Developmental Trajectories of Obsessive-Compulsive Symptoms in College Students: A Latent Growth Model Analysis Postprint

Authors: Guo Zexi, Ilzat Memet, Guligena Aitahong, Ilyazat Memet

Date: 2024-09-11T00:00:00+00:00

Abstract

Background: College students represent a high-risk population for obsessive-compulsive symptoms. While numerous cross-sectional studies have examined the overall developmental trends of obsessive-compulsive symptoms among college students, research on the developmental trajectories of obsessive-compulsive symptoms in this population is lacking.

Objective: To investigate the developmental trajectories of obsessive-compulsive symptoms among college students and their influencing factors through longitudinal follow-up.

Methods: Using cluster random sampling, first-year students from Xinjiang Normal University were selected as participants. The obsessive-compulsive symptom subscale and anxiety subscale of the Symptom Checklist-90 (SCL-90) were administered three times over a 3-year period: the first assessment in November 2020 (T1), the second in March 2022 (T2), and the third in March 2023 (T3). Latent growth modeling was used for data analysis.

Results: Data from 3289 valid participants who completed all three assessments were analyzed. Among the 3289 college students, 1966 were female (59.8%), 2352 were Han ethnicity (71.5%), and the mean age at first assessment was $(21.0\$\pm0.7)years.Anxietyscoreswere: T1(1.48\pm0.51), T2(1.38\pm0.45), andT3(1.33\pm0.43).Obsessive-compulsivesymptomscoreswere: T1(1.75\pm0.58), T2(1.66\pm0.55), andT3(1.53\pm0.53).Pearsoncorrelationanaly$
$compulsivesymptomsandanxietyatalltimepoints(P < 0.05).Theunconditionallinearmodelshowedgoodfit, wi$
$0(P < 0.001)andasignificantslope < 0(P < 0.001).Theinterceptandslopewerenegativelycorrelated(r = -0.033, P < 0.001), indicatingthatobsessive-compulsivesymptomscoresdecreasedovertime, withhigherinitia$
$male = 0, female = 1), genderpositivelypredictedtheintercept(= 0.105, P < 0.001)butnottheslope(< 0.001, P > 0.05), suggestingthatfemalestudentshadhigherinitiallevelsofobsessive-compulsivesymptomsthanmalestudents, withnodifferenceindeclinerates.Afterincludinganxietyasacovaria$
$compulsivesymptomsatalltimepoints(P < 0.001).Genderpositivelypredictedtheslope(=$

$0.017, P < 0.05$)*butnottheintercept*($=0.012, P>0.05$), indicating that after controlling for anxiety, female students showed slower decline rates in obsessive-compulsive symptoms compared to male students.

Conclusion: Obsessive-compulsive symptoms among college students decreased with advancing grade level, and high initial levels did not necessarily lead to long-term distress. Anxiety hindered the alleviation of obsessive-compulsive symptoms and more substantially influenced the manifestation of obsessive-compulsive symptoms in female students and the decline rate of obsessive-compulsive symptoms in male students.

Full Text

The Developmental Trajectory of Obsessive-Compulsive Symptoms in College Students: A Latent Growth Model Analysis

Guo Zexi[1], Yilizhati Maimaiti[1]*, Guligena Aitahong[2]

[1]Key Laboratory of Mental Development and Learning Science, Xinjiang Normal University, Urumqi 830017, China
[2]Xinjiang Normal University Mental Health Education Service Center, Urumqi 830017, China

Corresponding author: Yilizhati Maimaiti, Associate Professor; E-mail: elzat730@126.com

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Abstract

Background: Obsessive-compulsive symptoms are a common psychological phenomenon among college students. While numerous cross-sectional studies have examined the overall developmental trends of these symptoms, research on the developmental trajectories of obsessive-compulsive symptoms in this population remains scarce.

Objective: This study investigated the developmental trajectory and influencing factors of obsessive-compulsive symptoms in college students through longitudinal tracking.

Methods: Using cluster random sampling, we selected freshman students from Xinjiang Normal University as participants and conducted three follow-up assessments over a three-year period using the obsessive-compulsive and anxiety subscales of the Symptom Checklist-90 (SCL-90). The first assessment was administered in November 2020 (T1), the second in March 2022 (T2), and the third in March 2023 (T3). Data were analyzed using latent growth modeling.

