

Psychological cognition and women's entrepreneurship: A country-based comparison using fsQCA



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ABSTRACT

Entrepreneurial activity measures a country's economic vitality. Studies have examined the psychological cognitive conditions that influence women's entrepreneurial activity by considering the effects of individual psychological cognitive conditions in isolation while ignoring their interdependence. Based on the necessary condition analysis and the fuzzy-set qualitative comparative analysis, this study utilized data from the 2021 Global Entrepreneurship Monitor report for 42 countries and explored the complex causal mechanisms driving women's entrepreneurial activity. We observed that (1) a single psychological cognitive factor does not constitute a necessary condition for high female entrepreneurial activity (FEA), despite high entrepreneurial expectation and capability perception (CP); (2) the driving mechanisms for high and low FEA can be categorized into three and four pathways, respectively. There is an asymmetric relationship between the driving paths of high and low FEA. Finally, we propose three measures to support female entrepreneurship: optimizing female psychological cognition, improving female CP, and establishing excellent female entrepreneurial role models.

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Introduction

The steady growth in women's entrepreneurial activities is conducive to improving their social status (Ahmed et al., 2022), reducing unemployment, and improving the overall quality of their social life (Chatterjee et al., 2022). There are substantial differences in the levels of female entrepreneurial activity (FEA) in different countries (Dheer et al., 2019). According to a report from the Global Entrepreneurship Monitor (GEM) report (Global Entrepreneurship Research Association, 2021), of the 42 countries surveyed, only Angola, Indonesia, Kazakhstan, Saudi Arabia, Oman, and Togo had produced more active women entrepreneurs than men. Therefore, activating women's entrepreneurial activity has become an important issue that requires urgent resolution. Materialist dialectics point out that the development of things results from the joint action of internal and external causes. The internal cause is the basis for the development of things that determines the basic trends in such development (Engel-Di Mauro, 2020). Therefore, exploring how psychological cognition activates FEA is of great practical and theoretical value.

The degree of FEA reflects the overall level of development of the female entrepreneurial economy in a particular region (Vidal-Suñé & López-Panisello, 2013). Previous studies are mainly in the context of a single country (Benzing et al., 2009) and rarely examine a transnational environment. We have used the latest GEM report, which conducted a cross-country analysis of female entrepreneurship across 42 countries from the perspective of psychological cognition. In addition, some studies have investigated the influence of social norms (Meek et al., 2010), government policies, human and financial capital, and other macro-environmental aspects on female entrepreneurship (Thébaud, 2015; Yousafzai et al., 2015). However, these approaches have ignored key micro-level impacts (Datta & Gailey, 2012). For example, entrepreneurial expectation (EE) and capability perception (CP) are crucial for FEA (Bayon et al., 2015). A high CP and strong EE will engage female entrepreneurs in entrepreneurial activities (Bayon et al., 2015; Gaies et al., 2022). However, few studies have focused on the combined effects of multiple psycho-cognitive conditions. Entrepreneurial activity is a complex phenomenon affected by various cognitive conditions that may be subject to multiple equally effective approaches (Prasastyoga et al., 2021). Different combinations may lead to similar results (Meyer et al., 1993). Furthermore, understanding the psychological cognition supporting women's entrepreneurial activities provides us with a richer perspective on

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how to promote women's entrepreneurial activities (López-Cabarcos et al., 2016).

Psychological cognition entails the processes of attention perception, representation, memory, creative problem-solving, speech, and thinking, among other things (Deng & Rui, 2010). Deng and Rui (2010) divided psychological cognition into several dimensions, namely intention, expectation, motivation, and purpose. In recent years, considerable emphasis has been placed on investigating female entrepreneurship from the perspective of psychological cognition (Ribes-Giner et al., 2018). One example entails research on the relationship between female entrepreneurship motivation and innovation performance based on the social patchwork theory (Domenico et al., 2010). Moreover, the influence mechanism of entrepreneurial motivation (EM) and efficacy, based on self-determination and goal-setting theories (Prasastyoga et al., 2021), has been explored. Using the grounded theory (Chandra & Paras, 2021), the influencing factors and mechanisms of the transformation from entrepreneurial intention to behavior have also been evaluated. However, the grounded theory explores the separate influences of different factors on female entrepreneurship.

