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Article

Does Thinking Style Make a Difference in Environmental Perception and Orientation? Evidence from Entrepreneurs in Post-Sanction Iran

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Abstract: Styles of thinking set different paths for an entrepreneur's perception and strategic action. In order to understand the environmental consequences of a thinking style, we investigated the relations between entrepreneurs' linear and nonlinear styles of thinking with their perception of environmental uncertainty in their businesses. Furthermore, we tested the effect of the entrepreneurs' linear and nonlinear style of thinking on their newly established firms' orientation towards preserving the surrounding internal and external environment. Entrepreneurs with linear or rational thinking styles prefer more tangible data, information, facts, and analytical tools, and entrepreneurs with nonlinear or non-rational thinking styles rely more on internal feelings, impressions, imagination, creativity, and sensations when making important organizational decisions. By using cross-sectional survey data from 144 entrepreneurs in post-sanction Iran (2016–2017), we found that entrepreneurs with a linear style of thinking, in comparison to entrepreneurs with a nonlinear style of thinking, perceive a higher level of environmental state, effect, and response uncertainty in their business context. Furthermore, our survey results reveal that newly established firms by entrepreneurs with nonlinear styles of thinking have a more external environmental orientation, while newly established firms by entrepreneurs with a linear style of thinking have a more internal environmental orientation. Recognizing this contingency advances our understanding of how entrepreneurs perceive and enact their environments.

Keywords: style of thinking; perception of environmental uncertainty; environmental orientation; post-sanction Iran; entrepreneurship

1. Introduction

Like any other group of people, entrepreneurs differ in their styles of thinking [1,2]. Some entrepreneurs use more traditional rational or linear thinking, which relies more on data, facts, reason, and analytical tools, when making firm-level strategic decisions [2]. Others engage more in a non-rational style of thinking, such as nonlinear thinking, which is rather based on imagination, intuition, holistic appraisal, creativity, and perceptual flexibility, when making important organizational decisions [3–6]. The literature indicates that the difference in thinking styles may result in different perceptions [7] and courses of action [8].

The relationship between the individuals' styles of thinking and their subsequent perceptions and orientation have been the subject of increased research attention in leadership, entrepreneurship, psychology, and strategic management literature [7,9–14]. Taken as a whole, this literature indicates that thinking styles make a difference to individuals' perceptions [9,10] and subsequent orientation and behavior [8,15]. Nevertheless, despite the growing number of research papers in this context [1,6,9,16], few empirical studies have been conducted with regard to the role thinking styles may play in environmental perception and orientation. Our study attempts to fill this research gap by using unique survey data from entrepreneurs in post-sanction Iran.

There are a limited number of academic studies published about Iranian entrepreneurs' behavior after the longstanding UN and US economic, political, and scientific and trade sanctions against Iran were lifted. Lifting the sanctions has generated several opportunities and challenges for Iranian entrepreneurs and businesspeople. Easier access to new technologies, the international financial system, and necessary raw materials enables startups to mature faster and to grow. Currently, they are in a better position to use modern manufacturing technologies and equipment that helps to reduce the environmental impact. In addition, the environmental awareness of Iranian policy makers, consumers, and firms has increased significantly in recent years [17,18]. However, despite the growing consciousness of environmental issues, not all entrepreneurs and their firms are environmentally oriented [14]. Environmental orientation plays an important role in a firms' strategy formulation [19,20] and performance [21]. Therefore, it is worth determining which type of entrepreneurs pay more attention to the environment and have more willingness to pursue proactive environmental strategies in their firms. By considering the thinking style of entrepreneurs, we are looking to identify more environmentally oriented newly established firms or sustainable ventures.

On the other hand, after years of isolation, Iran opened up the market for foreign investors and companies. The entry of mature international companies has enhanced the level of competition and made it difficult for local startups to achieve a sustainable competitive advantage. Such competition can be even more poignant for local startups that are struggling to renew their aging infrastructures. Iranian entrepreneurs are highly concerned about what makes their new established business better than local and international competitors, how these changes in the market may affect the success of their business, and finally, what will be the most appropriate strategic responses to these changes.

In this regard, Milliken [22] proposed three types of environmental uncertainties that may be faced by entrepreneurs when dealing with the business environment changes, namely environmental state, effect, and response uncertainties. Perceived environmental state uncertainty refers to the entrepreneurs' inability to predict what will happen to their business environment. Perceived environmental effect uncertainty describes the entrepreneurs' inability to evaluate the effect of environmental changes on their organizations, and perceived environmental response uncertainty refers to the entrepreneurs' inability to evaluate the likely consequences of their strategic responses to the environmental changes [23–25]. Although entrepreneurs' perceptions of the external environment is a key factor to the firms' strategy formulation and enactment [26], we know little about why a common external environment translates into differing perceptions [25]. In an effort to fill this gap, this paper studies the role of the different styles of thinking (linear and nonlinear) that entrepreneurs have in order to gain insights into why entrepreneurs have different perceptions of the same situation [27].

2. Literature Review and Hypothesis Development

2.1. Style of Thinking

Style of thinking, in general, refers to a manner of using mental abilities to do daily activities, such as problem solving and overcoming challenges [28], and is relatively stable over time [29]. According to Vance et al. [30], there are, in general, two distinct types of thinking, namely linear and nonlinear. Entrepreneurs with a linear style of thinking rely more on tangible data and facts; they process the data and information through conscious and rational logic in order to make a final

decision. On the other hand, entrepreneurs with a nonlinear style of thinking rely more on internal feelings, impressions, and sensations. They usually process the data and information through intuition, creativity or insight in order to make a final decision [2,4].

