ < 0.01) were positively correlated with emotion-focused coping. Similar patterns were observed among male students, where conscientiousness ($r$ = 0.316, $p$ < 0.01), agreeableness ($r$ = 0.233, $p$ < 0.01), extraversion ($r$ = 0.114, $p$ < 0.05), and openness ($r$ = 0.264, $p$ < 0.01) were positively associated with problem-focused coping, and conscientiousness ($r$ = 0.335, $p$ < 0.01), agreeableness ($r$ = 0.336, $p$ < 0.01), extraversion ($r$ = 0.293, $p$ < 0.01), and openness ($r$ = 0.332, $p$ < 0.01) were correlated with emotion-focused coping. Interestingly, avoidance coping showed weaker associations with personality traits in female students but had a stronger relationship with extraversion ($r$ = 0.309, $p$ < 0.01) and openness ($r$ = 0.247, $p$ < 0.01) in males, suggesting that avoidance coping may be linked to higher social engagement and curiosity-driven behaviours in male students.

#### 3.1.2. Mental Health and Personality Traits

In terms of mental health, neuroticism was the strongest predictor of negative mental health shifts (MHCIS) for both female students ($r = 0.213$, $p < 0.01$) and male students ($r = 0.227$, $p < 0.01$), reinforcing its role as a key risk factor. For females, extraversion ($r = -0.162$, $p < 0.01$) and agreeableness ($r = -0.130$, $p < 0.01$) were negatively correlated with MHCIS, suggesting that female students who were more extraverted or agreeable tended to experience fewer negative shifts in mental health. For male students, conscientiousness ($r = -0.222$, $p < 0.01$), agreeableness ($r = -0.223$, $p < 0.01$), and openness ($r = -0.137$, $p < 0.01$) were negatively associated with MHCIS, suggesting that these personality traits may provide some level of protection against mental health deterioration. These results suggest that while neuroticism is a strong predictor of mental health shifts in both males and females, males tend to benefit more from personality traits such as conscientiousness, agreeableness, and openness, which are negatively correlated with MHCIS.

#### 3.1.3. Coping Strategies and Mental Health

The relationship between coping strategies and mental health (MHCIS) revealed consistent patterns across both male and female students. Problem-focused coping and emotion-focused coping were negatively correlated with MHCIS, indicating their protective effects against mental health deterioration. Specifically, for female students, problem-focused coping was negatively correlated with MHCIS ($r = -0.111$, $p < 0.05$), while emotion-focused coping had a slightly stronger negative correlation ($r = -0.117$, $p < 0.05$). For male students, both problem-focused coping ($r = -0.209$, $p < 0.01$) and emotion-focused coping ($r = -0.133$, $p < 0.05$) were also negatively associated with MHCIS, indicating their protective role. These findings suggest that individuals who engage in active problem-solving strategies or emotion regulation techniques may be more resilient to stress-related mental health shifts.

Conversely, avoidance coping was positively correlated with MHCIS for both female students and male students, suggesting its association with worse mental health outcomes. The correlation was slightly stronger for male students ($r = 0.188$, $p < 0.01$) than for female students ($r = 0.142$, $p < 0.01$), suggesting that avoidance coping may contribute more substantially to mental health deterioration in males.

Although both problem-focused and emotion-focused coping were protective across genders, the strength of these associations varied. Among male students, problem-focused coping had a stronger negative correlation with MHCIS ($r = -0.209$, $p < 0.01$) compared to emotion-focused coping ($r = -0.133$, $p < 0.01$), suggesting that actively addressing stressors plays a more central role in their mental health resilience. Female students showed a slightly stronger reliance on emotion-focused coping ($r = -0.117$, $p < 0.05$) compared to problem-focused coping ($r = -0.111$, $p < 0.05$), indicating that they may benefit more from emotional regulation strategies to cope with stress.

