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Decide to Take Entrepreneurial Action: Role of Entrepreneurial Cognitive Schema on Cognitive Process of Exploiting Entrepreneurial Opportunity

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Abstract: Given its impact on preference for different information, the cognitive schema is recognized as a critical mechanism for people to make up their minds on willingness to act. However, how entrepreneurial cognitive schema influences cognitive processes remains unclear. Based on entrepreneurial action theory and information processing theory, we delineate the relationship between entrepreneurial cognitive schema and decision of entrepreneurial action by decomposing the cognitive process of comprehending external information related to entrepreneurial opportunity. We randomized 123 participants into different priming groups and collected their decision policies with a conjoint analysis experiment. Firstly, we found the individuated cognitive process, since the positive effect of founding rates is strengthened, and dissolution rates are reduced by positive knowledge-relatedness. Further, we partly validated the moderating role of entrepreneurial cognitive schema, with a more positive relationship between founding rates and willingness to act, and between knowledge-relatedness and willingness to act when participants are primed with this future-focused schema. This paper proves one critical cognitive unit while making a decision to act on entrepreneurial opportunity and indicated an active role of entrepreneurial cognitive schema in enabling people to emphasize and make better use of relevant information.

Keywords: entrepreneurial action decision; entrepreneurial cognitive schema; future orientation; entrepreneurial opportunity

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1. Introduction

Entrepreneurship is theoretically an activity-based behavior based on evaluation and judgment about the potential opportunity [1–4]. Previous researches have reached a consensus that the judgment and subsequent action on entrepreneurial opportunity are the fruit of general [3] but individuated [5,6] cognitive processes since even similar conditions which preside over the opportunity would invoke different personal evaluations on the credibility of such opportunity [7], and finally drive potentials into entrepreneurship reality [3]. Therefore, it is important to explore the building process of first-person action intention which is built up from opportunities, which is the core of the entrepreneurial decision. Many explicit characteristics of entrepreneurs, such as emotion [8] or experience [9], have been viewed as key factors in individuated choice in entrepreneurs [10]. The cognitive part has been emphasized [9,11] but somehow still been investigated more explicitly and in post-hoc ways [6,12]. The process of transferring objective opportunity to subjective [3]—which lies in the unit of the cognitive system [13] and forming the subjective processing [14]—still captures limited attention.

Cognitive factors which are dominant while processing information, especially during the entrepreneurial information process [15], have only been paid attention to through a few perspectives. For instance, experienced knowledge structure [16] and flexible cognitive ability [17] are important in the regulation of information preference and filtering. Moreover,

the intuitive cognitive shortcut does exist during the decision process collective ways [18]. Nevertheless, the underlying mechanism which leads different people to employ different strategies in deciding on entrepreneurial action still lacks exploration from a synthetic perspective, since people always make a general decision based on a series of evaluations unconsciously [19]. The underlying mechanism which is cultivated or educated would intuitively dominate the decision process [20].

Cognitive schema, which is proposed as an individual and existing way of assuming how the world is organized [21], is a primary mechanism of information processing with the synthesis of physical structure [14] and various experiences [22]. It is also an inner-stable but environmentally interactive module that dominates the cognitive process [23], especially when making a decision on entrepreneurial action [24,25]. Cognitive schema derives from individuated knowledge structure [23] but its specific mode of representation would be induced by environmental interaction [22]. It exerts a significant impact on how people perceive and incorporate external information since personally, cognitive schema regulates the process of evaluation and form of willingness with various emphasis on different phases of the information process [15]. It is convinced that entrepreneurs attend to specific information channels and intuitively focus on interesting parts to decide whether it is a valuable opportunity [26]. The integrated cognitive structure, cognitive schema, is a key factor to filter and emphasize different information and enables people to have a positive preference for entrepreneurship opportunities [13]. Especially under the condition of entrepreneurial action with environmental interaction, the entrepreneurial cognitive schema would help to amplify the effect of certain indicators from information [27] so as to distinguish potential or active entrepreneurs [15] even under same circumstance.

In the present study, we employ cognitive schema as the critical processing unit while making a decision on entrepreneurial action since it is the accumulated and underlying mechanism during the cognitive process according to specific circumstances [28]. With an experiment on two distinct groups, we would confirm specific schema does impact the decision on entrepreneurial action by priming unexperienced participants [29] in order to focus on the effect of our presupposed entrepreneurial cognitive schema. We would explore the preference for future-oriented information, which is the most prominent feature of entrepreneurial cognitive schema [7], which would regulate the relationship between objective feature of environment and subjective opportunity belief, since it influences the process of decisive information. In summary, we would synthesize these convincible hypotheses to prove the presence and key effect of entrepreneurial cognitive schema during forming opportunity belief and making a decision on taking action.

With the present study, we explore the link between perceiving external attributes and making a decision on the action from a cognitive perspective. In that way, we make some innovations and contributions. Theoretically, we describe the cognitive unit which amplifies or filters external information in order to enrich the conceptualization of the processing system between opportunity and action. Empirically, we depict one typical portrayal of entrepreneurs who would utilize external information more positively to promote their actions and provide a traceable difference in the decision of opportunity based on personal disposition. Even though the concept of opportunity-belief or opportunity-action process has been developed theoretically [3], previous works which investigated some individual-level factors of decision alongside the circumstance focused more on experience-based [6] or emotion-based factors [7,30]. Our study provides a critical cognitive unit of individuation that contributes to the personal decision system and tries to explain some counterintuitive but subjective nature of potential entrepreneurial action takers. The effect is an improved understanding of how individual-level cognitive mode determines whether or not entrepreneurial action occurs while encountering seemingly the same circumstance.

This article consists of six parts. The introduction part introduces the background and necessity of studying the action of entrepreneurship from the perspective of cognitive schema. Following the introduction part, we review previous work on entrepreneurial action and cognitive schema and put forward core hypotheses about the cognitive process

of perceiving attributes and the impact of cognitive schema. In the methodology part, we describe the design of the experiment including sampling, measures of conjoint analysis, and implementation procedure. We describe the analysis of data in the results part and explain the indication of data in the discussion part. In the end, we conclude the main findings and inspiration in our study.