Results: Analysis was based on 3,289 valid participants who completed all three assessments. The sample comprised 1,966 females (59.8%) and 2,352 Han

ethnicity individuals (71.5%), with a mean age of 21.0 ± 0.7 years at the first assessment. Anxiety scores were 1.48 ± 0.51 at T1, 1.38 ± 0.45 at T2, and 1.33 ± 0.43 at T3; obsessive-compulsive symptom scores were 1.75 ± 0.58 at T1, 1.66 ± 0.55 at T2, and 1.53 ± 0.53 at T3. Pearson correlation analyses revealed positive correlations between obsessive-compulsive symptoms and anxiety at each time point ($P < 0.05$). The unconditional linear model demonstrated good fit, with a significant positive intercept ($P < 0.001$) and significant negative slope ($P < 0.001$), and a negative correlation between intercept and slope ($r = -0.033$, $P < 0.001$), indicating that obsessive-compulsive symptom scores declined over time, with higher initial levels associated with faster decline rates. When gender was included as a covariate (male = 0, female = 1), gender positively predicted the intercept ($\beta = 0.105$, $P < 0.001$) but not the slope ($\beta < 0.001$, $P > 0.05$), suggesting that female students had higher initial obsessive-compulsive symptom levels than males, with no difference in decline rate. After including anxiety as a covariate, anxiety positively influenced obsessive-compulsive symptoms at all time points ($P < 0.001$). Gender positively predicted the slope ($\beta = 0.017$, $P < 0.05$) but not the intercept ($\beta = 0.012$, $P > 0.05$), indicating that after controlling for anxiety, female students' obsessive-compulsive symptoms declined more slowly than males' .

Conclusion: Obsessive-compulsive symptoms in college students decrease with advancing grade level, and high initial levels do not necessarily lead to long-term distress. Anxiety hinders symptom alleviation and differentially affects symptom emergence in female students versus decline rate in male students.

Keywords: Obsessive-compulsive symptoms; Developmental trajectory; Anxiety; Sex difference; Latent growth model

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Introduction

Obsessive-compulsive symptoms refer to recurrent intrusive thoughts or compulsive behaviors that constitute the core features of obsessive-compulsive disorder. These symptoms exist on a continuum and are not simply dichotomized into clinical and non-clinical categories, as they also appear in normal populations. Obsessive-compulsive symptoms can impair individuals'social and cognitive functioning, and individuals with such symptoms are more prone to psychological problems including anxiety and depression. Currently, numerous cross-sectional studies and some longitudinal research have examined overall developmental trends and stability of obsessive-compulsive symptoms in populations, but further exploration of individual developmental trajectories has been limited by differing research perspectives and measurement occasions.

Obsessive-compulsive disorder typically emerges in early adulthood, and college students represent a high-risk population for obsessive-compulsive symptoms. Understanding the developmental trajectories and influencing factors of these symptoms in college students can illuminate how obsessive-compulsive symp-

toms evolve during early adulthood and help researchers identify developmental patterns and optimal intervention timing in this population. This study collected and analyzed three waves of data over three years from college students' enrollment, employing latent growth modeling to examine developmental trajectories of obsessive-compulsive symptoms and incorporating gender and anxiety status as covariates to investigate their effects on these trajectories.

Methods

1.1 Participants Using cluster random sampling, we selected freshman students from Xinjiang Normal University as research participants. Trained administrators conducted three questionnaire assessments in classroom settings. The first assessment occurred in November 2020 (T1), with 3,367 questionnaires collected (98.9% response rate); the second in March 2022 (T2), with 3,402 questionnaires collected (97.4% response rate); and the third in March 2023 (T3), with 3,480 questionnaires collected (98.8% response rate). After excluding incomplete questionnaires and those with invariant responses, we matched responses across the three waves, yielding 3,289 valid participants. This study was approved by the Xinjiang Normal University Ethics Review Committee (approval number: 2024013).

1.2 Measures The study used the obsessive-compulsive and anxiety subscales of the Symptom Checklist-90 (SCL-90) to assess participants' obsessive-compulsive symptoms and anxiety levels. The SCL-90 was introduced and compiled by Wang Zhengyu and has been widely applied across different populations, with the obsessive-compulsive and anxiety dimensions demonstrating high reliability and validity. Each subscale contains 10 items rated on a 5-point scale (1 = "not at all" to 5 = "extremely severe"), with higher scores indicating greater symptom severity or anxiety.

1.3 Quality Control To ensure research quality, project team members provided unified training to investigators on standardized survey methods and procedures. During data collection, investigators distributed and collected questionnaires by class, with a completion time of 20-30 minutes. Students were required to complete questionnaires independently, and investigators collected them immediately upon completion. After collection, questionnaires with obvious careless responding or missing data were excluded.

