

# The Effect of Parental Autonomy Support on Grit: The Mediating Role of Basic Psychological Needs and the Moderating Role of Achievement Motivation

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**Purpose:** Grit plays a critical role in the academic achievement and future career success of college students. The family environment has an important influence on the development of individual grit, but the mechanisms linking family and grit are not well known. To further understand these relationships, this study sought to explore the mediating role of basic psychological needs between parental autonomy support and grit, and the moderating role of achievement motivation.

**Methods:** The present study model was developed according to the proposed hypotheses and was analyzed using structural equation modeling. A total of 984 college students in Hunan Province, China participated in the present study. The following tools were used: Perceived Parental Autonomy Support Scale, Basic Psychological Needs Scales, Short Grit Scale, and Achievement Motivation Scale.

**Results:** Parental autonomy support was positively correlated with basic psychological needs and grit, and both basic psychological needs and achievement motivation were positively correlated with grit. Basic psychological needs mediated the effect of parental autonomy support on grit. Achievement motivation moderated the second half of the path of the mediation model.

**Conclusion:** Parental autonomy support influences perseverance through the mediation of basic psychological needs, and achievement motivation plays a moderating role. Findings of this study reveal the influence of family environment on grit, and give reference to the development of grit.

**Keywords:** parental autonomy support, grit, basic psychological needs, achievement motivation, family environment

## Introduction

Grit is passion and perseverance for long-term goals, including perseverance of effort and consistency of interests.<sup>1</sup> Individuals with high grit persist in their enthusiasm for goals and efforts in the face of difficulties and setbacks, and are able to maintain this state over time. Studies have found that grit, independent of intellectual factors, is a good predictor of students' adaptability to their environment and academic achievement.<sup>2,3</sup> Also, grit predicts adult job satisfaction, career performance, creativity at work, and is positively correlated with their social adjustment.<sup>4,5</sup> While college students are studying in school, they are also preparing for entering the society. The study of college students' grit and its influencing factors not only plays a unique role in the development of students in school, but also has important significance for their future career.

Grit as a predictor has been proven effective by many studies, however the grit as outcome still needs more exploration.<sup>6</sup> Grit is thought to be strongly associated with responsibility in the Big Five Personality, with individuals who are more responsible also having higher grit.<sup>1</sup> It has also been demonstrated that grit is associated with conscientiousness, even their contents partially overlapped.<sup>7</sup> But the characteristic of grit, a combination of passion and perseverance, is not possessed by conscientiousness.<sup>8</sup> One study concluded that grit, similar to other personality traits, is more significantly influenced by genetic factors and less by environmental influences.<sup>9</sup> A previous study found a positive effect of growth mindset on grit,<sup>10</sup> while another found a positive correlation between grit and self-control,

and together they predict academic self-efficacy and satisfaction with school.<sup>11</sup> The present study will further explore the influencing factors of grit and expand the scope of study on grit as outcome.

A previous study concluded that grit has specificity in different domain.<sup>12</sup> Some researchers have taken a school environment perspective, such as one that found that teacher autonomy support can positively influence students' levels of grit and improve academic performance,<sup>13</sup> and peer relationships are also positively associated with grit.<sup>14</sup> However, previous studies have paid little attention to the influence of family factors on grit. According to ecological systems theory,<sup>15</sup> the family (such as parenting style) is a microsystem, the environment to which the individual is most directly exposed, and is inextricably linked to the individual's development. Parenting styles play an important role in the development of the individual, and respecting the autonomy of the child while providing the necessary supervision is conducive to good development.<sup>16</sup> Therefore, the present study was designed to examine the effect of parental autonomy support on individual grit and its mechanisms of action.