Considering these psychological cognitive dimensions, this study explores the theoretical mechanism of high FEA using the fuzzy-set qualitative comparative analysis (fsQCA). It examines the synergistic effect of various elements of psychological cognition on FEA, mainly from the perspective of psychological cognition, to promote high-level female entrepreneurial activities. This study uses the fsQCA to explore the complex causal mechanisms that activate FEA based on the configuration perspective. It integrates the micro-cognition level of CP, opportunity perception (OP), fear of failure (FoF), EE, and EM to answer the following questions: How can we increase women's entrepreneurial activity? What are the most effective means of activating entrepreneurship? Which pathways lead to reduced entrepreneurial activity among women?

The remainder of the paper is organized as follows: First, we review the relevant literature on psychological cognitive conditions that impact FEA. We argue that the interdependence of psychological cognitive conditions influences FEA, and further study is required to determine how combinations of psychological cognitive conditions influence FEA. Next, we employ the fsQCA to explore possible configurations of high FEA. Finally, we conclude by discussing theoretical and practical implications and draw on the study limitations to identify future research opportunities.

Theoretical framework and the configuration model

Psychological cognition

Psychological cognition is a cognitive process that includes attention, perception, representation, memory, creativity, problem-solving, speech, and thinking (Hunt & Ellis, 1999). Cognitive research gives us a variety of mechanisms, both theory-driven and experience-based, to establish a deeper and richer understanding of how to learn and find opportunities (Ephrem et al., 2021). Cognitive phenomena are important in the process (Krueger et al., 2000). Women's entrepreneurial activities may require the physical infrastructure of required resources, but we ignore the cognitive infrastructure, which helps us perceive (and learn to perceive) personally credible opportunities (Chatterjee et al., 2022). Understanding the cognitive infrastructure supporting women's entrepreneurial activities gives us a richer perspective on identifying ways to promote such activities (Baron, 2000). A cognitive perspective offers the possibility of useful new concept tools for entrepreneurship and assists in developing effective interventions to help women entrepreneurs in practice (Gorgievski & Stephan, 2016).

Capability perception

Capability perception (CP) is the ability to complete a task, confidence in leadership, or the perception of task success (Townsend et al., 2010). CP has a significant positive impact on female start-up activities (Bayon et al., 2015). Moreover, despite some similarities, self-efficacy differs from the perception of capability (Alvarez et al., 2013), which indicates two distinct competency beliefs: the confidence related to specific tasks—such as the ability to perform various tasks (Bird, 1988) and complete them—and the confidence of leadership or perception of task success (Alvarez & Busenitz, 2001). Townsend et al. (2010) have shown that task-related perceptions, such as CP, can exist independent of goals and has a necessary impact on female first-year students' entrepreneurial activities. Therefore, we hypothesize that:

Proposition 1. CP has an impact on women's entrepreneurial activity.

Opportunity perception

Timmons et al. (2004) proposed a novel entrepreneurial management model. They believed that the key to entrepreneurial behavior is looking for entrepreneurial opportunities. The “core” of entrepreneurship is to seek opportunities and take action. Therefore, to understand entrepreneurship, we must understand how to find and seek opportunities (Katz, 1992).