2. Literature Review and Hypotheses

This section comprises a review of the theoretical background and relevant empirical studies in order to develop the conceptual framework, discuss the relationships, and formulate the hypotheses as provided below.

2.1. Entrepreneurial Action and Decision

Entrepreneurial action is a consequence of entrepreneurs who seek out some new market or means to meet the need [3] and is operated under uncertainty which is reduced by entrepreneurs' future-focused vision [30]. It is central to the entrepreneurship life-cycle, therefore, the entrepreneurial action theory talks a lot about how a decision to take action toward entrepreneurial endeavors [3,31]. The opportunity represents potential and uncertain values to entrepreneurs while they encounter both needs and resources [32] and should be comprehended as an individually valuable opportunity, which could be further interpreted as intention or willingness to take action [11,33]. Once they have confidence in that survival and profit will result from taking action, the positive tendency to start a new venture on an opportunity idea could form [34]. This decision is the key factor before entrepreneurs take practical action [35]. In this way, the willingness to take entrepreneurial action is the integrated fruit of 'future-focused visions' [3].

2.2. Willingness to Entrepreneurial Action

Entrepreneurial action is defined as an independent behavior in response to evaluation and judgment about a possible opportunity [3] since it is actually an outcome of a series of decisions and activities [36] on the basis of personal information processing and evaluation about profitable opportunities [37]. In detail, the action of exploiting opportunity should be viewed as a positively synthetical choice of the entrepreneur's individuated judgment about the information [6] and distinctly formed opportunity evaluation which could be mentally presented as opportunity belief [3] and will result in practical exploitation or not [34] with its synthetical evaluation about both intrinsic and interactive value under certain environment. Moreover, the willingness is somehow represented as explicit preference when one interacts with the external world, such as in any post on social media [11]. The willingness is more closely connected to entrepreneurial action than simply alertness to opportunity since it is derived from positive prediction and strong belief about success.

2.2.1. Formation of Willingness

We have known that willingness has an impact on practical action, but we still lack knowledge about the underlying mechanism of how cognition influences the formation of willingness after taking a profitable opportunity. Based on reviewing previous work, we have accumulated a good understanding of cognition does take part in processing opportunities, specifically participating in the process of identifying [38,39], evaluating [40], and even acting [1,3]. The process will result in different judgments since it is either guided by external information or regulated by personalized cognitive mechanisms [41]. The judgmental decision which contributes towards the extent of opportunity belief consists of a comprehensive understanding of bottom-up and top-down processes.

Specifically, the form and features presented by external information will impact bottom-up access to cognition [3,40]. Moreover, Wood et al. verified that personalized cognitive resources would impact on top-down cognitive process and shape opportunity beliefs differently [6]. The entrepreneurs would employ opportunities differently under different circumstances since they are socially interactive [33]. Therefore, the interactive

process has been recognized by recent studies, and the external information which is accessible to potential entrepreneurs has been viewed as one of the most effective sources of forming belief [26].

Especially the information related to the condition of the current industry in which the opportunity resides would impact significantly on a form of opportunity belief [6,41] since the current state notably influences the possibility of successful exploitation of opportunity. For instance, Shane has asserted that the willingness and ability to exploit entrepreneurial opportunities are significantly influenced [42]. Cognitive mechanism plays an important role during judgment [40] and the belief-forming process [41] which is also an important driving force in realizing opportunity belief to action [43]. Consequently, the relationship between the index of environmental data and entrepreneurs' opportunity beliefs is confirmed.

Therefore, the interactive cognition mechanism interferes with the forming process of the ultimate decision on entrepreneurial action because it impacts precondition.

2.2.2. Cognitive Process of Forming Willingness Based on External Information

Consistent with previous studies, forming opportunity belief is a coherent process in that people perceive external information to form a gist of an environment that eventually matches their existing knowledge [41]. We summarize that the cues of industry dynamics are some of the most evident sources of opportunity belief, especially for entrepreneurs [44] from ecologists. Ecological studies have explored the dynamics which indicate the density of entrepreneurial firms, especially the founding rates, dissolution rates, density levels, and the amount of subsequently founding firms, influenced entrepreneurs' belief of current opportunity and subsequent willingness to result from the decision, since these information significantly indicates viability [45–47]. These three attributes of the industry indicate the current and future state of ventures, such as entry, exit, and potential survival, and may cause a change in entrepreneurial action decisions [48,49].

Relative to other environmental variables, industry rates are more relative to entrepreneurs' evaluation of opportunity and their assumed possibility of survival and success of new firms, since industry rates are indicators of organizational legitimacy and resource allocation which are key factors conveyed from the exogenous information [6]. Positive willingness which precedes entrepreneurial action is formed within a personal cognitive framework, meanwhile, industry rates are prominent information inputs and evaluation indexes [42]. Therefore, industry dynamics, especially population dynamics of newly found firms, would contribute to forming beliefs through entrepreneurs' cognitive system [50].

In detail, we selected some of the indexes of industry rates that would serve as the most prominent indicators of resources availability and competitive intensity for entrepreneurs to incorporate as evaluation standards [6]. Specifically, previous founding rates which indicate the accessible resource of new entry [6], dissolution rates which indicate a great number of competitors and limited resources [48], and density of population which indicates the immediate intensity of competition [51] would significantly influence opportunity beliefs and subsequent willingness to act. For entrepreneurs, positive indicators of resource availability such as a high level of entry rate [52] would encourage entrepreneurs' action willingness since it represents the abundance of required resources and the possibility of success. On contrary, a high level of dissolution rates and density of population demonstrate fierce competition for resources and survival would dampen personal willingness to believe in a positive outcome of building up new firms [51,53] since these data would be interpreted as signals not to take a risk. Therefore, exogenous information integrated by individuated cognitive processing of industry rates would underpin opportunity belief.