According to Milliken [22], there are three major types of perceived environmental uncertainty that entrepreneurs may experience as they try to understand, interpret and respond to changes in the business environment: environmental state uncertainty, effect uncertainty, and response uncertainty. Perceived environmental state uncertainty represents the inability of entrepreneurs to forecast the probabilities of particular events or changes in their business environment [31]. For example, an Iranian entrepreneur might be uncertain about the number of international rivals that will enter the market and how they will price their products and services. Perceived environmental effect uncertainty represents the inability of entrepreneurs to predict the effect of a future environment state on the organization [24]. For example, entrepreneurs may not be able to identify how lifting international sanctions will affect their firms' competitive position over time. Alternatively, they may not know how the price and quality of products and services of new international competitors will influence the success of their current and new products and services. The perceived environmental response uncertainty refers to the inability of entrepreneurs to predict the likely outcomes of their decisions [22]. For example, an Iranian entrepreneur might not be sure about entering the international markets after international sanctions have been lifted. In this model, three types of uncertainty occur sequentially, as entrepreneurs first scan the state of the environment and then interpret how the environment affects the organization before deciding how to respond [23,32].

When we consider environmental uncertainty as perceived and subjective [33], different entrepreneurs may perceive different levels of uncertainty in the same business environment [25]. Understanding which type of entrepreneurs perceive environmental uncertainty at a higher level is important because such perception has a significant influence on their subsequent strategic actions [25,34]. A high level of perceived environmental uncertainty makes entrepreneurs more innovative [35]; they pursue more proactive environmental strategies [36], enhance the diversity of their products and services [24], or make more diverse investments [37]. Several individual and environmental factors determine the level of uncertainty perception of entrepreneurs. For example, the experience of entrepreneurs is one of the factors that can explain how they notice, interpret, and respond to different perceived changes in the business environment [38]. The perception of environmental uncertainty is higher for those entrepreneurs that set up their firms in a business environment that is characterized by a high level of variability and complexity [39,40]. In the Iranian context [27], it has been shown that those entrepreneurs operating in the market with network externality perceive a higher level of environmental uncertainty.

2.2. Firms' Environmental Orientation

The environmental orientation of a recently established firm can be defined as the founder's recognition of the importance of the environmental issues that firms face and their responsiveness to various external stakeholders [20]. Accordingly, the environmental orientation of a firm might vary from the internal to external orientation [41]. Firms with a strong internal environmental orientation pursue more reactive environmental strategies and focus more on internal values, rules, and ethical standards regarding the level of commitment to environmental protection [21]. Environmental conservation and protection manifest only in the formal policies, documents, and procedures of a firm [20]. Furthermore, these types of firms provide formal environmental training for their employees [21]. Recently established firms with a strong external environmental orientation pursue more proactive environmental strategies and integrate environmental issues at higher levels of strategy [42], and the founders of such firms are more concerned about how to satisfy the environmental demands of external stakeholders, e.g., consumers, supplier, alliance firms, government, and community [41].

In the last decade, the protection of the natural environment became a main priority of business founders and managers [43]. The orientation of the companies to preserve the surrounding environment affects all levels of a company's operations and performance [44]. Corporate environmental protection enhances shareholder value [45] and organizational capabilities [36,46], and customers prefer to buy from firms that show more commitment to the natural environment [47,48]. Previous studies showed that the environmental orientation of a firm improves its competitiveness [49] and performance [21,50,51]. However, not all firms in the same industry pay equal attention to the environment, and some of them pursue more proactive environmental strategies than others [46]. How a firm's founders interpret environmental issues is crucial for understating such variation in pursuing environmental strategies [52].

2.3. The Relationship between the Style of Thinking and the Perceived Environmental Uncertainty

In this study, we anticipated that entrepreneurs with a linear or rational style of thinking perceive a higher level of environmental state, effect, and response uncertainty, in comparison to entrepreneurs with a nonlinear style of thinking. The business environment in post-sanction Iran is changing rapidly and is becoming increasingly complex and unpredictable. Entrepreneurs should be able to notice those changes quickly, interpret the changes in the right manner, and provide certain organizational responses. Entrepreneurs with a linear style of thinking pay attention to only rational solutions, relying on a subset of the available facts and information [8]. This may decrease the tendency to look for new and up-to-date information about environmental changes, and eventually companies may not be able to notice external events accurately. The lack of novel information will lead to the incorrect interpretation of a situation and will make it harder to predict how the external environment will impact their businesses. When the awareness of entrepreneurs of the business environment is limited, it is difficult to anticipate the likely outcomes of a response.

Hypothesis 1. *There is a positive relationship between the linear style of thinking and the perception of environmental (1a) state uncertainty, (1b) effect uncertainty, and (1c) response uncertainty.*

On the other hand, entrepreneurs with a nonlinear style of thinking rely on intuitive hunches to make decisions. This type of entrepreneur has a high capability for solving organizational problems in more creative ways [5]. Furthermore, individuals with a non-rational style of thinking have a high tendency to be imaginative [30], which may enable them to simultaneously analyze a special situation from different perspectives. The ability to imagine different aspects of the same object—technology progress, for instance—makes it possible to foresee how the probable changes in the object may or may not influence a given situation. Furthermore, Raffaldi et al. [28] argue that managers with intuitive and nonlinear thinking styles usually make more contact with the other senior managers in the areas involved, so they may have a much clearer picture of the business environment. Therefore, we hypothesize that:

Hypothesis 2. *There is a negative relationship between the nonlinear style of thinking and the perception of environmental (2a) state uncertainty, (2b) effect uncertainty, and (2c) response uncertainty.*

2.4. Understanding the Link between Thinking Style and Environmental Orientation

There is a new stream of research addressing the effects of managers' and entrepreneurs' thinking styles on the growth and survival of companies [2,53–55]. Furthermore, researchers have been asked to use individual differences in the style of thinking as a basis for explaining managerial and entrepreneurial behavior [15,56,57]. In this line of research, the question of whether the style of thinking of entrepreneurs leads to any difference in their firms' orientations toward environmental issues has kept researchers busy in recent years [58,59]. Firms with an internal environmental orientation pursue a reactive environmental strategy by considering environmental preservation as one of the goals across

all departments, and they set up multiple policies to enhance environmental awareness among their employees [60]. At a higher level of environmental orientation, firms with external environmental orientations pursue a proactive environmental strategy. They emphasize the need to satisfy external stakeholder (customers, communities, suppliers, alliance firms, and the government) demands through actions that respect the environment and foster its protection [20,41].