Opportunity perception (OP) refers to the ability of entrepreneurs to perceive entrepreneurial opportunities (Kusa et al., 2021). The perception process can track potential opportunities and transform them into appropriate profitable decisions (Lumpkin & Lichtenstein, 2005), which is a key element in the entrepreneurial process. Potential opportunities can be tracked through the perceived decision-making process and transformed into appropriate or profitable decisions (Teece, 1998). Cognitive research allows us to explore how this view helps us understand the emergence of opportunities because they need to be perceived after being identified (Krueger & Brazeal, 1994). Krueger and Brazeal (1994) propose that both OP and entrepreneurial intention are part of the cognitive state of potential entrepreneurs. They perceive entrepreneurial opportunities and make entrepreneurial decisions (Hsu et al., 2019). Entrepreneurial intention is the decisive factor that transforms entrepreneurial OP into conscious behavior (Charfeddine & Zaouali, 2022). Therefore, the perception of entrepreneurial opportunity directly affects the entrepreneurial intention and degree of success (Walker et al., 2013). The stronger the perception of entrepreneurial opportunity, the more significant the promotion of entrepreneurial intention (Noguera et al., 2013). The higher the expected entrepreneurial success rate (Wu et al., 2019), the greater the possibility of behavior induction (Krueger et al., 2000). Therefore, we hypothesize that:

Proposition 2. OP has an impact on women's entrepreneurial activity.

Fear of failure

Fear of failure (FoF) is a product of the motivation to “seeking benefits and avoiding harms” (Cacciotti et al., 2020). Studies have analyzed the nature of the FoF from the perspective of achievement motivation (Bélanger et al., 2013), emotional event, and emotional cognitive evaluation theories. Most entrepreneurs experience the FoF, which is an important part of the entrepreneurial process (Cacciotti & Hayton, 2015). When emotional events threatening personal ability and achievement emerge, female entrepreneurs' beliefs in the adverse consequences of failure are stimulated (Thébaud, 2015). The fear is focused on the threat stimulation in the external environment, the potential consequences of failure, and their own negative state,

which induces an emotional response (Stroe et al., 2020). Many empirical studies have found that the FoF inhibits entrepreneurial intention (Hessels et al., 2011), is detrimental to entrepreneurial entry, and hinders new entrepreneurial activities (Morgan & Sisak, 2016), and reduces the evaluation and utilization of entrepreneurial opportunities. Fear is not conducive to female entrepreneurs' pursuit of opportunistic entrepreneurship (Steininger, 2022). It delays the process of entrepreneurial action (Cacciotti et al., 2016), affecting the choice to start a business after failure. Therefore, we hypothesize that:

Proposition 3. FoF has an impact on women's entrepreneurial activity.

Entrepreneurial expectation

Behavioral science theory holds that behavior is related to expectations (Krueger & Brazeal, 1994). The proposed expectation theory is called the "valence-means-expectation theory" (Rahi et al., 2021). Rahi et al. (2021) believe that the concept of expectation refers to the fact that the psychological activity of a person (which is based on previous ability and experience) can achieve a goal within a certain period. Entrepreneurial expectation (EE) is related to the behavioral goals of entrepreneurship, which is an important cognitive activity of new entrepreneurs (Lawler & Suttle, 1973). Therefore, it is important to understand the process of establishing new enterprises and their performance (Baum et al., 2001).

EE can influence the vision and strategy of new entrepreneurs and guide their behavior (Gaies et al., 2022). It can stimulate entrepreneurs' creativity, drive them to identify and develop entrepreneurial opportunities, help them improve the efficiency of acquiring and allocating entrepreneurial resources (Kautonen et al., 2015), and motivate them to develop new prospective products and markets. The Global Entrepreneurship Research Association (2021) noted that EEs reflect the intrinsic nature and characteristics of entrepreneurial activities. Thus we hypothesize that:

Proposition 4. EE has an impact on women's entrepreneurial activity.

Entrepreneurial motivation

Instinct (motivation) drives behavior, whose goals are survival, success, and avoidance of failure (Carsrud & Brännback, 2011). Entrepreneurship is an action-oriented phenomenon (Ephrem et al., 2021; Piñeiro-Chousa et al., 2020), and entrepreneurial motivation (EM) is the key factor for individuals to participate in the entrepreneurial process (Piñeiro-Chousa et al., 2019). EM is a goal that entrepreneurs try to achieve by establishing an enterprise (D'andria et al., 2018; Eijdenberg & Masurel, 2013).