### *3.2. Stepwise Multiple Regression Analyses (MRAs)*

Table 2 presents the model summary statistics, indicating the overall explanatory power of personality traits in predicting mental health outcomes (measured by MHCIS) for both males and females. For females, the regression model with neuroticism as the sole predictor explained 4.5% of the variance in MHCIS ($R^2 = 0.045$, $F$ (1, 451) = 21.332, $p < 0.01$). The adjusted $R^2$ value (0.043) indicates that the model provides a relatively

modest yet statistically significant explanation of the variance in mental health outcomes. For males, the initial model including only neuroticism accounted for 5.2% of the variance in MHCIS ($R^2$ = 0.052, $F(1, 372) = 20.213$, $p < 0.001$), with an adjusted $R^2$ of 0.049 and a standard error of 0.840. Compared to females, this model explained slightly more variance in mental health outcomes, suggesting that neuroticism played a slightly stronger role in predicting mental health shifts in males. Adding agreeableness to the model resulted in a statistically significant increase in explained variance, bringing the $R^2$ to 0.066 ($\Delta R^2$ = 0.014, $F(1, 371) = 5.723$, $p = 0.017$). Incorporating extraversion further improved the model, raising the total variance explained to 8.1% ($R^2$ = 0.081, $\Delta R^2$ = 0.015, $F(1, 370) = 5.884$, $p = 0.016$). This shows that, in addition to neuroticism, agreeableness and extraversion also significantly contributed to predicting mental health shifts in males.

**Table 2.** Regression analysis results.

| Model Summary | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sex** | **Model** | ***R*** | $R^2$ | **Adjusted $R^2$** | **Std. Error of the Estimate** | **Change Statistics** | | | | |
| | | | | | | $R^2$ **Change** | $F$ **Change** | ***df*1** | ***df*2** | **Sig. $F$ Change** |
| Female | 1 | 0.213 a | 0.045 | 0.043 | 0.872 | 0.045 | 21.332 | 1 | 451 | <0.001 |
| Male | 1 | 0.227 a | 0.052 | 0.049 | 0.840 | 0.052 | 20.213 | 1 | 372 | <0.001 |
| | 2 | 0.257 b | 0.066 | 0.061 | 0.835 | 0.014 | 5.723 | 1 | 371 | 0.017 |
| | 3 | 0.284 c | 0.081 | 0.073 | 0.830 | 0.015 | 5.884 | 1 | 370 | 0.016 |

a. Predictors: (constant), neuroticism; b. predictors: (constant), neuroticism, agreeableness; c. predictors: (constant), neuroticism, agreeableness, extraversion.

Table 3 shows the regression coefficients[a], which details the individual contributions of personality traits to mental health shifts (measured by MHCIS) among male and females. For females, neuroticism was the only significant predictor, with higher levels associated with poorer mental health outcomes ($\beta$ = 0.213, $p < 0.001$). This finding reinforces the strong link between emotional instability and adverse mental health effects in females, as previously indicated in the model summary. No other personality traits significantly contributed to the prediction model. For males, neuroticism remained a significant predictor across all models, though its effect size varied as additional traits were included. In the second model, agreeableness emerged as a significant negative predictor ($\beta = -0.142$, $p = 0.017$), suggesting that higher agreeableness was associated with fewer adverse mental health effects. With the inclusion of extraversion in the final model, the predictive strength of both neuroticism and agreeableness remained, while extraversion showed a positive association with better mental health ($\beta$ = 0.173, $p = 0.016$). These findings suggest that while neuroticism contributes to mental health difficulties in both sexes, agreeableness and extraversion play a protective role for males.

