# The impact of novice entrepreneurs' faith in intuition on the entrepreneurial decision-making process

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## ABSTRACT

In today's ever changing environment, entrepreneurship contributes towards economic growth, innovation and job creation. In order to determine individuals that have a potentially higher success rate of becoming an entrepreneur in an uncertain environment, this research focuses on the individual in the entrepreneurial processes; which decision-making process – causational or effectual – is used and *how* can this preference be predicted. There are individual differences in how to use or operate in different modes of processing, but which style of thinking – radical or intuitive – influences the tendency of either effectuation or causation? Does a novice entrepreneurs' faith in intuition influence the preference for using the effectual approach, based on its underlying principles? A questionnaire, covering validated scales of the dependent variables effectuation and causation and the independent variables faith in intuition and need for cognition, was digitally transmitted to novice entrepreneurs. The analysis of the data has shown that neither a person's intuitive, nor radical thinking system causes a preference in effectual or causational decision-making. However, some of the sub-constructs of effectuation are associated with intuition. The differences in the results are supported by previous research; however, there is no evidence that the principles which are not influenced by the intuitive thinking style are contrariwise associated with radical thinking. Future research should compare novice and expert entrepreneurs, including validated scales for measuring experience and domain-specific knowledge in order to consider potential influences.

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## Keywords

Entrepreneurship, novices, decision-making processes, effectuation, causation, cognitive styles, faith in intuition, need for cognition



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# 1. INTRODUCTION

The importance and interest of entrepreneurship is already addressed many years ago (Cole, 1942). In the ever changing environment, entrepreneurship is still an essential and emerging field of research, since it disperses across continents, cultures and economies (Wright & Marlow, 2012), and it is increasingly important job creation (Busenitz, West III, Shephard, Nelson, Chandler, & Zacharakis, 2003). There have been multiple attempts to define entrepreneurship; however there is no uniform agreed definition which covers all aspects of entrepreneurship. Stevenson and Jarillo (1990) describe it as a set of opportunity-based practices, by which individuals pursue these opportunities irrespectively of the organizational context and availability of resources. Shane and Venkataraman (2000) framed the field of entrepreneurship into the existence of entrepreneurial opportunities, the discovery of these opportunities and the decision to exploit them. Essential parts of opportunity recognition are time, action and the contextual setting (Moroz & Hindle, 2011). The discovery, evaluation and creation of opportunities are concerned with providing innovation, engaging in resource allocation and solving problems of uncertainty (York & Venkataraman, 2010). Innovation can be defined as the entrepreneurs "act that endows resources with a new capacity to create wealth" (Drucker, 2014, p. 36). In order to allocate and control resources, such as financial and human capital or technical expertise, high information availability is necessary. There is not only uncertainty about the existence and availability of resources (York & Venkataraman, 2010). Risk and uncertainty are two fundamentally distinctive settings in the opportunity-creation process. A decision-maker, who is aware of the possible outcome, as well as of the probability of his or her action, is considered as taking a risky choice. Otherwise, in an uncertain setting, the decision-maker knows neither the possibility nor the probability of potential outcomes (Burns, Barney, Angus, & Herrick, 2015). Brinckmann, Grichnik and Kapsa (2010) found evidence that business planning is a relevant concept for the success of a new venture. It refers to the dilemma an entrepreneur faces, whether to plan systematic and prediction-oriented or to "just storm the castle" (p. 25). There is a positive relationship between business planning and the actual performance of the firm. However, their empirical analysis lacks in addressing *how* business planning affects firm performance.

The evolution of entrepreneurship has brought several conceptual frameworks defining the entrepreneurial process (Brockner*, Higgins, & Low, 2004; Venkataraman, 1997; Shane & Venkataraman, 2000; Bhave, 1994; Moroz & Hindle, 2011). Earlier research in the field of entrepreneurship is based on rational decision-making models, where opportunities are discovered and evaluated through a planned, goal-driven process (Perry, Chandler, & Markova, 2012). This process is able to predict the uncertain future by defining objectives in advance (Chandler, DeTienne, McKelvie, & Mumford, 2011). The anatomy of a decision contains a specific goal that wants to be achieved and a set of means which can be developed through the decision-making process. Additionally, it involves the maximization of the expected return according to the given goal as a criterion for choosing a specific mean, as well as constraints on potential means, such as the impact of the environment. Sarasvathy (2001) coins this traditional view on entrepreneurship as causation. She defines causation as a process that takes an effect as given and focuses on selecting between means that can help to create that effect. 'Effectuation' is another mode of entrepreneurial decision-making in a new venture development process; it is the inverse of causation. The distinguishing character between these two approaches is the set of choices: 'Causation processes take a particular effect as given and focus on selecting between means to create that effect. Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means*'* (Sarasvathy, 2001, p. 245).

Basically, effectuation can be seen as cognition based theory (Sarasvathy, 2001). Moreover, there is a fundamental relationship between an individual and an opportunity; not every opportunity is processed by every entrepreneur on the same level (Moroz & Hindle, 2011). Shane and Venkataraman (2000) recognized the influence of information corridors and cognitive properties on an individual's ability to recognize and discover entrepreneurial opportunities. The literature about cognition can be conceptualized into mentalism, process orientation and cognition across different levels of analysis, whereas the field of process orientation is so far limitedly researched (Grégoire, Corbett, & McMullen, 2011). The cognitive style of an individual is an essential determinant for an individual's ability of information processing. There are individual differences in how to use or operate in different modes of processing (Kickul, Gundry, Barbosa, & Whitcanack, 2009). The nature of cognitive style is not only a widely accepted field in psychology research. Brain researchers have found a difference between the two cerebral hemispheres of a human. The left can be described as the logical and rational one, whereas the right hemisphere acts as the creative and intuitive half (Saaty, 1990; Schore, 2001). A person's information-processing scheme can also be conceptualized into two parallel systems. The analytical-rational system is influenced by an individual's perception of logic and reasoning orientation. It is a relatively slow, analytic and intentional process. In contrast, the intuitive-experiential system operates at the pre-conscious level; processing information automatically, fast, holistic and intimately connected with affect (Epstein, Pacini, Heier, & Denes-Raj, 1996; Allinson & Hayes, 1996).

The purpose of this research will be to link an entrepreneur's cognitive thinking style to the preference for either effectuation or causation in the decision-making process. Effectuation can become a valuable theory of entrepreneurial processes; however, until now it is relatively underdeveloped. There needs to be a better recognition of potential problems, since it fails to address the causes underlying the process, such as personal resources and capabilities (Arend & Burkemper, 2015). Moroz and Hindle (2011) argue that the theory of effectuation is the only model of entrepreneurial processes that shows a direct practical focus, but lacks in showing that effectuation and causation are cognitive tools that exists in every entrepreneur. Thus, this research aims at investigating which style of thinking, radical or intuitive, leads to a preference of either effectuation or causation. Furthermore, the goal is to examine if the behavior in decision-making is influenced by the entrepreneurs' faith in intuition. On the basis of the ever changing environment, if effectuation leads to successful venture development and could be predetermined by an individuals' cognitive thinking style, then there would be a high chance of predicting suitable individuals for entrepreneurship in situations of uncertainty. Moreover, it will be possible to determine individuals that have a potentially higher success rate of becoming an entrepreneur. Additionally, a research that focuses on the origins of the individual thinking styles will provide mechanisms to improve entrepreneurial thinking in humanity (Krueger, 2007); leading to the following research question: '**To what extend is a novice entrepreneurs' preference in decision-making influenced by the individuals' cognitive thinking style?'**

In order to help the reader to understand the principles of effectual-causal decision-making and the intuitive-analytical thinking styles, the next section will describe the theoretical framework of both concepts. Thereafter, a link between these two concepts will be made, followed by the hypotheses of this research. In order to answer the research question, data was gathered through a questionnaire which was transmitted via different channels. The questionnaire contains proved scales on intuitive-rational information processing and effectual-causal decision-making. The next section describes the general demographics of the sample, followed by the results of the analyses. The discussion part presents the findings and leads to the conclusion of this study. The last part refers to the limitations of this research and suggestions for future research.

# 2. THEORETICAL FRAMEWORK

This chapter starts with a detailed explanation of the differences between effectuation and causation und its underlying principles, followed by an overview of the differences between the intuitive-radical thinking systems. Thereafter, a connection between the two theories will be made, deriving from existing literature.

## 2.1 Causation and Effectuation

An entrepreneur following the causation model starts with recognizing and evaluating an opportunity. This leads to opportunity identification, followed by a cleverly devised planning for the achievement of a specific goal. Moreover, the entrepreneur seeks to acquire resources that contribute to the pursuance of the opportunity, which leads to the development of a solution to meet the perceived requirements. The entrepreneur is able to enter the market, whereas the feedback of the market leads to the adaption of the product or service (Fisher, 2012). Moreover, Chandler, DeTienne, McKelvie and Mumford (2011) argue that the causation process is able to predict the uncertain future by defining objectives in advance.

However, due to the often highly uncertain, unpredictable and dynamic entrepreneurial environments, it is difficult to recognize and evaluate opportunities (Fisher, 2012). The effectual approach focuses on short-term experiments and flexibility for environmental contingencies. Thus, in situations of uncertainty it is assumed that a more effectual approach will be more effective in terms of decision-making. In this case, a decision consists of given types of means, a set of effects generated throughout the decision-making process, constraints on these possible effects and criteria for choosing an effect (Sarasvathy, 2001).

## 2.2 Principles of Effectuation

There are five different sub-constructs of effectuation, firstly developed by Sarasvathy (2001). These principles differentiate effectuation from causation by considering the basis for taking action, the view of risk and resources, the attitude towards others and unexpected events and the view of the future (Alsos, Clausen, & Solvoll, 2014, S. *NYP). Table 1 provides an overview of the differences between the principles of effectuation and causation.

