

# Analysis of the Relationship Between Parents' Support, Hope and Learning Engagement in Secondary Vocational Students Based on Internet Data

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**Abstract:** Objective: Explore the relationship between parental support, hope, and learning engagement in secondary school students, as well as the mediating mechanisms of parental support on learning engagement. Method: This study selected students from secondary vocational schools as participants and conducted a questionnaire survey using the Parental Support Questionnaire, Adult Hope Scale, and Learning Engagement Scale. A total of 1872 valid responses were collected. The data were analyzed using SPSS 22.0 software and hierarchical clustering. Result: The path analysis revealed that parental support positively influences hope and learning engagement. Additionally, hope was found to have a positive impact on learning engagement. The mediating effect tests indicated that parental companion support and instrumental support on learning engagement were statistically significant through hope. The mediating effect values were 0.078 and 0.084, respectively ( $P < 0.001$ ), with mediating effect sizes of 38.24% and 40.28%, respectively. Moreover, hope was found to play a completely mediating role between affirming value and learning engagement. Conclusion: Parental support directly influences learning engagement, while hope also has a direct effect on learning engagement. Additionally, hope plays a mediating role in the impact of parental support on learning engagement.

**Keyword:** Learning engagement; Parental support; Hope; Mediating role; Secondary vocational student; Visual Data Analysis

## 1 Introduction

Secondary vocational education, as an important part of senior high school education in China, assume the extremely critical responsibility of basic education in the construction of vocational education with Chinese characteristics and application-oriented personnel training system <sup>[1]</sup>. Learning is one of the important development tasks of secondary vocational students. Studies have shown that learning engagement is not only an important factor to predict students' academic success <sup>[2,3]</sup>, but also has a profound impact on students' growth and development <sup>[4,5]</sup>. According to the self-determination theory, individuals who have a harmonious relationship

with their parents and perceive their parents' support will have their psychological needs satisfied [6]. Parental support can alleviate the negative impact of learning pressure [7] and is an important resource to promote students' learning engagement and academic performance [6]. In addition, previous studies have shown that hope is influenced by parental support [8,9] and has a predictive effect on learning engagement [9,10]. Esther Sui-chu Ho et al. [11] found that individuals with a higher level of hope tend to turn learning into autonomous behavior, and have a higher level of learning motivation and involvement. In view of this, this study not only explores the direct impact of parents' support on secondary vocational students' learning engagement, but also introduces hope variables from the perspective of positive psychology to investigate the internal impact mechanism of parents' support on secondary vocational students' learning engagement, so as to find possible intervention ways to improve the learning engagement and academic development of secondary vocational students, and improving the education quality of secondary vocational schools.

## 2 Objects and Methods

### 2.1 Objects

This study takes secondary vocational students as the research object, and the data is from the questionnaire survey of the Internet professional data survey platform - SurveyMonkey. The data covers 10 secondary vocational education schools in 6 cities in Inner Mongolia Autonomous Region, and 1872 valid samples are collected, including 723 students in grade 1, 618 students in grade 2, 531 students in grade 3, 786 boys and 1086 girls. (Table 1)

**Table 1** Demographic variables statistics of research objects(n=1872)

|        |         | Frequency(n) | Proportion (%) |
|--------|---------|--------------|----------------|
| Gender | male    | 786          | 41.99          |
|        | female  | 1086         | 58.01          |
| Grade  | grade 1 | 723          | 38.62          |
|        | grade 2 | 618          | 33.01          |
|        | grade 3 | 531          | 28.37          |
| total  |         | 1872         | 100%           |

### 2.2 Tools

#### 1) Parent Support Questionnaire

The parents' social support questionnaire revised by Zou Hong [12] was adopted to measure the parents' social support perceived by secondary vocational students. The questionnaire consists of 17 items and 4 dimensions: companion support, emotional support, instrumental support and affirmative value. A 5-point scale was used. In this survey, the scale has been found to be internally reliable (alphas of 0.84).