1.4 Statistical Analysis We used SPSS 25.0 for descriptive statistical analyses and Mplus 8.6 for latent growth modeling. First, we examined correlations among variables. Next, we constructed an unconditional latent growth model to explore the developmental trajectory of obsessive-compulsive symptoms in college students. We then sequentially built conditional models incorporating gender as a time-invariant covariate (coded: male = 0, female = 1) and anxiety as a time-varying covariate to examine how these factors influenced symptom

trajectories. The robust maximum likelihood estimator (MLR) was used, with $P < 0.05$ indicating statistical significance.

Results

2.1 Participant Characteristics This study included 3,289 college students aged 18-26 years, with a mean age of 21.0 ± 0.7 years at the first assessment. The sample comprised 1,323 males (40.2%) and 1,966 females (59.8%); 2,352 Han ethnicity individuals (71.5%) and 937 from other ethnic groups (28.5%); and included 1,019 science and engineering majors (31.1%), 1,594 liberal arts and management majors (48.3%), and 676 arts and physical education majors (20.6%).

2.2 Descriptive Statistics and Correlations Across the three measurement occasions, college students' anxiety scores were 1.48 ± 0.51 at T1, 1.38 ± 0.45 at T2, and 1.33 ± 0.43 at T3; obsessive-compulsive symptom scores were 1.75 ± 0.58 at T1, 1.66 ± 0.55 at T2, and 1.53 ± 0.53 at T3. Pearson correlation analyses revealed positive correlations between obsessive-compulsive symptoms and anxiety at each time point ($P < 0.05$) .

2.3 Developmental Trajectory and Gender Differences A linear unconditional latent growth model [Figure 1: see original paper] was constructed to examine the developmental trajectory of obsessive-compulsive symptoms. Model fit indices were good ($^2 = 4.001$, df = 1, $P = 0.046$, CFI = 0.996, TLI = 0.988, RMSEA = 0.030, SRMR = 0.009). Results indicated that the intercept (baseline level) was 1.755 ($P < 0.001$), and symptoms showed a decreasing trend across the three assessments (slope = -0.112, $P < 0.001$). Both intercept variance ($\sigma^2 = 0.162$, $P < 0.001$) and slope variance ($\sigma^2 = 0.039$, $P < 0.001$) were significant, indicating individual differences in initial symptom levels and change rates. The negative correlation between slope and intercept (r = -0.033, $P < 0.001$) suggested that higher initial obsessive-compulsive symptom scores were associated with faster subsequent decline.

When gender was added as a covariate to the linear unconditional latent growth model, the conditional model [Figure 2: see original paper] showed good fit ($^2 = 4.845$, df = 1, $P = 0.089$, CFI = 0.997, TLI = 0.992, RMSEA = 0.021, SRMR = 0.009). Results revealed that female students had higher initial obsessive-compulsive symptom levels than males ($\beta = 0.105$, $P < 0.001$), but no significant gender difference in change rate ($\beta < 0.001$, $P > 0.05$).

2.4 Effects of Anxiety on Developmental Trajectory A conditional model was constructed with anxiety as a time-varying covariate [Figure 3: see original paper]. Model fit indices were good ($^2 = 89.467$, df = 8, $P < 0.001$, CFI = 0.990, TLI = 0.981, RMSEA = 0.056, SRMR = 0.044). Results indicated that anxiety levels at T1, T2, and T3 positively predicted obsessive-compulsive symptoms at each corresponding time point (T1: $\beta = 0.899$, $P < 0.001$; T2: β

= 0.944, P < 0.001; T3: β = 0.932, P < 0.001), suggesting that higher anxiety levels promoted obsessive-compulsive symptoms. After controlling for anxiety, no significant gender difference remained in initial symptom levels (β = 0.012, P > 0.05), but female students showed slower symptom decline than males (β = 0.017, P < 0.05).

Discussion

The unconditional growth model results indicate that college students' obsessive-compulsive symptom scores decreased annually, consistent with previous research. This trajectory largely reflects changes in students' life circumstances and self-development since enrollment. In terms of life circumstances, the novel environment creates psychological stress for incoming freshmen, and stressful life events represent an important cause of obsessive-compulsive symptoms. As group structures stabilize and individuals gradually adapt to their environment, symptoms alleviate. Regarding self-development, college students in early adulthood are establishing their self-identity, engaging in considerable self-exploration and heightened self-consciousness. Constantly examining one' s own thoughts is characteristic of metacognitive beliefs in obsessive-compulsive disorder, meaning individuals in the identity exploration period may be prone to obsessive-compulsive symptoms. As identity becomes established, symptoms related to self-exploration decrease accordingly.

