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## Article

# Psychological Well-Being Sustainable during Entrepreneurial Process – The Moderating Role of Entrepreneurial Creativity

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**Abstract:** Despite pitfalls during the entrepreneurial journey, entrepreneurship offers the opportunity to illuminate new ventures and preserve psychological well-being to sustain entrepreneurial development. From a dynamic perspective, this study discusses the early stage of the entrepreneurial process affecting student entrepreneurs' psychological well-being and examines the moderating role of entrepreneurial creativity. By building a framework with the data of 1873 student entrepreneurs across 36 university business incubators in China involved in entrepreneurship activity, we found that entrepreneurial passion, alertness and intention had a positive correlation with entrepreneurs' psychological well-being, but entrepreneurial action had the opposite effect. Entrepreneurial creativity positively moderated relationships between entrepreneurial action and students' psychological well-being. This finding contributes to a full understanding of students' psychological well-being on their entrepreneurial journey in the context of COVID-19 and eases the pressure of entrepreneurship by strengthening entrepreneurial creativity education.

**Keywords:** entrepreneurial process; entrepreneurial creativity; psychological well-being; student entrepreneurs

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## 1. Introduction

The COVID-19 pandemic has exacerbated entrepreneurial stress or the employment difficulties for university students. Not every student entrepreneur can be as successful as Bill Gates or Mark Zuckerberg. Student entrepreneurs in higher education starting a business alongside their university studies may end up facing the double blow of business failure and academic failure. An increasing number of student entrepreneurs are inspired by entrepreneurship education that provides multiple resources and support, such as incubators or maker spaces in universities [1,2]. There are various challenges for students in building their ventures, and student entrepreneurs bear more psychological pressure than other students [3]. Student entrepreneurs start from passion, bring new opportunities forward, and move towards entrepreneurial action, which is often like a roller coaster ride [4]. During this process, psychological well-being, as an important psychological capital, is essential for student entrepreneurs engaged in entrepreneurship. Thus, student entrepreneurs need to be trained to effectively manage their emotions and feelings, especially in the context of COVID-19, when they experience a roller-coaster entrepreneurial experience [5].

The relationship between entrepreneurship and well-being is rarely discussed [6]. Based on the self-determination theory (SDT), a two-stage multi-path mediation model has been developed in which psychological autonomy mediates the relationship between entrepreneurship and well-being [7]. Psychological functioning is the link or the pathway

between the entrepreneurship and well-being [4]. In terms of influencing factors, literature linking entrepreneurship to well-being includes two main perspectives: the personal factors and external factors. Personal factors affecting well-being are focused on gender [8,9], prior start-up experience, coping strategies [10], goal orientation [11], productivity and the entrepreneur's definition of success [12]. External factors affecting well-being are locations along the urban–rural continuum, wealth-deprived neighborhoods [13], macroeconomics [14], institutional contexts [15], and the existence of supportive social policies [16].

Recent emerging literature suggests a relationship between the start-up process development and well-being [17,18]. The relationship between the entrepreneurial process and well-being is from the aspect of a vertical time axis. Student entrepreneurs, as young adults who study in higher education, are most often lacking in relevant real business experiences [19], which causes more psychological stress. Thus, it is useful to study the psychological well-being of student entrepreneurs in the process of their entrepreneurship journey. Although it holds significant relevance today, it has not been fully understood.

A dynamic perspective on entrepreneurship and eudaimonic well-being has been proposed [17]. Student entrepreneurs go through these steps or components of the entrepreneurial process: passion, alertness, intention, action and other activities [20,21]. We may have an evolving and currently imperfect understanding of which component is most relevant to psychological well-being. Entrepreneurial creativity, as the core of entrepreneurship education and training, contributes to improving entrepreneurial intention, but it has not been proven to affect psychological well-being. Hence, understanding ways to support student entrepreneurs' psychological well-being during their entrepreneurial journey is meaningful.

This study seeks to explore the relationship between entrepreneurial process and entrepreneurs' psychological well-being. At the same time, we explore whether the cultivation of student entrepreneurs' creativity contributes to the improvement of psychological well-being. Based on the theory of planned behavior and cognition theory, we probe into the components of entrepreneurial process including passion, alertness, intention and action. We develop relationships between the entrepreneurial process and psychological well-being from student entrepreneurs' perspective and examine the moderating effects of entrepreneurial creativity in these relationships. To test these relationships, we use the data of 1873 student entrepreneurs from 36 university incubators in China. Results show that the ones with higher creativity combined with more entrepreneurial actions are more likely to have higher psychological well-being.