## 2) *Adult Qualities Hope Scale*

The adult quality Hope Scale compiled by Snyder and revised by Chen Canrui et al. [8] was used to measure the hope level of secondary vocational students. The scale consisted of 12 items, including 2 dimensions of willingness motivation and path thinking. The 4-point scale is adopted. The scale has been found to be internally reliable (alphas of 0.91).

## 3) *Learning Engagement Scale*

The Learning Engagement Scale compiled by Schaufeli et al. [5] and revised by Fang Laitan and Shi Kan et al., contains 17 items, including three dimensions of vitality, dedication and concentration. A 7-point scale is used. The scale has been found to be internally reliable (alphas of 0.95)

## **2.3 Statistics**

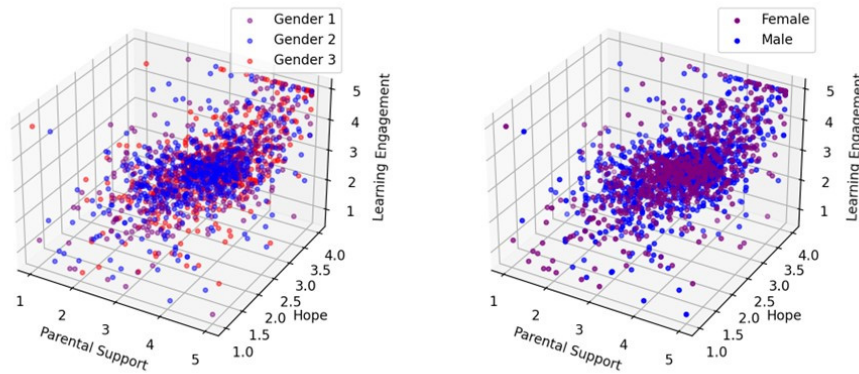
Conducted descriptive statistics using SPSS 22.0 and hierarchical clustering. Performed correlation and multiple linear regression analyses with SPSS 22.0, and tested the mediation effects using the non-parametric percentile bootstrap method to examine the mediating role of the variables.

## **3 Results**

### **3.1 The result of Visual Data Analysis based on different gender and grade**

By analyzing the three-dimensional scatter plot data, we observed that the data points were scattered throughout the entire graphical space, indicating no clear linear relationship between different feature dimensions. The data points showed a relatively uniform distribution across the three dimensions. Furthermore, we found that all participants tended to concentrate their choices around the upper-middle region. This suggests a general preference for options or performances at a moderate level. This phenomenon is known as "central tendency bias," where individuals favor middle values and avoid extreme ones. Additionally, we observed areas with higher data density, indicating that participants had excellent choices across all three feature dimensions in these regions. This can be explained as participants showing relatively consistent preferences for specific options across multiple dimensions under certain circumstances.

From a gender perspective, we found that female participants' choices were more concentrated, indicating a more substantial consensus or more consistent tendencies in certain features. On the other hand, male participants' choices were more dispersed, suggesting more significant individual differences in preferences for different options in certain features. See Figure 1.

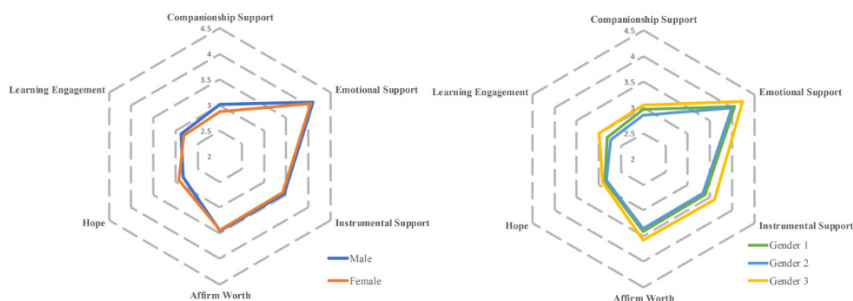


**Figure 1.** The result of Visual Data Analysis based on different gender and grade

By hierarchical clustering analysis, we observed that:

Girls have higher scores of companion support and learning engagement, and boys have higher scores of hope level than girls. that there is no gender difference in parental emotional support, instrumental support and affirmative value scores of secondary vocational students. Grade 3 has the highest score, followed by grade 1, the second grade has the lowest score.