Parental autonomy support is the ability of parents to accept and agree with their children's views, give them more choice, use as little authoritarian parenting as possible, and help them explore their interests and realize their personal values.<sup>17</sup> Good parental autonomy support allows individuals to be fully encouraged and supported in their development, which can enhance their self-esteem,<sup>18</sup> happiness,<sup>19</sup> promote their emotion regulation function,<sup>20</sup> which contributes to the good development of the individual. And perceived parental autonomy support can still positively influence children's development after they leave their parents and enter college.<sup>21</sup> One study found that positive parental attention was beneficial to grit development, whereas overprotection had negative effects, and children's grit was better developed when parental warmth was combined with authority, which is a democratic parenting style;<sup>22</sup> children with a democratic parenting style had higher levels of grit compared to those with authoritarian parents.<sup>23</sup> Democratic parents tend to devote more positive attention to their children and presumably have higher levels of autonomy support. Therefore, this study hypothesized that parental autonomy support positively predicts individual grit (H1).

An environment of autonomy support has a positive impact on the individuals and plays an important role in their physical and psychological health.<sup>24</sup> Some studies suggest that autonomy-supportive behaviors imply behaviors that meet the needs of individuals.<sup>25</sup> Self-Determination Theory (SDT) suggests that individuals exist three basic psychological needs, which are autonomy needs, competence needs, and relatedness needs.<sup>26</sup> When basic psychological needs are satisfied, it promotes the enhancement of intrinsic motivation and the internalization of extrinsic motivation, allowing individuals to develop in a positive, integrated direction.<sup>27</sup> When intrinsic motivation is reinforced, individuals are able to be more enthusiastic about their goals and persevere, and their grit is increased,<sup>19</sup> so the basic psychological needs satisfaction can increase individual grit. It has been suggested that the basic psychological needs satisfaction depends on having a good social environment and positive experiences,<sup>28</sup> and that the more important part of the social environment tends to come from the people with whom the individual has close relationships; therefore, higher levels of parental autonomy support lead to higher levels of basic psychological needs satisfaction. Self-determination theory also proposes a mechanistic model in which basic psychological needs mediate between the social environment and personal development,<sup>29</sup> for example, one study found that parental autonomy support influenced adolescents' future planning through the satisfaction of basic psychological needs.<sup>30</sup> In summary, this study hypothesized that basic psychological needs mediate the relationship between parental autonomy support and grit (H2).

However, grit is not only influenced by the family environment, but the individual's own psychological factors also have a great impact on grit.<sup>10,14</sup> According to ecological systems theory, individuals grow up with interactions between environment, individual and behavior, and different individuals in similar environments will differ due to differences in perceptions. Achievement motivation is a higher social standard that individuals use to judge the success or failure of their behavior,<sup>31</sup> and expectancy-value theory<sup>32</sup> suggests that achievement motivation can be divided into two parts depending on the causative factors: motivation to achieve and motivation to avoid failure. Individuals who are more motivated to achieve are more likely to enjoy the positive emotions of pride and satisfaction that come with success, and thus keep working toward possible success; individuals who are more motivated to avoid failure are afraid of experiencing negative emotions such as shame and humiliation after failure, and thus avoid such situations by withdrawing or not acting.<sup>33</sup> A previous study found that grit mediates the relationship between motivation and academic achievement,<sup>34</sup> motivation of achieve makes individuals positive, with a strong desire for success and an interest in taking on challenges;

they also tend to reflect and adjust themselves from failure after encountering setbacks, enjoy the process of effort more, and are willing to keep putting in effort, so they are more likely to persevere in the process of achieving long-term goals. The two mindsets of individuals with motivation to achieve are consistent with the grit of effort and consistency of interests in grit. One study found that grit was positively related to motivation variables such as goal orientations and instrumentality.<sup>35</sup> It has been found that growth mindset influences individual grit through achievement motivation and that achievement motivation predicts the level of individual grit.<sup>36</sup> Therefore, the present study hypothesized that achievement motivation moderates the effect of basic psychological needs on grit (H3).

In summary, parental autonomy support, basic psychological needs, achievement motivation, and grit are closely related. The present study introduces ecological systems theory within the framework of self-determination theory to explore the mechanisms influencing grit among college students, and analyzes how parental autonomy support influences grit through basic psychological needs and the moderating role of achievement motivation in it. Based on previous theories and studies, a hypothetical model was constructed with college students as the subjects, as shown in Figure 1.