**Table 3.** Regression Coefficients [a] for Predicting Mental Health Outcomes (MHCIS) from personality traits.

| **Sex** | **Model** | | **Unstandardised Coefficients** | | **Standardised Coefficients** | ***t*** | ***Sig.*** |
|---|---|---|---|---|---|---|---|
| | | | ***B*** | ***Std. Error*** | ***Beta*** | | |
| Female | 1 | (Constant) | 1.317 | 0.117 | | 11.264 | 0 |
| | | Neuroticism | 0.129 | 0.028 | 0.213 | 4.619 | 0 |

**Table 3.** *Cont.*

| Sex | Model | | Unstandardised Coefficients | | Standardised Coefficients | *t* | *Sig.* |
|---|---|---|---|---|---|---|---|
| | | | *B* | *Std. Error* | *Beta* | | |
| Male | 1 | (Constant) | 1.371 | 0.109 | | 12.557 | 0 |
| | | Neuroticism | 0.129 | 0.029 | 0.227 | 4.496 | 0 |
| | 2 | (Constant) | 2.031 | 0.296 | | 6.853 | 0 |
| | | Neuroticism | 0.086 | 0.034 | 0.151 | 2.533 | 0.012 |
| | | Agreeableness | −0.101 | 0.042 | −0.142 | −2.392 | 0.017 |
| | 3 | (Constant) | 1.665 | 0.331 | | 5.034 | 0 |
| | | Neuroticism | 0.136 | 0.039 | 0.239 | 3.442 | 0.001 |
| | | Agreeableness | −0.137 | 0.045 | −0.194 | −3.088 | 0.002 |
| | | Extraversion | 0.091 | 0.038 | 0.173 | 2.426 | 0.016 |

[a] Dependent Variable: MHCIS.

### 3.3. Path Analysis

To determine whether different coping strategies mediated the relationship between neuroticism and students' mental health shifts during the COVID-19 pandemic, two path analyses were performed–one for males, and one for females. Correlations between scores on neuroticism, different coping strategies and MHCIS are shown in Table 1. The path coefficients associated with all direct effects in the model are presented in Figures 1 and 2 for males and females (respectively), while the total indirect effects are shown in Table 4.