See Figure 2.



**Figure 2.** Results of cluster analysis for different genders and grades

Furthermore, when considering grade levels, the data distribution appeared relatively even, failing to show significant differences between different grades. As a result, we conducted further independent sample t-tests to examine the significance of the differences.

### 3.2. Comparison of scores of secondary vocational students with different population characteristics in each scale

The independent sample t test was further conducted to conduct descriptive statistics on the gender and grade differences in parents' support, hope and learning engagement scores of secondary vocational students, and to test the significance of the differences.

Independent-sample t test results show that:

1) *Gender difference*: there is no gender difference in parental emotional support, instrumental support and affirmative value scores of secondary vocational students. There are gender differences in the scores of companion support, hope and learning engagement. Girls have higher scores of companion support and learning engagement, and boys have higher scores of hope level than girls ((Table 2).

**Table 2** Comparison of Parental Support, Hope and Learning Engagement scores of different genders ( $\bar{x} \pm s$ )

|                      | male        | female      | t      | P       |
|----------------------|-------------|-------------|--------|---------|
| companion support    | 11.55±3.30  | 12.05±3.36  | -3.181 | 0.001** |
| emotional support    | 12.22±2.60  | 12.34±2.54  | -1.039 | 0.299   |
| instrumental support | 20.70±5.07  | 20.87±4.88  | -0.696 | 0.487   |
| affirmative value    | 13.68±3.54  | 13.55±3.59  | 0.726  | 0.468   |
| Hope                 | 23.43±5.11  | 22.68±4.57  | 3.341  | 0.001** |
| Learning Engagement  | 67.02±22.50 | 69.06±19.46 | -2.049 | 0.041*  |

Annotation: \* $P < 0.05$  , \*\* $P < 0.01$

2) *Grade difference*: The scores of Parental Support, Hope and Learning Engagement were significantly different in grade, with the highest score in grade 3, followed by grade 1, the second grade had the lowest score (Table 3).

**Table 3** Comparison of Parental Support, Hope and Learning Engagement scores of different grades ( $\bar{x} \pm s$ )

|                      | Grade1      | Grade2      | Grade3      | F      | P       |
|----------------------|-------------|-------------|-------------|--------|---------|
| companion support    | 11.86±3.31  | 11.45±3.28  | 12.26±3.40  | 8.475  | 0.000** |
| emotional support    | 12.30±2.58  | 11.93±2.72  | 12.70±2.30  | 13.129 | 0.000** |
| instrumental support | 20.66±4.79  | 20.20±5.13  | 21.68±4.88  | 13.389 | 0.000** |
| affirmative value    | 13.50±3.40  | 13.18±3.74  | 14.24±3.49  | 13.302 | 0.000** |
| Hope                 | 22.94±4.71  | 22.69±4.93  | 23.42±4.82  | 3.391  | 0.034*  |
| Learning Engagement  | 67.66±19.13 | 65.60±21.21 | 71.97±22.00 | 13.984 | 0.000** |

Annotation: \* $P < 0.05$  , \*\* $P < 0.01$

### 3.3. The relationship between parental support, hope and learning engagement

#### 1) *The correlation between parental support, hope and learning engagement*

The correlation analysis results showed (Table 4) that there were significant pound-for-pair correlations among companion support, emotional support, instrumental support, affirming value, hope, and learning engagement

**Table 4** Correlation analysis of Parental support, Hope and Learning Engagement(r)

| Variate              | Companion support | Emotional support | Instrumental support | Affirmative value | Hope   | Learning Engagement |
|----------------------|-------------------|-------------------|----------------------|-------------------|--------|---------------------|
| Companion support    | 1                 |                   |                      |                   |        |                     |
| Emotional support    | 0.573**           | 1                 |                      |                   |        |                     |
| Instrumental support | 0.774**           | 0.790**           | 1                    |                   |        |                     |
| Affirmative value    | 0.742**           | 0.755**           | 0.855**              | 1                 |        |                     |
| Hope                 | 0.460**           | 0.353**           | 0.476**              | 0.482**           | 1      |                     |
| Learning Engagement  | 0.443**           | 0.340**           | 0.448**              | 0.432**           | 0.549* | 1                   |