Studies have confirmed the close correlation between EM and behavior (Larsson & Thulin, 2019). The strength of motivation directly determines the willingness, behavior, ability, and effort of entrepreneurs in entrepreneurial activities, thereby indirectly affecting the entrepreneurial process and performance (Benzing, Chu, & Kara, 2009). Most studies reveal that EM can affect entrepreneurial behavior and decision-making (Piñeiro-Chousa et al., 2016), entrepreneurial management mode, and enterprise performance (Naffziger et al., 1994) after starting a business. The heterogeneity of male and female EM determines whether they produce entrepreneurial behavior and achieve success (Lawler & Suttle, 1973). EM is a prerequisite for women to implement entrepreneurial behavior and achieve success (Ahmed et al., 2022). Therefore, we hypothesize that:

Proposition 5. EM has an impact on women's entrepreneurial activity.

Psychological cognition and female entrepreneurial activity from the perspective of configuration

Research on the net effect of various elements of psychological cognitive theories on women's entrepreneurial activity has provided a basis for understanding the relationship between multiple psychological cognitive elements and women's entrepreneurship (Chatterjee et al., 2022). In such studies, the linear relationship between psychological cognitive elements and women's entrepreneurship has been uncertain, and it is difficult to answer the configuration effects of multiple elements to explore a clear, necessary, and sufficient causal relationship (Douglas et al., 2020) and gain insight on the complex causal relationship among multiple psychological cognitive elements on women's entrepreneurship. There is a symbiotic and competitive relationship among the elements. Entrepreneurial activities are affected when the elements are linked and matched, and the entrepreneurial psychological cognition changes (Lim et al., 2010).

The configuration perspective explains how the elements interact (Meyer et al., 1993). This perspective holds that organizations are clusters of interrelated structures and practices rather than cells or loosely combined entities (Fiss, 2011). Organizations cannot be comprehended through the analysis of their isolated components, which is consistent with our perspective of psychological cognition. Therefore, the configuration perspective is highly suitable for exploring the causal complexity of nonlinearity, equivalence, and asymmetry between psychological cognition and women's entrepreneurial activity. Psychological cognition affects women's entrepreneurship by affecting their CP (Bayon et al., 2015) and EEs (Ephrem et al., 2021). Psychological cognition enhances women's resources and entrepreneurial ability by optimizing women's policies and market environment (Grégoire et al., 2011). The EEs create a social atmosphere supporting entrepreneurship, establish female role models, and improve women's EEs.

The question of how the elements of psychological cognition affect women's entrepreneurship remains unanswered. Based on the configuration perspective, this study focuses on the complex causal mechanism of psychological cognition affecting women's high entrepreneurial activity. Fig. 1 presents the theoretical model.

Methodology

Necessary condition and qualitative comparative analyses hybrid methods

Necessary and sufficient causality are the two new explanations of causality. Necessary conditional causality means that the result will not occur when an antecedent does not exist; sufficient condition causality means that antecedents (combinations) fully produce results (Dul, 2016; Ragin, 2008). To better analyze the necessary and sufficient causality of this study, we adopt a new method of necessary

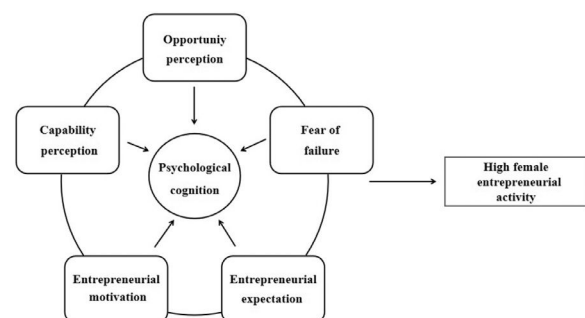


Fig. 1. Theoretical model.

condition analysis (NCA) and supplementary qualitative comparative analysis (QCA) that highlights the advantages of sufficient analysis.