Our study makes a contribution to student entrepreneurs' psychological well-being on their entrepreneurial journey and provides new insights that cultivating entrepreneurial creativity can help improve psychological well-being. The importance of psychological well-being has been widely recognized in the entrepreneurship literature [22,23]. In the process of entrepreneurship, the change of psychological well-being from entrepreneurial passion to entrepreneurial behavior may change over time. This study reveals which steps are positive or negative to psychological well-being for student entrepreneurs during the entrepreneurial process. We may shed light on entrepreneurial creativity conducive to the psychological well-being, especially in the current difficult COVID-19 situation. Higher education throughout the world has been assigned the task of stimulating and increasing entrepreneurialism among the population [24]. We argue that student entrepreneurs who straddle two different environments—academia and business, need to pay more attention to their psychological well-being.

This paper is structured as follows: In Section 2, we offer the theoretical context to analyze the student entrepreneurs' entrepreneurial process that establishes a link between the entrepreneurial process and psychological well-being. We then add entrepreneurial creativity to moderate these relationships. Section 3 outlines the research design and methodology. In Section 4, we explain the results of data through empirical analysis.

Section 5 is the conclusion, which has implications for student entrepreneurs. Section 6 shows limitations and future research direction.

## 2. Theoretical Background and Hypotheses

### 2.1. Theoretical Background

Illustrating how entrepreneurial activity proceeds from individuals' minds to individuals' efforts is an important branch of entrepreneurship research [25]. A cognitive perspective is that these psychological processes describe the knowledge and motivation-related factors at the basis of entrepreneurial intentions, actions and innovations [26]. Entrepreneurial cognition is defined as "the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth" [27]. Additionally, there is another popular theory—the theory of planned behavior (TPB), which conceptualizes strength of intention as the direct antecedent of behavior [28]. In this process framework, the entrepreneurial journey is regarded as a process from entrepreneurial intention to behavior, and the formation of an intention to start a business is a necessary step in the process of founding a new business [3,29].

Under the self-determination theory (SDT), creative self-efficacy enhances the persistence level and the coping efforts that individuals will demonstrate when they encounter challenging situations [30]. Entrepreneurial creativity usually refers to the generation of useful and novel ideas, ranging from "big" ideas about business opportunities or innovations, to "small" ideas for coping with daily challenges at work, like the daily creativity which entrepreneurs need to deal with their complex, challenging, and uncertain work [31,32]. The connection between entrepreneurial creativity and entrepreneurship is the novel ideas or innovations that are produced when entrepreneurs are getting access to information [33,34].

### 2.2. Hypotheses

#### 2.2.1. Entrepreneurial Process and Entrepreneurs' Psychological Well-Being

The analysis of the relationship between entrepreneurship and well-being usually rests on the assumption that individuals recognize an opportunity and engage in entrepreneurship for their personal benefit [13]. Entrepreneurial well-being is useful in understanding the mechanisms that certain well-being outcomes are produced through entrepreneurial engagement [13]. Most researches linking entrepreneurship to well-being have focused on hedonic well-being, especially life satisfaction guided by self-determination theory [35], which is a formulation of three intrinsic motivational needs, namely: autonomy, competence and relatedness [36].

Many studies in the entrepreneurial field underscore the importance of studying the entrepreneurial process as it plays out over time [36]. A further question is how dynamic processes are relevant to longer-term entrepreneurial well-being? Therefore, we pay attention to dynamic processes and changeability over time to more fully understand entrepreneurs' psychological well-being. We propose the following hypotheses:

Student's entrepreneurial passion is positively related to their psychological well-being.

**Hypothesis 1:** *Student entrepreneurs' entrepreneurial passion is positively related to their psychological well-being.*

**Hypothesis 2:** *Student entrepreneurs' entrepreneurial alertness is positively related to entrepreneurs' psychological well-being.*

**Hypothesis 3:** *Student entrepreneurs' entrepreneurial intention is positively related to their psychological well-being.*

**Hypothesis 4:** *Student entrepreneurs' entrepreneurial action is positively related to their psychological well-being.*

### 2.2.2. Entrepreneurial Creativity and Entrepreneurs' Psychological Well-Being

Compared with the quality of life, psychological well-being is a qualitatively different and a more complex concept, and it is connected to human potential [37]. If entrepreneurs possess higher levels of creative thinking, the daily operation of a start-up firm is less likely to create anxiety for them; and they may thereby manage their career better and enjoy the pleasure of combining their work and social lives [38]. Creative thinking had a positive correlation with subjective well-being. The research has showed that this expresses the self-perception of the quality of life and significantly predicted that subjective well-being is better than self-efficacy [39].

Creative entrepreneurs pay more attention to their well-being because the creative process is itself a source of joy and stimulates more creative outputs through the process of opportunity recognition [6]. Despite the growing amount of interest in creativity and its relationship with other variables, studies are still scant on psychological well-being in the startup process. This study provides valuable insight into the unexplored link of entrepreneurial creativity as a force to foster entrepreneurs' psychological well-being.