Table 1

Differences between Effectuation and Causation

| Dimension | Causation | Effectuation |
|---|---|---|
| Basis for taking action | Goal-oriented approach | Means-based approach |
| View of risk and resources | Focus on expected returns | Focus on affordable loss |
| Attitude towards others | Competitive analysis | Pre-commitments with stakeholders |
| Attitude toward expected events | Exploiting pre-existing knowledge | Exploiting contingencies |
| View of the future | Predicting the uncertain future | Controlling the unpredictable future |

### *2.2.1 Basis for taking action: Means vs. Ends*

If an entrepreneur follows a goal-oriented approach, he or she thinks about what to do in order to achieve a particular effect. The focus of selecting the goal first is consistent with the causational approach. In contrast, putting the emphasis on creating a new venture with existing means, the entrepreneur follows a means-based approach or the *bird-in-hand principle* which is typically for the effectual approach. Means can be described as the characteristics of the decision-makers, such as who they are, whom they know and what they know (Sarasvathy, 2001; Sarasvathy, Kumar, York, & Bhagavatula, 2013). An entrepreneur following effectuation starts off with three classifications of means. These means refer to the entrepreneurs own capabilities and traits, their knowledge fields and their relationships in social networks (Sarasvathy, 2001). Furthermore, the means can change over time, due to the influence of experience that emerges with time (Krueger, 2007). Moreover, Fischer and Reuber (2011) suggested that entrepreneurs who participate in social interactions such as social media are able to trigger new cognitions regarding the current means and the potential effects that can be generated with those means.

### *2.2.2 View of risk and resources: Affordable loss vs expected returns*

Causation focuses on the principle of maximizing returns by selecting an optimal strategy. Resources will be purchased on the basis of a forecast for the future and a detailed risk calculation (Sarasvathy, 2001). On the opposite, effectuators follow the *affordable-loss principle*; focusing on available resources and committing in advance what they are willing to lose (Sarasvathy, Kumar, York, & Bhagavatula, 2013). For example, an entrepreneur following the causational view on risk and resources refuses to leave his job until there will be an opportunity where he or she predicts a higher salary. In contrast, the effectuator invests a part of private savings and time on a project where he or she keeps faith that it will be of value, irrespective of the actual profit (Dew, Read, Sarasvathy, & Wiltbank, 2009). According to Dew et al. individuals evaluate risks and opportunities in different ways, depending on the level of expertise. For example, novice entrepreneurs are more likely to pursue the highest expected return due to a strong leaning towards selecting multiple market segments.

### *2.2.3 Attitude towards others: Commitment vs Competitive analysis*

Effectual entrepreneurs follow the principle of pre-commitments from a network of self-selected stakeholders. They are forming strategic alliances in contrast to causation, which focuses on competitive analysis (Sarasvathy, 2008). The principle of negotiating with many motivated stakeholders instead of selecting partners for achieving a given goal can be described as the *crazy-quilt principle* (Sarasvathy, Kumar, York, & Bhagavatula, 2013). The partnerships arise before clarifying which goals to pursue, in order to permit the

stakeholders to co-decide on the goals and markets the enterprise will end up (Dew, Read, Sarasvathy, & Wiltbank, 2009). If a stakeholder sees an opportunity in co-creating a venture, he or she can put her "skin in the game" (Sarasvathy, Kumar, York, & Bhagavatula, 2013, p. 74).

### *2.2.4 Attitude towards unexpected events: Exploiting contingencies vs pre-existing*

In unexpected events, causation processes are preferable when pre-existing knowledge acts as a basis for competitive advantage. The effort to eliminate particularly painful surprises is very high. Entrepreneurs that follow an effectual process are more suitable in uncertain environments with exploiting contingencies (Sarasvathy, 2001). Instead of trying to avoid or manage surprises, an entrepreneur following the effectuation model leverages them in order to appropriate contingencies. This refers to the *lemonade principle*; "the process of turning lemons to lemonade" (Sarasvathy, Kumar, York, & Bhagavatula, 2013, p. 74) In contrast to causation, effectuation focuses more on the available resources, builds more partnerships and creates more ends (Dew, Read, Sarasvathy, & Wiltbank, 2009).

### *2.2.5 View of the future: Controlling the unpredictable future vs predicting the uncertain future*

Entrepreneurs following a causation process notice the future as controllable as long as it is predictable. Thus, the focus is the determination of predictable factors in the future. On the other hand, entrepreneurs who try to control the future follow the *pilot-in-plane principle*, which is another term for controlling the unpredictable future in such a way that prediction will be not necessary (Sarasvathy, 2008; Sarasvathy, Kumar, York, & Bhagavatula, 2013). An example of this non-predictive control is a fashion designer who seeks for contracts with large fashion distributors in order to design the type of clothes as negotiated. Contrary to this, an entrepreneur using the logic of predictive control takes advantage of market research in order to predict the fashion of the future before he or she contracts with suitable distributors (Dew, Read, Sarasvathy, & Wiltbank, 2009).

To conclude, an entrepreneur with a preference for effectuation in the decision-making process follows a mean-based approach and the principles of affordable loss and commitment, exploiting contingencies and controlling the unpredictable future. However, effectuation and causation cannot be seen as polar opposites, they rather represent orthogonal approaches (Perry, Chandler, & Markova, 2012). It is assumed that effectuation is best suited in uncertain environments, whereas the causational approach works best for predictable future scenarios (Alsos, Clausen, & Solvoll, 2014, S. *NYP). Sarasvathy compares the process of effectuation to cooking without a recipe, where the outcome will be more uncertain than cooking on schedule. Due to today's ever changing environment it is likely that an effectual approach will lead to a more successful venture development.

Moreover, causation and effectuation are fundamental parts of the human reasoning. Entrepreneurs following the effectuation approach are rather characterized as open-minded about new challenges and possibilities. They are also excellently attuned to their own competencies (Sarasvathy, Kumar, York, & Bhagavatula, 2013).

## 2.3 Cognition

Effectuation can be seen as cognition based theory (Sarasvathy, 2001), Moreover, the decision of a new venture development framed by effectual logic can be based on an intuitive judgement (Blume & Covin, 2011). Epstein and colleagues argue that an individuals' decision-making process can be influenced by its faith in intuition (Epstein, Pacini, Heier, & Denes-Raj, 1996). Intuitions are the outcome of the cognitive processes of an individual and can be defined as: "affectively charged judgments that arise through rapid, nonconscious, and holistic associations" (Dane & Pratt, 2007, p. 33).

An individuals' preference in entrepreneurial actions such as information processing, knowledge gathering and decision-making can be influenced by its cognitive style (Barbosa, Gerhardt, & Kickul, 2007). In psychology research, the nature of cognitive style is a widely accepted field. On the basis of a widely cited definition, a cognitive style refers to the individual differences in the preferred ways of processing information (Allinson & Hayes, 1996). The cognitive style of an individual is an essential determinant for an individual's ability of information processing. There are individual differences in how to use or operate in different modes of processing. Researchers found evidence for a relationship between an individual's cognitive style and the ability of decision-making (Kickul, Gundry, Barbosa, & Whitcanack, 2009). Brain researchers have found a difference between the two cerebral hemispheres of a human. The left can be described as the logical and rational one, whereas the right hemisphere acts as the creative and intuitive half (Saaty, 1990; Schore, 2001). This is in line with Epstein's and colleague's theory of personality, the Cognitive-Experiential Self-Theory (CEST). A person's information-processing scheme can be conceptualized into two parallel systems – the analytical-rational and the intuitive-experiential system (Epstein, Pacini, Heier, & Denes-Raj, 1996; Epstein & Kirkpatrick, 1992). The analytical-rational system, caused by the left hemisphere, can be characterized as thinking-conceptual-logical, deliberative, effortful, intentional, systematic, explicit and verbal. It is influenced by an individual's perception of logic and reasoning orientation. In contrast, the intuitive-experiential system operates at the pre-conscious level; decisions will be made on a natural, automatic, schematic, narrative, implicit, experiential and non-verbal basis (Epstein, Pacini, Heier, & Denes-Raj, 1996). Further details of the two systems are outlined in Table 2.

Table 2

Comparison of Intuitive and Radical Thinking Styles

| Intuitive | Radical |
|---|---|
| Holistic | Analytic |
| Automatic, no effort | Intentional, highly effortful |
| Pleasure-pain oriented (affective) | Reason oriented (logical) |
| Associationistic | Logical |
| Mediated by vibes from past events | Mediated by conscious appraisal of events |
| Concrete images, Metaphors | Abstract symbols, Words, Numbers |
| More rapid | Slow |
| More Resistant to change; slow | Changes more rapidly and easily |
| Crudely differentiated | Highly differentiated |
| More Crudely Integrated (context-specific processing) | More highly Integrated |

| Passive and Preconscious Experience (seized by emotions) | Active and Conscious Experience (in control of thoughts) |
|---|---|
| "Experiencing is believing" | Justification via logic |

Information processing is an essential part of entrepreneurial decision-making. It explores contrasts in the way individuals process information and assess preferences in either rational or intuitive thinking styles (Allinson & Hayes, 1996). Epstein and colleagues constructed the Rational Experiential Inventory (REI), which measures individual differences in their preference for rational or experiential information processing. This measurement uses separate unipolar scales and includes a need for cognition scale (NFC) on the basis of the work of Cacioppo and Petty (1982), in order to cover the analytical-rational system, and the creation of the faith-in-intuition (FI) scale, which refers to the intuitive-experiential system. They measured the two modes of processing among 973 psychology students and came to the conclusion that NFC and FI are two independent systems (Epstein, Pacini, Heier, & Denes-Raj, 1996).

## 2.4 Cognition and Entrepreneurial Decision-Making

Further research indicates that there is a relationship between a person's entrepreneurial intention and its cognitive style and the preference for improvisation. (Hmieleski & Corbett, 2006). "Cognitive style refers to the characteristic way people process and organize information and arrive ad judgements or conclusions, and these styles are viewed as relatively stable dispositions, which leads to differences in behavior in the decision-making process" (Brigham, De Castro, & Shephard, 2007, p. 30). Kickul et al. (2009) found evidence that an individual's cognitive style has an effect on the process of venture development. A person who thinks analytical is confident in planning and evaluating opportunities, but is in an insecure position when it comes to the recognition of opportunities. On the opposite, individuals with an intuitive cognitive style are more confident in recognizing an entrepreneurial opportunity, but are less confident in their ability of evaluating the opportunity.

