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How Childhood Conscientiousness Influences Academic Motivation among University Students: A Mediator Effect of Current Conscientiousness

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Abstract. Conscientiousness, as characterized by self-regulation, industriousness, responsibility, and impulsive control, is consistently regarded as one of the strongest predictors of academic success. However, most research investigates the association at a single point, leaving the uncertainty of whether early expressions of conscientiousness continue to influence motivation and learning behaviors in young adulthood. The present study adopts a developmental perspective to investigate how childhood conscientiousness predicts academic motivation among university students and whether this relationship is mediated by current conscientiousness. Students and one of their parents will participate in the study. Parents will retrospectively assess their child's conscientiousness during Grade 6 (age 11-12) using the Big Five Questionnaire for Children (BFQ-C). At the same time, students will complete the BFI-2-S for current conscientiousness, the Academic Motivation Scale (AMS), and brief behavioral measurements of study habits. Correlational and partial correlation analyses will be used to test whether current conscientiousness mediates the relationship between early personality and academic motivation. The predicted results indicate that childhood conscientiousness will predict both current conscientiousness and higher intrinsic and extrinsic motivation, lower amotivation, and that this association will weaken after controlling for current conscientiousness. The study helps to understand how ideas and behaviors with the characteristics of conscientiousness affect the motivational results of higher education, and provides insights into promoting long-term academic participation and success.

Keywords: conscientiousness, academic motivation, developmental precursor, self-report, mediating effects

1. Introduction

As one of the five personality traits, responsibility usually includes self-regulation, diligence, sense of responsibility, and impulse control [1,2]. According to Eisenberg et al. [1], students with high conscientiousness tend to plan effectively, show greater task persistence, and exert effortful control (i.e. the efficiency of executive attention). In addition, even after controlling for intelligence, these self-regulating characteristics can predict educational and career outcomes [2]. In higher education,

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conscientiousness is associated with better learning habits, more effective time management and higher grades [3]. Although numerous studies have examined conscientiousness, most of them focus on current personality traits. Relatively speaking, most studies do not focus on the origin of the development of conscientiousness or its long-term role in academics.

As more research is conducted, personality psychology places more emphasis on the gradual development and stability of characteristics throughout life. Currently, there is no uniform definition of conscientiousness. Roberts et al. [2] argued that conscientiousness is shown by a hierarchical structure, including self-control, orderliness, diligence and responsibility, which is conducive to goal-oriented behavior and persistence. While Tuckerman et al. believed that responsibility follows the U-shaped development trajectory. In other words, it increases in mid-childhood, decreases in early adolescence, and rises again in late adolescence with the improvement of individual self-regulation ability. Similarly, Eisenberg et al. [1] argue that effortful control in childhood is regarded as the ability to regulate attention and suppress impulsive behavior, which is a precursor to adult conscientiousness. In general, the above research indicates that the self-regulation pattern established in childhood may have a lasting impact on personality and behavior.

Academic motivation is another key factor in determining learning and achievement. According to the Self-Determination Theory (SDT) proposed by Vallerand et al. [4], motivation can be divided into intrinsic motivation, extrinsic motivation and amotivation. Intrinsic motivation refers to the task for personal enjoyment or satisfaction, while extrinsic motivation involves external rewards such as money and promotion opportunities [4]. Amotivation means that academic activities lack intention or perceived value [4]. Compared with students who are only motivated by external factors, students with strong intrinsic motivation show stronger perseverance, adopt more effective learning strategies, and experience higher happiness [4]. In contrast, high amotivation is associated with academic disconnection and incompetence [4]. Students who demonstrate amotivation have neither internal nor external motivation [4].

Responsibility and academic motivation have a common psychological characteristic, which is self-regulation. Research shows that conscientious people tend to set goals and resist external interference [3,5]. These behaviors can maintain intrinsic motivation and minimize amotivation. Evidence from Komarraju et al. [5] indicated that the conscientious behaviors of college students are positively correlated to intrinsic motivation and academic persistence. Credé et al. [3] also reported that conscientious students perform better in time management, organization and learning discipline. These behaviors reflect the motivational adjustment described in the Self-Determination Theory, showing that having characteristics of conscientiousness is beneficial for the continuous pursuit of academic success [4].

