



International Journal of Educational Methodology

Volume 8, Issue 1, 139 - 149.

ISSN: 2469-9632

<https://www.ijem.com/>

The Relationship between Internal Locus of Control and Entrepreneurial Intentions of College Students: A Chain Mediation Model

Li-Yu Wang 

Hainan Tropical Ocean University, CHINA
Dhurakij Pundit University, THAILAND

Jian-Hao Huang* 

Dhurakij Pundit University, THAILAND

Received: October 17, 2021 • Revised: December 6, 2021 • Accepted: February 8, 2022

Abstract: This study explores the relationship among the internal locus of control, entrepreneurial alertness, entrepreneurial opportunity recognition, and entrepreneurial intentions of college students. The scales of internal locus of control, entrepreneurial alertness, entrepreneurial opportunity recognition, and entrepreneurial intention have been used to conduct a questionnaire survey among 921 undergraduates from four universities in China. The results show four key findings. First, the internal locus of control has a positive and significant impact on entrepreneurial intention. Second, entrepreneurial alertness plays a mediating role in the relationship between internal locus of control and entrepreneurial intention. Third, entrepreneurial opportunity recognition plays a mediating role in the relationship between the internal locus of control and entrepreneurial intention. Finally, entrepreneurial alertness and entrepreneurial opportunity recognition have a chain mediation effect on the relationship between the internal locus of control and entrepreneurial intention. The study proposes suggestions and future research directions based on the research results, serving as a reference for entrepreneurial education and entrepreneurship planning of college students.

Keywords: *College students, internal locus of control, entrepreneurial alertness, entrepreneurial opportunity recognition, entrepreneurial intention.*

To cite this article: Wang, L. -Y., & Huang, J. -H. (2022). The relationship between internal locus of control and entrepreneurial intentions of college students: A Chain mediation model. *International Journal of Educational Methodology*, 8(1), 139-149. <https://doi.org/10.12973/ijem.8.1.141>

Introduction

Entrepreneurial intention plays an indispensable and vital role in entrepreneurship (Liñán & Chen, 2009). Understanding the entrepreneurial intentions of college students allows researchers to better predict whether they will take actual actions to start their businesses. Improving the entrepreneurial intentions of college students can effectively increase the possibility that they will become entrepreneurs (Wu & Wu, 2008). This study primarily explores and discusses the entrepreneurial intentions of college students in China.

Internal locus of control is a significant factor influencing entrepreneurial intention (Shane et al., 2003). Individuals with an internal locus of control typically possess a more active attitude towards challenges and are more willing to solve problems through effective solutions (Luthans et al., 2006). They are also good at utilizing social capital to compensate for possible shortcomings while starting their businesses and obtain more entrepreneurial resources to guarantee their success (Obschonka et al., 2012). They have clearer entrepreneurial motivations and stronger entrepreneurial intentions to actually establish their businesses (Baldegger et al., 2017).

Entrepreneurial alertness, the ability to actively detect opportunities that are overlooked by others, is also a key driver of entrepreneurial intention (Hayton & Cholakova, 2012; Lee et al., 2016). It is the rare ability to discover opportunities (Kirzner, 1997), make plans, continuously scan the environment, and be prepared to discover opportunities at any time (Kaish & Gilad, 1991). Individuals with entrepreneurial alertness can discover opportunities to build and manage their own businesses (Karabulut, 2016). In general, entrepreneurial alertness typically enhances people's entrepreneurial intentions and encourages them to start their own businesses (Glederen et al., 2008).

Entrepreneurial opportunity recognition is the ability to identify opportunities and start a business through their perception of the market environment (Bygrave & Hofer, 1991), form a unique cognitive framework with both current

* Corresponding author:

Jian-Hao Huang, Dhurakij Pundit University, Bangkok, Thailand. ✉ jianhao.hua@dpu.ac.th



analysis and experience, and transform knowledge into opportunities (Baron & Ensley, 2006); it can also enhance entrepreneurial intentions (Liu et al., 2011). Individuals who can identify entrepreneurial opportunities can explore potential business opportunities and transform them into actual businesses through practices (Lumpkin & Lichtenstein, 2005). People good at identifying potential business opportunities are more likely to start their own businesses and show greater entrepreneurial intentions (Hassan et al., 2020).

The above statements have introduced the influence of internal locus of control, entrepreneurial alertness, and entrepreneurial opportunity recognition on entrepreneurial intention and their significance as predetermined variables in forming an entrepreneurial intention. Some studies have also concluded that internal locus of control can significantly and positively affect entrepreneurial alertness and entrepreneurial opportunity recognition (Asante & Affum-Osei, 2019; Tang, 2009) and that entrepreneurial alertness has a significantly positive impact on entrepreneurial opportunity recognition (Hussain-Samo & Hashim, 2015; Lu & Wang, 2018). Previous studies have shown that entrepreneurial alertness and entrepreneurial opportunity recognition play a key mediating role between personality variables and entrepreneurial intention (Hu et al., 2018; Yan et al., 2018; Yasir et al., 2020). Moreover, individuals with higher entrepreneurial alertness are more sensitive to environmental changes and are therefore more likely to identify opportunities (Hajizadeh & Zali, 2016). Entrepreneurial alertness not only improves people's ability to identify opportunities but also helps form entrepreneurial intentions and start entrepreneurial behaviors (McMullen & Shepherd, 2006). Consequently, this study employs entrepreneurial alertness and entrepreneurial opportunity recognition as mediating variables to build a chain mediation effect model to explore the impacts of internal locus of control on entrepreneurial intention. Thereby, it provides empirical evidence for entrepreneurial theories to determine the mediating mechanism that affects entrepreneurship, promoting research in the field of entrepreneurship. This study then proposes practical suggestions for universities of higher learning to better plan and implement their entrepreneurship courses to encourage college students to start their businesses.

Literature Review

Internal Locus of Control and Entrepreneurial Intention

Levenson (1981) points out that internal locus of control is a personality characteristic, describing the level of impacts on people of various events in life. Those with a strong internal locus of control believe that they can control situations through their actions. Lii and Wong (2008) claim that those who believe that their efforts can affect their lives possess an internal locus of control. DeNoble et al. (1999) hold that entrepreneurial intention refers to the level of motivation and willingness to create new businesses. Peng et al. (2013) believe that entrepreneurial intention refers to psychological tendencies, such as desire, aspiration, and hope, which impact people's entrepreneurial choices.