Students, with a serious theoretical background of entrepreneurial theory, but no experience in the practical field, prefer the causation process when it comes to decision-making, whereas expert's entrepreneurs tend to have a higher degree of effectuation (Dew, Read, Sarasvathy, & Wiltbank, 2009). Read and Sarasvathy (2005) propose effectuation as a form of entrepreneurial expertise, which they describe as a set of processes and skills that an individual can acquire over time. "The development of entrepreneurial expertise is nurtured through effectual reasoning, and effectual action becomes a primary tool of expertise" (p. 24). Similarities between expert and novice entrepreneurs and the logic of effectuation and causation can be found in the example of forward and backward thinking. In forward thinking, employed by experts, information cues such as stakeholder commitments are used as a basis to take action. On the opposite, in backward thinking, employed by novices, information cues are used to validate actions that are based on goals; acting as passive cues derived from the environment. The development of expertise underlies a set of unique theoretical approaches. Amongst others, these approaches include knowledge structure and experience (Read & Sarasvathy, 2005). Krueger (2007) distinguishes between knowledge content and structure. Knowledge content refers to the cognitive framework of an individual and does not change over time. Knowledge structure refers to the way the individual processes information due to development experiences. It does change over time. Thus, experts structure their knowledge content differently than novice entrepreneurs (Krueger, 2007). There is a complex quantity of research investigating that knowledge is gained through experience (Read & Sarasvathy, 2005). Blume and Covin (2011) argue that experience and domain-relevant knowledge are the foundation for the generation of complex knowledge structures. Additionally, familiarity with situations or concepts such as effectuation can lead to 'automatic' behavior in the decision-making process. This indicates that experiences from the past leads to a learning process which acts as basis for the development of intuition (Blume & Covin, 2011). However, experience can lead to decision-making errors, since individuals could become overconfident in the opportunity evaluation which leads to the risk of missing essential objects, due to fragmentary information-processing (Dew, Read, Sarasvathy, & Wiltbank, 2009).

# 3. HYPOTHESES

In order to answer the research question, testable hypotheses are formulated. These alternative hypotheses indicate that a relation between an individual's cognitive style and the preference for either effectuation or causation is expected. Moreover, the construct of effectuation-causation and the intuitive-analytical dimension are tested against other potential influences. Table 3 provides an overview of the hypotheses.

There is a relationship between a person's entrepreneurial intention and its cognitive style and the preference for improvisation. (Hmieleski & Corbett, 2006). Additionally, an individual's cognitive style has an effect on the process of venture development. (Kickul, Gundry, Barbosa, & Whitcanack, 2009). It is expected that in situations of uncertainty a more effectual approach will be more effective (Sarasvathy, 2001). *"*Research on effectuation has drawn attention to the cognitive implications of uncertainty and the consequent constraints it places on both information processing and the use of planning heuristics in entrepreneurship*"* (Grégoire, Corbett, & McMullen, 2011, p. 1461). An individuals' decision-making process can be influenced by its intuition. It can be assumed that the predominant use of intuition is rather related to effectuation than causation. Moreover, research has pointed out that cognition plays an important role in the development of entrepreneurial expertise (Dew, Read, Sarasvathy, & Wiltbank, 2009). However, it cannot be suggested that the entrepreneurs' highest level of expertise is needed in order to use intuition effectively (Blume & Covin, 2011). Therefore, it is interesting to identify whether novice entrepreneurs make use of the effectual decision-making process and their intuitive thinking style, and how these two processes are related. Thus, before testing the underlying principles of effectuation derived from the literature, it needs to be investigated if there is a relationship between a novice entrepreneur's intuitive thinking style and the preference for the effectual approach. This leads to following hypotheses: "*There is a significant influence of a novice entrepreneurs' thinking style on the use of effectual decision-making"* (H1a). Due to the fact that there is not one 'best' way of cognitive thinking and a person will always have intuitive as well as radical thoughts (Epstein, Pacini, Heier, & Denes-Raj, 1996), and causation and effectuation can occur simultaneously (Sarasvathy, 2001), the following hypothesis will also be tested: *"There is a significant influence of a novice entrepreneur's thinking style on the use of causational decision-making"* (H1b).

## 3.1 The cognitive Style and the underlying principles of effectuation

Research has also shown that the entrepreneurial decision-making process can be a combination of causational and effectual actions, since both are part of the human reasoning and can occur simultaneously (Sarasvathy, 2001). Therefore, it is interesting to evaluate whether an individuals' faith in intuition might have an influence of the sub-constructs of effectuation in the decision-making of novice entrepreneurs. In order to investigate potential differences, the principles will be tested on the assumption that they are influenced by the faith in intuition. Figure 1 illustrates this assumption.

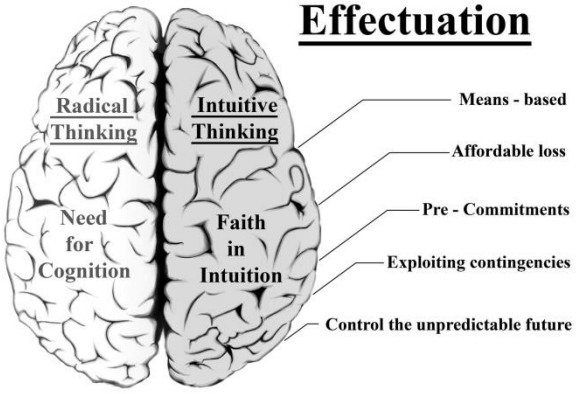


Figure 1: Conceptual Model of Hypotheses

The basis for taking action is interesting to analyze, since the means an entrepreneur starts off includes the individual's own capabilities and traits (Sarasvathy, 2001). This may be affected by a person's faith in intuition and the way he or she makes a decision on the basis of means, since it reasonable that, amongst others, individual's capabilities refers to the cognitive thinking style. This leads to the hypotheses that the use of a means-driven approach is significantly influenced by an entrepreneur's faith in intuition (H2). "The effectuator prefers options that create more options in the future over those that maximize returns in the present" (Sarasvathy, 2001, p. 252). In the earlier described example of the affordable-loss principle, the effectuator invests a part of private savings and time on a project where he or she keeps faith that it will be of value, (Dew, Read, Sarasvathy, & Wiltbank, 2009). It can be assumed that risky investments as such include more intuitive than radical thinking, since intuition tolerates more risk (Butler, Guiso, & Jappelli, 2014). This leads to the hypotheses that the use of the affordable loss principle is significantly influenced by the entrepreneurs' faith in intuition (H3). Intuitive thinkers process information automatically and fast. Thus, they reach decisions more rapidly, on the basis of less information. This is an advantage in dealing with unexpected events or situations of uncertainty. Moreover, being an intuitive thinker reduces the aversion of ambiguity (Butler, Guiso, & Jappelli, 2014). This is in line with the effectual decision-maker who leverages surprises to appropriate contingencies, leading to the hypotheses that the entrepreneurs' faith in intuition influences the use of the exploiting contingencies principle (H4). "An effectual approach calls for entrepreneurs to rapidly engage in conversations with a variety of people they already know or come into contact with, some of whom end up making actual commitments to the new venture" (Sarasvathy, Kumar, York, & Bhagavatula, 2013, p. 74). There is a high potential that the tendency of novice entrepreneurs to rely more on pre-commitments and partnerships is influenced by their faith in intuition, due to the fact that entrepreneurs with an intuitive cognitive style feel more comfortable in unexpected situations. In contrast, situations of uncertainty trigger causational entrepreneurs to analyze and search for more information in order to stay competitive (Krueger, 2007), leading to following hypotheses: *"The use of the pre-commitment principle is significantly influenced by the novice entrepreneur's faith in intuition."* (H5). There has not been much research about entrepreneurial prediction or control of an uncertain environment (Perry, Chandler, & Markova, 2012). Chandler et al. (2011) argue that the causation process is able to predict the uncertain future by defining objectives in advance. Thus, it might be interesting to investigate whether the decision to control the unpredictable future is influenced by the faith in intuition; leading to hypothesis that the use of the controlling the future is significantly influenced by the entrepreneurs faith in intuition (H6).

Table 3

Summary of Hypotheses

| |
|---|
| H1a: There is a significant influence of an entrepreneur's thinking style on the use of effectual decision-making |
| H1b: There is a significant influence of an entrepreneur's thinking style on the use of causational decision-making |
| H2: The use of a means-driven approach is significantly influenced by a novices entrepreneurs faith for intuition |
| H3: The use of the affordable loss principle is significantly influenced by the novice entrepreneurs faith for intuition |
| H4: The use of the exploiting contingencies principle is significantly influenced by the novice entrepreneur's faith in intuition. |
| H5: The use of the pre-commitment principle is significantly influenced by the novice entrepreneur's faith in intuition. |
| H6: The use of controlling the unpredictable future approach is significantly influenced by the novice entrepreneur's faith in intuition. |

# 4. METHODOLOGY

The following chapter contains the sample, the variables and measurement tools and the method of analysis that will be used for conducting this research.

## 4.1 Sample and Data Collection

Considering the fact that the time for this research is relatively limited, quantitative research is the best option to acquire digitally results from a large sample in a less time consuming manner. Novice entrepreneurs, who are founder of a start-up business up to five years, were asked to fill in a questionnaire. The reason for considering only novice entrepreneurs derived from the literature. Dew and colleagues (2009) found differences between students and expert entrepreneur's. Moreover, testing the relationship between effectual decision-making and intuitive thinking on a sample of novice entrepreneurs is limitedly researched. Due to the fact that effectuation can be seen as a tool of expertise (Read & Sarasvathy, 2005), it is interesting to analyze the decision-making behavior and cognitive thinking styles of entrepreneurs who decide on a level that is not fully influenced either by experience, or theory. Additionally, the start-up of the entrepreneur should no longer exist than five years in order to

analyze the behavior in the growth phase, where many decisions have to be made.