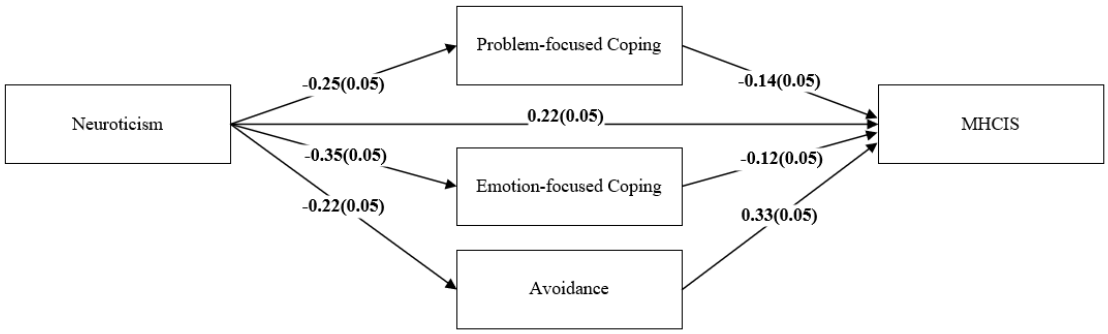


**Figure 1.** The path analysis model for male students.

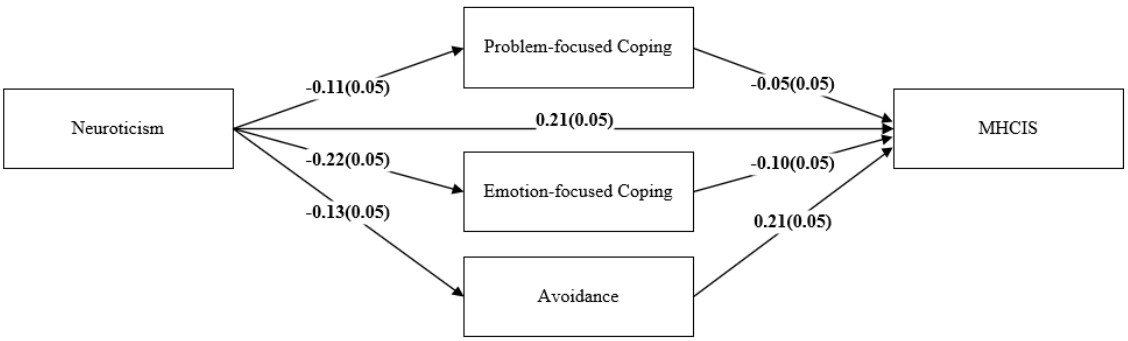


**Figure 2.** The path analysis model for female students.

**Table 4.** Indirect effects for variables in path analysis model.

| Outcome Variable | Sex | Indirect Effect (Problem-Focused Coping) | Indirect Effect (Emotion-Focused Coping) | Indirect Effect (Avoidance) |
|---|---|---|---|---|
| MHCIS | Male | 0.035 | 0.042 | −0.073 |
| | Female | 0.006 | 0.022 | −0.027 |

The path analysis models (Figures 1 and 2) illustrate the mediating roles of problem-focused coping, Emotion-focused coping, and Avoidance coping in the relationship between neuroticism and mental health shifts (MHCIS) for male and female students. For male students (Figure 1), neuroticism was negatively associated with problem-focused coping ($\beta = -0.25$, $SE = 0.05$), emotion-focused coping ($\beta = -0.35$, $SE = 0.05$) and avoidance coping ($\beta = -0.22$, $SE = 0.05$), indicating that higher neuroticism was linked to lower engagement in all these coping strategies. Among the three coping strategies, avoidance coping had the strongest positive association with mental health shifts ($\beta = 0.33$, $SE = 0.05$), suggesting that greater reliance on avoidance coping was linked to more adverse mental health outcomes. Problem-focused and emotion-focused coping showed weaker negative associations with mental health shifts ($\beta = -0.14$ and $\beta = -0.12$, respectively), indicating that while these strategies were somewhat protective, their effects were less pronounced than avoidance coping.

For female students (Figure 2), neuroticism was also negatively associated with all three coping strategies: problem-focused coping ($\beta = -0.11$, $SE = 0.05$), emotion-focused coping ($\beta = -0.22$, $SE = 0.05$) and avoidance coping ($\beta = -0.13$, $SE = 0.05$), but these associations were weaker compared to males. In terms of the relationships between coping strategies and mental health shifts, avoidance coping was again positively associated with adverse mental health outcomes ($\beta = 0.21$, $SE = 0.05$), though its effect size was smaller than in males. Problem-focused coping had a negligible association with mental health shifts ($\beta = -0.05$, $SE = 0.05$), whereas emotion-focused coping showed a weak negative association ($\beta = -0.10$, $SE = 0.05$), suggesting a limited protective effect.

Table 4 presents the indirect effects of neuroticism on mental health shifts (MHCIS) through three coping strategies—problem-focused coping, emotion-focused coping, and avoidance coping—for male and female students.

For male students, neuroticism had small but positive indirect effects on MHCIS through problem-focused coping ($\beta = 0.035$) and emotion-focused coping ($\beta = 0.042$), suggesting that these coping strategies partially mediated the relationship, albeit with limited impact. The strongest indirect effect was through avoidance coping ($\beta = -0.073$), indicating that higher neuroticism led to greater reliance on avoidance coping, which in turn was associated with more adverse mental health shifts.

For female students, the indirect effects were generally weaker. Problem-focused coping ($\beta = 0.006$) had a negligible mediating effect, while emotion-focused coping ($\beta = 0.022$) showed a modest indirect pathway. The indirect effect through avoidance coping ($\beta = -0.027$), though present, was smaller than that observed in males, suggesting that avoidance coping had a less pronounced role in mediating the relationship between neuroticism and mental health outcomes for females.

These results indicated sex differences in the mediating role of coping strategies, with avoidance coping playing a stronger detrimental role for males, whereas for females, the mediation effects of coping strategies were weaker overall, implying that additional unmeasured factors may contribute to their mental health responses to neuroticism.

## 4. Discussion

This study explored the predictive role of personality traits on mental health outcomes among Chinese university students during the COVID-19 pandemic, and examined how coping strategies mediated these relationships, across genders.