Ang and Hong (2000) have found that internal locus of control is the determinant of entrepreneurial intention, and Zhao et al. (2010) demonstrates that internal locus of control can improve people's entrepreneurial intention. Further, the internal locus of control plays an important role in the formation of entrepreneurial intentions (Baldegger et al., 2017) and can positively influence entrepreneurial intention (Tentama & Abdussalam, 2020). People with an internal locus of control choose to become entrepreneurs as they believe that their decisions and actions affect their entrepreneurship (Karabulut, 2016). The internal locus of control of college students can also positively impact their entrepreneurship intentions (Hsiung, 2018), indicating that the stronger the internal locus of control, the higher the entrepreneurial intention (Kristiansen & Indarti, 2004). Consequently, this study proposes Hypothesis 1: The internal locus of control of college students has a significant positive impact on their entrepreneurial intentions.

Entrepreneurial Alertness Plays a Mediating role between Internal Locus of Control and Entrepreneurial Intention

Busenitz (1996) believes that entrepreneurial alertness is a mental state that is open to opportunities. Although entrepreneurial alertness may trigger search behavior in a known environment, it is generally an acceptance of any opportunities at any time. Kirzner (1997) further defines entrepreneurial alertness as the ability to actively detect opportunities that others overlook.

Other studies have explored how entrepreneurial alertness impacts entrepreneurial intention as a mediating variable. Lu and Wang (2018) have studied the role of entrepreneurial alertness in the Theory of Planned Behavior, establishing that entrepreneurial alertness partially mediates the influence of entrepreneurial attitude on entrepreneurial intention. Yasir et al. (2020) have conducted a study with college students as the research samples. The study uses entrepreneurial self-efficacy, proactive personality, and creativity as independent variables, opportunity recognition and sustainable entrepreneurial intention as dependent variables, and entrepreneurial alertness as a mediating variable. The results showed that entrepreneurial alertness has a mediation effect on the relationship between the above variables. Consequently, this study proposes Hypothesis 2: The entrepreneurial alertness of college students plays a mediating role in the impacts of internal locus of control on entrepreneurial intention.

Entrepreneurial Opportunity Recognition Plays a Mediating role between Internal Locus of Control and Entrepreneurial Intention

First, entrepreneurial opportunity recognition refers to acts that identify opportunities and start a business through the perception of the market environment (Bygrave & Hofer, 1991). Second, it indicates the ability to form a unique cognitive framework with both current analysis and experience and transform knowledge and information into opportunities (Baron & Ensley, 2006). Entrepreneurial opportunity recognition is the ability to explore potential business opportunities and transform them into actual businesses through practices (Lumpkin & Lichtenstein, 2005).

Most studies in the field of entrepreneurship conclude that entrepreneurial opportunity recognition plays the role of a mediating variable, and some studies have also found that entrepreneurial opportunity recognition, as a mediating variable, significantly impacts entrepreneurial intention. Yan et al. (2018) have studied the impacts of entrepreneurial alertness and entrepreneurial opportunity recognition as a mediating variable on the relationship between personality traits and entrepreneurial intentions. They establish that these factors play a mediating role in the relationship between personality traits and entrepreneurial intentions of college students. Wei et al. (2019) have found that political skills and entrepreneurial opportunity recognition not only play a mediating role in entrepreneurial education and innovation but also have a chain mediation effect on the relationship between entrepreneurial education and innovation. Studies also indicate that opportunity recognition plays a mediating role between entrepreneurial orientation and the performance of the new business (Anwar et al., 2021). Therefore, this study proposes Hypothesis 3: The entrepreneurial opportunity recognition of college students plays a mediating role in the impacts of internal locus of control on entrepreneurial intention.

The Chain Mediation Effects of Entrepreneurial Alertness and Entrepreneurial Opportunity Recognition on Internal Locus of Control and Entrepreneurial Intention

Individuals with higher entrepreneurial alertness are more likely to combine their ideas and knowledge and identify entrepreneurial opportunities (Craig & Johnson, 2006). In other words, people with entrepreneurial alertness have a stronger ability to identify opportunities, and hence, entrepreneurial alertness is considered one of the primary factors of opportunity recognition (Kaish & Gilad, 1991). Studies have found that entrepreneurial alertness has a positive impact on opportunity recognition, improving the individual's awareness of obtaining information and possibilities to identify opportunities (Hajizadeh & Zali, 2016). Some studies have found that entrepreneurial alertness and entrepreneurial opportunity recognition play an important mediating role between personality variables and entrepreneurial intentions (Anwar et al., 2021; Hu et al., 2018; Yan et al., 2018; Yasir et al., 2020). Subsequently, college students strengthen their entrepreneurial alertness; their entrepreneurial opportunity recognition ability is also significantly improved. Under the combined influence of entrepreneurial alertness and entrepreneurial opportunity recognition, they eventually improve their entrepreneurial intentions and commence their entrepreneurial efforts. Therefore, entrepreneurial alertness improves the individual's ability to recognize opportunities, helping individuals form entrepreneurial intentions and start entrepreneurial behaviors (McMullen & Shepherd, 2006).

The cross-cultural cognitive model of venture creation (CCCMVC) shows that internal locus of control, schema, and heuristics are all important prerequisites affecting entrepreneurial intention and that internal locus of control can significantly and positively influence schema and heuristics (Busenitz, 1996). Schema refers to one's inherent way of thinking and interacting with the outside world to help people improve their ability to concentrate on information (McVee et al., 2005). Entrepreneurial alertness and schema have some common attributes: the sharper the schema, the higher the entrepreneurial alertness, helping individuals discover entrepreneurial opportunities in unknown environments (Chen, 2008; Gaglio & Katz, 2001). Consequently, entrepreneurial alertness plays a positive role in entrepreneurial opportunity recognition (Puhakka, 2011). Heuristics, the way one receives and uses knowledge, can significantly and positively impact one's entrepreneurial intention (Busenitz, 1996). Entrepreneurial opportunity recognition is the ability to transform knowledge and information into opportunities by combining current knowledge and experience (Baron & Ensley, 2006), which can positively and significantly impact entrepreneurial intention (Liu et al., 2011). Heuristics and entrepreneurial opportunity recognition demonstrably have some common attributes. Individuals can recognize the perception of the external environment through thinking about heuristics and entrepreneurial opportunities. They ultimately affect entrepreneurial intentions rather than the individual's direct perception of the external environment.