This research is part of a bigger project, where the data was collected by a group of five German students as part of their bachelor thesis. It can be expected that translating the original scales in the entrepreneur's native language, the respondent understands the questions in the most preferable way. Thus, Germany was selected as a basis for this research. The last requirement a respondent needs to have is an educational background in order to fit into this research. Respondents that did not meet the requirements were excluded.

After e period of two weeks, a reminder was send via Newsletter2Go to all of the entrepreneurs who did not respond until that moment. In order to reach suitable respondents, around 2000 founders of newly formed start-ups were contacted in total. The questionnaire reached a total of 130 responds, on which 69 were usable due to the previous described requirements. This leads to a response rate of 6.5%.

## 4.2 Measurement Tools

The questionnaire contains questions on intuitive-rational information processing and effectual-causal decision-making. Besides the parts for the dependent and independent variables, the survey contains control variables. Respondents have to answer on questions about their age, study program and work experience in an enterprise. Furthermore, the entrepreneurs will be asked whether they are familiar with the term effectuation. During the data analysis, it will be investigated if these control variables have an influence of the effect between cognitive styles and preference for effectuation or causation.

### *4.2.1 Cognitive style of an individual*

The cognitive style of an individual, which is the independent variable in this research, will be measured on the basis of Epstein and colleagues (1996) theory of personality, the Cognitive –Experiential Self-Theory (CEST). No research was found that linked the model of CEST to the concept of effectuation. There are indeed several alternatives to measure a person's cognitive style; however, survey fatigues can have a big impact on surveys. In order to avoid that respondents may become uninterested in completing the survey, a validated scale with the least possible number of items will be selected (Porter, Whitcomb, & Weitzer, 2004). According to the study of Epstein et al., a ten-item version of the REI, which includes five NFC scales and five FI scales, was developed with the purpose to include it into a questionnaire among students (Epstein, Pacini, Heier, & Denes-Raj, 1996). Due to the fact that only novice entrepreneurs are suitable in this research, there is no need for using a scale developed for experts. Thus, the ten-item scale of the REI will be included into the questionnaire in order to gain insights into the respondents' different thinking styles. Moreover, "The two kinds of processing are not opposite equivalents but represent two kinds of information processing that are independent" (Epstein, Pacini, Heier, & Denes-Raj, 1996, p. 401). It is proven that the scales are sufficiently reliable and independent. The respondent needs to answer on a 5-point-Likert-scale where 1 'I strongly disagree', 2 'I disagree', 3 'I neither agree nor disagree ', 4 'I agree', 5 'I strongly agree'. This leads to an interval variable output, since the data is measured on a scale where the intervals between each scale are equal (Field, 2009).

### *4.2.2 Entrepreneurial decision-making process*

An entrepreneurial decision-making process will be measured on the effectuation and causation model by Sarasvathy (2001). The preference for either causation or effectuation in the decision-making process is the dependent variable. In order to measure an entrepreneurs' degree of effectuation, a ten-item scale developed by Alsos and colleagues will be included (Alsos, Clausen, & Solvoll, 2014, S. *NYP). They critically analyzed and improved Chandler et al. (2011) currently existing scale for the measurement of effectuation and causation. The scale was successfully tested for validity and reliability. Furthermore, this scale covers all five principles of effectuation, which is an essential factor in measuring effectuation (Alsos, Clausen, & Solvoll, 2014). Additionally, the fact that it is a scale with only ten items leads to a minimization of the risk of survey fatigue (Porter, Whitcomb, & Weitzer, 2004). The respondents answers will range on a 7-Point-Scale from 1 totally disagree to 7 totally agree, which will lead to an interval measurement.

## 4.3 Methods of Analysis

After receiving the relevant responses, the data will be transferred into an IBM SPSS Statistics Database (version 22), where all analysis will be conducted. In order to control the reliability of the scales and to measure internal consistency, they will be tested on Cronbach's alpha, which is the most common scale reliability measure (Field, 2009). According to the rule of thumb, a Cronbach's alpha of 0.7 for testing the questionnaire is acceptable. The higher the Cronbach's alpha, the more excellent and reliable will be the tested scale (Santos, 1999). An exploratory factor analysis will be made to measure the constructs of effectuation and causation and intuitive and radical thinking styles. This analysis is essential to identify variability and the underlying relationship in the constructs. The fact that the original scales are translated from English into German justifies the necessity of the factor analysis. The Varimax method of orthogonal rotation will be used since it can be expected that the factors are independent (Field, 2009).

Before testing the hypotheses, it needs to be investigated whether the data is normally distributed or not. The Shapiro-Wilk test is a test of normality and appropriate for small sample sizes (Field, 2009). A significance value below .05 indicates a deviation from the normal distribution. To test the hypotheses, a significance level of 0.05 determines if the output is significant. Every output above 0.05 ($p > 0.05$) will be stated as statistically not significant. In order to estimate the relationship between an individual's intuitive or radical thinking style and entrepreneurial decision-making constructs, a multiple linear regression will be conducted. A multiple regression analysis is logical of situations with several predictor variables (Field, 2009). To predict the relationship of an individual's faith of intuition on the effectual decision-making principals, a linear regression analysis will be conducted. The method of ordinary least squares will be used in order to minimize the differences between the arbitrary dataset of responses in this study and the linear approximation. The Pearson correlation coefficient will be applied in order to measure the strength of relationships between two variables. A value of 1 indicates a totally positive correlation, 0 means no correlation and a value of -1 state that there is a perfectly negative correlation (Field, 2009). A positive correlation coefficient denotes that as one variable changes, the other changes as well. This is also true for a negative correlation, but in this case the other variable changes in the opposite direction.

## 4.4 Control variables

In order to identify whether the control variables age, study program, familiarity with effectuation and work experience are correlated with the thinking styles or behavior in entrepreneurial decision-making, a correlation analysis was conducted (Field, 2009). According to this, the study program is significantly

correlated with causational decision-making (r = -.242, p < .05). The negative relationship indicates that the higher the educational background in business studies of a respondent, the less he or she uses the causational process. For the other control variables, no significant relationship can be observed. A detailed overview can be found in appendix 10.9. Thus, in all likelihood, having an educational background in business administration may influence the preference for the effectual decision-making process.

# 5. RESULTS

## 5.1 Scale validation

The Cronbach's alphas for the data in this research are .808 for the effectuation scale, .744 for the causation scale, .865 for the faith in intuition scale and .767 for the need for cognition scale. This indicates an at least acceptable reliability for all of the set of items.

Table 4

Scale Reliability - Cronbach's Alpha

| Effectuation | Causation | Faith in intuition | Need for cognition |
|---|---|---|---|
| .81 | .74 | .87 | .77 |

Significant if > .7

A principal component analysis was conducted with orthogonal Varimax rotation. The Kaiser–Meyer–Olkin measure verified the sampling adequacy for the analysis of the effectual-causational constructs, KMO = .76 and all KMO values for individual items were > .64 which lies above the acceptable limit of .50 (Field, 2009). Bartlett's test of sphericity (45) =214,052, p < .001, indicates that correlations between items were sufficiently different from zero. The rotated component matrix shows two factor loadings after rotation, where 1 refers to the effectual and factor 2 to the causational construct. .A principal component analysis was also conducted with orthogonal Varimax rotation for the Cognition items. The Kaiser–Meyer–Olkin measure also verified the sampling adequacy for the analysis of the intuitive-radical constructs, KMO = .77. Additionally, all KMO values for individual items were > .58 which lies above the acceptable limit of .50, as well. Bartlett's test of sphericity (45) =264,416 p < .001, indicates that correlations between items were sufficiently different from zero. The rotated component matrix shows two factor loadings after rotation, where 1 refers to faith in intuition and factor 2 to need for cognition.

### *5.1.1 Test of Normality*

The Shapiro-Wilk test shows no statistically significant deviation from a normal distribution for the effectual survey items (SW(69) = .975, p = .171). Next to this, there is a statistically significant deviation from a normal distribution for the causational construct (SW(69) = .960, p = .027. This can be explained through a small amount of outliers; the Normal Q-Q Plot can be found in appendix 10.5.1. However, looking at the skewness of the causational distribution which is less than 1.0 and greater than -1.0 , the distribution can be stated as normally. According to the Shapiro.Wilk test, there is also a statistically significant deviation from a normal distribution for faith in intuition (SW(69) = 0.949, p = .007) and need for cognition (SW(69) = 0.935, p = .001). The skewness for both constructs is also less than 1.0 and greater than -1.0, referring to a normal distribution (Joh* & Malaiya, 2014).