Recent research focuses on investigating and integrating frameworks related to personality and motivation. Li et al. [6] found that motivation regulates the relationship between responsibility and academic performance, which means that people with higher conscientiousness scores tend to perform better, partly because they are more motivated to participate. Yet most studies adopt a cross-sectional design by evaluating two variables at the same time, which is a limitation for developing perspective insights. Therefore, we cannot infer whether conscientiousness will promote motivation or whether motivation will enhance conscientious behavior.

Some developmental research supports the idea that conscientiousness has been formed early in life and has a lasting impact. For example, Tuckerman et al. proved that conscientiousness in the early days of adolescence foreshadows future academic performance, while Eisenberg et al. [1] also demonstrated that self-regulation in early childhood can predict personality characteristics in adulthood. However, these studies did not examine the motivational results of adulthood. Assuming

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that conscientiousness is a stable self-regulation system. In this case, it should not only persist over time but also continue to play a lasting role in shaping the quality of motivation for higher education.

Although the connection between childhood conscientiousness and university motivation is important, it has not been studied in depth to a large extent. Most previous studies rely entirely on self-reporting measures, which may lead to inaccurate correlations due to potential confounding variables. Combining parents' memories of childhood behavior provides an external perspective, reducing the bias of self-reporting. Meanwhile, it makes the results more consistent with the actual situation of students. The Big Five Questionnaire for Children (BFQ-C) serves as a verified parent reporting measure for assessing conscientious behaviors that are positively correlated to academic performance [7]. By pairing the results of BFQ-C with the students' self-reported Big Five Inventory-2 Short Term (BFI-2-S) and the Academic Motivation Scale (AMS), researchers can check whether the personality can predict the unique motivational characteristics in the future [4,8].

It is noteworthy that although previous work has identified the overall relationship between conscientiousness and motivation, most studies regard motivation as a single structure. It is important to distinguish between intrinsic motivation, extrinsic motivation and non-motivation, because these forms of motivation represent different processes in motivation formation [4]. A conscientious and responsible student may have both the extrinsic motivation to get high scores and the intrinsic motivation to master knowledge. The balance between these motives can determine their long-term academic engagement and achievement. Understanding the most predictable type of motivation for conscientiousness lays the foundation for developing learning strategies and adjusting academic goals.

In general, there have been several major findings in the past study. On the one hand, conscientiousness is related to academic performance and self-regulating learning [3,5]. From another perspective, this trait will develop in early childhood and show obvious measurable performance [1,9]. Even though the strong correlation between conscientiousness and motivation is studied, the continuity and causal relationship of development is still unclear. The gap in research is to connect these existing clues to determine whether traits of childhood conscientiousness continue to affect the academic motivation of the university. It is also a feasible step to find out whether current conscientiousness mediates this relationship.

2. Present work

This study will integrate the developmental perspective to test the long-term impact of childhood conscientiousness on the motivation of university students. The following research questions guide this study: How does childhood conscientiousness affect the academic motivation of university students, and is this relationship mediated by the current conscientiousness? It investigates whether childhood responsibility (such as parental retrospective reports) can predict the academic motivation of university students, and whether this relationship plays an indirect role through current conscientiousness. The model reflects the theoretical hypothesis that early self-regulation behavior lays the foundation for subsequent goal-oriented tasks and motivations.

Based on previous research and theoretical reasoning, I put forward three hypotheses: it is expected that the childhood conscientiousness reported by parents will be directly related to the current conscientiousness of students, reflecting the developmental stability of self-regulation tendency. Another hypothesis is that current conscientiousness will be positively correlated with the intrinsic and extrinsic motivation of students and negatively correlated to amotivation. This result is likely to occur because conscientious people usually learn from persistence, organization, and a

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sense of responsibility, thus promoting participation and enjoyment of academic work. In addition, early conscientiousness cultivates lasting self-regulation skills, so as to continue to support students' learning motivation in university level. As a result, childhood conscientiousness is very likely to have an impact on academic motivation.

By integrating the perspectives of development, personality and motivation, the study explores how early self-regulation tendencies affect the quality of motivation in adulthood. By understanding the relationship between personality and academic motivation, students can become aware of their study methods and identify areas for improvement. In this case, they can develop more effective learning strategies, better time management, and increased course engagement. For example, students with lower conscientiousness can be more proactive in planning a systematic schedule to break the habit of procrastination if they have one.