**Hypothesis 5:** *Student entrepreneurs' entrepreneurial creativity will be more positively related to their psychological well-being.*

### 2.2.3. The Moderating Role of Entrepreneurial Creativity

Creativity is closely aligned with agency in which it requires the exertion of free will and challenges the current situation [40]. It is considered to be relatively stable across time and situation [41]. Entrepreneurial creativity is elemental to the process of launching and developing a new venture [42,43]. Focusing on the "entrepreneurial perspective" of creativity, there is the data to support entrepreneurial creativity that is conducive to form entrepreneurial intention [44,45]. As such, entrepreneurial creativity represents the key individual difference factor. That is to say, this factor determines whether a person is suitable for the work of entrepreneurship.

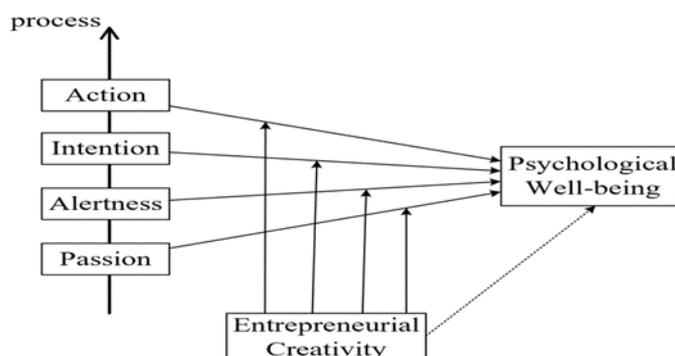
Recent research has taken creativity as a moderating variable and concluded that entrepreneurial creativity will be more positively related to perceived person-work fit for women than for men [8]. Thus, this research is designed to test the moderating effects of entrepreneurial creativity, as is shown in Figure 1:

**Hypothesis 6:** *Entrepreneurial creativity moderates the effect of entrepreneurial passion on psychological well-being.*

**Hypothesis 7:** *Entrepreneurial creativity moderates the effect of entrepreneurial alertness on psychological well-being.*

**Hypothesis 8:** *Entrepreneurial creativity moderates the effect of entrepreneurial intention on psychological well-being.*

**Hypothesis 9:** *Entrepreneurial creativity moderates the effect of entrepreneurial action on psychological well-being.*



**Figure 1.** Theoretical hypothesis.

### 3. Methods

#### 3.1. Participants and Procedures

1873 college student entrepreneurs across 36 university business incubators in China took part in this questionnaire. Among them we obtained 1526 valid questionnaires. The effective rate is 81.47%. All participants (52.75% male; 47.25% female) were student entrepreneurs. Students estimated that 73.4% of the entrepreneurship courses pertained to entrepreneurs and 68.8% involved entrepreneurial creativity. This sample consisted of 96.31% undergraduate student entrepreneurs and 3.69% other (Master's and Doctoral student entrepreneurs, as well as alumni entrepreneurs). We kept students' majors consistent, since the environment for entrepreneurship might vary from discipline to discipline. To do so, we created the following four groups: (1) business and economics (13.08%), (2) natural sciences (20.66%), (3) social sciences (4.91%), and (4) others (61.35%). Almost half of the participants (46.98%) were from rural areas; the proportion of participants from cities was just 26.11%; the remaining 26.91% were from towns. For the purposes of this study, a non-probabilistic convenience sampling procedure was used to recruit participants in person at different universities from January to July in 2021. To obtain the data for this study, the participants completed the questionnaires on We Chat. Table 1 presents the characteristics of the survey sample.

**Table 1.** Characteristics of the survey sample.

Category	%	Category	%
Gender		Rural-Urban Areas	
Male	52.75	Rural areas	46.98
Female	47.25	City areas	26.11
Four Broad Area Groups		Town areas	26.91
Business and economics	13.08	Student Entrepreneurs	
Natural sciences	20.66	Undergraduate	96.31
Social sciences(Except for economics and management)	4.91	Others	3.69
Others	61.35		

#### 3.2. Measures

##### 3.2.1. Dependent Variable

Entrepreneurs' psychological well-being was measured by 12 items of the General Health Questionnaire [46], which has recently been widely used in entrepreneurship education research [11,13]. Examples of the items include "Have you recently been able to concentrate on whatever you're doing?", "Have you recently been able to enjoy your daily activities?", "Have you recently felt constantly under pressure?" (reverse-coded). The scale proved to be reliable (Positive dimensional Cronbach's Alpha = 0.800 > 0.70; Negative dimensional Cronbach's Alpha = 0.846 > 0.70) and one-dimensional (all three items loaded on a single factor, KMO = 0.888). Cronbach's  $\alpha$  coefficient and factor loaded value indicates that the 12 items were thus averaged to compute the variable labelled PWB in the following empirical analysis.