## 5.2 Descriptive statistics

Table 4

Descriptive Statistics

| | Min | Max | Mean | Standard deviation |
|---|---|---|---|---|
| Faith in Intuition | 1,00 | 5,00 | 3,76 | ,75 |
| Need for Cognition | 2,20 | 5,00 | 4,09 | ,72 |
| **Effectual Decision-making** | **1,20** | **6,20** | **3,67** | **1,33** |
| Means-based | 1,0 | 7,0 | 3,48 | 1,86 |
| Affordable Loss | 1,0 | 7,0 | 4,10 | 1,69 |
| Exploiting contingencies | 1,0 | 7,0 | 3,44 | 1,87 |
| Commitment | 1,0 | 7,0 | 3,74 | 1,69 |
| Control future | 1,0 | 7,0 | 3,09 | 1,69 |
| **Causational Decision-making** | **1,40** | **6,40** | **4,56** | **1,02** |
| Goal-oriented | 1,0 | 7,0 | 5,13 | 1,39 |
| Exp. Returns | 1,0 | 7,0 | 4,88 | 1,45 |
| Pre-existing knowledge | 1,0 | 6,0 | 3,35 | 1,39 |
| Comp. Analysis | 1,0 | 7,0 | 4,74 | 1,46 |
| Predict future | 1,0 | 7,0 | 4,68 | 1,54 |

N = 69

From the usable sample of 69 novice entrepreneurs, 25 female and 44 male respondents filled in the questionnaire. This leads to a percentage of 36.2% female and 63.8% male participants. The age ranges from 20 to 59, with a mean of 32 years. 44 respondents (63,8%) have at least a bachelor degree in business administration studies. Moreover, 18 respondents (26..1%) of the total sample are familiar with the term 'Effectuation', 10 (14.5%) are in knowledge of the term and 41 (59.4%) never heard of it. The higher mean of causational decision-making (Mean = 4.56, SD =1.02) indicates that the sample uses more the causational decision-making approach than the effectual (Mean = 3.57, SD = 1.33). Table 4 displays more details about the descriptive statistics. According to the sub-categories of effectuation and causation that are tested within this research, further comparison between the means of the principals will be conducted in order to examine the tendencies of the sample. The respondents in this sample are more goal-oriented (Mean = 5.13, SD = 1.39) than mean-based (Mean= 3.48, SD = 1.86), have a higher preference for expected returns (Mean = 4.89, SD = 1.45) than for affordable loss (Mean= 4.10, SD = 1.69), rely more on competitive analysis (Mean= 4.74, SD = 1.46), than on commitment (Mean= 3.74, SD = 1.69) and have a higher tendency to predict the uncertain future (Mean = 4.68, SD = 1.55) instead of control the unpredictable future (Mean = 3.09, SD = 1.69). The preference for exploiting contingencies (Mean = 3.44, SD = 1.87) and the use of pre-existing knowledge (Mean = 3.35, SD = 1.39) shows a nearly similar mean. This is the only of five underlying principles which does not indicate a clear preference for causational decision-making. Thus, the preferences in the underlying principle are in line with the overall higher mean for the causational decision-making scale. Additionally, there is a higher mean for the need for cognition scale (Mean= 4.09, SD = .72) than for faith in intuition (Mean= 3.76, SD = .75).

In order to identify whether there is an interaction between the two dependent and the two independent variables, a multivariate analysis of variance (MANOVA) was conducted In contrast to an ANOVA analysis, this analysis looks on effectuation and causation simultaneously (Field, 2009). Using Pillai's Trace, which is the most powerful test for equal sample sizes, there is no significant effect of neither faith in intuition (V = .99, F (30, 34) = 1.19, p = >.05), nor need for cognition (V = .68, F (26, 34) = .677, p = >.05) on the entrepreneurial decision-making process. Looking at the dependent variables separately, there is also no significant effect of faith on intuition or need for cognition on neither effectual, nor causational decision-making. Thus, no interaction between the dependent and independent variables can be observed. The data of the analysis are displayed in appendix 10.6 and 10.7.

## 5.3 Hypotheses testing

Table

Results of Hypotheses Testing

| | | Significance level | Hypothesis |
|---|---|---|---|
| H1a: | Effectuation | .114 | rejected |
| | FI | .137 | |
| | NFC | .086 | |
| H1b: | Causation | .750 | rejected |
| | FI | .693 | |
| | NFC | .575 | |
| H2:Means oriented | FI | .552 | rejected |
| H3:Affordable loss | FI | .769 | rejected |
| H4:Exploiting contingencies | FI | .043 | **accepted** |
| H5:Pre-Commitments | FI | .603 | rejected |
| H6:Controlling future | FI | .025 | **accepted** |

Significant if < .05

### *5.3.1 Hypotheses 1*

**H1a**: *There is a significant influence of an entrepreneur's thinking style on the use of effectual decision-making*

A multiple linear regression was calculated to predict effectual decision-making based on the intuitive and radical thinking style. The analysis shows that there is no statistically significant relationship between a person's thinking style and effectual decision-making (F(2, 66) = 2.24, p = ,114). Neither faith in intuition (B = 0.32; SEB = 0.22; t = 1.51; p = .137), nor need for cognition (B = 0.39; SEB = 0.22; t = -1.75; p = .086), shows a statistically relationship for effectual decision-making. When comparing both explanatory variables, the larger beta of 0.212 indicates that need for cognition would be a better predictor of effectual decision-making, since it is associated with a lower p-value. However, there is no significant influence of a novice entrepreneurs thinking style on the preference for effectual decision-making. Thus, H1a is rejected.

**H1b:** *There is a significant influence of an entrepreneur's thinking style on the preference for causational decision-making*

A further multiple linear regression analysis was conducted to predict causational decision-making based on intuitive and radical thinking. The analysis also shows that there is no statistically significant relationship between the cognitive style of an entrepreneur and causational decision-making (F(2, 66) = 0.289, p = .750). Neither faith in intuition (B = 0.07; SEB = 0.17; t = 0.40; p = .693), nor need for cognition (B = 0.10; SEB = 0.18; t = 0.56; p = .575), shows a statistically relationship for effectual decision-making. The larger beta of 0.070 for need for cognition indicates that this construct would also be a better predictor of causational decision-making. However, no significant association can be observed.

Thus, the results of the two multiple linear regression analyses show that an entrepreneur's cognitive thinking style is not associated with neither effectual nor causational decision-making; H1b is rejected.

### *5.3.2 Hypotheses 2*

**H2:** *The use of a means-driven approach is significantly influenced by a novice entrepreneurs' faith for intuition*

According to the OLS linear regression analysis, no statistically significant relationship can be observed between faith in intuition and the use of a mean-based approach (F(1, 67) = 0.357, p =.55). Additionally, the results also show no statistically relationship between faith in intuition and the preference for a goal-oriented approach (F(1,67) = 2,27, p = .137). Therefore, the two linear regressions show that the faith in intuition is not associated with the preference for neither the means-based nor the goal-oriented approach; H2 is rejected.

### *5.3.3 Hypotheses 3*

**H3:** *The use of the affordable loss principle is significantly influenced by the novice entrepreneurs' faith for intuition*

According to the OLS linear regression analysis, there is no statistically significant relationship between faith in intuition and the preference for the affordable-loss principle (F(1, 67) = 0.09, p =.769). Furthermore, the results also show no statistically relationship between faith in intuition and the preference for expected returns (F(1,67) = 0,21, p = .651). Therefore, the two linear regressions show that the faith in intuition is not associated with the preference for neither the affordable-loss principle, nor the expected returns principle; H3 is rejected.

### *5.3.4 Hypotheses 4*

**H4:** *The use of the exploiting contingencies or pre-existing knowledge principle is significantly influenced by the novice entrepreneurs' faith in intuition*.

The OLS linear regression shows a statistically significant relationship between faith in intuition and the preference for exploiting contingencies (F(1, 67) = 4,25, p = .043). The Pearson correlation coefficient of .244 shows a positive, but relatively weak relationship between these two variables; the more faith in intuition, the higher the preference for exploiting contingencies. In line with this, the OLS linear regression shows no statistically significant relationship between faith in intuition and the use of existing knowledge (F(1, 67) = 0,70, p = .406). Thus, the results of the two linear regressions show that faith for intuition is associated with exploiting contingencies. There is enough evidence to not reject H4. In other words, the null-hypotheses, that there is no influence of an individual's faith in intuition, can be rejected.

### 5.3.5 Hypotheses 5

**H5:** *The use of the pre-commitment principle is significantly influenced by the novice entrepreneurs' faith in intuition.*

According to the OLS linear regression analysis, there is no statistically significant relationship between faith in intuition and the use of pre-commitments ($F(1, 67) = 0{,}27$, $p = .603$). Furthermore, the results also show no statistically relationship between faith in intuition and the use of competitive analysis ($F(1,67) = 0{,}09$, $p = .769$). Therefore, the two linear regressions show that the faith in intuition is not associated with the use for neither pre-commitments, nor competitive analysis; H5 is rejected.

### 5.3.6 Hypotheses 6

**H6:** The use of the controlling future principle is significantly influenced by the novice entrepreneurs' faith in intuition.

The OLS linear regression shows that there is a statistically significant relationship between faith in intuition and the preference to control the unpredictable future ($F(1, 67) = 5.24$, $p = .025$. According to the Pearson correlation coefficient of .269, there is a positive, but relatively weak relationship; the more faith in intuition, the higher the preference for controlling the unpredictable future. On the contrary, the OLS linear regression shows no statistically significant relationship between faith in intuition and the preference for predicting the uncertain future ($F(1, 67) = 1.22$, $p = .27$). Therefore, the two linear regression analyses show that an entrepreneur's faith in intuition is associated with the preference for controlling the unpredictable future. There is enough evidence to not reject H6. In other words, the null-hypotheses that there is no influence of an individual's faith in intuition can be rejected.

## 6. DISCUSSION

Findings of the research sample in this study have shown that novice entrepreneurs are more causational decision-makers instead of using the effectual approach. Besides the attitude towards unexpected events, all principles of effectuation and causation are in line with the result of a higher preference for causation. Moreover, there is a higher need in cognition than for the faith in intuition. This is in line with the theory that effectuation is a form of entrepreneurial expertise (Read & Sarasvathy, 2005), which can be developed through experience and learning processes, which in turn act as basis for the development of intuition (Blume & Covin, 2011).

On the basis of existing literature, the hypotheses were formulated and tested on the assumption that the principals of effectuation are influenced by the entrepreneurs' faith in intuition. Due to the fact that the entrepreneurial decision-making process can be a combination of causational and effectual actions (Sarasvathy, 2001), it was also tested whether the faith in intuition has a potential influence on the principals of causation. However, no relationship between causation and its underlying principles and intuitive thinking can be found. According to hypotheses 1, which analyzes the overall effect of the cognitive style on the decision-making process, there is no influence of an individuals' thinking style on the use of neither effectuation nor causation. This means that the null-hypotheses cannot be rejected. Therefore, it is not evidenced that the preference of causational decision-making in the sample is caused by the preference of radical thinking. Hypotheses 2, 3 and 5 have been rejected as well, which means that this sample shows no evidence that faith in intuition affect three out of five underlying principles of effectuation. Additionally, the use of the underlying principles of causation cannot be predicted by a novice entrepreneurs' faith in intuition. However, faith in intuition shows an influence on the attitude towards unexpected events and the view of the future in effectual decision-making. The more faith in intuition an entrepreneur has, the more will be his or her preference for the principle of exploiting contingencies. Moreover, the more faith in intuition an entrepreneur has, the higher the preference to control the future instead of predicting it.