First, we use NCA to test whether specific psychological cognitive factors are the necessary conditions for entrepreneurial activity. Second, we use the fsQCA method to explore the complex causal mechanism activating women's entrepreneurial behavior (Ragin, 2008). The fsQCA method adopts an overall perspective to conduct cross-case comparative analysis (Ragin, 2006) and is committed to exploring which configuration of conditional elements causes the emergence of expected results and which causes causal complexity problems such as the lack or absence of expected results (Douglas et al., 2020). The combination of various elements of psychological cognition forms different cognitive configurations, and the complex influence mechanism on women's entrepreneurial activity belongs to this kind of problem, so it is particularly suitable to use the fsQCA method for research.

Data and measurement

GEM was a joint research project between Babson College (USA) and the London Business School (UK) initiated in 1999. It is a network alliance comprising national teams combined with top academic institutions and is the only research agency worldwide to collect entrepreneurship data directly from individual entrepreneurs. GEM data are abundant and reliable. The Global Entrepreneurship Research Association (2021) provides complete indicators of female entrepreneurship in 42 countries. The data of countries with entrepreneurial activity and female entrepreneurship were matched, and all data from the relevant countries were retained.

The indicators that conveyed responses from relevant respondents aged between 18 and 64 years are explained. First, *FEA* refers to the percentage of women engaged in entrepreneurial activities in a country and is measured as a percentage of new women entrepreneurs or managers of new businesses. Second, *CP* represents individuals' confidence in the skills and knowledge required for starting a business (Townsend et al., 2010) and is measured as a percentage of people who think they have the skills and knowledge needed to start a business. Third, *OP* refers to the ability to perceive entrepreneurial opportunities (Kusa et al., 2021) by measuring the percentage of respondents who believe that entrepreneurial opportunities exist in the area in which they live. Fourth, *FoF* is the fear of failing as an entrepreneur (Bélanger et al., 2013). It is measured as the proportion of people who stated they found good opportunities but were reluctant to start a business because of the FoF. Finally, *EE* is the expectation of new entrepreneurs' entrepreneurial behavior (Baum et al., 2001). It is measured as the percentage of female entrepreneurs aged between 18 and 64 years who expect to employ six or more people in 5 years.

EM is the intrinsic driving instinct of entrepreneurship among individuals (Carsrud & Brännback, 2011). The 2021 GEM data survey measured EM from four perspectives. The mean value of these aspects represents the data. It shows the percentage of female entrepreneurs who decided to start a business because they wanted to "change the world," "create a great fortune or very high income," "continue the family tradition," or "start a business because they could not find work."

Data calibration

Calibration is the process of assigning a case to a set membership (Piñeiro-Chousa et al., 2019). Before calibrating the data, three registration points must be set: the fully in, crossover, and fully out points (Fiss, 2011). The set membership degree after calibration ranges between 0 and 1. In this study, 25%, 50%, and 75% of the sample data distribution were used as three loci (Xie et al., 2021). The calibration

Table 1

Fuzzy-set membership calibrations and sample descriptive statistics.

Variable	Fuzzy-set calibrations			Measure description			
	Fully in	Crossover	Fully out	Mean	SD	Min	Max
FEA	17.62	9.40	5.07	12.78	10.2	0.9	51.1
CP	65.55	53.05	46.35	55.49	15.75	26.9	92.6
OP	63.15	45.7	36.45	48.88	19.96	13.1	88.5
FoF	57.67	52.7	46.95	53.62	10.72	33.4	82.7
EE	39.37	25.15	16.05	32.29	31.55	0	200.6
EM	55.20	50.11	37.46	49.53	12.15	26.05	78.3

anchors and descriptive statistics for each variable are listed in Table 1.

Results

Necessity analysis

NCA not only identifies whether a specific condition is necessary for a certain result but also analyzes the effect size of the necessary condition. In NCA, the effect size is referred to as the bottleneck level, representing the lowest level of necessary conditions to produce a specific result. The value of effect size is between 0 and 1. The greater the value, the greater the effect, while less than 0.1 means that the effect quantity is too small (Dul, 2016). The NCA method can deal with continuous variables and discrete variables.