H1: *The willingness to act on an entrepreneurial opportunity is influenced by processing external attributes of a context.*

H1a: *The willingness to act on an entrepreneurial opportunity will increase when perceiving increasing industry founding rates.*

H1b: *The willingness to act on an entrepreneurial opportunity will decrease when perceiving increasing industry dissolution rates.*

H1c: *The willingness to act on an entrepreneurial opportunity will decrease when perceiving an increasing industry density level.*

2.2.3. Interaction of Exogeneous Information and Personal Knowledge

Beyond the direct impact of the extent to which the personal knowledge related to willingness to act on entrepreneurial opportunity, there are also a number of studies showing the direct impact of knowledge relatedness exerting on the subjective process of opportunity attributes and individual willingness [6,40]. The more entrepreneurs know about the present opportunity, the more attributes which relate to the objective condition of opportunity would form a deeper impression in entrepreneurs' subjective process of information, since they could use their knowledge to reduce the uncertainty [2,54].

According to the theory of schema, the process of information is an interaction of environmental information which attracts people and their cognitive unit which is initiated [55]. Therefore, entrepreneurs would form different willingness to act even if they encounter similar opportunities under similar conditions [42]. The exogenous information which matches possessed knowledge would be utilized promptly since it fits entrepreneurs' slots to interpret external attributes and relationships [28]. Entrepreneurs choose and comprehend information through certain paradigms with their possessed knowledge and subsequently form their own decision [56]. The following decision of entrepreneurial action is undoubtedly an integrated outcome of subjectively knowledge-based choice [57]. Even though preference and sensitivity towards information are unconscious to entrepreneurs, they would deliberately invoke acquired knowledge to make a reasonable decision when they encounter seemingly novel information. In this manner, the extent to which entrepreneurs' knowledge relative to certain opportunity environments would significantly influence the decision-making process for entrepreneurial action on this opportunity.

H1d: *The relationship between objective opportunity attributes and willingness to act on an entrepreneurial opportunity is relatively influenced by knowledge relatedness.*

2.3. Influence of Cognitive Schema

Personal experience and cognitive structure would influence the individuation of external information related to opportunities [6,17,58]. Nevertheless, the active constituent of cognitive structure which influences the formation of positive decisions still lacks exploration. The experience and cognitive resource would boost individual patterns of information processing and problem-solving [59], and this integral cognitive system is consistent with the process model which Axelrod proposed as cognitive schema [23].

Cognitive schema is one of the most important tools for people to perceive and interpret new information [22,23]. It impacts decisions since it regulates people's ability to recognize and utilize certain information since the activated schema makes this information more accessible and useful [28]. Consequently, the willingness to act formed after the opportunity evaluation would be customized as the cognitive schema varied. Cognitive schema impacts how people select, integrate, organize, and comprehend perceived information through a relatively robust frame [60] which is represented as information preference and familiarity. Personal characteristics such as prior information [61,62] and entrepreneurial learning [34,63] are key factors for initial entrepreneurial information processing and positive opportunity belief formation. Preserved information and learning frames constitute the cognitive schema that activated instant information to direct the selecting and filtrating process since the decision process is constrained by limited attention capacity and prefers familiar inputs and patterns [64]. Therefore, cognitive schema influences the bottom-up formation of belief and further regulate positive choice of entrepreneurial action.

Specifically, while willingness to act on entrepreneurial opportunity is forming, entrepreneurs are more prospective [7], since the subjective interpretation of information through personalized cognitive schema forms after assuming a future state. Entrepreneurs would imagine means and ultimate picture of opportunity exploitation [65] before they stabilize their opportunity belief for entrepreneurial action, and incorporated information is the source of imaging. For experienced entrepreneurs, the propensity to extract more clues about the future state from information would help them to make a more accurate evaluation of possible success or failure [66] of entrepreneurial action, since access to more information retrieved from indicating future enables entrepreneurs to broaden their mind map [67]. In this manner, entrepreneurs would accumulate and form the entrepreneurial cognitive schema that represents a preference for illustrating information as to future signals [27] and make the best use of it to reinforce their willingness to act. When they are confronted with descriptions of entrepreneurial opportunity, the entrepreneurial cognitive schema they possess would equip them with agility to notice valuable stimuli and expectations about future conditions [27,59], influencing the direct impact of perceived information exerts on personal willingness to take entrepreneurial action, since the more prospective thinking one has, the more possibility that they will take the perceived information as an indicator for a future state of their own company.

H2: *The relationship between willingness to act on an entrepreneurial opportunity and processing external attributes of context is moderated by entrepreneurial cognitive schema.*

H2a: *The positive relationship between willingness to act and perceiving increasing industry founding rates is strengthened while entrepreneurial cognitive schema is activated.*

H2b: *The negative relationship between willingness to act and perceiving increasing industry dissolution rates is strengthened while entrepreneurial cognitive schema is activated.*

H2c: *The negative relationship between willingness to act and perceiving increasing industry density level is strengthened while entrepreneurial cognitive schema is activated.*

H2d: *The positive relationship between willingness to act and perceiving increasing knowledge relatedness is strengthened while entrepreneurial cognitive schema is activated.*

According to all hypotheses of our study, we depicted the hypothesized relationships in Figure 1 in order to demonstrate the model in a clearer way.

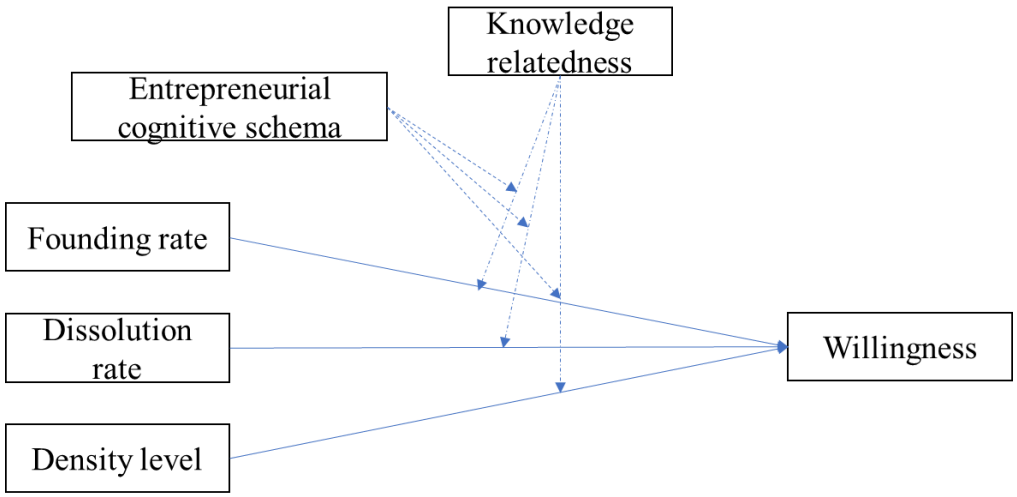

Figure 1. Relationship between Environmental Attributes and Entrepreneurial Action Willingness, Moderated by Entrepreneurial Cognitive Schema.