## Materials and Methods

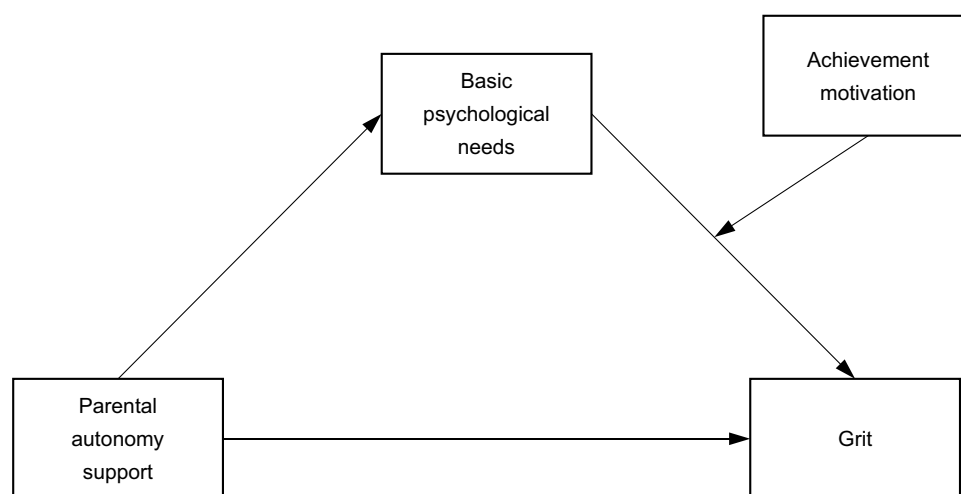
### Participants

This cross-sectional study was conducted using a convenience sampling method with participants from four universities in Hunan Province. All participants were recruited online without face-to-face interaction. Researchers sent questionnaires and collected data from participants using the electronic “Wenjuanxing” tool. All participants provided informed consent and spent approximately 15 minutes completing each questionnaire item. A total of 1036 students completed the questionnaire, we eliminated 52 invalid questionnaires, and finally 984 valid questionnaires were obtained, with an effective recovery rate of 94.98%. The exclusion criteria for the questionnaire consisted of missing values in the data, and regularity or continuity in answering. Of the responses, 375 (38.1%) were male and 609 (61.9%) were female, and the average age of the subjects was 20.23 years ( $SD=1.58$  years). To encourage participation, some incentive measures were also taken. The present study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of the Department of Psychology at Ningbo University. Participants were provided informed consent and were free to withdraw from the investigation at any time.

### Measures

#### Parental Autonomy Support

The Perceived Parental Autonomy Support Scale (P-PASS)<sup>37</sup> was used to measure the level of perceived parental autonomy support. The scale consists of 12 items (for example, “My parents gave me many opportunities to decide for



**Figure 1** The conceptual moderated mediation model.

myself what I wanted to do”), including three dimensions: offering choices, giving explanations, and acknowledging opinions and feelings. Participants answered the items on a 7-point scales ranging from 1 for “do not agree at all” to 7 for “very strongly agree”. The higher the score, the higher the individual’s perceived level of parental autonomy support. A previous study has shown the satisfactory validity and reliability of scale among Chinese college students.<sup>38</sup> According to the recommendations of previous studies, we conducted the analysis using a single score.<sup>37</sup> In the current study, Cronbach’s alpha coefficient for this scale was 0.95.

### Basic Psychological Needs

The Basic Psychological Needs Scales (BPNS)<sup>39</sup> were used to measure the degree to which individuals’ basic psychological needs are satisfied. We adopted the Chinese version of the scale as translated by Liu.<sup>40</sup> The scale consists of 19 items, including three dimensions: competence needs (6 items, for example, “I often do not feel very capable”, reversed coded), autonomy needs (6 items, for example, “I am free to express my ideas and opinions”), and relatedness needs (7 items, for example, “I really like the people I interact with”). Participants answered the items on a 7-point scale, ranging from 1 for “not true at all” to 7 for “definitely true”. The higher the score, the higher the satisfaction level of psychological needs. A previous study has shown the satisfactory validity and reliability of scale among Chinese college students.<sup>41</sup> According to the recommendations of previous studies, we conducted the analysis using a single score.<sup>41</sup> In the current study, Cronbach’s alpha coefficient of this scale was 0.81.