In the third and fourth hypotheses, we expected that newly established firms by entrepreneurs with a linear style of thinking would focus more on internal environmental factors, and newly established firms by entrepreneurs with nonlinear thinking would be more oriented towards external environmental factors. We build our arguments on the basis of several studies, mostly in the context of business ethics [30,61]. In this regard, Fleming [61] argues that an individual with a linear or rational thinking style emphasizes highly the specifics of a situation when making an important decision. It seems that relying heavily upon this pattern of rationality is less useful for understanding the complex and unpredictable external environment [30]. However, inside their organization, they set up and continuously take care of the legal system, audits, corporate policies, and codes of ethical conduct [30]. They analyze the internal organizational environment frequently to maintain an ethical climate in the organization. They usually follow the established rules and policies to solve organizational and environmental problems [4,62]. Individuals who exhibit a linear style of thinking are highly concerned about what is going on inside their organization and take more responsibility for managing the non-managerial population of workers [63]. Extending this argument into an environmental orientation, we predicted that entrepreneurs with a linear style of thinking focus more on the internal environment and set up multiple organizational rules and ethical standards to meet the legal environmental requirements.

Nonlinear thinkers rely on holistic appraisals, which enable them to have a deeper understanding of external environment, and intuition, which helps them to quickly respond to environmental issues [3]. Individuals who rely heavily on nonlinear thinking patterns have broad, global concerns of a personal, humanistic, or social nature [61]. It is, therefore, more likely that newly established firms by entrepreneurs with a nonlinear style of thinking will consider environmental protection as a main priority and responsibility [60].

Hypothesis 3. *Newly established firms by entrepreneurs with a linear style of thinking, in comparison with firms founded by entrepreneurs with nonlinear thinking, show a greater internal environmental orientation.*

Hypothesis 4. *Newly established firms by entrepreneurs with a nonlinear style of thinking, in comparison with firms founded by entrepreneurs with linear thinking, show a greater external environmental orientation.*

3. Methods

3.1. Setting

We collected our data from founders of small-sized and young businesses in Iran. We used three criteria to select our sample: First, we targeted only the founders of small-sized businesses. The Iranian Ministry of Industries and Commerce defines small businesses as those firms that have less than 50 employees [64]. Second, the firms should be a privately held organizations and be independent firms (i.e., not subsidiaries) [65]. Third, the firms should not be more than 10 years old. As in many developing countries, there is no comprehensive list of small-sized businesses available in Iran. Using four governmental databases (the directory of the Iran Small Industries and Industrial Parks Organization (<http://en.isipo.ir/>), Fars Industrial Estate (<http://www.farsiec.ir/>), Kerman Industrial Estate (<http://iec.kr.ir/>), and Hormozgan Industrial Estate (<http://www.hriec.ir/>) we have identified 358 young and small firms. Following the selection criteria, 170 firms were discarded. Our final sample included 188 small-sized and privately-held enterprises established in the last 10 years (between 2007 and 2017) [66]. The firms were located in southeast Iran in three provinces—Kerman (82 firms), Hormozgan (45 firms), and Fars (61 firms). According to the Ministry of Labour and Social Affairs,

(<http://amarkar.ir/>), these three provinces contributed 11.2 percent of the Iranian GDP in the study year. Please see Appendix A for a better understanding of the location of the selected firms. Most of the respondents living in these areas are Persian, all speak Farsi; and most of them are Muslim (in our study, all respondents were Muslim).

There are some reasons why Iran is an interesting country in which to focus a study of environmental uncertainty and orientation. The entrance of mature international companies to the Iranian market [27], due to the lifting of longstanding UN and US sanctions against Iran, enhanced the level of competition in the Iranian business market. Such a new level of serious competition has caused an extraordinary level of ambiguities and uncertainties for Iranian entrepreneurs. It is worthwhile determining which kinds of entrepreneurs are able to better understand the major events and trends in this new business environment (state certainty), who have a better understanding of how the future state of the new business environment might impact their startups (effect certainty), and who are feeling more confident about the quality of their strategic responses (response certainty).

On the other hand, Iran in general does not have acceptable performance in ecosystems and environmental protection. Iran ranked 83 out of 178 in the Environmental Performance Index report in 2017, and the country suffers from a high level of pollution and waste of water resources and is losing forests [14]. Lifting the foreign sanctions has provided an opportunity for Iranian firms to renew their old-fashioned manufacturing system and equipment. Furthermore, the government encourages newly established firms to use less pollutants and more clean technologies.