##### 3.2.2. Independent Variables

Entrepreneurial passion was measured by nine items, which have been used in recent research [20,47]. Examples of the items include "Establishing a new company excites me"; "Nurturing a new business through its emerging success is enjoyable"; "Being the founder of a business is an important part of who I am."; "I really like finding the right people to market my product/service", etc. All items were assessed on a 7-point, Likert-type scale ranging from "Strongly disagree" to "Strongly agree" (where 7 = strongly

agree). The scale proved to be reliable (Cronbach's Alpha = 0.962 > 0.70) and one-dimensional (all three items loaded on a single factor, KMO = 0.938). Cronbach's  $\alpha$  coefficient and factor loaded value indicates that the measurement index system of entrepreneurial passion can be a scientific and effective measure, thus these three questions can measure entrepreneurial passion.

Entrepreneurial alertness was measured by nine items, which have been used in recent research [20,21]. Examples of the items include "I have frequent interactions with others to acquire new information."; "I always keep an eye out for new business ideas when looking for information."; "I am always actively looking for new information"; "I see links between seemingly unrelated pieces of information". All items were assessed on a 7-point, Likert-type scale ranging from "Strongly disagree" to "Strongly agree" (where 7 = strongly agree). The scale proved to be reliable (Cronbach's Alpha = 0.969 > 0.70) and one-dimensional (all three items loaded on a single factor, KMO = 0.954). Cronbach's  $\alpha$  coefficient and factor loaded value indicates that the measurement index system of entrepreneurial alertness can be a scientific and effective measure, thus these three questions can measure entrepreneurial alertness.

Entrepreneurial intention was measured by three items, which has been used in recent research [20,45]. Examples of the items include "Probably I'll start my own firm in the near future"; "I will make every effort to start and run my own firm"; "My professional goal is to become an entrepreneur". All items were assessed on a 7-point, Likert-type scale ranging from "Strongly disagree" to "Strongly agree" (where 7 = strongly agree). The scale proved to be reliable (Cronbach's Alpha = 0.885 > 0.70) and one-dimensional (all three items loaded on a single factor, KMO = 0.706). Cronbach's  $\alpha$  coefficient and factor loaded value indicates that the measurement index system of entrepreneurial intention can be a scientific and effective measure, thus these three questions can measure entrepreneurial intention.

Entrepreneurial action was measured by three items, which has been used in recent research [48,49]. Examples of the items include "Have you applied much time to activities aimed at starting a business in the last 12 months?" "How much money have you invested in activities aimed at starting a business in the last 12 months?" All items were assessed on a 7-point, Likert-type scale ranging from "Strongly disagree" to "Strongly agree" (where 7 = strongly agree). The scale proved to be reliable (Cronbach's Alpha = 0.950 > 0.70) and one-dimensional (all three items loaded on a single factor, KMO = 0.766). Cronbach's  $\alpha$  coefficient and factor loaded value indicates that the measurement index system of entrepreneurial action can be a scientific and effective measure, thus these three questions can measure entrepreneurial action.

### 3.2.3. Moderator

Entrepreneurial creativity was measured according to existing studies [50,51], which revealed that creative people are open to new experiences and that divergent thinking leads to novel and useful ideas [51]. According to Zhou and George (2001) and Zampetakis et al. (2011), university students were presented with the following three items: "(1) I think I am a very creative person; (2) I like to try novel things in spite of the risk of failing; (3) I can easily come up with a lot of different and useful ideas (7-point Likert scale, 1 = strongly disagree 7 = strongly agree)." The scale proved to be reliable (Cronbach's Alpha = 0.906 > 0.70) and one-dimensional (all three items loaded on a single factor, KMO = 0.756). Cronbach's  $\alpha$  coefficient and factor loaded value indicates that the measurement index system of individual creativity can be a scientific and effective measure, thus these three items can measure individual creativity. A list of the measurement items for all the variables used in this study is presented in Table 2.