There is no significant association between the overall construct of effectuation and an entrepreneurs' faith in intuition, but some of the principles show that the intuitive thinking style affects the use of effectuation. The difference in the results for the single principles makes it hard to interpret the overall influence of intuitive thinking on effectuation, since effectuation is a multidimensional construct, and therefore the sum of these underlying principles (Chandler, DeTienne, McKelvie, & Mumford, 2011). Furthermore, it needs to be investigated if the principles all have the same value to account for effectuation, in order to come up with trustfully interpretation of these differences.

Contrary to existing literature, familiarity with effectuation and experience are not related to effectual decision-making (Read & Sarasvathy, 2005) or the entrepreneurs' faith in intuition (Blume & Covin, 2011). Due to the fact that the survey only contains one questions concerning work experience: '*How many years work experience do you have as an employee in an organization?*' it was hard to measure the real influence of experience on the constructs of causation-effectuation and intuitive-radical thinking. The fact that this single question does not really measure experience, the potential influence of experience is not considered in this research. However, the results in this sample show that the more knowledge in business studies is available, the less will be the use of the causational process. This is in line with existing literature, that domain-relevant knowledge leads to a preference for the effectual approach (Read & Sarasvathy, 2005; Krueger, 2007).

In order to create a reliable scale for the need for cognition construct, three questions have been reversed coded. In their article, Epstein et al. (1996) identified the first two questions as reversed coding, however during his research, Waardenburg found out that the last question of the NFC scale: '*Thinking hard and for a long time about something gives me little satisfaction*', also needs to be reversed coded. (Waardenburg, 2016). This assumption was approved by Seymour Epstein and therefore accounted for this research. The reliability of the questionnaire including all Cronbach's alpha scores is acceptable ($> 0.7$). Additionally, the factor analysis shows that there are respectively two factors for the decision-making process (effectuation and causation) and the cognitive style (intuitive and radical). This illustrates that the constructs are actually measuring what is expected and in need for the study.

## 7. CONCLUSION

This paper attempts to make a contribution to the theory of effectual decision-making establishing a link between an entrepreneur's cognitive style and the use of effectuation. The analysis aims to answer the research question: "**To what extend is a novice entrepreneurs' preference in decision-making influenced by the individuals' cognitive thinking style? "** In this study, no link between an entrepreneur's faith in intuition and the use of either the effectual or the causational approach can be observed. In more detail, neither a person's intuitive nor radical thinking system causes a preference in effectual or causational decision-making (H1a, H1b). Considering the underlying principles, there is no relationship between intuitive thinking and the basis for taking action (H2), the view on risk

and resources (H3) and the attitude towards others (H5). This is against the expectations of the literature. There is a significant association between faith in intuition and only two out of five principles of effectuation (H4, H6). These differences can be supported by previous research, which has shown that the entrepreneurial decision-making process can be a combination of causational and effectual actions (Sarasvathy, 2001). However, there is no evidence that the principles which are not influenced by the intuitive thinking style are contrariwise associated with radical thinking; there is no significant relationship between need for cognition and the entrepreneurial decision-making and its underlying principles. Moreover, the quiet similar means between the principle of exploiting contingencies and the principle of pre-existing knowledge indicate that there is no necessity of a tendency between effectuation and causation when making a decision, towards unexpected events. This result challenges the assumption that a more effectual approach is more effective in situations of uncertainty (Sarasvathy, 2001). As mentioned by Arend and Burkemper (2015), the concept of effectuation lacks in addressing personal resources and capabilities underlying this logic. This leads to the idea that not the individuals' thinking style alone may act as a single predictor for the behavior in the decision-making process. Besides the individuals' preference in thinking, it needs to be investigated whether there are common means of entrepreneurs, such as who they are, whom they know and what they know (Sarasvathy, 2001; Sarasvathy, Kumar, York, & Bhagavatula, 2013), and how they change over time (Krueger, 2007). For example, as evidenced in this research, the educational background in business administration studies has a negatively impact on the causational decision-making. Thus, research firstly needs to concentrate on the circumstances that force an individual to decide for a business administration study, followed by an investigation how this study program, or the development of domain-relevant knowledge, affects the preference for either causational or effectual decision-making. Considering the example of Sarasvathy (2001), where she compares the process of effectuation to cooking without a recipe where the outcome will be more uncertain than cooking on schedule. In order to predict the use of effectual decision-making, the reasons that may lead to the decision to not cook on schedule needs to be investigated. Additionally, it needs to be challenged whether experience in cooking without a recipe and knowledge about this process influences the outcome.

# 8. LIMITATIONS AND FUTURE RESEARCH

The focus in this research lies in the five principles of effectual-causational decision-making (Sarasvathy, 2001) and has shown that there is no evidence for the impact of an entrepreneurs' cognitive thinking style on the entrepreneurial decision-making process. One limitation of this research is the fact that the hypotheses are formulated with respect to the faith in intuition scale (Epstein, Pacini, Heier, & Denes-Raj, 1996) .However, no significant relationship between one of the principles and the need for cognition scale can be observed. The sample shows a higher preference for the causational construct, which can act as a limitation due to the fact that entrepreneurs only from Germany were asked to fill in the questionnaire. In this case, the cultural aspect plays an important role when conducting the research. Additionally, only novice entrepreneurs fulfilled the requirement of being a suitable respondent, where several questions arise; such as what actually is a novice entrepreneur and why is there no currently existing scale for the explicit measure of a novice entrepreneur thinking style? Thus, a suggestion for future research would be to distribute a questionnaire among international entrepreneurs, including experts and novices in order to analyze the relationship between the cognitive style and the behavior and preferences in decision-making. Furthermore, the survey needs to include a reliable scale of experience, to analyze the influence of experience, the impact on the individual cognitive thinking style, as well as on the concept of effectuation and causation.

The small sample size is a further limitation of this study. The fact that this research is part of a bigger project, the survey contained questions which are not considered in this research. Thus, the low response rate could be explained by the length of the questionnaire (Porter, Whitcomb, & Weitzer, 2004). The method of the data collection could be a further explanation of the small sample size. The survey was firstly distributed via e-mail and public networks, though it turned out that this does not lead to the desired response rate. Thus, entrepreneurs were contacted personally through social networks, which led to an increase in responses due to a perceived higher rate of attention.

A potential further limitation is the assumption that some respondents might have read between the lines and tried to give, as they assume, the best possible answer. Respondents were offered the possibility to make comments on the questionnaire. One of the participants commented that he did not see himself as an entrepreneur anymore, due to the fact that he has a 'bad picture' of an entrepreneur in the meanwhile. This might be a very interesting starting point for future research, not only in general but also for the assumption that this might influence an entrepreneurs' cognitive thinking style. While identifying reasons for the doubt in being an entrepreneur, it could be investigated if this might have a similar impact on the cognitive style like experience, as stated in the literature. Additionally it would be interesting if this kind of doubt has an influence on the preference for either effectual or causational decision-making.

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# 10. APPENDIX

## 10.1 Survey items for cognitive thinking styles

Need for Cognition (NFC)

1. I don't like to have to do a lot of thinking ®.
2. I try to avoid situations that require thinking in depth about something ®.
3. I prefer to do something that challenges my thinking abilities rather than something that requires little thought.
4. I prefer complex to simple problems.
5. Thinking hard and fora long time about something gives me little satisfaction ®.

Faith in Intuition (FI)

6. I trust my initial feelings about people.
7. I believe in trusting my hunches.
8. My initial impressions of people are almost always right.
9. When it comes to trusting people, I can usually rely on my "gut feelings."
10. I can usually feel when a person is right or wrong even if I can't explain how I know

## *10.2* Survey items for effectual/causal decision-making

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

## 10.3 Cronbach's alpha

### *10.3.1 Need for Cognition*

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| ,767 | ,767 | 5 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| NFC1_Reversed | 4,2464 | 1,06282 | 69 |
| NFC2_Reversed | 4,5507 | ,79588 | 69 |
| NFC3 | 3,8986 | 1,15230 | 69 |
| NFC4 | 3,7826 | ,98324 | 69 |
| NFC5_Reversed | 3,9710 | ,99957 | 69 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 20,4493 | 13,075 | 3,61588 | 5 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|---|
| NFC1_Reversed | 16,2029 | 9,046 | ,453 | ,249 | ,755 |
| NFC2_Reversed | 15,8986 | 9,916 | ,504 | ,302 | ,739 |
| NFC3 | 16,5507 | 7,339 | ,706 | ,511 | ,656 |
| NFC4 | 16,6667 | 8,549 | ,619 | ,442 | ,695 |
| NFC5_Reversed | 16,4783 | 9,430 | ,431 | ,213 | ,760 |

### *10.3.2 Faith in Intuition*

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| ,865 | ,867 | 5 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| FI1 | 3,667 | 1,0664 | 69 |
| FI2 | 3,899 | ,9259 | 69 |
| FI3 | 3,739 | ,8162 | 69 |
| FI4 | 3,855 | ,8791 | 69 |
| FI5 | 3,638 | ,9231 | 69 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 18,797 | 13,899 | 3,7282 | 5 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|---|
| FI1 | 15,130 | 8,380 | ,710 | ,542 | ,832 |
| FI2 | 14,899 | 8,857 | ,759 | ,581 | ,817 |
| FI3 | 15,058 | 9,702 | ,694 | ,498 | ,836 |
| FI4 | 14,942 | 9,261 | ,722 | ,524 | ,828 |
| FI5 | 15,159 | 9,783 | ,565 | ,349 | ,865 |