3.2. Data Collection

The researchers used the back-translation standard method [67] to translate the English version of the questionnaire into Persian, the official language of Iran. For this purpose, first, a business and management professor fluent in both English and Persian translated the survey into Persian. Later, we asked an English language expert to translate the Persian version back into English. After that, we held a meeting with both translators to compare the original survey with the translated ones to avoid wording problems or ambiguities. Finally, the questionnaires were pre-tested with 10 entrepreneurs and top-level managers before final distribution. One of the researchers met the founders and owners of the targeted small businesses in person, explained the main purpose of the survey, and asked for their participation. The researcher ensured the respondents' anonymity and confidentiality in the research. In total, 188 entrepreneurs in newly established firms received our survey. The final sample of the study consisted of 132 business founders and 12 business owners, which yielded a 75 percent response rate. In our sample, the respondents had an average age of 39.189 years ($SD = 7.865$). Of these, 111 were men and 33 were women. In terms of their academic qualifications, about 80 percent of the entrepreneurs had an academic certificate. The firms had on average 23 employees and were 6.7 years old. In terms of industry affiliation, 18.2 percent were from the service sectors; 24.5 percent from manufacturing; 14.7 percent from agriculture; 8.4 from construction; 10.5 percent from transportation, communications and public utilities; 12.6 percent from retail trade; 4.2 from finance, real estate and insurance; and about 6.9 percent from wholesale trade. We compared the respondents' firms in our study with non-respondents' firms on the basis of firm age and firm size. These comparisons revealed that there was no significant difference between the firms that agreed to participate in our study and those who refused to fill in our survey ($p < 0.05$) [68]. The comparison between early respondents (first 25%) and late respondents (late 25%) also did not provide any difference [69].

3.3. Measurement

3.3.1. Entrepreneurs' Linear and Nonlinear Thinking Styles

Entrepreneurs' linear and nonlinear styles of thinking were measured with the 26 items developed by Vance et al. [30]. The Cronbach's alpha coefficients for linear and nonlinear styles of thinking were

0.94 and 0.95, respectively. The reliability of both scales as measured by internal consistency in this research was quite strong.

3.3.2. Perceived Environmental Uncertainty

We adopted nine items from Ashill and Jobber [31] to measure three types of perceived environmental uncertainty (three items for each type). The Cronbach's alpha for the three types of perceived environmental uncertainty ranged from 0.73 to 0.78. The reliability of all the three scales as measured by internal consistency (Cronbach's alpha) in this research was fairly strong.

3.3.3. Firms' Environmental Orientation

We used eight items from Chan et al. [21] to measure the environmental orientation of the firms. The first four items measured the firms' internal environmental orientation, and the second four items measured the firms' external environmental orientation. The internal consistency of the firms' internal and external environmental orientation scale as measured by Cronbach's alpha was strong, at 0.812 and 0.848, respectively. See Appendix B for the wording of the items measuring the dependent and independent variables.

3.3.4. Control Variables

We controlled a number of entrepreneurs' demographic variables and three firms' demographic characteristics. At the individual level, we controlled the entrepreneurs' age and education (1 = High school; 2 = Attended college; 3 = Undergraduate; 4 = Attended graduate school; 5 = Master's; 6 = Attended doctoral program; 7 = Doctorate), gender (men and women), and experience. We included the entrepreneurs' age, gender, and educational level because these factors influence a person's concern for the environment [70] and his/her perception of environmental uncertainty [27,71]. Previous studies showed that an individual's experiences play an important role in his/her perception of the environment [38] and sustainability-oriented actions [14]. Therefore, we controlled for three types of entrepreneurial experience, namely management experience, marketing experience, and technology experience [72].

We included three firm-level control variables. In the regression analysis, we considered the number of employees in each company (firm size), the number of years the current business had been in operation (firm age), and the industry. For firm age and size, the researchers had access to the archival data of 105 participating firms. We compared this archival data with subjective data that we collected through the survey. As expected, we found quite strong correlations between the objective data and subjective measures for firm age ($r = 0.92, p < 0.001$) and firm size ($r = 0.88, p < 0.001$), which ensured the validity of the reported measures. We had eight different types of firms' industrial affiliation (services; manufacturing; agriculture, forestry, fishing; construction; transportation, communications and public utilities; retail trade; finance, insurance, real estate; and wholesale trade) as a control variable [73]. Previous studies showed that a higher level of technological changes, competition, and growth in a specific industry may enhance the level of perceived environmental turbulence and uncertainty [74].

Table 1 provides information on respondents' education. As we can see, most respondents attended university and have an academic certificate.

Table 1. Distribution of respondents in terms of education, age, and firm size and age.

	High School	Attended College	Undergraduate	Attended Graduate School	Master's	Attended Doctoral Program	Doctorate
Frequency	5	10	48	14	46	12	9
Percentage	0.035	0.069	0.333	0.097	0.319	0.083	0.625

$N = 144$.

The Table 2 represents information on the respondents' age. As we can see, most of the entrepreneurs are aged between 31 and 40 years.

Table 2. Respondents' age (year).

	20–30	31–40	41–50	51–60	60 and Above
Frequency	20	70	40	13	1
Percentage	0.139	0.486	0.278	0.09	0.007

N = 144.

The Table 3 provide information about age of the 144 firms that participated in our survey. Most of these firms were between five and six years old.

Table 3. Firms age (year).

	1–2	3–4	5–6	7–8	9–10
Frequency	3	25	41	35	40
Percentage	0.02	0.174	0.284	0.243	0.278

N = 144.

The Table 4 presents information on the participating firms' size. As we can see, the majority of firms have between 11 and 20 employees.

Table 4. Firm size (number of employees).

	1–10	11–20	21–30	31–40	41–50
Frequency	16	59	29	23	17
Percentage	0.111	0.409	0.201	0.159	0.118

N = 144.