Table 2 shows the results of the NCA analysis, including the effect size obtained by two different estimation methods: ceiling region and ceiling envelope. In the NCA method, the necessary conditions required to meet two conditions are as follows: the effect size (*d*) is not less than 0.1 (Dul, 2016), and Monte Carlo simulations of permutation tests show that the effect size is significant (Dul et al., 2020). Overall, the effect size (*d*) of CP and OP is not less than 0.1, and the *P*-value is significant, which can be considered a necessary condition for women's entrepreneurial activity. However, the effect sizes of FoF, EE, and EM are too small, and the test results are not significant, which shows that they are not necessary conditions for entrepreneurial activity.

This study further uses the fsQCA method to test the necessary conditions. Table 3 shows that the consistency of the necessity of a single condition is generally less than 0.9, which does not constitute a necessary condition for the research results. However, the configuration results depict that CP and EE are the core conditions of FEA, indicating that this result is some similarity between this result and the NCA result.

Sufficiency analysis

We used conditional combination analysis to evaluate whether combinations of different antecedent variables had strong

Table 2

Necessary condition analysis (NCA) result tables.

Variable	Method	Accuracy	Ceiling zone	Scope	Effect size (<i>d</i>)	<i>P</i> -value
CP	CR	95.2%	0.159	1	0.159	0.000
	CE	100%	0.154	1	0.154	0.000
OP	CR	92.9%	0.110	1	0.110	0.000
	CE	100%	0.130	1	0.130	0.000
FoF	CR	90.5%	0.034	1	0.034	0.009
	CE	100%	0.014	1	0.014	0.025
EE	CR	95.2%	0.015	1	0.015	0.029
	CE	100%	0.023	1	0.023	0.005
EM	CR	86%	0.011	1	0.011	0.023
	CE	100%	0.060	1	0.060	0.009

Note: $0.0 \leq d < 0.1$: low level; $0.1 \leq d$: high level; CR: ceiling region; CE: ceiling envelope.

Table 3
Necessity test for a single condition.

Conditional variable	High female entrepreneurial activity		Non-high female entrepreneurial activity	
	Consistency	Coverage	Consistency	Coverage
CP	0.765	0.782	0.291	0.309
~ CP	0.324	0.305	0.794	0.778
OP	0.674	0.663	0.409	0.418
~OP	0.408	0.399	0.670	0.681
FoF	0.608	0.591	0.480	0.485
~ FoF	0.470	0.465	0.594	0.612
EE	0.710	0.707	0.368	0.381
~ EE	0.378	0.366	0.716	0.719
EM	0.726	0.736	0.366	0.385
~ EM	0.394	0.374	0.749	0.739

Note: The symbol ~ denotes the absence of the condition.

explanatory power in terms of result variables. Five conditional variables were imported into the fsQCA3.0 software for calculations. The study adopted Ragin's (2008) model. The consistency and case frequency thresholds were set at 0.75 and 1, respectively. In the truth table, values greater than 0.7 were assigned a value of 1, representing a high level of this factor. Values below 0.7 were assigned a value of 0, representing a low level of this factor according to the software settings. Finally, three and four paths with high and low FEA, respectively, were retained.

Driving mechanism of high female entrepreneurial activity

The fuzzy-set analysis indicated three configurations (H1, H2, and H3) that produce high FEA (Table 4), and the consistency indicators of these configurations were 0.984, 0.990, and 0.992, respectively. All three configurations represented sufficient conditions for high FEA. The consistency index of the solutions was 0.982, which indicated that the three configurations covering most cases were sufficient for high FEA. The coverage of the model solution was 0.448, indicating that the three configurations explained approximately 50% of high FEA.

CP-EE-oriented

Configuration H1 indicated that when female potential entrepreneurial groups with high CP have strong OP and EE and are not afraid of entrepreneurial failure, they will engage in entrepreneurial activities regardless of whether they have good EM. Potential female entrepreneurs have a strong CP and believe they can start a business (Bayon et al., 2015), and their EEs increase (Teece, 1998), thus stimulating their entrepreneurial activities.