### Grit

The Short Grit Scale (GRIT-S)<sup>42</sup> was used to measure the level of individual grit. We adopted the Chinese version of the scale as translated by Liang.<sup>43</sup> The scale consists of 8 questions and includes two dimensions of perseverance of effort (4 item, for example, “Setbacks do not discourage me. I do not give up easily”) and consistency of interests (4 item, for example, “I often set a goal but later choose to pursue a different one”, reversed coded). Participants answered the items on a 5-point scale, ranging from 1 for “not at all like me” to 5 for “very much like me”. The higher the total score, the higher the individual’s level of grit. Previous studies have shown the satisfactory validity and reliability of the scale among Chinese college students and professional athletes.<sup>43,44</sup> According to the recommendations of previous studies, we conducted the analysis using a single score.<sup>8</sup> In the current study, the Cronbach’s alpha coefficient of this scale was 0.75.

### Achievement Motivation

The Achievement Motivation Scale (AMS)<sup>45</sup> was used to measure individual achievement motivation. In the current study, using the subscales of which motivation of achieve. This scale consists of 15 questions (for example, “I will be attracted to difficult tasks”) and is scored on a 5-point scale ranging from “strongly disagree” to “strongly agree”. The higher the subject’s score, the stronger the motivation of achieve. The scale showed satisfactory validity and reliability in Chinese samples.<sup>36</sup> In the current study, the Cronbach’s alpha coefficient of the scale was 0.89.

## Statistical Analyses

Data were analyzed using SPSS 22.0, and PROCESS 3.1. First, descriptive statistics and correlational analyses were performed for all variables using SPSS 22.0. Second, the mediating effect of basic psychological needs was investigated using the PROCESS 3.1. Third, the moderating effect of achievement motivation on the relationship between basic psychological needs and grit was analyzed using the PROCESS 3.1. All study continuous variables were standardized. All tests were performed using bootstrap methods with 95% confidence intervals, bootstrap sample sizes of 5000, and a test level of 0.05.

## Results

### Common Method Bias Test

This study mainly used self-reporting to collect relevant data, so serious common method bias problems may exist. Common method bias may compromise the reliability of research results.<sup>46</sup> Therefore, after we collected the data,

Harman's single-factor test was used to verify possible serious common method bias statistically.<sup>47</sup> The results of the unrotated principal component factor analysis show that there are 8 factors whose eigenvalues are greater than 1, and the variance explained by the first common factor is only 22.38%, which is less than the critical value standard of 40%, so there was no serious common method bias problem in this study.

## Descriptive Statistics and Correlational Analyses

The correlation analysis was conducted on the scores of parental autonomy support, basic psychological needs, grit, and achievement motivation scales. The correlation analysis results of all the variables had significant relationships with the other variables at level  $p < 0.01$ , indicating a mutual relationship among the variables. The results showed that parental autonomy support was positively correlated with basic psychological needs, grit, and achievement motivation. Meanwhile, basic psychological needs were positively correlated with grit and achievement motivation, and grit was positively correlated with achievement motivation (Table 1).

## Testing for Mediation Effect

This study hypothesized that parental autonomy support positively influences individual grit, and that basic psychological needs play a mediating role. According to the results of the Shapiro–Wilk test ( $W=1.00$ ,  $p=0.11 > 0.05$ ) and the Q-Q plot, the residuals of the dependent variable were normally distributed, indicating that the path analysis model was tenable. As suggested by Hayes,<sup>48</sup> Model 4 in the SPSS macro program PROCESS 3.1 was used to test the mediating role of basic psychological needs in the relationship between parental autonomy support and grit. After controlling for gender and age and standardizing the variables, parental autonomy support significantly and positively predicted grit ( $\beta=0.28$ ,  $t=6.02$ ,  $p < 0.001$ ), therefore, the total effect was significant, testing hypothesis 1. This direct effect became insignificant when the mediating variable basic psychological needs was included ( $\beta=0.05$ ,  $t=1.75$ ,  $p > 0.05$ ), whereas parental autonomy support was a significant predictor of basic psychological needs ( $\beta=0.45$ ,  $t=16.37$ ,  $p < 0.001$ ) and the predictive effect of basic psychological needs on grit was also significant ( $\beta=0.49$ ,  $t=15.46$ ,  $p < 0.001$ ). Bootstrap method test results yielded  $\beta=0.22$ ,  $\text{BootSE}=0.02$ , 95%  $\text{CI}=[0.18, 0.27]$ , and the mediating effect accounted for accounting for 80.36% of the total effect, the mediating effect was significant. Therefore, basic psychological needs mediated the effect of parental autonomy support on grit, verifying hypothesis 2.