3. Methodology

3.1. Participants

In order to investigate how underlying cognitive schema works on perceiving external information, we wanted to choose novice or potential entrepreneurs who were equipped with knowledge of entrepreneurship but without abundant experience. Our recruitment consisted of soliciting participants from an entrepreneurship course held at a major university located in China. We recruited senior and graduate students whose majorities are highly related to entrepreneurship and management in order to ensure sufficient understanding in evaluating entrepreneurial opportunities.

We compared the responses on the repeat profiles individually and found no significant differences ($p > 0.10$) in their own decision preference. Therefore, we consider it is consistent with every participant. We aggregated our data, which brought our total sample to 127 participants who made a total of 3048 decisions. Referring to previous studies investigating entrepreneurial decision making via conjoint experiments (cf. Haynie et al., 2009: n = 73 [40]; McKelvie et al., 2011: n = 90 [2]), our sample size exceeds previous ones and could be considered as reasonable when employing conjoint analysis.

The sample consists of 127 students of which 123 (66 females and 57 males) finished the whole experiment. Our sample has an average age of 21.59 (S.D. = 2.11). In terms of education, 112 of them are senior students who have majored in entrepreneurship or business for at least three years and 11 of them are graduate students who have majored in entrepreneurship for over five years. In terms of experience, the number of years of entrepreneurship per participant ranged from 0 to 3 with a mean of 0.27. Since the purpose of this study is to investigate the underlying cognitive schema during making entrepreneurial decisions, past experience is not necessary, but a basic understanding of founding ventures is requisite. Although there have been criticisms of recruiting students as participants in behavioral studies [68], it is more appropriate in the present study since students would probably reduce the impact of the acquired experience of work or entrepreneurship [17] since we wish to employ the priming process on the cognitive schema. We are confident that we employ an appropriate group of individuals with the requisite knowledge to evaluate entrepreneurial opportunities and be appropriate to take priming since this sample meets adequate requirements [69].

3.2. Ethics Approval

Since this study did not include any intervention manipulations, ethical approval was not required. We confirm that we did use non-stigmatizing and non-discriminatory language while describing any requirements for participants.

3.3. Method

Conjoint Analysis

Conjoint analysis is a useful technique for experiments [70] to explore implicit mechanisms behind behavior and is widely used in a number of fields. In the field of entrepreneurship, many studies have incorporated conjoint analysis as one of the most useful techniques to evaluate behaviors and mechanisms during the decision-making process, especially during the process of opportunity evaluation [6,40,71]. Conjoint analysis has been proved valid in demonstrating the underlying mechanism of personal evaluation and choice and has a key advantage that it could capture people's decision policies while they are 'in use' rather than recalling subjectively [72], therefore it is appropriate to interpret the cognitive process during deciding action on an opportunity.

Conjoint analysis could help us capture a series of theory-driven decision profiles composed of discrete conditions describing the entrepreneurial environment [6]. In the present study, we use conjoint analysis to capture participants' explicit choices and decompose underlying decision policies as previous researchers have proved [71] which consist of instantly imported information and existing cognitive schema for processing. Instead of post-hoc introspection which would be modified by pseudo memory and outcome, conjoint

analysis has an advantage for studies of decision-making [72]. According to previous work employing conjoint analysis to investigate entrepreneurship evaluations with intangible opportunities [6,34], we strictly followed the proper steps of conjoint analysis and ensured that every conjoint attribute described in the present study was understandable and reasonable for the participants. We also employed techniques to ensure participants' responses are reliable [73–75].

3.4. Measures

Since our study was conducted in China, all materials in the experiment were displayed in Chinese. We adopted the descriptions of industry rates and decisions for action from Wood et al. [6] and later translated them into the Chinese version. In the translation process, we followed the back-translation procedure [76] and asked two graduate students who major in English to help us finish reviewing.

3.4.1. Dependent Variable

In accordance with our hypotheses, we represent the willingness to employ certain opportunities within the described environment as our dependent variable [4,6,40] just as the antecedent entrepreneurial intention to take real action. In order to represent the extent to which personal evaluation and intention indicate an individual preference to take entrepreneurial action, this variable is measured using the likelihood of personal investment in launching a practical new venture [6]. This extent of intention is usually captured using a five-point scale ranging from (1) least likely to invest to (11) most likely to invest representing the different gradations of perceived attractiveness [6,40]. Therefore, this variable is measured by one question, which is presented as 'Based on the circumstance described above, how likely you will act on this opportunity' (see Appendix A).

3.4.2. Independent Variable

Founding rates, dissolution rates, density levels of entrepreneurial population, and knowledge relatedness of an individual are four attributes that served as independent variables for evaluating entrepreneurial opportunities, as hypotheses 1-a to 1-d described. Each has two levels for the construction of evaluation profiles and the operation of all attributes is presented in Table 1. We followed the principles of conjoint analysis conducted in many published studies [6,40,71] and constructed profiles by varying the levels of each attribute.

Table 1. Attributes of Industrial Rates.

Attribute of Opportunity	Levels
Founding rate of new firms	Low: There are very few new firms entering this industry. High: There are a great number of new firms entering this industry.
Dissolution rate of existing firms	Low: There are very few existing firms currently leaving this industry. High: There are a great number of existing firms leaving this industry.
Density of existing firms	Low: There are very few established firms in this industry and the competition is not fierce. High: There are a great number of established firms in this industry and the competition is very fierce.
Knowledge relatedness	Low: The opportunity under consideration is unrelated to your existing knowledge, skills, and abilities. High: The opportunity under consideration is highly related to your knowledge, skills, and abilities.