### *10.3.3 Causation*

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| ,744 | ,743 | 5 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| C1Goal_oriented | 5,130 | 1,3923 | 69 |
| C2Expected_Returns | 4,884 | 1,4505 | 69 |
| C3PreExisting_Know | 3,348 | 1,3914 | 69 |
| C4Comp_Analysis | 4,739 | 1,4618 | 69 |
| C5Pred_UncertainFut | 4,681 | 1,5482 | 69 |

**Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 22,783 | 25,967 | 5,0958 | 5 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|---|
| C1Goal_oriented | 17,652 | 18,083 | ,502 | ,296 | ,701 |
| C2Expected_Returns | 17,899 | 17,916 | ,484 | ,281 | ,708 |
| C3PreExisting_Know | 19,435 | 19,426 | ,375 | ,199 | ,745 |
| C4Comp_Analysis | 18,043 | 16,219 | ,646 | ,446 | ,645 |
| C5Pred_UncertainFut | 18,101 | 16,769 | ,536 | ,397 | ,688 |

### *10.3.4 Effectuation*

**Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| ,808 | ,809 | 5 |

**Item Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| E1Means_oriented | 3,478 | 1,8599 | 69 |
| E2Affordable_Loss | 4,101 | 1,6903 | 69 |
| E3Exploiting_Cont | 3,435 | 1,8746 | 69 |
| E4Commitment | 3,739 | 1,6947 | 69 |
| E5Control_UnpredictFut | 3,087 | 1,6868 | 69 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|---|
| E1Means_oriented | 14,362 | 30,176 | ,504 | ,357 | ,799 |
| E2Affordable_Loss | 13,739 | 29,490 | ,631 | ,441 | ,760 |
| E3Exploiting_Cont | 14,406 | 27,627 | ,649 | ,452 | ,753 |
| E4Commitment | 14,101 | 31,357 | ,511 | ,347 | ,794 |
| E5Control_UnpredictFut | 14,754 | 28,688 | ,686 | ,506 | ,743 |

## 10.4 Factor Analysis

### *10.4.1 Causation/Effectuation*

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,760 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 214,052 |
| | df | 45 |
| | Sig. | ,000 |

**Component Transformation Matrix**

| Component | 1 | 2 |
|---|---|---|
| 1 | ,781 | -,625 |
| 2 | ,625 | ,781 |

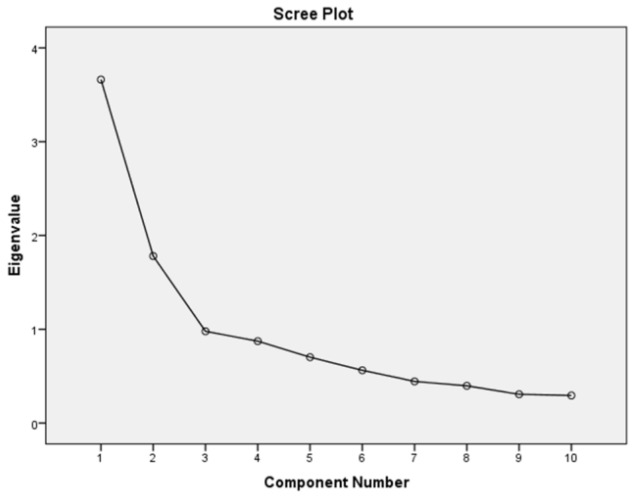
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

**Rotated Component Matrix[a]**

| | Component | |
|---|---|---|
| | 1 | 2 |
| C1Goal_oriented | | ,653 |
| C2Expected_Returns | | ,640 |
| C3PreExisting_Know | | ,653 |
| C4Comp_Analysis | | ,805 |
| C5Pred_UncertainFut | | ,696 |
| E1Means_oriented | ,653 | |
| E2Affordable_Loss | ,772 | |
| E3Exploiting_Cont | ,794 | |
| E4Commitment | ,697 | |
| E5Control_UnpredictFut | ,773 | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.




### *10.4.2 Intuition/Cognition*

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | ,777 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 264,416 |
| | df | 45 |
| | Sig. | ,000 |

**Component Transformation Matrix**

| Component | 1 | 2 |
|---|---|---|
| 1 | ,869 | ,494 |
| 2 | -,494 | ,869 |

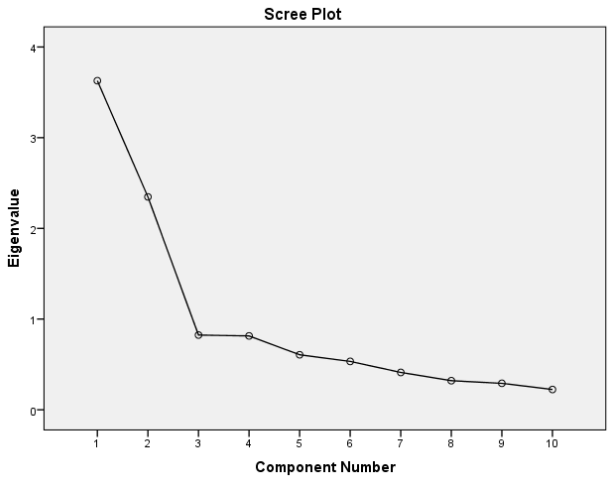
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

**Rotated Component Matrix[a]**

| | Component | |
|---|---|---|
| | 1 | 2 |
| NFC1_Reversed | | ,663 |
| NFC2_Reversed | | ,685 |
| NFC3 | | ,845 |
| NFC4 | | ,788 |
| NFC5_Reversed | | ,585 |
| FI1 | ,832 | |
| FI2 | ,866 | |
| FI3 | ,815 | |
| FI4 | ,820 | |
| FI5 | ,676 | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.



## 10.5 Testing Normality

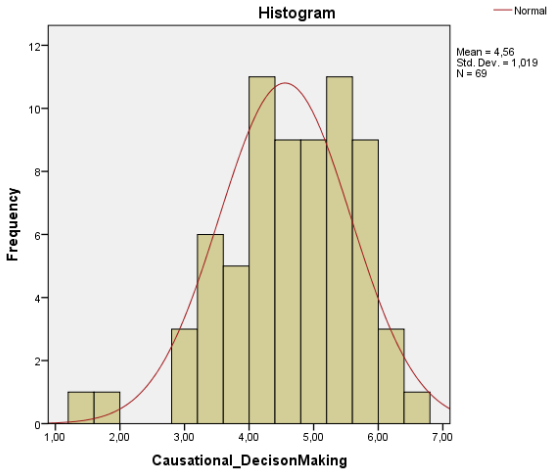
### *10.5.1 Effectuation/Causation*

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Causational_DM | ,103 | 69 | ,067 | ,960 | 69 | ,027 |
| Effectual_DM | ,070 | 69 | ,200* | ,975 | 69 | ,171 |

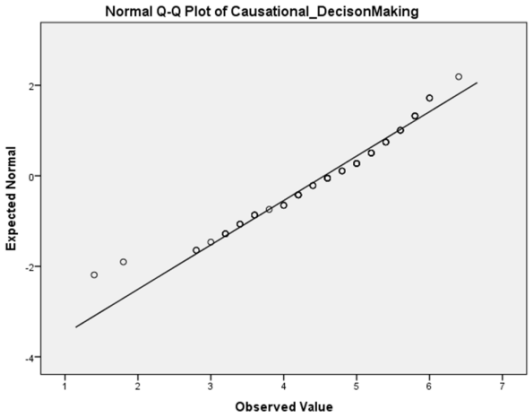
*. This is a lower bound of the true significance.

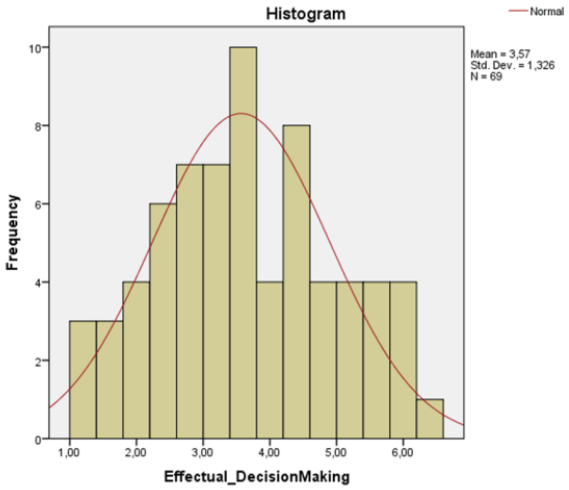
a. Lilliefors Significance Correction

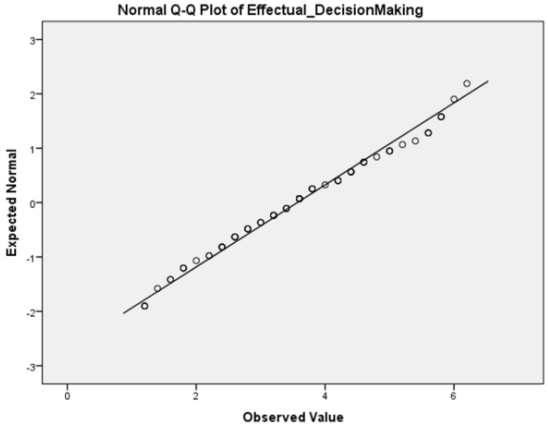



**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Causational_DM | Mean | | 4,5565 | ,12269 |
| | 95% Confidence Interval for Mean | Lower Bound | 4,3117 | |
| | | Upper Bound | 4,8013 | |
| | 5% Trimmed Mean | | 4,6061 | |
| | Median | | 4,6000 | |
| | Variance | | 1,039 | |
| | Std. Deviation | | 1,01915 | |
| | Minimum | | 1,40 | |
| | Maximum | | 6,40 | |
| | Range | | 5,00 | |
| | Interquartile Range | | 1,40 | |
| | Skewness | | -,717 | ,289 |
| | Kurtosis | | ,517 | ,570 |
| Effectual_DM | Mean | | 3,5681 | ,15958 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,2497 | |
| | | Upper Bound | 3,8866 | |
| | 5% Trimmed Mean | | 3,5646 | |
| | Median | | 3,6000 | |
| | Variance | | 1,757 | |
| | Std. Deviation | | 1,32560 | |
| | Minimum | | 1,20 | |
| | Maximum | | 6,20 | |
| | Range | | 5,00 | |
| | Interquartile Range | | 1,90 | |
| | Skewness | | ,107 | ,289 |
| | Kurtosis | | -,800 | ,570 |