Conducting its analysis using the CCCMVC, this study has found that internal locus of control potentially impacts entrepreneurial alertness and entrepreneurial opportunity recognition and that entrepreneurial alertness can influence entrepreneurial opportunity recognition and form entrepreneurial intention (Gaglio & Katz, 2001; McMullen & Shepherd, 2006). This finding proves the compatibility between the variables of this study and the CCCMVC. Therefore, the study has integrated these relationships into the CCCMVC, exploring the chain mediating role of entrepreneurial alertness and entrepreneurial opportunity recognition in how the internal locus of control impacts entrepreneurial intention. Consequently, this study proposes Hypothesis 4: The entrepreneurial alertness and entrepreneurial opportunity recognition of college students play a chain mediating role in the impacts of internal locus of control on entrepreneurial intention.

Methodology

Research Framework

This study has proposed the research framework based on the above hypotheses, as shown in Figure 1.

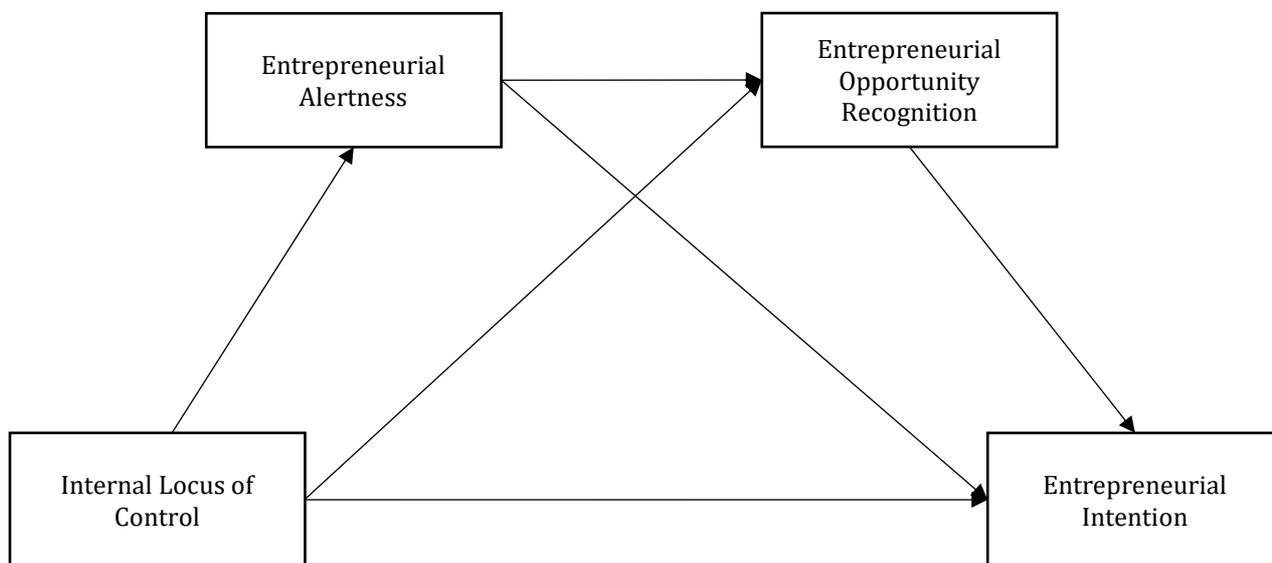


Figure 1. Research Framework

Research Object

Universities in Hainan Province, China, strongly desire to improve the quality of talent cultivation; they have made innovative practices and exploration in the employment and subsequent entrepreneurship of college students, developing innovative and entrepreneurial courses, and ensuring that innovation and entrepreneurial education are covered in the entire university education. The strategies of Hainan for entrepreneurial education and entrepreneurial development of college students are relatively mature, and hence, the selection of Hainan for the survey of college students' entrepreneurship is reasonable and representative. This study has adopted the purposive sampling method, selecting college students from four universities in Hainan Province as the research objects.

Research Tools

This study has used the questionnaire survey as the principal research method to analyze the collected sample data. Its research tools include the internal locus of control scale, entrepreneurial alertness scale, entrepreneurial opportunity recognition scale, and entrepreneurial intention scale, which are described as follows:

- *Internal Locus of Control Scale*

Measuring the internal locus of control draws primarily on the internal locus of control scale of Asante and Affum-Osei (2019), which is typically used for the measurement of the start-up group. The research objects include college students, and there are four questions in total. The scale is Cronbach's $\alpha = 0.90$, demonstrating satisfactory reliability. This study used the 5-point Likert scale for measurement. The answers range from "strongly disagree" to "strongly agree." The higher the score, the stronger the internal locus of control. The Cronbach's α of internal locus of control in this study was 0.853.

- *Entrepreneurial Alertness Scale*

The study has measured alertness using the Entrepreneurship Alertness Scale designed by Tang et al. (2012). The scale used samples of college students from a large state university in the southeastern region of the U.S. and covered three dimensions (scanning and searching, association and connection, and evaluation and judgment) with 13 items. Its Cronbach's α was above 0.91 in all aspects, indicating good reliability. This study has used the 5-point Likert scale for measurement. The answers range from "strongly disagree" to "strongly agree." The higher the score, the stronger the entrepreneurial alertness. The Cronbach's α of entrepreneurial alertness in this study was 0.911.

- *Entrepreneurial Opportunity Recognition Scale*

The entrepreneurial opportunity recognition scale compiled by Puhakka (2006) has been used for measurement; it consists of five dimensions (knowledge acquisition, competitive scanning, proactive searching, innovative behavior, and collective action) and 14 items. Cronbach's α of the scale was 0.93, indicating good reliability, and other researchers have also used it. (Kannadhasan et al., 2018; Wei & Hisrich, 2016). This study used the 5-point Likert scale for measurement, with the choices ranging from "strongly disagree" to "strongly agree". The higher the score, the stronger the entrepreneurial opportunity recognition. The Cronbach's α of entrepreneurial opportunity recognition in this study was 0.898.