3. Method

I will report all measures, manipulations, and exclusions. This study will be approved by and carried out in accordance with the recommendations of the Institutional Review Board for human participants with written informed consent obtained from all participants.

Participants: 213 individuals and one of their parents will be recruited from a Canadian university. Participants will be excluded if their parents did not know the students well when they were in Grade 6; if students fail to pair with their parents; or if they provide low-quality responses. Participants who fail the attention check will also be excluded from the study.

My primary hypothesis involves assessing …. I performed a power analysis using the software package G*Power [10]. The results indicated that with N=213, my experiment could detect an effect size of Cohen’s d of .22, using the Pearson correlation at a 5% alpha level (two-tailed) threshold with 90% statistical power.

4. Study design

Procedures. After providing informed consent, students will complete the BFI-2-S, AMS, and questions about study habits in an online survey. They will obtain an anonymous code after completing the survey. Parents will then use the code to access a separate online survey and rate their children using BFQ-C. In order to protect personal information, I will use anonymous code for data analysis to ensure privacy. When the child and one of their parents complete the survey, they will receive an email with the purpose of the study and my contact information in case they have any questions or concerns.

Measure 1. Childhood conscientiousness. Parents will complete the conscientiousness subscale in the Big Five Questionnaire for Children (BFQ-C), which is a standardized measurement method to evaluate the personality traits of children. The conscientiousness scale contains 13 items, and the 5-point Likert scale is used for scoring (1 = almost never, 5 = almost always). It includes statements such as "I like to keep all my school things in a great order" and "I play only when I have finished my homework" [7]. In order to improve the accuracy of memory, parents will receive context prompts to help them recall the situation at that time. For example, "Please recall your child's situation in the sixth grade and consider their typical behavior during the normal school week."

Measure 2. Current conscientiousness. Students will complete the Big Five Inventory-2 Short Form, especially the conscientiousness subscale, including statements such as "is reliable and can always be counted on". Responses will be recorded on a 5-point scale, ranging from strong disagreement to strong agreement [8]. In order to supplement the answers of the self-report, the

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survey will also include four behavioral questions to measure students' observable self-regulation habits: 1) How many hours did you study last week? 2) How often do you submit your homework on time? 3) How many days before the deadline do you start to complete the last assignment? 4) How often do you plan your weekly study plan? The answers will be standardized and combined with the BFI-2-S conscientiousness score to show the students' current conscientiousness level.

Measure 3. Academic motivation. Students will also complete the Academic Motivation Scale (AMS), which includes three types of motives: 1) Intrinsic motivation, which refers to the individual's learning for personal interest and enjoyment; 2) External motivation, which refers to the individual's learning to obtain external rewards such as scholarships; 3) Amotivation, which refers to the individual's absence from learning due to lack of interest or perceived value [4]. Each item is rated from 1 (not at all) to 7 (exactly).

Covariates. Variables including gender, year, major, and GPA will be collected in the online survey completed by students. These covariates will serve as control factors that minimize potential confounding problems in the observed relationships.

Data Analytic Approach. Descriptive statistics and reliability analyses will be conducted first for all main variables. Pearson correlation will examine the relationships among childhood conscientiousness, current conscientiousness, and types of academic motivation. Multiple regressions will then test whether childhood conscientiousness predicts current conscientiousness, and whether current conscientiousness predicts intrinsic, extrinsic, and amotivation after controlling for covariates. To examine the indirect pathway, comparisons will be made between models with and without current conscientiousness as a predictor. A weaker direct connection would suggest there is an indirect effect between childhood conscientiousness and academic motivation. Given differences in measurement sources and the developmental effect involved, a small effect size (d = .20) will be expected.

5. Predicted results

Descriptive statistics: On average, I expect that parents' reports show a moderate conscientiousness in childhood (M = 3.40, SD = 0.60), while the current sense of conscientiousness of students is slightly higher (M = 3.50, SD = 0.70). On the Academic Motivation Scale, the participants will show relatively strong intrinsic motivation (M = 4.80, SD = 1.00) and extrinsic motivation (M = 5.20, SD = 1.10), and low amotivated scores (M = 2.60, SD = 1.10). Behavioral indicators will also reflect continuous academic participation. Students study for an average of 13 hours a week and submit about 85% of their homework on time. These results indicate that participants generally displayed moderate to high levels of conscientiousness and motivation, providing sufficient variability for testing the relationships between childhood conscientiousness, current conscientiousness, and academic motivation.