## Moderated Mediation Effect Analysis

This study hypothesized that achievement motivation moderates the effect of basic psychological needs on grit. Model 14 in the SPSS macro program PROCESS 3.1 was used to test the moderating effect of achievement motivation on the second half of the pathway, which required estimation of the parameters of three regression equations. The results are shown in Table 2. Parental autonomy support had a positive predictive effect on grit ( $\beta=0.28$ ,  $t=9.02$ ,  $p < 0.001$ ); parental autonomy support had a significant positive predictive effect on basic psychological needs ( $\beta=0.46$ ,  $t=16.37$ ,  $p < 0.001$ ); basic psychological needs had a positive predictive effect on grit ( $\beta=0.39$ ,  $t=12.41$ ,  $p < 0.001$ ); and the interaction term of basic psychological needs and achievement motivation had a significant positive predictive effect on grit ( $\beta=0.09$ ,  $t=4.06$ ,  $p < 0.001$ ). The results indicated that there is

**Table 1** Descriptive Statistics and Correlations Among Variables (N= 984)

	M	SD	1	2	3	4	5
1 Sex	—	—	—	—	—	—	—
2 Age	20.23	1.58	-0.19**	—	—	—	—
3 Parental autonomy support	4.86	1.12	-0.01	0.03	—	—	—
4 Basic psychological needs	4.52	0.55	0.07*	-0.06	0.46***	—	—
5 Grit	3.16	0.53	-0.02	0.05	0.28***	0.50***	—
6 Achievement motivation	3.34	0.53	-0.11*	-0.03	0.14***	0.32***	0.38***

**Note:** \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , Sex code: 0 = men, 1 = women.

**Table 2** Summary of Moderated Mediation Effect Analysis

Variables	Grit			BPN			Grit		
	SE	$\beta$	t	SE	$\beta$	t	SE	$\beta$	t
Sex	0.06	-0.01	-0.07	0.06	0.13	2.19*	0.06	0.01	0.18
Age	0.02	0.03	1.50	0.02	-0.04	-2.08*	0.02	0.05	2.89**
PAS	0.03	0.28	9.02***	0.03	0.46	16.37***	0.04	0.06	1.84
AM							0.03	0.25	9.09***
BPN							0.03	0.39	12.41***
BPN×AM							0.02	0.09	4.06***
R <sup>2</sup>	0.08			0.22			0.33		
F	28.16			92.19			78.47		

Notes: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

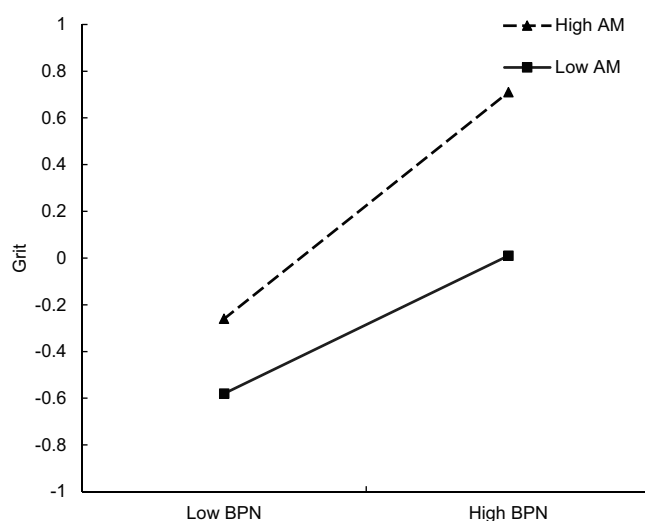
Abbreviations: PAS, Parental autonomy support; AM, Achievement motivation; BPN, Basic psychological needs.

a moderating mediating effect, and achievement motivation moderated the relationship between basic psychological needs and grit, verifying hypothesis 3.