- *Entrepreneurial Intention Scale*

This study has implemented the entrepreneurial intention scale developed by Liñán and Chen (2009). The primary research objects of this scale were college students, who were asked a total of six questions. The Cronbach's α of this scale reached 0.94, showing good reliability. The study has used the 5-point Likert scale for measurement, with the choices ranging from "strongly disagree" to "strongly agree." The higher the score, the stronger the entrepreneurial intention. The Cronbach's α of entrepreneurial intention scale in this study was 0.897.

Statistical Analysis Method

The study has used SPSS software to analyze the collected data, including descriptive statistics and correlation analysis. It has used the SPSS Process Macro to test the hypothesis and Model 6 to test the mediation model (Hayes, 2013). The study data had to satisfy normal distribution. The skewness absolute values for the 37 items were between 0.006 and 0.689, and the kurtosis absolute values for the 37 items were between 0.010 and 1.407. The results satisfied the standards of the absolute value for skewness <2 and kurtosis <7 (Curran et al., 1996).

Results

Description of Research Objects

A total of 1,000 formal questionnaires were distributed; 956 were returned, of which 921 were valid, with an effective response rate of 96.338%. The background variables of the study include four items of gender, grade, major, and permanent residence. Statistics, data sorting, and analysis have been conducted on the collected research samples. In terms of gender: 555 male (60.26%) and 366 respondents are female (39.74%); in terms of grade: 79 freshmen (8.58%) and 168 sophomore (18.24%), 255 juniors (27.69%), 419 seniors (45.49%); in terms of major: 394 are of liberal arts (42.78%), 527 of science (57.22%); and in terms of permanent residence: 409 are from urban cities (44.41%), 254 from towns (27.58%) and 258 from rural areas (28.01%).

Variable Descriptive Statistics and Correlation Analysis

As shown in Table 1, the mean and standard deviation of each variable are as follows: internal locus of control ($M = 3.773$, $SD = 0.653$), entrepreneurial alertness ($M = 3.462$, $SD = 0.563$), entrepreneurial opportunity recognition ($M = 3.351$, $SD = 0.583$), and entrepreneurial intention ($M = 3.069$, $SD = 0.787$). All four scales are 5-point scales. According to the findings, each variable is at the upper-middle performance level. A significantly positive correlation exists among all the variables in this study. The correlation coefficient of each variable is between 0.377–0.577, smaller than 0.8, indicating no serious collinearity among them (Rodgers & Nicewander, 1988).

Table 1. Variable Descriptive Statistics and Correlation Analysis

Variables	M	SD	Internal locus of control	Entrepreneurial alertness	Entrepreneurial opportunity recognition	Entrepreneurial intention
Internal locus of control	3.773	0.653	1			
Entrepreneurial alertness	3.462	0.563	0.377***	1		
Entrepreneurial opportunity recognition	3.351	0.583	0.415***	0.454***	1	
Entrepreneurial intention	3.069	0.787	0.411***	0.528***	0.577***	1

Note. *** $p < 0.001$

Hypothesis Testing

As shown in Table 2, internal locus of control of college students can significantly and positively affect entrepreneurial intention ($B = 0.496$, $p < 0.001$), this finding verifies Hypothesis 1. In the path of internal locus of control \rightarrow entrepreneurial alertness \rightarrow entrepreneurial intention, internal locus of control has a significantly positive impact on entrepreneurial alertness ($B = 0.326$, $p < 0.001$). Further, entrepreneurial alertness has a significantly positive impact

on entrepreneurial intention ($B = 0.421, p < 0.001$), verifying the mediating role of entrepreneurial alertness between internal locus of control and entrepreneurial intention and supporting Hypothesis 2. In the path of internal locus of control → entrepreneurial opportunity recognition → entrepreneurial intention, internal locus of control has a significantly positive impact on entrepreneurial opportunity recognition ($B = 0.254, p < 0.001$). Entrepreneurial opportunity recognition has a significantly positive impact on entrepreneurial intention ($B = 0.515, p < 0.001$), verifying that entrepreneurial opportunity recognition can play a mediating role between internal locus of control and entrepreneurial intention and supporting Hypothesis 3. In the path of internal locus of control → entrepreneurial alertness → entrepreneurial opportunity recognition → entrepreneurial intention, internal locus of control has a significantly positive impact on entrepreneurial intention ($B = 0.168, p < 0.001$); internal locus of control has a significantly positive impact on entrepreneurial alertness ($B = 0.326, p < 0.001$); entrepreneurial alertness has a significantly positive impact on entrepreneurial intention ($B = 0.421, p < 0.001$); internal locus of control has a significantly positive impact on entrepreneurial opportunity recognition ($B = 0.254, p < 0.001$); entrepreneurial opportunity recognition has a significantly positive impact on entrepreneurial intention ($B = 0.515, p < 0.001$); entrepreneurial alertness has a significantly positive impact on entrepreneurial opportunity recognition ($B = 0.359, p < 0.001$), verifying the chain mediating role of entrepreneurial alertness and entrepreneurial opportunity recognition on internal locus of control and entrepreneurial intention and supporting Hypothesis 4. Moreover, Model 4 showed that internal locus of control has a significantly positive impact on entrepreneurial intention ($B = 0.168, p < 0.001$). Therefore, entrepreneurial alertness and entrepreneurial opportunity recognition play a partial mediating role in the relationship between internal locus of control and entrepreneurial intention (see Figure 2).