Additionally, the study found that higher initial obsessive-compulsive symptom levels were associated with faster subsequent decline. According to the protective-stability model, the link between risk factors and negative outcomes is severed when protective factors emerge. In other words, when appropriate protective factors appear (such as group support or identity achievement), the relationship between risk factors and negative outcomes is substantially weakened, and obsessive-compulsive symptoms quickly return to normal levels. This suggests that high initial symptom levels may not cause long-term distress for college students.

When gender was added to the linear unconditional latent growth model, differences in initial symptom levels emerged between male and female students, with female freshmen exhibiting more obsessive-compulsive symptoms. Previous research has found that female obsessive-compulsive symptoms often emerge suddenly in conjunction with life stress events, whereas male symptoms follow a long-term increasing process. As noted, the stress of a completely new living environment may affect female students' obsessive-compulsive symptoms more rapidly than males, resulting in initial level differences. Regarding change trajectories, both male and female students showed decreasing symptoms over time with no difference in decline rate, consistent with prior findings that symptom duration does not differ by gender. This suggests that gender differences in obsessive-compulsive symptom trajectories are more pronounced during the formation stage than during subsequent alleviation.

Further incorporating anxiety as a time-varying covariate revealed that anxiety levels at all three time points positively influenced obsessive-compulsive symptoms, with anxiety hindering symptom alleviation, consistent with previous research. Learning theory suggests that compulsive behaviors emerge to relieve anxiety, and research confirms that anxiety levels decrease to some extent after compulsive behaviors appear. According to the double conflicts model, threatening stimuli evoke anxiety, creating information conflict between new information and individuals' basic beliefs. Unresolvable conflict prevents integration of current information, subsequently triggering obsessive-compulsive symptoms. In other words, anxiety can induce obsessive-compulsive symptoms, and its presence hinders symptom alleviation, though the underlying mechanisms require further investigation.

Moreover, after controlling for anxiety's influence, gender differences in obsessive-compulsive symptom trajectories changed. First, the initial gender difference in symptom levels disappeared, indicating that female students' initial symptom levels were more strongly influenced by anxiety status. Research has found that female students score higher than males on negative coping styles under test anxiety conditions. Lack of appropriate coping strategies may be an important reason why female students exhibit higher obsessive-compulsive symptoms under anxiety. Second, after controlling for anxiety, female students' symptom decline rate was lower than males' , suggesting that male students' symptom reduction was more closely related to anxiety alleviation. This result can be interpreted in two ways. First, although obsessive-compulsive symptoms are partly triggered by anxiety, only when individuals assign negative evaluations to these symptoms does anxiety re-emerge after symptom onset. In other words, if individuals accept the legitimacy of obsessive-compulsive symptoms as an effective method for coping with internal conflict, anxiety may decrease while symptoms persist. Second, maintenance and development of obsessive-compulsive symptoms may be influenced by factors beyond anxiety, such as disgust and fear. Previous research has found that cleaning-related compulsions appear more frequently in female populations, primarily driven by disgust toward contamination. This suggests that after obsessive-compulsive symptoms emerge in female students, anxiety may develop into fear or disgust toward unknown outcomes, reducing anxiety' s relative explanatory power for symptom trajectories.

Conclusion

This study used latent growth modeling to examine the developmental trajectory of obsessive-compulsive symptoms in college students and investigated how gender and anxiety influence these trajectories. Results showed that obsessive-compulsive symptoms decrease with advancing grade level, and anxiety hinders symptom alleviation. Importantly, anxiety differentially affects obsessive-compulsive symptoms by gender: it more strongly influences symptom emergence in female students and decline rate in male students. This study advances understanding of obsessive-compulsive symptom development in college

students from a trajectory perspective and explores anxiety' s effects at the gender level. However, the sample was drawn from a single university in Xinjiang, which may limit generalizability.

Author Contributions: Guo Zexi conceptualized and designed the study, analyzed and interpreted data, and wrote the manuscript. Guligena Aitahong collected and organized data. Yilizhati Maimaiti was responsible for quality control and review, and provided overall supervision.

Conflict of Interest: The authors declare no conflict of interest.

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(Received: May 10, 2024; Revised: August 20, 2024) (Edited by: Mao Yamin)

Note: Figure translations are in progress. See original paper for figures.