To further determine the specifics of the interaction effect of basic psychological needs and achievement motivation, a simple slope analysis (Figure 2) showed that the positive predictive effect of basic psychological needs on grit was significant when individuals had high levels of achievement motivation ( $\beta = 0.49$ ,  $t = 12.90$ ,  $p < 0.001$ ), whereas the positive predictive effect of basic psychological needs on grit became weaker when individuals had low levels of achievement motivation, but was still significant ( $\beta = 0.30$ ,  $t = 7.35$ ,  $p < 0.001$ ). Simple slope analysis demonstrated that basic psychological needs satisfaction has a greater effect on grit in individuals with high achievement motivation relative to those with low achievement motivation. In summary, the mediating process by which parental autonomy support influences grit through basic psychological needs is moderated by achievement motivation.

## Discussion

The results of the correlation analysis showed that individuals with higher levels of parental autonomy support also had higher grit, which is consistent with the results of previous studies.<sup>22</sup> It suggests that parental autonomy support is an important factor influencing grit and that a good and autonomous family environment is crucial for the development of



**Figure 2** The effect of the interaction between basic psychological needs and achievement motivation on grit.

Notes: AM and BPN were graphed as one standardized deviation below the sample mean (ie, low) and one standardized deviation above the sample mean (ie, high).

Abbreviations: AM, Achievement motivation; BPN, Basic psychological needs.



individuals. Also, individuals who are at higher levels of parental autonomy support also have higher satisfaction of basic psychological needs. Previous studies had demonstrated that autonomy support from teachers and mothers can increase individuals' psychological need satisfaction,<sup>49</sup> which indicates that parental autonomy support has a significant impact on individuals' psychological well-being. More importantly, the present study revealed the mediating mechanism by which parental autonomy support affects grit, and found a mediating role of basic psychological need satisfaction, which means that parental autonomy support is further influencing grit by affecting basic psychological needs. This is also similar to previous studies, such as parental autonomy support influencing adolescents' future planning through basic psychological needs satisfaction,<sup>30</sup> teacher autonomy support enhancing college students' academic performance through basic psychological needs satisfaction.<sup>13</sup> Ecological systems theory suggests that individuals are influenced by their environment in their interactions with it, and that good parent-child interactions allow children to explore their interests and develop their abilities more freely, and that the good family environment created in the interaction enhances the emotional connection between parents and children, fully satisfying the individual's needs for autonomy, competence, and relatedness. Self-determination theory suggests that when individuals' basic psychological needs are satisfied, they will develop in a more positive direction and be willing to make more efforts to achieve their goals, and therefore their grit will be improved. For example, in second language learning, the satisfaction of basic psychological needs helps individuals maintain their interest in learning and make long-term efforts to achieve their learning goals, which eventually manifests itself in the improvement of their grit.<sup>50</sup> In summary, parental autonomy support influences individuals' grit level through basic psychological needs.

It has also been found that grit can enhance individuals' subjective well-being by influencing basic psychological needs, and that individuals with higher levels of strength of character are more capable of satisfying their psychological needs and derive greater well-being from psychological need satisfaction.<sup>51</sup> Higher parental autonomy support brings individuals higher levels of basic psychological needs satisfaction, which leads to higher levels of grit, and with higher levels of grit, individuals are more capable of satisfying their psychological needs, creating a virtuous cycle. The effects of parental autonomy support on children are effective over time, which is also consistent with previous findings that perceived parental autonomy support continues to have a positive impact after children leave their parents and enter college.<sup>21</sup> Other study found that parental grit produces intergenerational covariation through parenting styles.<sup>52</sup> It is thus clear that a good family environment does not only play a role in individual growth, but also has a profound impact on future development. The present study identified the important influence of family environment on individual grit and identified the mediating mechanisms involved. This facilitates the promotion of individual grit from the family perspective in the future.