Table 2. Model Results

Variables	Model 1			Model 2			Model 3			Model 4		
	Entrepreneurial intention			Entrepreneurial alertness			Entrepreneurial opportunity recognition			Entrepreneurial intention		
	B	SE	t	B	SE	t	B	SE	t	B	SE	t
Constant	1.199	0.139	8.643***	2.233	0.101	22.120***	1.151	0.119	9.666***	0.747	0.149	-5.028
Internal locus of control	0.496	0.036	13.685***	0.326	0.026	12.354***	0.254	0.027	9.361***	0.168	0.034	4.966***
Entrepreneurial alertness							0.359	0.031	11.418***	0.421	0.040	10.548***
Entrepreneurial opportunity recognition										0.515	0.039	13.124***
R ²	0.169			0.142			0.275			0.437		
F	187.271***			152.627***			174.126***			236.936***		

Note. *** $p < 0.001$

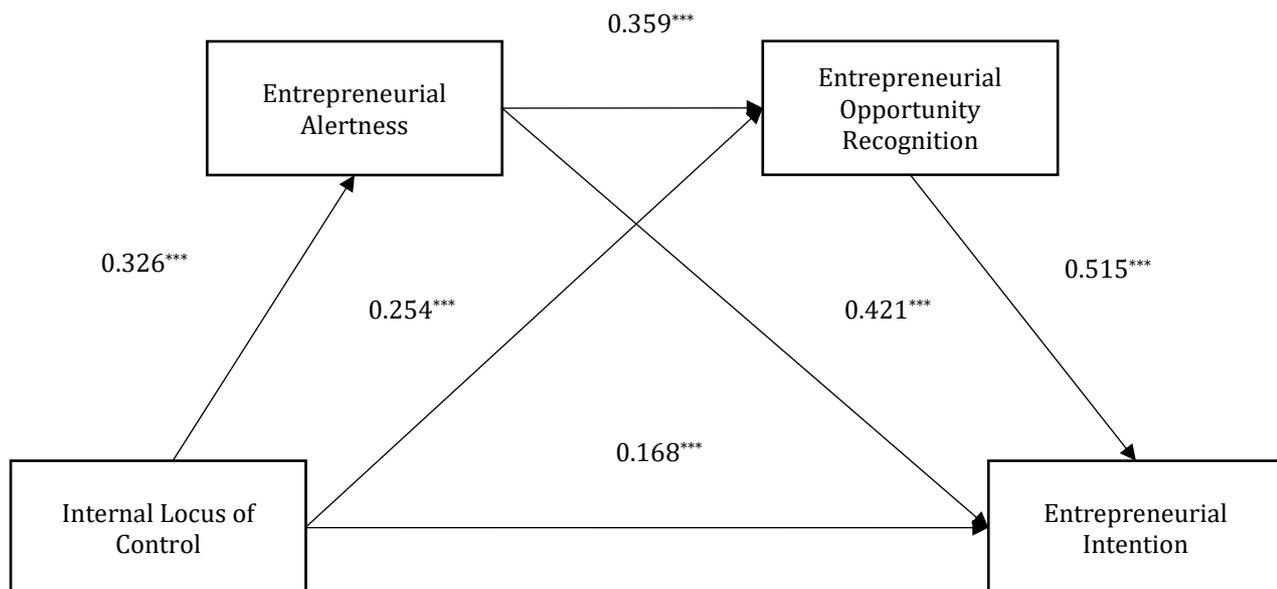


Figure 2. Roadmap of the Mediation Model

Note. *** $p < 0.001$

Bootstrap Mediation Effect Test

As demonstrated in Table 3, Indirect effect path 1 is internal locus of control → entrepreneurial alertness → entrepreneurial intention. Indirect effect path 2 is internal locus of control → entrepreneurial opportunity recognition → entrepreneurial intention. Indirect effect path 3 is internal locus of control → entrepreneurial alertness → entrepreneurial opportunity recognition → entrepreneurial intention. The results demonstrate that: the total indirect effect of entrepreneurial alertness and entrepreneurial opportunity recognition is 0.328, indicating a significant mediation effect of entrepreneurial alertness and entrepreneurial opportunity recognition on the relationship between internal locus of control and entrepreneurial intention. The mediation effect includes three indirect effects. The first indirect effect is internal locus of control → entrepreneurial alertness → entrepreneurial intention. Its path effect value = 0.137, with a confidence interval of (0.105, 0.169), not including 0, proving that entrepreneurial alertness does play a mediating role between internal locus of control and entrepreneurial intention and verifying Hypothesis 2. The second one is internal locus of control → entrepreneurial opportunity recognition → entrepreneurial intention. The path effect value = 0.131, with a confidence interval of (0.098, 0.166), not including 0. Consequently, entrepreneurial opportunity recognition plays a mediating role between internal locus of control and entrepreneurial intention, verifying Hypothesis 3. The third effect is internal locus of control → entrepreneurial alertness → entrepreneurial opportunity recognition → entrepreneurial intention. Its path effect value = 0.060, and the confidence interval is (0.045, 0.079), not including 0, proving the chain mediation effect of entrepreneurial alertness and entrepreneurial opportunity recognition on internal locus of control and entrepreneurial intention and verifying Hypothesis 4. The path effect value of direct effect = 0.168, and the confidence interval is (0.101, 0.234), not including 0, verifying the partial mediating role of entrepreneurial alertness and entrepreneurial opportunity recognition in the relationship between internal locus of control and entrepreneurial intention.

Table 3. Mediation Effect Bootstrap Test Analysis

Path	Effect	SE	95% LLCI	95% ULCI
Direct Effect	0.168	0.034	0.101	0.234
Total Indirect Effect	0.328	0.025	0.283	0.378
Indirect Effect 1	0.137	0.016	0.105	0.169
Indirect Effect 2	0.131	0.017	0.098	0.166
Indirect Effect 3	0.060	0.008	0.045	0.079

Note. Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

Discussion

This study explored the relationship between internal locus of control and entrepreneurial intention as well as the role of entrepreneurial alertness and entrepreneurial opportunity recognition in the relationship between internal locus of control and entrepreneurial intentions of college students. The study has found that internal locus of control has a significantly positive impact on entrepreneurial intention, which is consistent with the results of previous studies (Hsiung, 2018). This finding indicates that entrepreneurs with an internal locus of control are more willing to accept challenges and actively overcome difficulties (Luthans et al., 2006), are more visionary and rational, and can propose innovative and creative ideas to facilitate entrepreneurship (Roberts, 1991). The stronger the internal locus of control, the greater is the entrepreneurial intention (Mazzarol et al., 1999).

This study has established that entrepreneurial alertness plays a partial mediating role in the relationship between internal locus of control and entrepreneurial intention, similar to the results of previous studies. Entrepreneurial alertness also plays an important mediating role (Lu & Wang, 2018), indicating that individuals with higher entrepreneurial alertness are more sensitive to the entrepreneurial environment and can identify entrepreneurial opportunities faster; consequently, they create more active and stronger entrepreneurial intentions (Hayton & Cholakova, 2012; Lee et al., 2016).