CP-EE-EM-oriented

Configuration H2 indicated that when the potential female entrepreneurial groups with high EM have strong CP and EE and are not afraid of entrepreneurial failure, they will participate in entrepreneurial activities regardless of whether their OP is excellent (Harmeling & Sarasvathy, 2013).

CP-OP-EE-EM-oriented

Configuration H3 indicated that when potential female entrepreneurial groups with high EM have high CP and OP, their EEs increase (Teece, 1998), and they will devote themselves to entrepreneurial activities regardless of whether the FoF is high (Miao et al., 2022).

Driving mechanism for low female entrepreneurial activity

According to the fuzzy-set analysis, four configurations (H4, H5, H6, and H7) produced low FEA (as shown in Table 4). The consistency index of the four configurations was found to be 0.922, 0.963, 0.920, and 0.915, respectively. The consistency index of the solution was 0.919, and the coverage of the model solution was 0.668, indicating that the four configurations explained approximately 70% of the reasons for low FEA.

Configuration H4 indicated that irrespective of whether OP is superior and the FoF is high, the lack of CP, EE, and EM will not produce high entrepreneurial activity among women. Configuration H5 indicated that irrespective of whether the EE is superior, the lack of CP, OP, and EEs will not produce high entrepreneurial activity among women even if the women are not afraid of entrepreneurial failure. Configuration H6 indicated that irrespective of whether the EE is

Table 4
Configuration of female with high entrepreneurial activity Configuration of female with low entrepreneurial activity.

Conditional variable	Configuration of female with high entrepreneurial activity			Configuration of female with low entrepreneurial activity			
	H1	H2	H3	H4	H5	H6	H7
CP	●	●	●	⊗	⊗	⊗	
OP	●		●		⊗	●	⊗
FoF	⊗	⊗			⊗	●	●
EE	●	●	●	⊗			⊗
EM		●	●	⊗	⊗	⊗	●
Consistency	0.984	0.990	0.992	0.922	0.963	0.920	0.915
Raw Coverage	0.211	0.243	0.380	0.495	0.419	0.188	0.075
Unique Coverage	0.017	0.049	0.186	0.053	0.073	0.086	0.01
Overall Consistency		0.982				0.919	
Overall Coverage		0.448				0.668	

Note: The full black and crossed open circles denote the presence and absence of conditions, respectively. The large and small circles denote core and peripheral conditions, respectively. The blank spaces denote conditions that are irrelevant to the outcome.

superior, the lack of CP and EM and fear of entrepreneurial failure do not produce high entrepreneurial activity even if their OP is superior. Configuration H7 indicated that irrespective of whether CP is superior, the lack of OP and EE and fear of entrepreneurial failure will not produce high entrepreneurial activity among women even if they have strong EM.

Table 4 shows that the three high FEA configurations contained high CP and EE. This indicated that CP and EE have a more widespread impact on female entrepreneurship.

Sensitivity analysis

We changed the calibration point of the data to the upper quartile, lower quartile, and mean of the upper and lower quartiles. Through the robustness test of the configuration that produces women's high entrepreneurial activity, we observed a clear subset relationship between the configurations of the new and original models (Fiss, 2011). To test the robustness of the conclusion, we increased the proportional reduction in consistency (PRI) threshold to 0.85 and tested the robustness of the configuration that produces women's high entrepreneurial activity. The configuration of the new model was completely consistent with the original one (Kraus et al., 2018), indicating that the conclusions were relatively robust.

Discussion

The results help identify the synergistic effect of psychological cognitive factors influencing female entrepreneurship. Prior studies mainly consider the net effect of a single psychological cognition factor on FEA (Bayon et al., 2015), neglecting the configurational effect of multiple psychological cognitive factors. To fill this gap, we develop a psychological cognitive framework composed of CP, OP, FoF, EE, and EM as interdependent configurations. We use this framework to explore how combinations of multiple psychological cognition shape FEA. The data analysis results supported the stance that CP, OP, FoF, EE, and EM impact women's entrepreneurial activity. The significant results found between psychological cognition and FEA support the results found in past studies (Chatterjee et al., 2022; Lim et al., 2010; Xie et al., 2021). The results also indicate that high CP and EE play a more widespread role and affect other entrepreneurial conditions (Bayon et al., 2015; Gaies et al., 2022). This proves the powerful effect that CP and EE have on women's entrepreneurial activities.