Annotation: \*\*  $P < 0.01$

### 2) The predictive effect of parental support on learning engagement

In order to investigate the possible predictive effect of parental support on learning engagement, with the influence of gender and age controlled, the scores of the four dimensions of parental support, emotional support, instrumental support and affirmative value as independent variables, and the scores of learning engagement as dependent variables, the progressive regression analysis was conducted, and the results showed (Table 5) companion support, instrumental support and affirmative value all have significant predictive effects on learning engagement, but emotional support has no significant predictive effects on learning engagement.

**Table 5** Multiple linear regression with learning engagement as the dependent variable and four dimensions of parental support as the independent variable

| independent variable | partial regression coefficient |       |          | Standard partial regression coefficient | $R^2$ | $R^2_{adj}$ |
|----------------------|--------------------------------|-------|----------|---|-------|-------------|
|                      | $\beta$                        | SE    | t        |   |       |             |
| Companion support    | 1.295                          | 0.21  | 6.179*** | 0.49                                    | 0.228 | 0.226       |
| Emotional support    | -0.362                         | 0.282 | -1.283   | 0.56                                    |       |             |
| Instrumental support | 0.884                          | 0.201 | 4.392*** | 0.13                                    |       |             |
| Affirmative value    | 0.763                          | 0.246 | 3.101*** | 0.19                                    |       |             |

Annotation: \*\*\*  $P < 0.001$

### 3) The predictive effect of parental support on hope

In order to investigate the possible predictive effect of parental support on hope, the influence of gender and grade was controlled. The four dimensions of companion support, emotional support, instrumental support and affirmative value were taken as independent variables, and hope score was taken as dependent variable for stepwise regression analysis. The results showed (Table 6) that companion support, instrumental support and affirmative value had significant positive predictive effect on the total score of hope, That is, whether secondary vocational students feel more parental support, instrumental support, or more parental value affirmation, their hope level will increase; emotional support significantly negatively predicted hope.

**Table 6** Multiple linear regression with hope as the dependent variable and four dimensions of parental support as the independent variable

| independent variable | partial regression coefficient |       |          | Standard partial regression coefficient | $R^2$ | $R^2 adj$ |
|----------------------|--------------------------------|-------|----------|---|-------|-----------|
|                      | $\beta$                        | SE    | t        |   |       |           |
| Companion support    | 0.24                           | 0.047 | 5.069*** | 0.167                                   | 0.263 | 0.261     |
| Emotional support    | -0.182                         | 0.064 | -2.851** | -0.097                                  |       |           |
| Instrumental support | 0.198                          | 0.046 | 4.336*** | 0.203                                   |       |           |
| Affirmative value    | 0.348                          | 0.056 | 6.25***  | 0.257                                   |       |           |

Annotation: \*\* $P < 0.01$ , \*\*\*  $P < 0.001$

#### 4) The predictive effect of hope on learning engagement

Taking learning engagement as the dependent variable, gender and grade were controlled to test the predictive effect of hope on learning engagement of secondary vocational students. Regression analysis of all samples showed that hope level significantly positively predicted learning engagement,  $\beta=2.369$ ,  $t=28.388$ ,  $p < 0.001$ ,  $R^2=0.301$ . Therefore, whether in school education or family education, we can enhance the sense of hope of secondary vocational students by taking intervention measures to enhance the level of hope, so as to promote the learning involvement of secondary vocational students.

### 3.4 The mediating role of hope in the influence of parental support on learning engagement

Using the step test method, we tested the mediating effect of hope in the process companion support, emotional support, instrumental support and affirmative value influence learning engagement respectively.