The results demonstrate that entrepreneurial opportunity recognition plays a partial mediating role in the relationship between internal locus of control and entrepreneurial intention, similar to the results of previous studies. Entrepreneurial opportunity recognition also plays a key mediating role in the relationship between personality traits and entrepreneurial intention of college students (Yan et al., 2018). This finding indicates that internal locus of control promotes entrepreneurial opportunity recognition and inspires entrepreneurial intention, thus generating entrepreneurial intention. Entrepreneurs with an internal locus of control can carry out entrepreneurial activities more effectively because they have strong abilities to identify, develop, and evaluate external opportunities. Further, they are more emotionally stable and reliable, showing a relatively higher level of entrepreneurship (Elfring & Hulsink, 2003).

The results also demonstrate that entrepreneurial alertness and entrepreneurial opportunity recognition play a chain mediating role in how the internal locus of control influences entrepreneurial intention. Internal locus of control can

raise entrepreneurial alertness, further enhancing entrepreneurial opportunity recognition and entrepreneurial intention.

In the CCCMVC, the internal locus of control affects schema and heuristics and as well as, ultimately, entrepreneurial intention. Therefore, the model can help clarify entrepreneurs' thinking methods and the reasons for entrepreneurial decision-making (Busenitz, 1996), leading to the conclusion that higher entrepreneurial alertness, more sensitivity to environmental changes, and a greater likelihood of identifying opportunities (Hajizadeh & Zali, 2016). Entrepreneurial alertness improves one's ability to recognize opportunities and helps form entrepreneurial intentions and start entrepreneurial behaviors (McMullen & Shepherd, 2006). Consequently, when college students strengthen their entrepreneurial alertness, their entrepreneurial opportunity recognition ability is also significantly improved. Under the combined influence of entrepreneurial alertness and entrepreneurial opportunity recognition, their entrepreneurial intentions are subsequently improved.

Conclusions

From the perspective of the mediating role of entrepreneurial alertness and entrepreneurial opportunity identification, this study revealed the importance of internal locus of control in promoting college students' entrepreneurial intention. Specifically, the study found the following: First, the internal locus of control has a positive and significant impact on entrepreneurial intention. Second, entrepreneurial alertness plays a mediating role in the relationship between internal locus of control and entrepreneurial intention. Third, entrepreneurial opportunity recognition plays a mediating role in the relationship between the internal locus of control and entrepreneurial intention; Finally, entrepreneurial alertness and entrepreneurial opportunity recognition have a chain mediation effect on the relationship between the internal locus of control and entrepreneurial intention.

Recommendations

Universities should develop more courses on life planning and self-management, proactively testing and understanding levels of internal locus of control of college students. Further, universities should help students strengthen their internal locus of control and improve their initiative and enthusiasm, thus, stimulating their entrepreneurial intentions.

While strengthening students' internal locus of control, universities should integrate entrepreneurial education courses, cultivate students' sensitivity to entrepreneurial information, and enhance their interpretation of entrepreneurial information. Doing so influences their alertness to searching, association, and evaluation. Therefore, universities can set up more courses on entrepreneurial behavior, cognition, action, and experience to improve students' entrepreneurial alertness in the market environment.

While strengthening students' internal locus of control of students, universities should offer more entrepreneurial practice opportunities to make it easier to acquire business data and information. They should also provide students with better protection and services in terms of entrepreneurial information and training to let students better observe and evaluate the market environment. Additionally, universities should hold diversified activities and projects, transform the thinking mode of students, and improve foresight. They should offer more entrepreneurship and innovation courses to cultivate students' innovative thinking and integrate interpersonal communication and emotional communication into students' daily education, thereby strengthening their interpersonal communication skills and collective behaviors.

Specifically, universities can improve the entrepreneurial information platform to grant students easier access and cultivate their sensitivity to entrepreneurial information. They can build entrepreneurial practice bases to give students opportunities to improve their ability to absorb entrepreneurial information and related information in practice and maintain a high level of alertness to entrepreneurial information at any time. Universities can also invite experts to provide entrepreneurial guidance, helping students understand the entrepreneurial process and gain more experience, as well as evaluate and discover more valuable entrepreneurial resources. Additionally, students' ability to identify entrepreneurial opportunities must be improved through professional entrepreneurial education. More entrepreneurial training courses should be offered to cultivate their insights into the pros and cons of entrepreneurial opportunities and give them internship opportunities in companies or entrepreneurial institutions to experience real entrepreneurial environments. Such opportunities help students improve their skills to analyze the entrepreneurial market and entrepreneurial capabilities, eventually enhancing their entrepreneurial intentions and increasing the success rate of entrepreneurship.

Limitations

The study has selected its samples primarily from Hainan Province, China, presenting geographical limitations and research restrictions such as a method of questionnaire distribution and thereby affecting the universality of the research effect. Therefore, the sample scope of future research can be expanded to cover different regions to improve the external validity. The questionnaire survey was based on the cross-sectional data obtained simultaneously and lacked periodical follow-up of the sample. Consequently, it could not facilitate in-depth study and analysis of the dynamic formation of entrepreneurial intentions of college students. Therefore, future studies can use longitudinal data

tracking methods to explore the relationship between these variables. Alternatively, qualitative research methods can be used at the same time to obtain richer research results. Moreover, further discussion on the mediation effect of other variables on the relationship between internal locus of control and entrepreneurial intention is recommended. An additional area with scope for research is its role of utilizing other moderating variables to influence the relationship between internal locus of control and entrepreneurial intention. Such a study will provide more evidence for empirical research results between internal locus of control and entrepreneurial intention.

Authorship Contribution Statement

Wang: Conceptualization, design, data acquisition, statistical analysis/ interpretation, writing. Huang: Editing/reviewing, supervision, final approval.