4. Results

An exploratory factor analysis (EFA) using all of the items was run to measure the seven main variables and yielded seven distinct factors with eigenvalues greater than 1; the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.890; and the Bartlett's value was 0.000. The seven- factors explained 71.43% of the total variance. Table 5 displays the mean, standard deviation, and inter-correlations among the constructs of the study. To test the hypotheses of the study, we performed hierarchical regression analysis.

Table 5. Correlation between all variables of the study.

	Mean	S.D	N	1	2	3	4	5	6	7
1. Age	39.189	7.865	144	1						
2. Education	4.076	1.501	144	−0.039	1					
3. Gender	1.769	0.423	144	0.039	−0.054	1				
4. Management Exp.	3.622	0.821	144	0.045	0.03	−0.07	1			
5. Marketing Exp.	3.441	1.039	144	0.016	0.068	−0.007	0.362 **	1		
6. Technology Exp.	3.371	1.105	143	−0.036	0.147	0.034	0.202 *	0.305 **	1	
7. Firm size	23.224	11.722	144	−0.11	0.001	0.032	−0.14	−0.128	−0.086	1
8. Firm age	6.706	2.567	144	0.189 *	−0.270 **	−0.063	0.014	−0.015	0.098	−0.061
9. Industry	5.486	2.993	144	−0.014	0.027	−0.028	0.014	−0.023	−0.017	0.037
10. State	2.814	1.193	143	0.074	0.068	0.198 *	0.035	0.124	0.113	0.037
11. Effect	2.931	1.166	144	−0.059	0.142	0.186 *	−0.013	0.025	0.148	−0.002
12. Response	3.179	1.24	143	0.01	0.075	0.025	−0.029	−0.006	0.266 **	−0.099
13. Internal Orin.	3.323	0.936	144	−0.04	0.096	0.049	−0.028	0.051	0.286 **	−0.054
14. External Orin.	2.438	0.85	143	0.056	−0.092	−0.158	0.006	−0.025	−0.168	0.084
15. Linear	20.538	11.288	143	0.014	0.113	0.107	0.035	0.162	0.117	0.006
16. Nonlinear	18.755	11.042	143	−0.141	0.019	−0.07	0.154	−0.064	−0.162	0.06
			8	9	10	11	12	13	14	15
			1							
			−0.044	1						
			−0.131	−0.185 *	1					
			−0.069	−0.208 *	0.522 **	1				
			0.034	−0.052	0.263 **	0.295 **	1			
			0.011	−0.133	0.484 **	0.533 **	0.436 **	1		
			0.021	0.083	−0.471 **	−0.361 **	−0.488 **	−0.185 *	1	
			−0.028	−0.174 *	0.559 **	0.532 **	0.455 **	0.567 **	−0.477 **	1
			−0.114	0.184 *	−0.527 **	−0.438 **	−0.425 **	−0.546 **	0.453 **	−0.530 **

* Correlation is significant at the 0.05 level (two-tailed). ** Correlation is significant at the 0.01 level (two-tailed).

To test the hypotheses statistically, hierarchical regression analyses were conducted in IBM SPSS statistics 24. Hypotheses 1a, 1b, and 1c predicted that entrepreneurs with linear thinking styles perceive higher levels of environmental state, effect, and response uncertainty. As we can see in Table 6 and Figure 1, there is a positive and significant relationship between the linear thinking style and the perception of (a) environmental state ($\beta = 0.035$; $p < 0.001$); (b) effect ($\beta = 0.041$; $p < 0.001$); and (c) response uncertainty ($\beta = 0.038$; $p < 0.001$). Therefore, hypotheses 1a, 1b, and 1c are empirically supported.

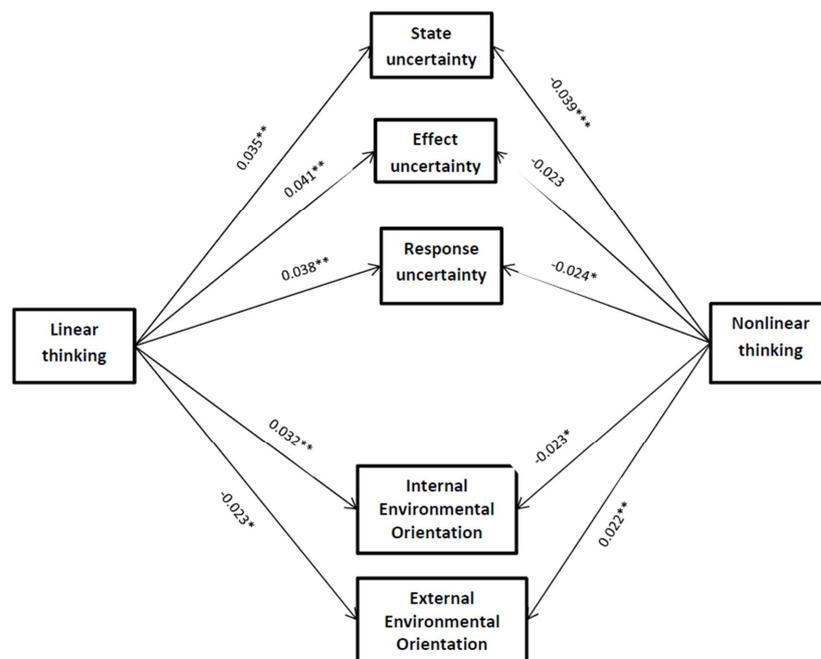


Figure 1. The effects of entrepreneur's thinking style on their perceptions of environmental uncertainty and newly established firms' environmental orientations.