Theoretical implications

First, this study examined the driving mechanism for women's entrepreneurship based on five key condition variables at the level of micro-psychological cognition. It enriches the findings of entrepreneurship process theory at the level of micro-psychological cognition of entrepreneurship. The findings reveal seven pathways that influence women's entrepreneurship. They identify more efficient entrepreneurial driving pathways that can help uncover the "black box" of psychological cognitive factors influencing women's entrepreneurial activities.

Second, this study proposes a comprehensive framework for analyzing women's entrepreneurial activities based on psychological cognition. Unlike previous studies that mainly focused on the theoretical model of the entrepreneurial process based on the background of women's entrepreneurship, it explores multiple factors that influence women's entrepreneurial activity and enhances extant theoretical understanding. Furthermore, it provides a reference for subsequent research and relevant policies.

Third, we used the fsQCA method to determine the causal asymmetry in the driving mechanisms of women's entrepreneurship. The findings show that the fsQCA method breaks through the uniform

symmetry assumption of causal effect in linear regression and can provide a more detailed explanation of the occurrence of a certain result. It can better explain the difference between female entrepreneurial activities and the configuration effect of inter-condition dependence.

Managerial implications

First, optimizing women's psychological cognition according to different national backgrounds is necessary to stimulate women's entrepreneurial activities. Similar to the comprehensive framework of female psychological cognition proposed in this study, different countries have different paths to high entrepreneurial activity. Moreover, low FEA can be divided into four paths. Therefore, strengthening female psychological cognition needs to adjust measures to local conditions.

Second, perceptions of women's capability should be improved, further stimulating the vitality of women's entrepreneurship. The CP is the core element of female entrepreneurship. It largely determines the problems of "whether they want to start a business" and "whether they can start a business." It indicates that we should support women's subjective entrepreneurship initiatives by strengthening their perception of courage to discover, create, and use entrepreneurial opportunities and stimulating their entrepreneurial will, thus reinforcing their belief in succeeding in entrepreneurship.

Third, excellent female entrepreneurial role models should be promoted to improve women's EE. Krumboltz et al. (1976) define a role model as a person who sets an example and encourages others to make certain career path choices or pursue certain goals. Therefore, role models are important for guiding an individual's career path or motivating entrepreneurial intention and entrepreneurial behavior.

Limitations and directions for future research

This study has achieved its objectives successfully. However, this study has two limitations that need to be highlighted. First, it focuses on the factors that affect women's entrepreneurial activity through psychological cognition but does not consider the influence of macro-level factors such as the market environment, social norms, and infrastructure. Second, the number of antecedent conditions proposed by the study is inadequate owing to the limitations of case details and the number of observed cases. Future research should focus on exploring the factors that influence female entrepreneurship at the macro level. Special attention is required to determine whether there is a synergy between the macro and micro perspectives.

Conclusion

This study explored the complex causal mechanism of psychological cognition driving FEA. First, a single psychological cognitive factor does not constitute a necessary condition for high FEA. This supported the finding that CP, OP, EE, and EM are correlated with female entrepreneurship. High CP and EE play a generic role and affect other entrepreneurial conditions. This proves the powerful effect that CP and EE have on women's entrepreneurial activities. Second, there are three high and four low driving paths for FEA: (1) The driving mechanism for high FEA can be divided into three paths. (2) Among the three pathways leading to high FEA, the CP-OP-EE-EM pathway is more likely to activate female entrepreneurship effectively. CP and EE are more likely to affect FEA, thus strongly affecting economic activities. (3) The driving mechanism for low FEA can be divided into four paths, and there is an asymmetric relationship between them and the driving mechanism of high FEA. (Proposition 1-5)

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