### *4.1. Relationships Between Personality Traits, Coping Strategies and Mental Health*

The findings showed that neuroticism negatively related to all three coping strategies in both male and female students, suggesting that individuals with higher neuroticism are less likely to engage in coping mechanisms, regardless of whether they are adaptive (Problem-focused and Emotion-focused coping) or maladaptive (Avoidance coping). This contrasts with previous research, which has reported varying patterns of association. For instance, Leszko et al. found that neuroticism was positively associated with both avoidance coping and emotion-focused coping [46], implying that individuals with higher neuroticism may be more likely to rely on these strategies. Similarly, Gashi et al. reported that neuroticism is positively related to avoidance coping but negatively associated with problem-focused coping [47]. These discrepancies may stem from differences in sample populations, measurement tools, or contextual factors influencing coping behaviours, indicating the complex and multifaceted nature of the relationships between personality traits and coping strategies.

The findings also revealed positive relationships between conscientiousness, agreeableness, extraversion, and openness and problem-focused and emotion-focused coping for both males and females. These results align with prior research indicating that individuals who score higher in these traits tend to adopt more adaptive coping strategies, such as actively addressing stressors (problem-focused coping) or regulating their emotions effectively (emotion-focused coping) [46,47]. For example, Gashi et al. demonstrated that people who are extravert are more likely to use seeking social support as a coping strategy [47]. Leszko et al. reported positive relationships between task-oriented coping (aligns with problem-focused coping in this paper) and all personality traits except for neuroticism [46].

The relationships between personality traits and mental health also show some differences across males and females. For both female and male students, neuroticism emerged as the strongest predictor of negative shifts in mental health, consistent with prior research that links high neuroticism to increased vulnerability to stress and mental health issues [16,21]. However, the patterns differed between genders. Among female students, neuroticism was the primary predictor of mental health declines. Extraversion and agreeableness were negatively correlated with MHCIS, indicating that those who are more socially outgoing and cooperative tend to experience fewer negative mental health shifts. Extraverted individuals may have greater access to social support networks [48], while agreeable individuals may have more positive social interactions [49], both of which contribute to better wellbeing. This is consistent with previous literature demonstrating the positive effects of social engagement and positive social interactions on mental health [50,51].

For male students, conscientiousness, agreeableness, and openness were negatively associated with MHCIS, suggesting that a broader range of personality traits may offer resilience against mental health deterioration in males. Conscientious individuals tend to be more goal-oriented and disciplined [52], which may help them maintain emotional stability during stressful periods. Meanwhile, agreeableness in males was equally as protective as it was in females, reinforcing the importance of positive social interactions in fostering mental wellbeing. The negative correlation between openness and MHCIS suggests that males who are more open to new experiences may be better able to adapt to stressors, possibly through cognitive flexibility and a greater capacity for psychological growth.

The gender differences observed in the protective effects of personality traits may be attributed to differences in coping strategies and socialisation patterns. Males may rely more on structured, goal-driven behaviours (as reflected in conscientiousness) to maintain psychological stability. In contrast, females may benefit more from social and interpersonal coping mechanisms (such as extraversion and agreeableness), which facilitate emotional expression and support-seeking behaviours.

### 4.2. Coping Strategies Mediating the Relationships Between Personality Traits and Mental Health

A key finding of this study is the stronger impact of avoidance coping on mental health outcomes compared to problem-focused and emotion-focused coping, particularly among male students. For males, avoidance coping had the strongest positive association with adverse mental health shifts, indicating that those who rely more on avoidance coping tend to experience greater declines in mental health. In contrast, problem-focused and emotion-focused coping had weaker negative associations with MHCIS, suggesting that while they offer some protective benefits, their effects are less pronounced. Prior research has found that avoidance coping is associated with negative mental health outcomes such as heightened distress, depression and stress [53,54]. Thus, based on this study, interventions targeting male students should focus on reducing reliance on avoidance coping and promoting active coping strategies, such as problem-solving and emotion-focused coping.