Regression analysis shows (Table 7) that:

The dimension of companion support, emotional support, instrumental support and affirmative value all have significant predictive effects on the total score of hope; (a)

Hope has a significant direct predictive effect on learning engagement; (b)

Companion support, instrumental support and affirmative value all significantly predict learning engagement, emotional support had no significant predictive effect on learning engagement ( $t=-1.328$ ,  $p > 0.05$ ); (c)

Taking learning engagement as the dependent variable, and controlling for gender and grade, when companion support, emotional support, instrumental support and affirmation value, hope were entered into the regression equation at the same time, the predictive effect of companion support and instrumental support on learning engagement was significant, while the predictive effect of emotional support ( $t=-0.362$ ,  $P > 0.05$ ) and affirmation value was not significant ( $t=0.838$ ,  $P > 0.05$ ). (c')

**Table 7** The mediating effect of hope on parental support and learning engagement

| Model                | Model 1                |       | Model 2                     |       | Model 3    |       |
|----------------------|------------------------|-------|-----------------------------|-------|------------|-------|
|                      | learning engagement(c) |       | learning engagement(b & c') |       | hope(a)    |       |
|                      | B                      | SE    | B                           | SE    | B          | SE    |
| Constant             | -0.205*                | 0.083 | -0.321**                    | 0.076 | 0.275**    | 0.08  |
| companion support    | 0.204**                | 0.034 | 0.126**                     | 0.031 | 0.184**    | 0.033 |
| emotional support    | -0.046                 | 0.035 | -0.009                      | 0.032 | -0.089**   | 0.034 |
| instrumental support | 0.209**                | 0.048 | 0.124**                     | 0.044 | 0.199**    | 0.047 |
| affirmative value    | 0.134**                | 0.042 | 0.033                       | 0.039 | 0.240**    | 0.041 |
| hope                 |                        |       | 0.423**                     | 0.022 |            |       |
| R <sup>2</sup>       | 0.231                  |       | 0.361                       |       | 0.271      |       |
| R <sup>2</sup> adj   | 0.228                  |       | 0.359                       |       | 0.268      |       |
| F                    | 93.233***              |       | 150.589***                  |       | 115.312*** |       |

Annotation: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

The non-parametric percentile Bootstrap method was further used to test the mediation effect, repeated sampling 5000 times, and the two demographic variables of gender and grade were controlled. The results show (Table 8) that:

**Table 8** Analysis of the mediating effect between parental support and learning engagement

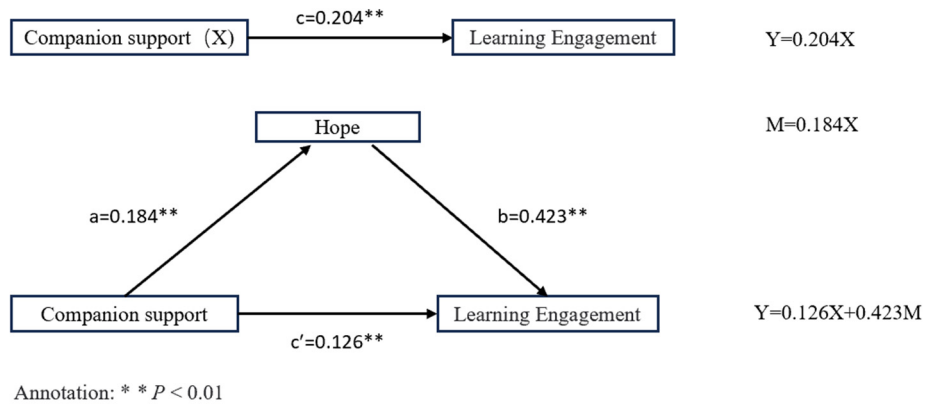
| Intermediate path                               | Direct effect(c') | Mediation effect value(ab) | Boot SE | Boot CI lower limit | Boot CI upper limit | Mediation effect size(ab/c) |
|---|-------------------|----------------------------|---------|---------------------|---------------------|-----------------------------|
| companion support=>hope=>learning engagement    | 0.126**           | 0.078***                   | 0.015   | 0.05                | 0.107               | 38.24%                      |
| emotional support=>hope=>learning engagement    | -0.009            | -0.037*                    | 0.016   | -0.07               | -0.006              | 100.00%                     |
| instrumental support=>hope=>learning engagement | 0.125**           | 0.084***                   | 0.022   | 0.042               | 0.127               | 40.28%                      |
| affirmative value=>hope=>learning engagement    | 0.033             | 0.101***                   | 0.02    | 0.06                | 0.142               | 100.00%                     |