Especially for knowledge relatedness which is highly connected usage of external information and internal cognitive system, we want to explore not only its main effect on willingness to pursue opportunity but also its interactive effect on the processing industry rate.

3.4.3. Individual-Level Moderate Variable

Entrepreneurial cognitive schema enables entrepreneurs to first spot the valuable stimulus and make sense of the future state of the opportunity [27,59]. It is a cognitive preference that could help entrepreneurs to categorize information about information and develop expectations about future connections and results of behaviors. Aligning with previous references, we could use priming to manipulate personal entrepreneurial cognitive schema under current conditions.

We utilized direct process priming [67,77] to activate different levels of cognitive schema preference. We provided two sets of scenarios to distinctly enable participants' preferences to be prospective in cognitive processing at different levels. The experimental group read a series of phrases that describe the forthcoming future to inspire their prospective cognitive schema which we describe entrepreneurial cognitive schema would represent in processing preference. Meanwhile, the control group read a series of phrases that relate to the Big Five Personality scale [67].

3.4.4. Manipulation Check

In order to measure the level of preference and ensure the validity of experimental manipulation, we adopted a post-operation questionnaire and took the response to participants' contemporary condition of cognitive schema.

3.5. Procedure

3.5.1. Priming Process

We randomized the participants into two different groups to take a direct process priming operation (2 levels) in order to activate the cognitive condition for prospective processing. Every participant received priming/control operation through different processes.

Prospect priming: Participants filled out the Subjective Probability Task [78] (see Appendix B)to stimulate entrepreneurial cognitive schema. Participants are required to judge the extent to which certain events will happen to them and induce their imagination for the future [79]. Instead of priming tasks, participants in the control group are asked to fill out the same number of questions but without imagination for the future. They answered questions adopted from the scale of the Big Five Personality [67] (see Appendix C).

Manipulation check: After the priming process, every participant was required to finish some items adopted from the questionnaire for future-oriented cognition [79]. Two groups of participants should answer four items which are adopted from Frederiks et al. (Cronbach's $\alpha = 0.86$) [67] indicate their preference for upcoming information rather than current condition (see Appendix D). We explored that future-oriented cognition of the priming group ($M = 16.06$) is much higher than the control group ($M = 13.98$) and the difference is significant ($t(121) = -6.183$, $p < 0.00$). We also utilized the results of the manipulation check to indicate the extent to which the participants' prospect and innovative cognition was after the priming process.

3.5.2. Conjoint Analysis Task

We used Inquisit 5.0 to program and display the features of opportunities on a personal computer. The whole experiment included instructions, a sample of descriptions of variables, the main task (a series of abstract profiles composed of attributes), and a post-experiment questionnaire. Every participant read and followed standardized instructions to make an evaluation about his/her willingness to act on opportunities under different conditions. The instruction introduced the hypothesized premise for participants that they should put themselves in the context of each scenario of profiles and make decisions for a focal opportunity as if they are actually in that situation. We also emphasized that there were no objective restrictions for entrepreneurship except for the hypothesized attributes manipulated in the present experiment (see a sample of profile and question in Appendix A).

The hypothesized attribute profiles were randomly combined with either high or low levels of founding rates, dissolution rates, density, and personal relatedness of knowledge [6]. After reading the description of each profile, participants were asked to rate their likelihood to take action and to invest [4] in an entrepreneurial opportunity under certain conditions in order to rate their willingness.

We used an orthogonal full factorial design in the present study, which resulted in a total of 16 full profile descriptions of the opportunity environment. In addition, participants should finish three more profile descriptions which we randomly selected as reliability checks. Inquisit 5.0 was also used to randomize the order of description presences in order to reduce the potential order effect in the whole sample [80].

3.5.3. Conjoint Validity and Reliability Analysis

Following previous published conjoint studies in entrepreneurship [6,75], we conducted a pilot study to ensure face validity and the clarity of variables descriptions to participants which represents answering reliability. We invited five experienced entrepreneurs and three doctoral students who major in entrepreneurship and have attempted entrepreneurship to take the pilot test. Since these profiles describe abstract opportunities with detailed attributes, we asked the entrepreneurs if these attributes we used in this study are relevant to their entrepreneurial decision in real-life. According to previous work [6,12,74] and the experienced entrepreneurs' confirmation of clarity and indispensable relevance to entrepreneurial action, the profiles in the present study meet the requirement of necessary face validity.

Further, we randomly insert three repeat profiles in the series of trials for reliability analysis [6]. Even though we recruited participants with a business majority to ensure the description of manipulated variables is understandable, the paired sample t-test between responses of original profiles and repeat profiles would further confirm the comprehension and reliable evaluation of each profile. We selected four profiles as reliability tests and received paired sample t-test results. The means of each pair of responses showed no significant difference. The means of willingness are 4.71 vs. 4.5 (T = 1.09, p = 0.28), 6.74 vs. 6.57 (T = 1.61, p = 0.11), 4.99 vs. 4.65 (T = 1.69, p = 0.10), and 3.54 vs. 3.57 (T = −0.14, p = 0.89). The means of willingness of investment are 4.53 vs. 4.25 (T = 1.67, p = 0.10), 6.93 vs. 6.81 (T= 1.00, p = 0.32), 4.84 vs. 4.68 (T = 0.88, p = 0.38), and 3.44 vs. 3.37 (T = 0.42, p = 0.68). As these findings indicated the responses are reliable.

3.5.4. Post-Experiment Questionnaire

Since the experience-related factors significantly exert an impact on personal willingness to take action on entrepreneurial opportunities [4,6,25,40]. We used a post-experiment questionnaire to record participants' education, work, and entrepreneurial experience. The conjoint analysis usually presents the effect of control variables as the intercept in HLM (Hierarchical Linear Model).