References

- Ang, S. H., & Hong, D. G. P. (2000). Entrepreneurial spirit among East Asian Chinese. *Thunderbird International Business Review*, 42(3), 285-309. <https://bit.ly/35Lhv2z>
- Anwar, M., Clauss, T., & Issah, W. B. (2021). Entrepreneurial orientation and new venture performance in emerging markets: the mediating role of opportunity recognition. *Review of Managerial Science*. Advance online publication. <https://doi.org/10.1007/s11846-021-00457-w>
- Asante, E. A., & Affum-Osei, E. (2019). Entrepreneurship as a career choice: The impact of locus of control on aspiring entrepreneurs' opportunity recognition. *Journal of Business Research*, 98, 227-235. <https://doi.org/10.1016/j.jbusres.2019.02.006>
- Baldegger, U., Schroeder, S. H., & Furtner, M. R. (2017). The self-loving entrepreneur: Dual narcissism and entrepreneurial intention. *International Journal of Entrepreneurial Venturing*, 9(4), 373-391. <https://doi.org/10.1504/IJEV.2017.088639>
- Baron, R. A., & Ensley, M. D. (2006). Opportunity recognition as the detection of meaningful patterns: Evidence from comparisons of novice and experienced entrepreneurs. *Management Science*, 52(9), 1331-1344. <https://doi.org/10.1287/mnsc.1060.0538>
- Busenitz, L. W. (1996). Research on entrepreneurial alertness: Sampling, measurement, and theoretical issues. *Journal of Small Business Management*, 34(4), 35-44. <http://bitly.ws/o72y>
- Bygrave, W. D., & Hofer, C. (1991). Theorizing about entrepreneurship. *Entrepreneurship Theory and Practice*, 16(2), 13-22. <https://doi.org/10.1177/104225879201600203>
- Chen, H. Y. (2008). Research on discovery process of entrepreneurial opportunities based on information resources. *Information Science*, 26(9), 1413-1418. <http://bitly.ws/o73z>
- Craig, J., & Johnson, D. (2006). Establishing individual differences related to opportunity alertness and innovation dependent on academic-career training. *Journal of Management Development*, 25(1), 28-39. <https://doi.org/10.1108/02621710610637945>
- Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods*, 1(1), 16. <https://doi.org/10.1037/1082-989X.1.1.16>
- DeNoble, A. F., Jung, D., & Ehrlich, S. B. (1999). *Entrepreneurial self-efficacy: The development of a measure and its relationship to entrepreneurial action*. Babson College. <http://bitly.ws/o745>
- Elfring, T., & Hulsink, W. (2003). Networks in entrepreneurship: The case of high-technology firms. *Small Business Economics*, 21(4), 409-422. <https://doi.org/10.1023/A:1026180418357>
- Gaglio, C. M., & Katz, J. A. (2001). The psychological basis of opportunity identification: Entrepreneurial alertness. *Small Business Economics*, 16(2), 95-111. <https://doi.org/10.1023/A:1011132102464>
- Glederen, M. V., Brand, M., Praag, M. V., Bodewes, W., Poutsma, E., & Gils, A. V. (2008). Explaining entrepreneurial intentions by means of the theory of planned behavior. *Career Development International*, 13(6), 538-559. <https://doi.org/10.1108/13620430810901688>
- Hajizadeh, A., & Zali, M. (2016). Prior knowledge, cognitive characteristics and opportunity recognition. *International Journal of Entrepreneurial Behavior & Research*, 22(1), 63-83. <https://doi.org/10.1108/IJEER-05-2015-0110>
- Hassan, A., Saleem, I., Anwar, I., & Hussain-Samo, A. (2020). Entrepreneurial intention of Indian university students: The role of opportunity recognition and entrepreneurship education. *Education and Training*, 62(7-8), 843-861. <https://doi.org/10.1108/ET-02-2020-0033>

- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. The Guilford Press
- Hayton, J. C., & Cholakova, M. (2012). The role of affect in the creation and intentional pursuit of entrepreneurial ideas. *Entrepreneurship Theory and Practice*, 36(1), 41-68. <https://doi.org/10.1111/j.1540-6520.2011.00458.x>
- Hsiung, T. (2018). Satisfaction with entrepreneurial education and entrepreneurial intention: The moderating role of internal locus of control. *International Journal of Education and Research*, 6(4), 139-146. <https://ijern.com/journal/2018/April-2018/11.pdf>
- Hu, R., Wang, L., Zhang, W., & Bin, P. (2018). Creativity, proactive personality, and entrepreneurial intention: The role of entrepreneurial alertness. *Frontiers in Psychology*, 9, 1-10. <https://doi.org/10.3389/fpsyg.2018.00951>
- Hussain-Samo, A., & Hashim, N. (2015). The impact of entrepreneurial alertness on entrepreneurial intentions. *Journal of International Business Research and Marketing*, 1(6), 7-11. <https://doi.org/10.18775/jibrm.1849-8558.2015.16.3001>
- Kaish, S., & Gilad, B. (1991). Characteristics of opportunities search of entrepreneurs versus executives: Sources, interests, general alertness. *Journal of Business Venturing*, 6(1), 45-61. [https://doi.org/10.1016/0883-9026\(91\)90005-X](https://doi.org/10.1016/0883-9026(91)90005-X)
- Kannadhasan, M., Charan, P., Singh, P., & Sivasankaran, N. (2018). Relationships among social capital, self-efficacy, and new venture creations. *Management Decision*, 56(1), 204-218. <https://doi.org/10.1108/MD-04-2017-0304>
- Karabulut, A. T. (2016). Personality traits on entrepreneurial intention. *Procedia-Social and Behavioral Sciences*, 229, 12-21. <https://doi.org/10.1016/j.sbspro.2016.07.109>
- Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*, 35(1), 60-85. <https://www.jstor.org/stable/2729693>
- Kristiansen, S., & Indarti, N. (2004). Entrepreneurial intention among Indonesian and Norwegian students. *Journal of Enterprising Culture*, 12(1), 55-78. <https://doi.org/10.1142/S021849580400004X>
- Lee, K., Kim, Y., & Koh, D. (2016). Organizational learning, top management team's entrepreneurial alertness, and corporate entrepreneurship in high-tech firms. *Asian Journal of Technology Innovation*, 24(3), 338-360. <https://doi.org/10.1080/19761597.2016.1249381>
- Levenson, H. (1981). Differentiating among internality, powerful others, and chance. In H. M. Lefcourt (Ed.), *Research with the Locus of Control Construct* (pp. 15-63). Academic Press. <https://doi.org/10.1016/B978-0-12-443201-7.50006-3>
- Lii, S. Y., & Wong, S. Y. (2008). The antecedents of overseas adjustment and commitment of expatriates. *The International Journal of Human Resource Management*, 19(2), 296-313. <https://doi.org/10.1080/09585190701799861>
- Liñán, F., & Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 33(3), 593-617. <https://doi.org/10.1111/j.1540-6520.2009.00318.x>
- Liu, W. L., Hu, P., & Xu, K. P. (2011). Proactive personality can promote entrepreneurs produce entrepreneurial intention? - based on opportunity recognition of intermediary effect. *World Sci-Tech R & D*, 33(4), 708-713. <https://doi.org/10.3969/j.issn.1006-6055.2011.04.054>
- Lu, H., & Wang, J. (2018). Entrepreneurial intention of two patterns of planned behaviour and alertness: empirical evidence in China. *The Journal of Asian Finance, Economics, and Business*, 5(2), 63-72. <https://doi.org/10.13106/jafeb.2018.vol5.no2.63>
- Lumpkin, G. T., & Lichtenstein, B. B. (2005). The role of organizational learning in the opportunity-recognition process. *Entrepreneurship Theory and Practice*, 29(4), 451-472. <https://doi.org/10.1111/j.1540-6520.2005.00093.x>
- Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. M. (2006). Psychological capital development: Toward a micro-intervention. *Journal of Organizational Behavior*, 27(3), 387-393. <https://doi.org/10.1002/job.373>
- Mazzarol, T., Volery, T., Doss, N., & Thein, V. (1999). Factors influencing small business start-ups. *International Journal of Entrepreneurial Behavior & Research*, 5(2), 48-63. <https://doi.org/10.1108/13552559910274499>
- McMullen, J. S., & Shepherd, D. A. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of Management Review*, 31, 132-152. <https://doi.org/10.5465/amr.2006.19379628>
- McVee, M. B., Dunsmore, K., & Gavelek, J. R. (2005). Schema theory revisited. *Review of Educational Research*, 75(4), 531-566. <https://doi.org/10.3102/00346543075004531>