Annotation: \*  $P < 0.05$ , \*\*  $P < 0.01$ , \*\*\*  $P < 0.001$

The Bootstrap 95% confidence interval for mediating effects in the companion support dimension does not contain 0, indicating that the mediating effect of parental companion support on learning engagement through hope was statistically significant. The mediating effect value

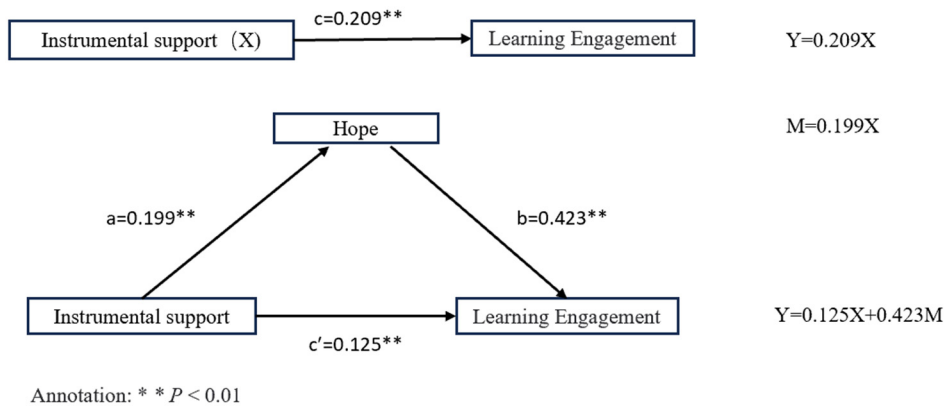


was 0.078 ( $P < 0.001$ ), and the mediating effect size ( $ab/c$ ) was 38.24%. The mediation effect model is shown in Figure 3.



**Figure 3.** Mediated pathway model of companion support and learning engagement

The Bootstrap 95% confidence interval of the mediating effect in the instrumental support dimension does not contain 0, indicating that the mediating effect of parental instrumental support on learning engagement through hope is statistically significant. The mediating effect value is 0.084 ( $P < 0.001$ ), and the mediating effect size ( $ab/c$ ) is 40.28%. The mediation effect model is shown in Figure 4.



**Figure 4.** Mediated pathway model of instrumental support and learning engagement

The regression coefficients  $a$  and  $b$  of the mediating effect test of the hope in the affirmative value dimensions are significant, and  $c'$  is not significant. that is, it is hope to play a completely mediating role between affirmative value and learning engagement.

The significant mediating effect size of hope reached 38.24% and 40.28%, respectively, indicating that hope has great practical significance in the influence of parental support on learning engagement. In other words, the more support secondary vocational students perceive

from their parents, the higher their hope level and learning motivation will be, and the more efforts they will make to achieve their learning goals . It can be considered that hope plays a very important role as an intermediary in the process of parental social support affecting learning engagement.

## 4 Conclusion

The results of this study show that there is a close relationship between parents' support, hope and learning engagement. Parental support, instrumental support, affirmative value and hope level all have positive effects on secondary vocational students' learning engagement, Hope plays an important mediating role between hope and learning engagement. In other words, appropriate and timely support of parents and the improvement of hope level are effective means to promote the learning involvement of secondary vocational students. The conclusion of the study has important practical significance: first, it provides a basis and a new perspective for secondary vocational school educators to rationally think about the relationship between social resources outside school and the academic involvement of secondary vocational school students, and to explore a more effective educational path to improve the academic involvement; Secondly, it provides a theoretical basis for parents' effective participation in the academic development of secondary vocational students and the importance of supportive parenting in adolescence.

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