4. Results

4.1. Analytic Measure

HLM Empirical Model

We followed previous research which employed conjoint analysis and use a multilevel model to structure our data. Our data consist of evaluations of a series of profiles (within-participant level) and individual cognitive schema preferences (between participant level). It is our hypothesis to explore how entrepreneurial cognitive schema, which represents a preference for prospective information, impacts on individual information process and the willingness to entrepreneurial action. Therefore, we explore the cross-level interactions within and between participant variables by using HLM, which is widely used in conjoint analysis [4,6,40]. In HLM, t-values associated with different parameters indicate the main effect of them, the interaction between them, and the cross-level interaction between level one parameters and level two individuals [6] We followed the regulation of the data process

in HLM [2,40] and interpreted the main and interactive effect of conjoint attributes and cross-level attributes interactions as unstandardized regression coefficients.

4.2. Effect of Attributes on Willingness

4.2.1. Attribute and Willingness

We present the HLM results of the main effect (the levels of attributes and the willingness to act on opportunities) in Table 2. We confirmed some of the hypothesized attributes are influencing personal willingness to act and invest in opportunities under certain conditions. Specifically, we observed the dissolution rate and density of existing firms significantly impair willingness to act (b = −1.40, $p < 0.00$, b = −1.34, $p < 0.00$). Meanwhile, knowledge relatedness has a significantly positive effect on willingness to act (b = 2.67, $p < 0.00$). We did not observe the statistical significance of the relationship between founding rate and individual willingness (b = 0.04, $p > 0.05$). In this manner, we observed the process of some hypothesized industry-rate data information influences willingness to take entrepreneurial opportunities, especially negative effects of dissolution and density levels which support our hypotheses 1b and 1c. The effect of the founding rate has no significance since it could not contribute to positive belief about reasonable action and investing in an opportunity (hypothesis 1a not proved). Moreover, we observed the willingness formation process is influenced by not only external information but also individual knowledge structure. Personal familiarity with certain entrepreneurial opportunities would significantly promote a wish to action.

Table 2. HLM Results of Industrial Rates on Willingness to Act.

Dependent Variable	Final Estimation of Fixed Effects	Full Model with Cross-Level Moderations	
		Unstandardized Coefficients	T-Value
	Level-1: Task unit		
Willingness to act	Main effects		
	Founding rates	0.04 (0.11)	0.355
	Dissolution rates	−1.40 (0.14)	−9.858 ***
	Density levels	−1.34 (0.14)	−9.043 ***
	Knowledge relatedness	2.67 (0.15)	17.644 ***
	Interactions		
	Founding rates × relatedness	0.32 (0.16)	2.011 *
	Dissolution rates × relatedness	0.34 (0.17)	1.988 *
	Density levels × relatedness	−0.15 (0.17)	−0.888
	Intercept	5.49 (0.68)	8.130 ***
	Pseudo R^2	0.76	

*, $p < 0.05$; ***, $p < 0.001$.

4.2.2. Interaction of Knowledge-Relatedness and Attributes on Willingness

After examining the main effect of processing attributes, we also checked the interaction between environmental attributes and knowledge relatedness on willingness to self-involvement as hypothesis 1-d. Firstly we followed previous research and found a positive impact on knowledge-relatedness and willingness (b = 2.67, $p < 0.00$). It is important to examine due to its implication for our main hypotheses about the cognitive impact on information processing. We observed some significant interaction effects between knowledge relatedness and industry rate data. The direct relationship which is not observed between founding rates and willingness is now strengthened by more knowledge-relatedness (b = 0.32, $p < 0.05$). Meanwhile, the negative impact of dissolution rates is slightly moderated by knowledge relatedness but it is significant (b = 0.34, $p < 0.05$). However, the significantly negative effect of density levels is interacted by knowledge-relatedness (b = −0.15, $p > 0.05$), representing that the more entrepreneurs know about the opportunity, the less they will be impeded by a high level of density level. Personal

familiarity with certain entrepreneurial opportunities would significantly promote a wish to action (hypothesis 1d is partly supported).

4.2.3. Effect of Cognitive Schema on Processing Attribute

We then explored the moderating effect of cognitive schema, which is interpreted as a cognitive preference to comprehend information, on processing industry-rate data levels. Different from the main effect of processing attributes, the effect of cognitive schema is represented as the coefficients for the individuated evaluation model at an individual level. Table 3 presents the cross-level interactions. The results indicated the significant effect of cognitive schema on knowledge relatedness when evaluating an opportunity.

Table 3. HLM Results of Entrepreneurial Cognitive Schema on Processing Industrial Rates and Willingness to act.

Dependent Variable	Final Estimation of Fixed Effects	Full Model with Cross-Level Moderations	
		Unstandardized Coefficients	T-Value
	Level-2: Individual unit		
Willingness to act	Entrepreneurial cognitive schema moderation		
	Founding rates	0.48 (0.24)	2.00 *
	Dissolution rates	−0.19 (0.24)	−0.81
	Density levels	−0.10 (0.24)	−0.43
	Knowledge relatedness	0.62 (0.24)	2.53 *
	Pseudo R^2	0.76	

*, $p < 0.05$.

Prospective preference promotes the positive relationship between founding rates and willingness (b = 0.48, $p < 0.05$), and knowledge relatedness and willingness (b = 0.62, $p < 0.05$). The positive relationship indicates that the higher prospective preference one presented during the information process, the more attention the participant pays to founding rates and personal knowledge relatedness.

5. Discussion

It is a common trend to employ cognitive components in the field of entrepreneurship [9]. Previous studies have focused on the role of cognition around opportunity such as identifying [39], evaluating [40], and acting [1]. However, they spotlighted general cognitive differences. The process of making decisions to take action on opportunity is an interactive process between personally activated schema and spotted external information. Consequently, exploring the presupposed frame which initiates and exerts influence on willingness to act under different conditions is necessary as core cognitive schema orients the whole process of decision making [59], such as attention and hypothesis of a future state. Regard of this, our study reveals that the pre-existing schema for future state among entrepreneurs [34] does impact the formation of individuated decisions to some extent.