**Table 2.** Measurement items.

<b>Entrepreneurs' psychological well-being (Goldberg, 1978)</b>	
Psy1	Have you recently been able to concentrate on whatever you're doing
Psy2	Have you recently been able to enjoy your daily activities
Psy3	Have you recently felt constantly under pressure
Psy4	You lost much sleep over worry recently
Psy5	You have felt that you are playing a useful part in things
Psy6	You have felt capable of making decisions about things
Psy7	You have felt you could not overcome your difficulties
Psy8	You have been able to face up to your problems
Psy9	You have been feeling unhappy and depressed
Psy10	You have been losing confidence in yourself
Psy11	You have been thinking of yourself as a worthless person
Psy12	You have been feeling quite happy with all things considered
<b>Entrepreneurial passion (Tobin and Peter, 2018; Cardon et al., 2013)</b>	
EP1	Establishing a new company excites me
EP2	Nurturing a new business through its emerging success is enjoyable
EP3	Being the founder of a business is an important part of who I am
EP4	I really like finding the right people to market my product/service to
EP5	It is exciting to figure out new ways to solve unmet market needs that can be commercialized
EP6	Searching for new ideas to offer products/services is enjoyable to me
EP7	I am motivated to figure out how to make existing products/services better
EP8	Scanning the environment for new opportunities really excites me
EP9	Inventing new solutions to problems is an important part of who I am
<b>Entrepreneurial alertness (Tobin and Peter, 2018; Tang et al., 2012)</b>	
EA1	I have frequent interactions with others to acquire new information
EA2	I always keep an eye out for new business ideas when looking for information
EA3	I am always actively looking for new information
EA4	I see links between seemingly unrelated pieces of information
EA5	I am good at "connecting dots"
EA6	I often see connections between previously unconnected domains of information
EA7	I can distinguish between profitable opportunities and not-so-profitable opportunities
EA8	I have a knack for telling high-value opportunities apart from low-value opportunities
EA9	When facing multiple opportunities, I am able to select the good ones
<b>Entrepreneurial intention (Tobin and Peter, 2018; Zampetakis and Moustakis, 2006)</b>	
EI1	Probably I'll start my own firm in the near future
EI2	I will make every effort to start and run my own firm
EI3	My professional goal is to become an entrepreneur
<b>Entrepreneurial action (Jiang and Ruling, 2019; Teemu et al., 2015)</b>	
Eac1	Have you applied much time to activities aimed at starting a business in the last 12 months
Eac2	How much time have you spent on activities aimed at starting a business in the last 12 months
Eac3	How much money have you invested in activities aimed at starting a business in the last 12 months
<b>Entrepreneurial creativity (Amabile, 2018; Zampetakis et al., 2011)</b>	
EC1	I think I am a very creative person
EC2	I like to try novel things in spite of the risk of failure
EC3	I can easily think a lot of different and useful ideas

Finally, socio-demographic background questions covered gender, student source, major, work experience, and monthly household income. Experience in preparing a business plan and/or experience in starting a firm were collected as well. These variables are set as control variables: gender (0 = male, 1 = female).

#### 4. Results

Data were analyzed by using SPSS 25 (descriptive statistics, factor analysis, reliability analysis, ANOVA and correlations). All the index systems constructed according to previous research studies have passed the test of reliability (Alpha all were above the recommended value of 0.70) and validity (the value of KMO all were above 0.70). Moreover, their constructs were significant ( $p < 0.001$ ).

According to the survey data, the mean value, standard deviation and correlation degree of variables were firstly analyzed. In the correlation analysis, Pearson Correlation coefficient and double-tail significance test were adopted in Table 3. Entrepreneurs' psychological well-being is significantly positively correlated with entrepreneurial passion, entrepreneurial alertness, entrepreneurial intention, entrepreneurial action and entrepreneurial creativity ( $P < 0.01$ ), indicating the possibility of hypotheses.

**Table 3.** Descriptive statistics and correlations of variables.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10
1. Entrepreneurs' psychological well-being	2.96	0.35										
2. Entrepreneurial passion	4.67	1.17	0.43**									
3. Entrepreneurial alertness	4.60	1.12	0.43**	0.87**								
4. Entrepreneurial intention	4.59	1.22	0.39**	0.78**	0.73**							
5. Entrepreneurial action	3.54	1.56	0.15**	0.45**	0.52**	0.50**						
6. Entrepreneurial creativity	4.76	1.10	0.49**	0.74**	0.75**	0.74**	0.41**					
7. Gender (0 = male)	0.50	0.50	-0.09**	-0.18*	-0.20*	-0.21**	-0.19*	-0.18**				
8. Rural-Urban areas	1.78	0.82	0.15**	0.03	0.07**	0.01	-0.02	0.10**	0.04			
9. Major	3.14	1.15	0.09**	0.08**	0.05*	0.08**	-0.07*	-0.05*	-0.14**	-0.05*		
10. Work experience	1.84	0.76	-0.05	0.06**	0.05*	0.06*	-0.11*	-0.03	-0.05*	-0.06*	0.00	
11. Monthly household income	3.39	1.19	0.16**	0.08**	0.11**	0.08**	-0.00	0.11**	-0.02	0.38**	-0.07*	-0.03

N = 1526, \*  $P < 0.05$ , two-tailed tests. \*\*  $P < 0.01$ , two-tailed tests.

Before the regression analysis, we standardized all interaction variables to reduce multicollinearity problems. We also checked multicollinearity by examining the tolerance and the variance inflation factors (VIF). The small tolerance values were more than the recommended threshold 0.1. The value of Variance Inflation Factors (VIF) are all below

the recommended threshold of 5 -, which indicated that there is no multicollinearity in explanatory variables.