Hypotheses 2a, 2b, and 2c suggested that entrepreneurs with nonlinear styles of thinking perceive lower levels of environmental state, effect, and response uncertainty. Table 6 and Figure 1 present the results of the hierarchical regression analyses. Support was found for Hypothesis 2a, 2b, and 2c, as the slope coefficient for the perception of environmental state uncertainty ($\beta = -0.039$; $p < 0.001$) was negative and significant, for (b) environmental effect uncertainty ($\beta = -0.023$; $p < 0.05$) was negative and significant, and for (c) environmental response uncertainty ($\beta = -0.024$; $p < 0.01$) was also negative and significant. These results suggest that a higher level of nonlinear thinking scores were related to a lower perception of the three types of environmental uncertainty scores.

Hypothesis 3 suggests that newly established firms by entrepreneurs with linear styles of thinking have a greater internal environmental orientation and a lesser external environmental orientation. As we can see in Table 6 and Figure 1, linear thinking is significantly and positively related to the firms' internal environmental orientation ($\beta = 0.032$; $p < 0.001$) and is negatively and significantly related to the firms' external environmental orientation ($\beta = -0.023$; $p < 0.01$). Therefore, Hypothesis 3 was empirically supported by the data.

Hypothesis 4 suggests that newly established firms by entrepreneurs with nonlinear styles of thinking have a lesser internal environmental orientation and greater external environmental orientation. As we can see in Table 6 and Figure 1, the nonlinear style of thinking was significantly and negatively related to firms' internal environmental orientation ($\beta = -0.028$; $p < 0.001$) and was positively and significantly related to firms' external environmental orientation ($\beta = 0.022$; $p < 0.01$). Therefore, Hypothesis 4 was empirically supported by the data.

Table 6. Direct relationship between thinking style with the three types of perceived uncertainty and the firms' environmental orientation.

	State Uncertainty	Effect Uncertainty	Response Uncertainty	Internal Orientation	External Orientation
	Model 1	Model 2	Model 3	Model 4	Model 5
Age	0.008 (0.010)	−0.016 (0.011)	−0.004 (0.012)	−0.010 (0.008)	−0.007 (0.009)
Gender	0.335 * (0.187)	0.390 * (0.195)	−0.075 (0.217)	−0.043 (0.147)	0.191 (0.169)
Education	−0.021 (0.056)	0.057 (0.058)	0.023 (0.065)	0.009 (0.044)	0.038 (0.049)
Management experience	0.144 † (0.106)	0.048 (0.109)	−0.029 (0.123)	−0.002 (0.083)	0.036 (0.096)
Marketing experience	0.016 (0.084)	−0.117 † (0.087)	−0.181 *(0.098)	−0.097 † (0.066)	−0.072 (0.075)
Technology experience	−0.015 (0.078)	−0.089 (0.082)	−0.255 ** (0.091)	−0.185 ** (0.061)	0.065 (0.069)
Firm size	0.005 (0.007)	−0.004 (0.007)	−0.008 (0.008)	−0.004 (0.005)	−0.003 (0.006)
Firm age	−0.087 ** (0.033)	−0.021 (0.034)	0.004 (0.038)	−0.009 (0.026)	−0.003 (0.028)
Industry	−0.027 (0.027)	−0.040 † (0.027)	0.021 (0.031)	−0.002 (0.021)	0.014 (0.024)
Linear thinking	0.035 *** (0.008)	0.041 *** (0.009)	0.038 *** (0.010)	0.032 *** (0.007)	−0.023 ** (0.008)
Nonlinear thinking	−0.039 *** (0.009)	−0.023 * (0.009)	−0.024 ** (0.010)	−0.028 *** (0.008)	0.022 ** (0.008)
R ²	0.451	0.393	0.310	0.455	0.310
Adj. R ²	0.404	0.341	0.251	0.409	0.238
F	9.573 ***	7.490 ***	5.235 ***	9.729 ***	4.435 ***
Number of observations	143	144	143	144	143

Standard errors are in parentheses. Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; † $p < 0.10$.

Figure 1 presents a clear picture regarding the relationship between our independent variables and dependent variables.

We calculated the variance inflation factors (VIF) for all five regression equations. As we can see in Table A2 (in Appendix), the highest VIF score was 1.664; therefore, the multicollinearity is not likely to bias the data [75].

5. Discussion and Conclusions

The lifting of longstanding foreign economic sanctions has caused unpredictable changes in the business environment of Iranian entrepreneurs. By considering the thinking styles of entrepreneurs, we first wanted to find out how entrepreneurs interpret and perceive these unexpected changes. Particularly, we found that entrepreneurs with linear styles of thinking perceived a higher level of environmental state, effect, and response uncertainty, in comparison to entrepreneurs with a nonlinear style of thinking. These results confirmed the heterogeneity of the entrepreneurs' interpretations and perceptions, even concerning the same external shock (lifting foreign sanctions). Secondly, we were interested to know whether the thinking style of the entrepreneurs yielded any difference in terms of the newly established firms' orientation toward the protection of the surrounding environment. We found that newly established firms by entrepreneurs with a linear thinking style preferred more reactive environmental strategies and focused more on the internal environment. Firms recently established by entrepreneurs with a nonlinear thinking style engaged more in proactive environmental strategies and focused more on the external environment.