5.1. General Discussion of Current Results

According to the main purpose of the present study, which is to investigate the impact of entrepreneurial cognitive schema exerting on processing information and deciding to act, we follow our two parts of hypotheses and try to find out the cognitive process and the impact of the core cognitive unit. The results from our study indicate the primary cognitive process of external attributes firstly, especially the negative effect of dissolution rates and density levels. Furthermore, the main purpose of identifying the effect of entrepreneurial cognitive schema is to some extent fulfilled by results, showing that founding rates which show available resources, and knowledge relatedness which shows controllability would be perceived significantly more positively when the entrepreneurial cognitive schema

is primed. Even though some moderation effects of entrepreneurial cognitive schema processing negative attributes are not confirmed in the present study, the positive effect on positive attributes is a critical way while identifying typical entrepreneurs while deciding on action. This is consistent with entrepreneurial action theory, indicating entrepreneurs would utilize positive attributes and internal state to reduce the uncertainty [3] and form positive beliefs to act on opportunity [81].

According to hypothesis 1 (including H1a to H1d), we found perceiving high dissolution rates and density levels hampered the positive willingness to take action on the entrepreneurial opportunity and the negative effect would be reduced by high internal knowledge relatedness. In this regard, we identified the cognitive process of perceiving industry dynamics and the interactive process of their possessed knowledge and subsequently forming their own decision [56]. Specifically, both the direct negative impact of dissolution rates and density levels were relieved, and the direct positive impact of founding rates is strengthened significantly, with a higher level of knowledge relatedness. Therefore, the different aspects of competition and resources are somehow individuated by personal knowledge relatedness. This is consistent with previous findings [6,57,62] and our framework that more personal relevance to opportunity would interact with the impact of opportunity context and probably strengthen the positive effect. Knowledge relatedness is the evidence that the individuated and unconscious cognitive process does occur while encountering the same but novel circumstance and is proved to be a critical part of making reasonable decisions on whether to act. Moreover, the positive interaction of knowledge relatedness shows the demand for confidence is fulfilled by it to some extent since the negative signals become less impactful and positive signals show significant promotion since relevant knowledge would foster a more predictable future state [4,57] during a personal knowledge-based cognitive process.

Regarding Hypothesis 2, which is the main purpose of this present study, we confirmed the impact of entrepreneurial cognitive schema during making decisions on entrepreneurial action, especially its positive effect while people are perceiving positive attributes. The founding rate indicates the resource abundance and knowledge relatedness, which indicates personal controllability is strengthened while higher entrepreneurial cognitive is equipped during the process of entrepreneurial action decision. The decision which is the result of imagining a desirable state after the actualization of a certain action is positively promoted with a future-oriented schema since the primed preference to envisage future images enables ones to create mental images of the future and helps them to predetermine their patterns [25,39,67]. During this process, entrepreneurial cognitive schema plays an important role as an information filter and amplifier and further helps entrepreneurs form beliefs that contribute to making the ultimate decision of exploiting the opportunity from which they are supposed to make a benefit. The underlying cognitive unit ultimately helps entrepreneurs reduce external uncertainty by amplifying positive signals and personal controllability [62]. In this regard, the entrepreneurial cognitive schema facilitates entrepreneurs with the probability of controllable certainty [3] and more confidence, which consequently leads to a more positive willingness to act while under the same circumstance. In this manner, entrepreneurs would accumulate and form an entrepreneurial cognitive schema that represents a preference for illustrating information as to future signals [27] and make the best use of it to reinforce their willingness to act.

5.2. Implication and Future Research

Theoretically, we describe the cognitive unit which amplifies or filters external information in order to enrich the conceptualization of the processing system between opportunity and action. First, we depicted entrepreneurial cognitive schema and its impact on entrepreneurial action decision making. We adopt the general concept of the cognitive schema into the entrepreneurial field and match it with the general preference of experienced entrepreneurs who perform their acute and proactive alertness to opportunity [27]. Previous studies have shown that entrepreneurs always presuppose a future state

of exploiting opportunity [59,65], but did not explain the underlying mechanism for their common propensity. In detail, the mental images they form in advance would contribute to their own belief of opportunity [50] which further directs their willingness to act, but the formation process lacks sufficient exploration as well. In this study, we introduced the concept of the cognitive schema into the process of opportunity exploitation and explain its important role during processing information, especially in strengthening the positive effect which reduces uncertainty [81]. Meanwhile, a cognitive schema is an organization of past reactions and experiences, which could be a summary of well-adapted organic responses [22]. The underlying frame which gives rise to this individualized difference shows its prominent preference for information processing preference. The positives are not only effective when generated by experience but also by priming [67]. In this regard, more direct representatives of entrepreneurial cognitive schema and its process of impact have been depicted in our study. The entrepreneurs, especially those experienced ones, have established entrepreneurial cognitive schema and would unconsciously utilize it when they encounter opportunity-related information.

Moreover, we confirmed the impact of entrepreneurial cognitive schema during making decisions on entrepreneurial action, especially its positive effect when people are perceiving positive attributes. To entrepreneurs, the structural relationship between objective market needs and emerging technology does not equal subjective opportunity [39] and could not make contributions to instant action. The individuated process of deciding on taking action on opportunity is confirmed as motivation-related, experience-related, and emotion-related [8,9,82]. We followed previous studies that willingness is undoubtedly necessary for practically entrepreneurial action [3,6,39] and discovered that cognitive components do play an important role during the formation of opportunity belief [26] which leads to further willingness. In that regard, our findings provide a supplementary unit to individuation when forming a willingness to act on entrepreneurial opportunities from a cognitive perspective in a more direct way. In the present study, we employ entrepreneurial cognitive schema as the critical processing unit while making decisions on entrepreneurial action [40]. With experiment on two distinct groups, we confirm specific schema does impact decisions on entrepreneurial action by priming unexperienced participants in order to form future-focused vision, especially while they are processing positive attributes which would promote their willingness to act. This might be the presumption that the entrepreneurs could enroll stakeholders' confidence [83] to ensure their success. There are some critical but inconspicuous characteristics of the cognitive unit [84] that entrepreneurs present may also be studied in this way in order to form a more comprehensive frame of the whole cognitive system that is underlying.