After checking multicollinearity, we use the special procedure in SPSS 25.0 software to adopt the hierarchical multilevel mixed effect model. This approach is relevant because the context levels are taken into account. Variables, starting from the controls, were added step by step. Results showed four models. Model I includes all controls (gender, rural–urban areas, major, work experience, monthly household income). Model II includes the four variables of the entrepreneurial process in addition to other variables. Model III includes the moderating variable (entrepreneurial creativity), Model IV includes the effect of the moderating variable on entrepreneurial passion, entrepreneurial alertness, entrepreneurial intention, and entrepreneurial action. The results are presented in Table 4.

**Table 4.** Hierarchical multiple regression: entrepreneurial process, entrepreneurial creativity and entrepreneurs' psychological well-being.

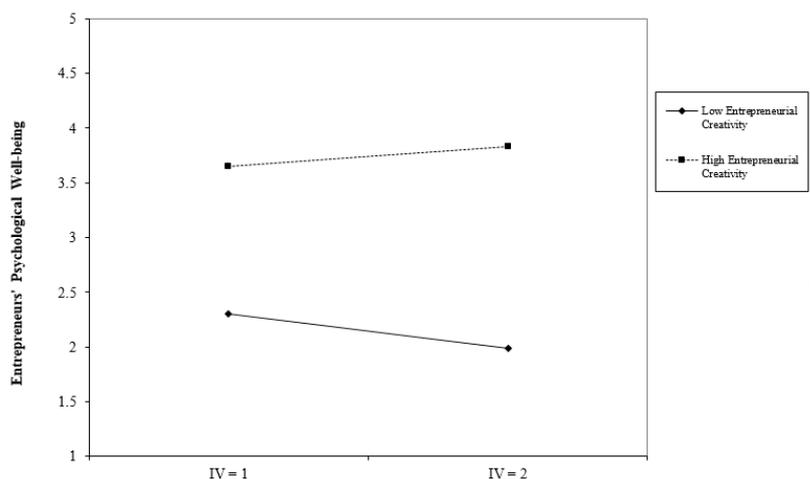
Variable	Model I	Model II	Model III	Model IV
Gender(0 = male)	−0.078*** (0.002)	0.000 (0.984)	0.007 (0.754)	0.007 (0.773)
Rural-Urban areas	0.107*** (0.001)	0.091*** (0.001)	0.071*** (0.003)	0.070*** (0.003)
Major	0.092*** (0.001)	0.070*** (0.002)	0.073*** (0.001)	0.072*** (0.001)
Work experience	−0.041 (0.102)	−0.057** (0.011)	−0.054** (0.014)	−0.053** (0.016)
Monthly household income	0.119*** (0.001)	0.071*** (0.003)	0.071*** (0.003)	0.071*** (0.003)
Entrepreneurial passion		0.120** (0.018)	0.076 (0.129)	0.073 (0.142)
Entrepreneurial alertness		0.257*** (0.001)	0.138*** (0.005)	0.135*** (0.007)
Entrepreneurial intention		0.156*** (0.001)	0.025 (0.527)	0.025 (0.530)
Entrepreneurial action		−0.111*** (0.001)	−0.099*** (0.001)	−0.120*** (0.001)
Entrepreneurial creativity			0.334*** (0.001)	0.345*** (0.001)
Entrepreneurial passion × Entrepreneurial creativity				−0.035 (0.594)
Entrepreneurial alertness × Entrepreneurial creativity				0.037 (0.565)
Entrepreneurial intention × Entrepreneurial creativity				−0.026 (0.543)
Entrepreneurial action × Entrepreneurial creativity				0.067** (0.037)
R <sup>2</sup>	0.051	0.240	0.279	0.282
Adjusted R <sup>2</sup>	0.048	0.236	0.274	0.275
F-value	16.382***	53.321***	58.666***	42.388***
F-change	16.382***	94.458***	81.339***	1.501

Note. N = 1526, two-tailed tests. \*\* P < 0.05, two-tailed tests. \*\*\* P < 0.01, two-tailed tests.

As shown in Model I, the analysis revealed that gender appears to matter, as being a male student is positively associated with the entrepreneurs' psychological well-being ( $-0.078$ ,  $p < 0.001$ ). Urban student entrepreneurs ( $0.107$ ,  $p < 0.01$ ) or entrepreneurs with a higher monthly household income ( $0.119$ ,  $p < 0.01$ ) have a high psychological well-being score. The major is more inclined to those specialized in business and economics ( $0.092$ ,  $p < 0.01$ ). For student entrepreneurs, work experience has no direct impact ( $-0.035$ ,  $p > 0.1$ ).

As shown in Model II, entrepreneurial passion ( $0.120$ ,  $p < 0.05$ ), entrepreneurial alertness ( $0.257$ ,  $p < 0.01$ ), and entrepreneurial intention ( $0.156$ ,  $p < 0.01$ ) were all positively related to entrepreneurs' psychological well-being, which supported the hypotheses H1, H2 and H3. However, entrepreneurial action ( $-0.111$ ,  $p < 0.01$ ) is negatively related to entrepreneurs' psychological well-being, which is contrary to H4. As shown in Model III, the coefficient for entrepreneurial creativity is positive and significant ( $0.334$ ,  $p < 0.01$ ), which supported H5.