Even though it was not part of our main hypotheses, we found a positive correlation between three types of uncertainty. Inconsistent findings resulted from studies of the relationships among these three types of uncertainty. Using a sample of university administrators, Milliken [23] found a positive relationship between state and effect uncertainty and negative relationships between state/effect uncertainty and response uncertainty, in contrast some studies [27,76,77] that have found a negative relationship between state with effect/response uncertainties and a positive relationship between effect and response uncertainty. The results in this paper are similar to Ashill and Jobber [31], who found in a study of large established businesses in New Zealand that all three types of uncertainty are positively related to each other. This means that once entrepreneurs are highly uncertain about what is happening in their business environment (state uncertainty), this makes it difficult for them to know how what is happening will impact their organizations (effect uncertainty) and, in turn, will not be able to take a certain response action (response uncertainty). The perception of environmental uncertainty has been considered a fundamental factor for better understanding the variation in entrepreneurs' strategic behavior and actions [25]. In order to know why a common business environment generates heterogeneous types of perceived environmental uncertainty [22], we consider the role of entrepreneurs' differences in terms of their style of thinking. Currently, entrepreneurs are experiencing intense changes in the business environment of post-sanction Iran. These unpredictable changes produce a high level of ambiguities, doubts, and uncertainties for all entrepreneurs and businesspersons. Our empirical evidence for 144 entrepreneurs shows that not all of these entrepreneurs perceived the same amount of environmental uncertainties. The perceptions of environmental state, effect, and response uncertainty was higher among those entrepreneurs who rely heavily on objective, tangible data and verifiable facts when making important decisions. In post-sanction Iran, quantitative data and information about unexpected changes in the business environment is scarce. Therefore, entrepreneurs with rational or linear thinking styles find it more difficult to predict changes in the business environment and to evaluate the effect of those changes on their business; they also feel less confident about their strategic responses.

In contrast, the perception of environmental state, effect, and response uncertainties was lower for entrepreneurs who rely more on feelings, intuitive insights, and qualitative factors at the time of decision-making. Entrepreneurs with a non-rational thinking style exhibit a high level of imagination and creativity at the time of decision-making [8,15], which allowed them to anticipate business environment changes and trends more accurately. Furthermore, these types of entrepreneurs feel more confident about the likely outcomes of their strategic decisions [11]. Entrepreneurs' certainty is particularly important when creating new products or services and new ventures [78].

We contribute to the current literature on perceived environmental uncertainty by finding empirical evidence for the argument in [22], that each type of uncertainty perception has its own particular antecedent. Therefore, we are in a better position to understand why a common external environment translates into different perceptions [25]. The way an entrepreneur uses his/her own mental abilities to carry out organizational activities may yield a different perception of the business environment. Accordingly, one main source of variation in environmental perception is individual differences in thinking style.

Entrepreneurship can be considered a solution for the deterioration of the environment, and certainly entrepreneurs can make a positive contribution to solving environmental problems by creating more environmentally-oriented goods and services [79]. By considering entrepreneurs' different thinking styles, the second main objective of our paper was to determine which type of entrepreneur is interested in running their business in a more sustainable way and in developing a high level of environmental orientation. According to the literature, several factors can explain the level of environmental orientation of entrepreneurs and executives. For instance, Vincent-Molina et al. [80] found that gender can make a difference in the level of an individual's environmental orientation. Females and males have different sets of values and attitudes. These differences influence the level of their environmental orientation and pro-environmental behavior [81].

Sustainable entrepreneurship is a new emerging stream of research in the entrepreneurship literature [82–86]. Sustainable entrepreneurs have a high level of environmental and social concern and contribute positively to environmental degradation [87]. Not all entrepreneurs pay equal attention to sustainability [14]. There is a limited number of studies, especially in developing countries, for the identification of these types of entrepreneurs [14,88]. According to our results, by understanding the style of thinking we can distinguish sustainable entrepreneurs from other entrepreneurs. Our paper provides preliminary answers to recent calls for a better understanding of the sustainable entrepreneur phenomenon [82,86]. In the Iranian context, survey data from 177 entrepreneurs showed that those entrepreneurs that have other values and that are highly future-oriented have a greater tendency to undertake sustainability-oriented actions [14]. In small-sized enterprises, having behaviorally integrated top management teams [89] and a customer orientation [18] are further reasons explaining why Iranian entrepreneurs pay attention to the surrounding business environment.

6. Limitations and Future Research Directions

Several limitations to this research need to be addressed by scholars in future studies. As in many other research studies [18,90–92], the cross-sectional nature of the data may limit the assessment of causal relationships in the model. In particular, some caution must be taken in the interpretation of our findings. Like other similar studies, we considered the entrepreneurs' thinking style to be relatively stable over time; this may not be true. Using a longitudinal design in the future may generate stronger causal inferences. Since our data comes from special regions of Iran, we considered our sample to be culturally homogenous. Individual culture is, however, an important factor in the understanding of environmental perception and orientation [93,94]. By including some control variables related to respondents' culture, future studies may generate results that are more robust. Finally, according to the Sustainable Society Foundation, there are three dimensions for sustainability conditions at the societal level, including high human, environmental, and economic well-being [86,95]. In our paper, we only considered the human factor. To obtain a more holistic picture of sustainability conditions, future studies may choose to consider all three dimensions. Finally, our sample may suffer from some bias. As with most studies in the context of Iran, we were unable to compare the selected entrepreneurs from each region with the total number of entrepreneurs in that region. In contrast to similar studies in developed countries [96–99], this type of statistical information is not available in developing countries.

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Appendix A. Locations of the Selected Firms

There are 1514 SMEs in Kerman province according to recent published statistics of the Center for Strategic Research (CSR), (<http://www.css.ir/Media/PDF/1396/06/15/636403023546679735.pdf>) (2016). Because of several reasons, such as the lack of foreign investments due to longstanding international sanctions, economic mismanagement, corruption and high inflation [100], only 695 SMEs were fully active in the year of the study. The majority of SMEs belonged to the mining and metals (e.g., steel, iron, copper), and agriculture sectors. According to the recent report of the organizations of Industry, Mine & Trade of Province (<http://frs.mimt.gov.ir/>), there are about 4190 SMEs in the Kerman Province (less than 50% of these firms are fully active). Most of the SMEs belong to chemical, petrochemical, food, construction, electrical, electronic and cellulose industries. About 258 SMEs are active in Hormozgan province according to Hormozgan Industrial Estate (<http://www.hriec.ir>). Most of these SMEs

belong to the mining industry (oil, gas, steel, aluminum and related products), fishing industry and import/export industry. According to the Global Entrepreneurship Monitor (GEM) data in 2014 (<https://www.gemconsortium.org/country-profile/71>), most of Iranian entrepreneurs are male and have 25 to 44 years old; most of them hold academic degree (more than 50%).