The present study also found that basic psychological needs not only mediated the effect of parental autonomy support on grit, but this mediating effect was moderated by achievement motivation. Compared to college students with low achievement motivation, the basic psychological needs of college students with high achievement motivation influenced their grit more, which means that the positive predictive effect of basic psychological needs on grit increased when achievement motivation was high. Many studies have demonstrated a close relationship between motivation and grit, for example, motivation mediates between growth mindset and grit,<sup>10</sup> academic motivation influences academic achievement through the mediation of grit.<sup>34</sup> Individuals with higher levels of achievement motivation are more willing to accept challenges, aspire to achieve more, and have stronger motivation to overcome difficulties and resist various external shocks, as a result, these individuals have higher levels of grit. A previous study also found grit is positively related to the motivational variable of performance approach goal orientation.<sup>35</sup> Self-determination theory suggests that the influence of basic psychological needs satisfaction on individual development is inseparable from its contribution to the enhancement of intrinsic motivation and the internalization of extrinsic motivation.<sup>27</sup> This process is further facilitated by individuals' higher achievement motivation, and their pursuit of success helps individuals internalize their motivation, which, together with basic psychological needs satisfaction, contributes to the level of grit. Thus, the positive impact of basic psychological needs satisfaction on grit is more pronounced in individuals with higher achievement motivation. Educators can integrate motivation with instruction, avoid using extrinsic motivation to encourage students, and use reasonable strategies to foster students' achievement motivation, such as by introducing growth mindset instruction to promote students' achievement motivation. By this way, students' grit can be well developed, ultimately helping to improve academic performance and better future career development.

There are still some limitations in this study that should be discussed. First, this study is a cross-sectional study, and no exact causal relationship can be obtained. The development of individual grit is a long-term process, and future studies can further investigate the long-term effects of parental autonomy support on grit through longitudinal follow-up. Another shortcoming of the present study is that our samples were only in one province, and we used the convenience sampling method. It limits the external validity and reliability of the present findings. Therefore, future research may expand the sample selection and use random sampling methods, in order to increase the reliability and validity of research findings. Third, the school environment is quite important in students' growth and development, and family and school may interact with each other, as one study found that parental autonomy support interacts with teacher autonomy support to jointly influence students' internalizing and externalizing problems.<sup>41</sup> Therefore, in future studies, family and school factors can be considered together to better reveal the patterns of individual grit development. Fourth, this study examined parental autonomy support as a whole, without distinguishing between mothers and fathers. The effects of maternal autonomy support and paternal autonomy support on individual development may be different, for example, one study found that maternal autonomy support had a more significant effect on adolescent social anxiety than paternal autonomy support.<sup>53</sup> Therefore, in future studies, maternal autonomy support and paternal autonomy support can be examined separately to investigate more deeply the effects of parental autonomy support on individual grit development.

## Conclusion

In conclusion, this study demonstrated the relationships between parental autonomy support, basic psychological needs, grit and achievement motivation. Parental autonomy support significantly and positively predicted individual grit. Basic psychological needs mediated the relationship between parental autonomy support and grit. Achievement motivation moderated between basic psychological needs and grit, and the effect of basic psychological needs on grit was greater in college students with high achievement motivation compared to low achievement motivation. These findings highlight the important role of the family in individual grit and expand the scope of influencing factors of grit, provide knowledge for family education and grit, which is of great significance for the development and education of grit.

## Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki, and the study has been reviewed and approved by the Ethics Committee of the Department of Psychology at Ningbo University. In the questionnaire, we explicitly informed the participants of the objectives of the study and guaranteed their confidentiality and anonymity. All participants were free to choose whether or not to answer questions and were free to withdraw from the investigation at any time. Informed consent was obtained from all participants before they participated in the study.

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## Disclosure

All authors declare that they have no conflicts of interest.

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