- Obschonka, M., Silbereisen, R., & Schmitt-Rodermund, E. (2012). Explaining entrepreneurial Behavior: Dispositional personality traits, growth of personal entrepreneurial Resources, and Business idea generation. *The Career Development Quarterly*, 60, 178-190. <https://doi.org/10.1002/j.2161-0045.2012.00015.x>
- Peng, Z., Lu, G., & Kang, H. (2013). Entrepreneurial intentions and its influencing factors: A survey of the university students in Xi'an China. *Creative Education*, 3(8), 95-100. <https://doi.org/10.4236/ce.2012.38B021>
- Puhakka, V. (2006). Effects of social capital on the opportunity recognition process. *Journal of Enterprising Culture*, 14(2), 105-124. <https://doi.org/10.1142/S0218495806000088>
- Puhakka, V. (2011). Developing a creative-cognitive model of entrepreneurial alertness to business opportunities. *Journal of Management and Strategy*, 2(4), 85-94. <https://doi.org/10.5430/jms.v2n4p85>
- Roberts, E. B. (1991). *Entrepreneurs in high technology: Lessons from MIT and beyond*. Oxford University Press.
- Rodgers, J. L., & Nicewander, W. A. (1988). Thirteen ways to look at the correlation coefficient. *The American Statistician*, 42(1), 59-66. <https://doi.org/10.2307/2685263>
- Shane, S., Locke, E. A., & Collins, C. J. (2003). Entrepreneurial motivation. *Human Resource Management Review*, 13(2), 257-279. [https://doi.org/10.1016/S1053-4822\(03\)00017-2](https://doi.org/10.1016/S1053-4822(03)00017-2)
- Tang, J. (2009). Exploring the Constitution of Entrepreneurial Alertness: The Regulatory Focus View. *Journal of Small Business and Entrepreneurship*, 22(3), 221-238. <https://doi.org/10.1080/08276331.2009.10593452>
- Tang, J., Kacmar, K. M., & Busenitz, L. W. (2012). Entrepreneurial alertness in the pursuit of new opportunities. *Journal of Business Venturing*, 27(1), 77-94. <https://doi.org/10.1016/j.jbusvent.2010.07.001>
- Tentama, F., & Abdussalam, F. (2020). Internal locus of control and entrepreneurial intention: A study on vocational high school students. *Journal of Education and Learning*, 14(1), 97-102. <https://doi.org/10.11591/edulearn.v14i1.13999>
- Wei, X., & Hisrich, R. D. (2016). Error orientation and entrepreneurial decision making in Chinese enterprises: Opportunity identification as mediator. *Social Behavior and Personality: An International Journal*, 44(4), 555-568. <https://doi.org/10.2224/sbp.2016.44.4.555>
- Wei, X., Liu, X., & Sha, J. (2019). How does the entrepreneurship education influence the students' innovation? Testing on the multiple mediation model. *Frontiers in Psychology*, 10(7), 1-10. <https://doi.org/10.3389/fpsyg.2019.01557>
- Wu, S., & Wu, L. (2008). The impact of higher education on entrepreneurial intentions of university students in China. *Journal of Small Business and Enterprise Development*, 15(4), 752-774. <https://doi.org/10.1108/14626000810917843>
- Yan, X., Gu, D., Liang, C., Zhao, S., & Lu, W. (2018). Fostering sustainable entrepreneurs: Evidence from China college students' "Internet Plus" innovation and entrepreneurship competition (CSIPC). *Sustainability*, 10(9), 1-23. <https://doi.org/10.3390/su10093335>
- Yasir, N., Mahmood, N., Jutt, A. A., Babar, M., Irfan, M., Jamil, F., & Liren, A. (2020). How can entrepreneurial self-efficacy, proactivity and creativity enhance sustainable recognition opportunity? The effect of entrepreneurial alertness is to mediate the formation of sustainable entrepreneurial intention. *Revista Argentina de Clínica Psicológica*, 29(5), 1004-1023. <http://bitly.ws/o7Mm>
- Zhao, H., Seibert, S. E., & Lumpkin, G. T. (2010). The relationship of personality to entrepreneurial intentions and performance: A meta-analytic review. *Journal of Management*, 36(2), 381-404. <https://doi.org/10.1177/0149206309335187>