Figure A1. Areas of the study: Map of Iran. Scale: 1:1,800,000, Source: https://upload.wikimedia.org/wikipedia/commons/b/be/Iran_location_map.svg.

Appendix B. Construct Measures

Table A1. The measurement scale for the independent and dependent variables.

Perceived Environmental State Uncertainty, Adapted from [31]	Factor Loading
After lifting international sanctions, how often do you feel and believe:	
1. You have the information to understand how your business environment will change in the future	0.845
2. Your information about your business environment is adequate for your decision-making	0.754
3. You are unable to get the necessary information about your business environment for your decision-making (Reverse coded)	0.760
Perceived environmental effect uncertainty, Adapted from [31]	
After lifting international sanctions, how often do you feel and believe:	
1. You are unable to predict the impact of your business environment on your project (Reverse coded)	0.845
2. You fully understand the effect of the environment factor on your decision-making	0.783
3. Please indicate your "sureness" (level of certainty) as to how each environmental factor affects your decision-making? (not at all sure about how it will affect my decision making/completely sure about how it will affect my decision making)	0.805
Perceived environmental response uncertainty, Adapted from [31]	
After lifting international sanctions, how often do you feel and believe:	
1. You can accurately anticipate the consequences/outcomes of making decisions before making them	0.736

Table A1. Cont.

Perceived Environmental State Uncertainty, Adapted from [31]	Factor Loading
2. You know how to respond to changes in the external environment	0.819
3. You are able to determine what the response options should be in light of changes in the external environment	0.770
Internal environmental orientation, Adapted from [21]	
1. Our firm makes concerted efforts to let every employee understand the importance of environmental preservation.	0.704
2. Our firm has clear policy statements urging environmental awareness in every area of operations.	0.717
3. Environmental preservation is highly valued by our firm members.	0.716
4. Environmental preservation is a central corporate value of our firm	0.777
External environmental orientation, Adapted from [21]	
1. The developments in the natural environment affect our firm's business activities.	0.793
2. The financial well-being of our firm depends on the state of the natural environment.	0.544
3. Environmental preservation is vital to our firm's survival.	0.744
4. Various external stakeholders expect our firm to preserve the environment.	0.743
Nonlinear thinking style, Adapted from [30]	
1. I primarily rely on my feelings when making career decisions	0.655
2. I primarily weigh qualitative factors when making a decision about a large purchase or investment, such as my gut feelings or a sense that the decision is right for me	0.736
3. When making important decisions, I pay close attention when I experience a "knowing in my bones", chills, tingling or other physical sensations	0.760
4. The most important factor in making life-altering changes (such as a career change, marriage, or major relocation) is feeling it is right for me	0.781
5. When my analysis and intuition are in conflict, I give precedence to my intuitive insights	0.790
How the following items influence on your decision-making and behaviour (3 = "very strong influence on how I behave", 2 = "strong influence on how I behave", 1 = "moderate influence on how I behave" and 0 = "little or no influence on how I behave")	0.778
6. Instincts	
7. Empathy	0.676
8. Felt Sense	0.789
9. Inner Knowing	0.741
10. Feelings	0.813
11. Heartfelt	0.719
12. Hunch	0.745
13. Intuition	0.793
Linear thinking style, Adapted from [30]	
1. I primarily rely on logic when making career decisions	
2. I primarily weigh quantitative factors when making a decision about a large purchase or investment, such as my age, budget needs, or future earnings	0.723
3. When making important decisions, I pay close attention to when a number of people with well-justified expertise give me the same advice	0.716
4. The most important factor in making life-altering changes is knowing that the change is based on objective, verifiable facts	0.743
5. When my analysis and intuition are in conflict, I give precedence to my analytical reasoning	0.776
How the following items influence on your decision-making and behaviour (3 = "very strong influence on how I behave", 2 = "strong influence on how I behave", 1 = "moderate influence on how I behave" and 0 = "little or no influence on how I behave")	0.773
6. Concepts	
7. Rationality	0.747

Table A1. Cont.

Perceived Environmental State Uncertainty, Adapted from [31]	Factor Loading
8. Reason	0.755
9. Logic	0.735
10. Facts	0.782
11. Proof	0.654
12. Data	0.743
13. Deduction	0.735

Table A2. The variance inflation factors.

	State Uncertainty	Effect Uncertainty	Response Uncertainty	Internal	External
	Model 1	Model 2	Model 3	Model 4	Model 5
Age	1.085	1.083	1.085	1.085	1.063
Gender	1.038	1.046	1.038	1.038	1.054
Education	1.159	1.160	1.159	1.159	1.198
Management experience	1.251	1.246	1.251	1.251	1.282
Marketing experience	1.257	1.262	1.257	1.257	1.311
Technology experience	1.201	1.225	1.201	1.201	1.188
Firm size	1.053	1.054	1.053	1.053	1.068
Firm age	1.178	1.173	1.178	1.178	1.184
Industry	1.048	1.048	1.048	1.048	1.082
Linear thinking	1.501	1.540	1.501	1.501	1.645
Nonlinear thinking	1.575	1.623	1.575	1.575	1.664

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