Moderating effects were shown in Model IV. There was no significant effect of entrepreneurial creativity on the relationship between entrepreneurial passion and entrepreneurs' psychological well-being. Thus, we fail to find data supporting H6. The coefficient of entrepreneurial creativity between entrepreneurial alertness and entrepreneurs' psychological well-being is also insignificant ( $0.037$ ,  $p > 0.1$ ), which suggested that H7 was not confirmed. Moreover, the relationship between entrepreneurial passion and entrepreneurs' psychological well-being was not clearly moderated by entrepreneurial creativity ( $-0.026$ ,  $p > 0.1$ ). However, the coefficient of entrepreneurial creativity on the relationship between entrepreneurial action and entrepreneurs' psychological well-being is positive ( $0.067$ ,  $p < 0.01$ ), which showed the moderating effect on Figure 2. As predicted, the relationship between entrepreneurial action and entrepreneurs' psychological well-being turns positive when student entrepreneurs have high entrepreneurial creativity.



**Figure 2.** Entrepreneurial creativity as a moderator.

### Robustness Tests

To verify the robustness of the findings, we used PROCESS v3.3 (released 3 February 2019) software (Andrew F. Hayes, 2019) to test and analyze the moderator variable. Bootstrap method was proposed by Preacher and Hayes (2004) and used for moderating effect testing in psychological research, which facilitates estimation of the indirect effects with a normal theory approach and enhances the frequency of formal moderating tests in the psychology [52]. We used the bootstrap by choosing “Model Number 1” and selected

5000 samples. At the same time, we set the confidence interval at 95%. The results were re-run in Table 5. The results produced the same patterns of findings as in the 1526 samples.

**Table 5.** Entrepreneurial creativity moderating tests bootstrap results.

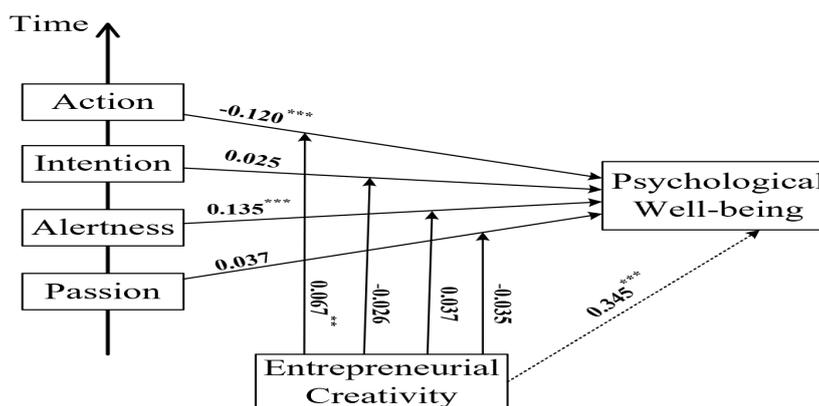
Entrepreneurial Action → Entrepreneurs' Psychological Well-Being			
Entrepreneurial Creativity	Boot SE(sig.)	LLCI	ULCI
Low	0.0324(0.0003)	-0.1810	-0.0539
Mean	0.0264(0.0013)	-0.1369	-0.0334
High	0.0274(0.4564)	-0.0742	0.0333

Note: Model Number 1, under 95% confidence.

## 5. Discussion

### 5.1. Findings

This study attempts to demonstrate the psychological well-being of student entrepreneurs in the process of entrepreneurship and that the enhancement of entrepreneurial creativity in entrepreneurship education can regulate the psychological well-being. We explore the relationship between the entrepreneurial process and student entrepreneurs' psychological well-being with the moderating effect of entrepreneurial creativity, as is shown in Figure 3. The following discussion relates to the main findings:



**Figure 3.** Psychological well-being and Process of entrepreneurship. \*\*  $P < 0.05$ , two-tailed tests. \*\*\*  $P < 0.01$ , two-tailed tests.

Firstly, we analyzed entrepreneurs' psychological well-being in the entrepreneurial journey. The entrepreneurial process can be divided into entrepreneurial passion, entrepreneurial alertness, entrepreneurial intention and entrepreneurial action. Entrepreneurial passion, entrepreneurial alertness and entrepreneurial intention are positively related to entrepreneurs' psychological well-being. However, entrepreneurial action has a negative effect on entrepreneurs' psychological well-being. We also acknowledge the role of other factors, like gender, student source, major, work experience and monthly household income. We focused the entrepreneurial process on how to develop from passion to action, at least for some. At the beginning, entrepreneurs' psychological well-being may be rising when they push the tasks or ideas ahead. Once into action, entrepreneurs' psychological well-being may face challenges and stresses of entrepreneurial action, and thereby, psychological well-being declines as entrepreneurial activity deepens.