5.3. Implications for Practice

Empirically, we depict one typical portrayal of entrepreneurs who would utilize external information more positively to promote their actions and provide traceable differences in the decision of opportunity based on personal disposition. From a cognitive perspective, we confirmed that subjective opportunity evaluation and action willingness are discriminable. The implication is that not only experienced entrepreneurs, but people with similar entrepreneurial cognitive schema would also be more positive when they perceive positive attributes of potential opportunity. The implication is consistent with many previous works [6,31,34], opportunities are not evenly appealing to people even when they encounter the same circumstances since cognitive schema will enable them to interpret the meaning of those circumstances differently. Even this present paper just investigates those who differ in deciding to act but does not link the subsequent survival and profit, the initial is regarded as important during the entrepreneurial process and the individuated start also links to further phases which are also filled with cognitive preference. The positive preference may promote or hinder when circumstance alteration occurs, and actual entrepreneurs could be aware of their cognitive preference while they are making further decisions on the investment of both time and money.

5.4. Limitation

However, the present study still contains some drawbacks. We recruited students as our participants since we want to manipulate their active cognitive schema without influence from the experience of entrepreneurship. Nevertheless, the sample we used was recruited from the eastern part of China, where the environment fits entrepreneurship. These students might be more entrepreneurial compared with students from other parts of China since they are used to and pay much closer attention to entrepreneurship. It is necessary to import more students with different contexts of entrepreneurship and further observe the role of entrepreneurial cognitive schema played during initiating action on an opportunity. Future studies should expand the area from which the participants are selected. Furthermore, recruitment of MBA students who are more business-integrated but with little entrepreneurship experience would be a good chance to retest the whole cognitive model since they could better understand the importance of opportunity attributes. A second limitation of this study is the void of recruiting plenty of entrepreneurs as our benchmark sample. We have summarized from previous studies and verified in our study that there is a substantial relationship between experience and decision about acting on opportunity. Therefore, performing experiments on experienced entrepreneurs would significantly strengthen the ecological validity of our conclusion about entrepreneurial cognitive schema and entrepreneurial action decisions. Further studies would broaden the geographical and experience range of selecting participants who meet the basic criterion of our theoretical model.

6. Conclusions

Entrepreneurial action decision is undoubtedly an individuated result even encountering the same conditions and the cognitive process is critical to forming such subjective choice. The present study used conjoint analysis to explore the relationship between cognitive processes and decisions on taking entrepreneurial action, and the impact of entrepreneurial cognitive schema exerts on the relationship among 123 participants. The positive impact of cognitive schema which exerts on the cognitive process is found, especially on perceiving founding rates and processing internal knowledge relatedness, indicating that the future-orient cognitive schema does impact the decision process while encountering the same circumstance.

Theoretically, this present study explores the underlying mechanism while processing information and making entrepreneurial action decision by providing evidence of entrepreneurial cognitive schema's positive effect on perceived positive attributes of opportunity, which contributes to the personal decision system and explain some counterintuitive but subjective nature of potential entrepreneurial action takers. The activation of entrepreneurial cognitive schema does strengthen the effect of perceiving positive industry rates on promoting a willingness to take action. Moreover, the findings also enrich the conceptualization of the processing system between opportunity and action from a synthesized cognitive perspective. Empirically, this paper indicates that people with different levels of the originally entrepreneurial cognitive schema would make different use of external attributes when they encounter the same opportunity, especially promoting them to positively act.

The critical limitation of the present study is that we should not only recruit entrepreneurs for pilot tests but also for formal experiments in order to improve ecological validity. This is also the future direction for our work since more tangible opportunities and practical performance of entrepreneurship could be supplementary evidence for the indirect effect of entrepreneurial cognitive schema.

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Appendix A. Conjoint Instructions and Sample Profile

Please imagine that you are preparing to start a venture and the following are circumstance you will meet. Please make your decision on whether you will take action under such circumstance.

Founding rate of new firms	There are very few new firms entering this industry.
Dissolution rate of existing firms	There are very few existing firms currently leaving this industry.
Density of existing firms	There are very few established firms in this industry and the competition is not fierce.
Knowledge relatedness	The opportunity under consideration is unrelated to your existing knowledge, skills, and abilities at all.

Based on the circumstance described above, how likely you will act on this opportunity

○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

very unlikely maybe very likely

Appendix B. Priming for Experimental Group—Subjective Probability Task (Adopted from Frederiks et al.)

Please make your decision on probability about following events happening.

1. In next ten years, there will be earthquake in your city

○ ○ ○ ○ ○

very unlikely maybe very likely

2. When you walk on the street, you happen to find a 100-dollor bill

○ ○ ○ ○ ○

very unlikely maybe very likely

3. In next five years, you will travel abroad

○ ○ ○ ○ ○

very unlikely maybe very likely

4. In next five years, you will switch jobs

○ ○ ○ ○ ○

very unlikely maybe very likely

5. In your future life, you will take a space trip

○ ○ ○ ○ ○

very unlikely maybe very likely

Appendix C. Priming for Control Group—Big Five Personality (Adopted from Frederiks et al.)

Please make your judgement about how likely the following sentences are relevant to you.

1. I always have new ideas

○ ○ ○ ○ ○

very unlikely maybe very likely

2. I always pleased to help others

○ ○ ○ ○ ○

very unlikely maybe very likely

3. Sometimes I am careless about details

○ ○ ○ ○ ○

very unlikely maybe very likely

4. I am always capable of coping with stress

○ ○ ○ ○ ○

very unlikely maybe very likely

5. I am a generous person

○ ○ ○ ○ ○

very unlikely maybe very likely

Appendix D. Priming Manipulation Check (Adopted from Deeprose and Holmes and Frederiks et al.)

Please make your judgement about how likely the following sentences are describing you.

1. I believed my thoughts about the future would definitely happen and would become real

○ ○ ○ ○ ○

very unlikely maybe very likely

2. I found myself acting or feeling like it was really happening

○ ○ ○ ○ ○

very unlikely maybe very likely

3. Any reminders evoked feelings about the future

○ ○ ○ ○ ○

very unlikely maybe very likely

4. Pictures about the future popped into my mind now

○ ○ ○ ○ ○

very unlikely maybe very likely

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