For female students, avoidance coping was still positively associated with adverse mental health shifts, but its effect size was smaller than in males. Problem-focused coping had a minimal association with MHCIS, whereas emotion-focused coping had a weak negative association. These results suggest that females may benefit slightly more from emotion-focused coping than males, but avoidance coping remains a significant risk factor for poor mental health outcomes, which is again aligned with previous research [53,54].

The weaker indirect effects of coping strategies on mental health among female students, compared to males, suggest that the mechanisms underlying their coping responses remain somewhat ambiguous. One potential explanation is that female students may engage in additional, unmeasured coping strategies, such as shopping [55], which could buffer against stress without being fully captured in the current model. In addition, given that females generally score higher on neuroticism than males [56,57], their psychological response to stress may involve a broader range of coping behaviours rather than relying on any single strategy. Future research should explore additional coping mechanisms that may play a role in female students' mental health when experiencing adverse life events.

### 4.3. Rethinking the Role of Avoidance Coping

In this study, avoidance coping was strongly linked to negative mental health shifts, particularly among males. While avoidance strategies, such as disengagement, have been linked to poorer mental health outcomes in previous research [19,54,58,59], it is important to acknowledge that not all forms of avoidance are inherently maladaptive. For example, in the study of Allen et al. [54], passive avoidance coping strategies, such as resignation and withdrawal, were linked to perceived stress, whereas active avoidance coping, like diversion, was not. In some cases, temporary disengagement or emotional distancing may serve as an adaptive short-term coping mechanism, allowing individuals to regain emotional stability before actively addressing stressors [60,61]. These findings indicate the importance of further exploring different aspects of avoidance coping to enhance our understanding of the negative consequences of excessive avoidance in response to stress. Moreover, it would also be interesting to examine the potential benefits of integrating

avoidance coping with problem-solving coping to determine whether a balanced approach may mitigate its detrimental effects.

### 4.4. Limitations and Future Research

Despite the significant findings, this study has several limitations that should be addressed in future research. First, while personality traits and coping strategies significantly predicted mental health shifts, the relatively small variance explained suggests that other unmeasured factors contribute to psychological responses during stressful events. Variables such as social support, financial stress, academic workload, pre-existing mental health conditions, and cultural differences in coping may also play a role and should be explored in future studies. Second, the study investigated the mediating roles of three categories of coping strategies on the relationships between personality traits and mental health, Future research should explore how different coping strategies can be integrated into a structured framework to assess whether such an approach is more effective in fostering resilience, particularly among individuals with high levels of neuroticism. Third, although the survey in the present study did not include sensitive questions likely to cause participants' distress there is always the possibility that this might occur. Therefore, in future research a resource that participants can access should they experience distress will be provided. Finally, the generalisability of these findings to other cultural or demographic groups remains an open question. Given that coping mechanisms and personality influences on mental health may vary across cultural contexts, future studies should examine how these relationships manifest in students from diverse backgrounds and how cultural factors shape their coping responses.

## 5. Conclusions

This study provides valuable insights into the complex interplay between personality traits, coping strategies, and mental health outcomes in Chinese university students during the COVID-19 pandemic. The findings suggest that while neuroticism is a key predictor of negative mental health shifts for both sexes, males and females rely on different coping mechanisms to manage stress. Avoidance coping was particularly detrimental for males, whereas females exhibited weaker mediation effects through coping strategies overall, indicating that other factors may play a more significant role in their mental health responses.

From a practical perspective, these findings underscore the need for sex-specific mental health interventions. For male students, interventions should emphasise reducing avoidance coping and promoting active problem-solving and emotion-focused strategies. For female students, a broader range of coping mechanisms may need to be explored to better support their psychological wellbeing. Future research should further investigate how personality traits and coping strategies interact with contextual factors, such as social support, environmental stressors, and cultural influences. In addition, exploring how different coping strategies can be integrated into a structured framework could help assess whether a holistic, adaptive coping approach is more effective in fostering mental health resilience when facing adverse life events.

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