Second, this study added entrepreneurial creativity into the model to examine the effect of entrepreneurial creativity on entrepreneurs' psychological well-being. The change in hearts and/or minds from entrepreneurial inspiration can be very powerful

[53], leading to higher entrepreneurial creativity. It is important to note that this is different from the existing research on entrepreneurship education and its contribution to individual creativity [44]. This empirical analysis shows that entrepreneurial creativity also contributes to enhancing entrepreneurs' psychological well-being.

Third, the results implies that, for student entrepreneurs with the same backgrounds and the same intention, passion, alertness in entrepreneurship, the ones with higher creativity together with more entrepreneurial actions are more likely to have higher psychological well-being. Entrepreneurial education focuses on stimulating students' creativity, which not only helps start-ups, but also benefits their psychological well-being.

### *5.2. Theoretical and Practical Implications*

This study builds a new theoretical framework that integrates theory with concept related to the theory of planned behavior (TPB) and self-determination theory (SDT). We extend the entrepreneurial early stage process framework conceptualized by Tobin and Peter (2018). A source of both stress and reward can have a profound impact on the entrepreneurs' psychological well-being. Student entrepreneurs may expect procedural utility from entrepreneurship because they may not get it as paid employees do. The process of psychological well-being across individuals is a reflection of this selection process from planning to action. Entrepreneurial creativity, which is the key content of entrepreneurship education, helps to seize an entrepreneurial opportunity and produce innovation. Entrepreneurial creativity positively moderated relations between entrepreneurial action and students' psychological well-being. This framework enriches the theory of planned behavior (TPB) through incorporating self-determination theory (SDT).

This finding also has important practical implications for student entrepreneurs. Entrepreneurial process represents a source of both stress and reward, which can have a profound impact on student entrepreneurs' psychological well-being. The persistent entrepreneurial process is a "step by step" process where entrepreneurs climb an entrepreneurial ladder. Student entrepreneurs gain psychological capital from the entrepreneurial process before actual entrepreneurial action. It is the real collision of actual difficulties during the actual entrepreneurial action. Entrepreneurial passion, entrepreneurial alertness and entrepreneurial intention promote entrepreneurial well-being because these processes stay at the ideological level and will not face real difficulties.

Student entrepreneurs are usually described as creative students, and creativity is deemed to a main characteristic of entrepreneurship. Entrepreneurial creativity, important for psychological well-being, plays a positive role in the practical action of entrepreneurship. Psychological well-being reflects entrepreneurs' affective and cognitive experiences in the process of venture creation. Entrepreneurial creativity can enhance the acquisition of this intangible outcome. This study also demonstrates the meaning of entrepreneurship education centered on cultivating students' creativity.

### **6. Limitations and Future Research**

Our study effectively attempts to open the "black box" of entrepreneurial effectuation as a process [48], by identifying the entrepreneurial process as entrepreneurial passion, entrepreneurial alertness, entrepreneurial intention, and entrepreneurial action. These divisions of the entrepreneurial process in this study may require further refinement. We recommend more research to expand our model by adding the variables and establishing different models. In doing so, we can shed more light upon this "black box" of the entrepreneurial process to more clearly define and understand it. In addition, other aspects of well-being may be nurtured by the longer-term journey of entrepreneurial venturing. Some emerging organizations, such as social impact accelerators, give practitioners knowledge of start-ups and sustainability-oriented start-ups insights to support them in developing a sustainable business mode [54]. Better psychological well-being of student entrepreneurs may contribute to more start-ups that is economically viable or

economically sustainable. Second, we can even consider more personal factors for psychological well-being in the opportunity recognition process in the future [13]. We can take some personal characteristics into deep account as the control variables, such as gender, student source, major (the field or specialty of study), work experience, education level and monthly household income. Earlier research suggests that entrepreneurs with strong family ties and business ties have high levels of individual creativity [38]. We call for further research to understand more detailed family creativity to explain psychological well-being and why some students react differently from others. Education level or occupation influenced depression or anxiety [55]. The future research can study the influence of student entrepreneurs' major or grade on psychological well-being.

Third, we conduct data collection and analysis in a Chinese university. However, does entrepreneurial creativity have the same effect in other countries? For example, Zhang et al. (2021) [56] has designed a comparative study to compare the different views of science teachers in China and Canada on entrepreneurship. In the future, comparative studies across countries will be conducted. The COVID-19 pandemic impacted new entrepreneurial opportunities and psychological well-being [57] in different national contexts. The global comparisons will allow us to conduct a closer and more precise analysis of psychological well-being and creativity education for student entrepreneurs. In addition, the target population of future research can be expanded to ordinary students. Ordinary students who are educated in a creative spirit may have better psychological well-being, especially during the COVID-19 pandemic.

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