5.1. Aim 1

I expect a small positive association (d = .15) between parent-reported childhood conscientiousness and students' current conscientiousness. The scatter plot indicates a gentle upward trend, suggesting that individuals described by their parents as more self-regulated in Grade 6 tend to be more conscientious in university, supporting my first hypothesis. See Figure 1.

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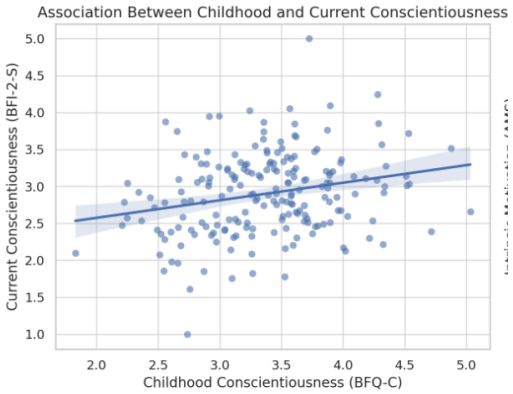

Figure 1. Predicted association between childhood and current conscientiousness

5.2. Aim 2

The above three scatter plots summarize the relationship between current conscientiousness and three types of academic motivation. I will expect the result to be consistent with assumptions. Current conscientiousness will show a small to moderate positive correlation with intrinsic motivation (d = .28), a small positive correlation with extrinsic motivation (d = .10), and a small negative correlation with amotivation (d = -.20). These findings would suggest that students who are more organized, responsible, and industrious tend to engage in learning that will both for satisfy themselves and achievement-related factors, while being less likely to feel self-doubted or unmotivated. See Figure 2.

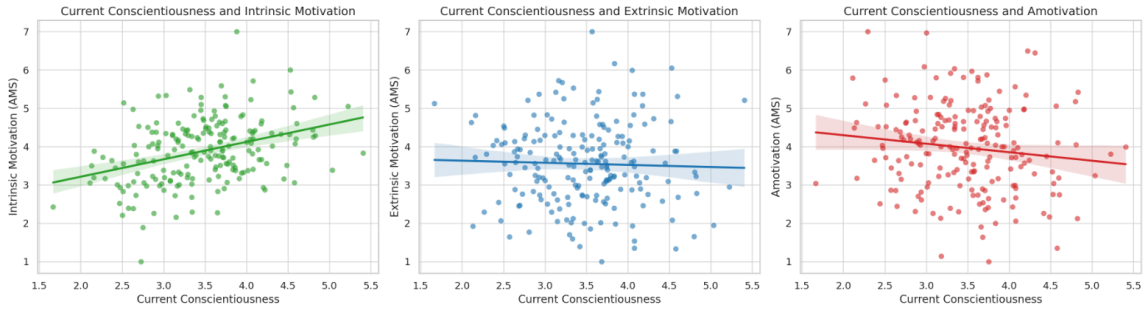

Figure 2. Predicted association between current conscientiousness and intrinsic motivation, extrinsic motivation, and amotivation

5.3. Aim 3

The bar graph illustrates the change in correlation between childhood conscientiousness and intrinsic motivation when current conscientiousness is statistically controlled for. The zero-order correlation (d = .10) weakens to d = .05 after accounting for current conscientiousness, exhibiting that the association between early self-regulation skills and intrinsic motivation is largely explained by the persistence of early conscientious traits into adulthood. This decay pattern visually supports the indirect way for childhood conscientiousness to influence later motivation through lasting personality stability. See Figure 3.

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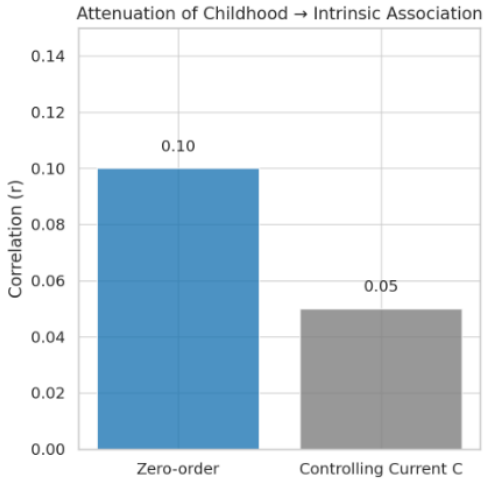

Figure 3. Predicted association between childhood conscientiousness and intrinsic motivation after statistical control of current conscientiousness

6. General discussion

The prediction results will provide evidence for the development continuity characteristics of conscientiousness, indicating that the early self-regulation tendency will continue to affect the academic motivation of young children. After controlling the current conscientiousness, the weakening of the direct influence of childhood conscientiousness will explain some of the mediating effects, which is consistent with the prediction that early personality traits shape later results through persistent conscientious behavior patterns.

These findings further expand the framework proposed by Roberts et al. [2]. It operates as a hierarchical system that affects behavior and motivation. The research results also supplement the development model of Tackman et al. [9], which shows that conscientiousness is stable in adolescence, but retains the ability to predict future motivation results. Meanwhile, the results are consistent with those of Credé and et al. [3], who believe that the expected association between conscientiousness and learning habits will prove that personality traits are expressed in behavior through structured learning practices. In addition, by distinguishing between intrinsic motivation, extrinsic motivation and amotivation, this study will improve the existing findings of Komarraju et al. [5] and Li et al. [6]. In this case, it provides insights into the qualitative nature of motivation influenced by personality.

The research mainly made the following contributions. It integrates developmental psychology and personality psychology by linking early personality precursors with later motivational orientation. It also pairs the results of parent-child self-reporting, reducing the inaccuracy of data and conducting a comprehensive assessment of early conscientiousness. Unlike other studies, it introduces motivational differences and clarifies how responsibility predicts different forms of participation without considering only a single form.

Nevertheless, I admit that this research has some limitations. Retrospective design may cause students to be inconsistent with their actual situation, because parents often recall significant behaviors, such as children's mistakes. However, providing a specific time range and behavioral prompts may alleviate this restriction. In addition, due to the cross-sectional nature of the data, I cannot infer the causal relationship or direction. Finally, the study sample may represent too many students with a high degree of parental participation, thus limiting the generalizability. The sample

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size also limits cultural diversity, because the data is only collected from one school, and the sample is relatively small.

In order to improve this research, future research should be based on these findings in many ways. Researchers can use a longitudinal design to directly measure conscientiousness and motivation at multiple stages of development to determine whether there is a causal relationship. Multiple information reports from teachers or peers can be included to maintain statistical accuracy. Researchers can also explore situational regulators, such as the way of parenting or cultural background, which may strengthen or weaken the relationship between childhood conscientiousness and later motivation. Given results of the research, it is essential to consider cultivating conscientiousness and self-regulation skills in early adolescence for children's development. Researchers can also explore the practical significance of this idea.

7. Conclusion

This study aims to investigate how conscientiousness develops from early childhood to early adulthood, and how it continues to affect individual motivational behavior. By linking conscientiousness for childhood reported by parents with the current conscientiousness and academic motivation of college students, this study provides a developmental perspective on how early self-regulation tendencies can be transformed into long-term academic participation. Although most existing studies rely solely on self-reporting measures or cross-sectional design, this study includes parental memories that provide additional sources of evidence for early personality traits, thus confirming structural validity and minimizing data fabrication or inaccuracy.

The expected results show that the current conscientiousness mediates the relationship between childhood conscientiousness and intrinsic motivation, and emphasizes the continuity of self-regulation from childhood to early adulthood. Small correlations indicate that even the slight consistency of early conscientious skills may have a lasting impact on motivational results. These results are expected to expand the theories of personality development and supplement the Self-Determination Theory by explaining how persistent traits support motivational learning [1,2,4].

The study also provides practical educational significance. If the conscientious characteristics rooted in childhood can enhance motivation in higher education, the educational programs of cultivating conscientiousness and self-regulation in early adolescence may bring long-term academic benefits. Teachers and parents can promote the development of children's conscientiousness by setting targeted expectations and constantly evaluating the effectiveness of learning strategies.

In general, this research proposal highlights the development roots of academic motivation and the lasting impact of conscientiousness. By integrating the framework of development, personality and motivation, it aims to clarify how the early self-regulation model shapes the long-term learning trajectory. Moreover, it provides in-depth insights into the cultivation of academic motivation and achievements.

Data availability statement

The data and the materials will be made available in the Open Science Framework database.

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