### *10.5.2 Intuition/Cognition*

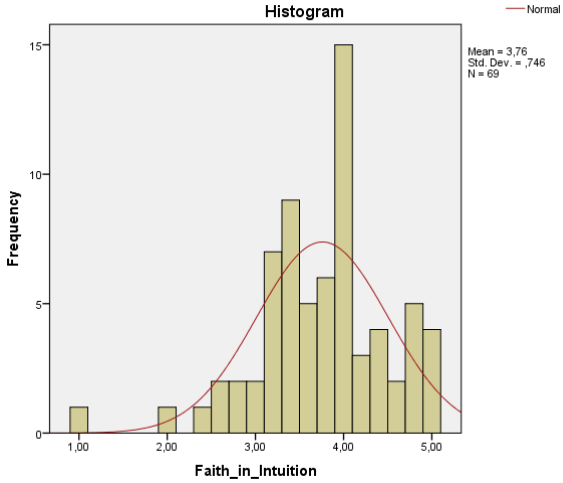
**Tests of Normality**

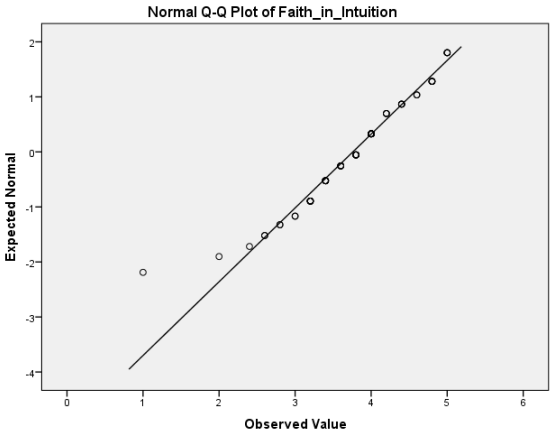
| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Faith_in_Intuition | ,113 | 69 | ,030 | ,949 | 69 | ,007 |
| Need_For_CognitionR | ,108 | 69 | ,046 | ,935 | 69 | ,001 |

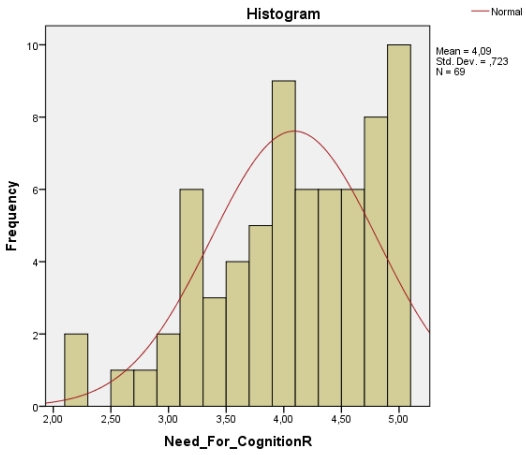
a. Lilliefors Significance Correction

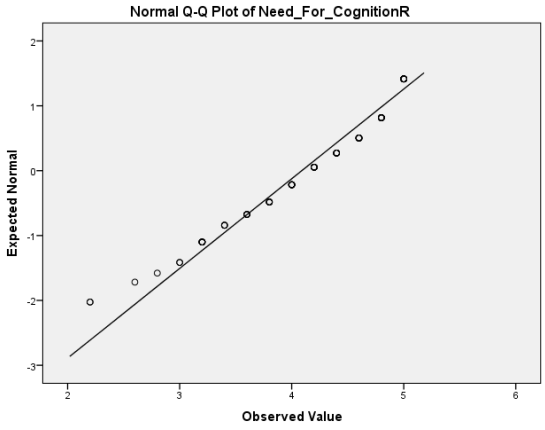
**Descriptives**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| Faith_in_Intuition | Mean | | 3,7594 | ,08976 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,5803 | |
| | | Upper Bound | 3,9385 | |
| | 5% Trimmed Mean | | 3,7936 | |
| | Median | | 3,8000 | |
| | Variance | | ,556 | |
| | Std. Deviation | | ,74564 | |
| | Minimum | | 1,00 | |
| | Maximum | | 5,00 | |
| | Range | | 4,00 | |
| | Interquartile Range | | ,80 | |
| | Skewness | | -,746 | ,289 |
| | Kurtosis | | 1,798 | ,570 |
| Need_For_CognitionR | Mean | | 4,0899 | ,08706 |
| | 95% Confidence Interval for Mean | Lower Bound | 3,9161 | |
| | | Upper Bound | 4,2636 | |
| | 5% Trimmed Mean | | 4,1335 | |
| | Median | | 4,2000 | |
| | Variance | | ,523 | |
| | Std. Deviation | | ,72318 | |
| | Minimum | | 2,20 | |
| | Maximum | | 5,00 | |
| | Range | | 2,80 | |
| | Interquartile Range | | 1,20 | |
| | Skewness | | -,639 | ,289 |
| | Kurtosis | | -,195 | ,570 |



## 10.6 Output variables MANOVA

**Multivariate Tests[a]**

| Effect | | Value | F | Hypothesis df | Error df | Sig. |
|---|---|---|---|---|---|---|
| Intercept | Pillai's Trace | ,987 | 589,488 | 2,000 | 16,000 | ,000 |
| Faith_in_Intuition | Pillai's Trace | ,993 | 1,118 | 30,000 | 34,000 | ,375 |
| Need_For_CognitionR | Pillai's Trace | ,682 | ,677 | 26,000 | 34,000 | ,847 |
| Faith_in_Intuition * Need_For_CognitionR | Pillai's Trace | ,985 | ,718 | 46,000 | 34,000 | ,854 |

a. Design: Intercept + Faith_in_Intuition + Need_For_CognitionR + Faith_in_Intuition * Need_For_CognitionR

**Tests of Between-Subjects Effects**

| Source | Dependent Variable | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Corrected Model | Causational_DM | 46,090[a] | 51 | ,904 | ,626 | ,900 |
| | Effectual_DM | 92,517[b] | 51 | 1,814 | 1,143 | ,395 |
| Intercept | Causational_DM | 844,449 | 1 | 844,449 | 584,989 | ,000 |
| | Effectual_DM | 563,324 | 1 | 563,324 | 355,036 | ,000 |
| Faith_in_Intuition | Causational_DM | 16,464 | 15 | 1,098 | ,760 | ,700 |
| | Effectual_DM | 43,826 | 15 | 2,922 | 1,841 | ,113 |
| Need_For_CognitionR | Causational_DM | 6,990 | 13 | ,538 | ,372 | ,962 |
| | Effectual_DM | 21,344 | 13 | 1,642 | 1,035 | ,465 |
| Faith_in_Intuition * Need_For_CognitionR | Causational_DM | 22,096 | 23 | ,961 | ,666 | ,821 |
| | Effectual_DM | 34,124 | 23 | 1,484 | ,935 | ,567 |
| Error | Causational_DM | 24,540 | 17 | 1,444 | | |
| | Effectual_DM | 26,973 | 17 | 1,587 | | |
| Total | Causational_DM | 1503,200 | 69 | | | |
| | Effectual_DM | 997,960 | 69 | | | |
| Corrected Total | Causational_DM | 70,630 | 68 | | | |
| | Effectual_DM | 119,490 | 68 | | | |

a. R Squared = ,653 (Adjusted R Squared = -,390)

b. R Squared = ,774 (Adjusted R Squared = ,097)

## 10.7 Pearson's Correlation Matrix

**Correlations**

| | | C1Goal_oriented | C2Expected_Returns | C3PreExisting_Know | C4Comp_Analysis | C5Pred_UncertainFut | E1Means_oriented | E2Affordable_Loss | E3Exploiting_Cont | E4Commitment | E5Control_UnpredictFut | Faith_in_Intuition | Need_For_CognitionR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1Goal_oriented | Pearson Correlation | 1 | ,328 | ,401 | ,458 | ,279 | -,269 | -,162 | -,264 | -,291 | -,318 | ,181 | ,158 |
| | Sig. (2-tailed) | | ,006 | ,001 | ,000 | ,020 | ,026 | ,184 | ,028 | ,015 | ,008 | ,137 | ,196 |
| | N | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| C2Expected_Returns | Pearson Correlation | | 1 | ,181 | ,409 | ,481 | -,186 | -,265 | -,095 | -,156 | -,248 | ,055 | ,007 |
| | Sig. (2-tailed) | | | ,138 | ,000 | ,000 | ,125 | ,028 | ,439 | ,200 | ,040 | ,651 | ,953 |
| | N | | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| C3PreExisting_Know | Pearson Correlation | | | 1 | ,356 | ,202 | -,037 | ,016 | ,020 | ,039 | -,120 | ,102 | ,044 |
| | Sig. (2-tailed) | | | | ,003 | ,095 | ,764 | ,896 | ,870 | ,750 | ,328 | ,406 | ,717 |
| | N | | | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| C4Comp_Analysis | Pearson Correlation | | | | 1 | ,567 | -,170 | -,150 | -,237 | -,117 | -,301 | ,036 | ,009 |
| | Sig. (2-tailed) | | | | | ,000 | ,163 | ,219 | ,050 | ,339 | ,012 | ,769 | ,944 |
| | N | | | | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| C5Pred_UncertainFut | Pearson Correlation | | | | | 1 | -,237 | -,184 | -,276 | -,116 | -,395 | -,134 | ,065 |
| | Sig. (2-tailed) | | | | | | ,050 | ,130 | ,022 | ,342 | ,001 | ,274 | ,594 |
| | N | | | | | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| E1Means_oriented | Pearson Correlation | | | | | | 1 | ,574 | ,391 | ,227 | ,404 | -,073 | -,159 |
| | Sig. (2-tailed) | | | | | | | ,000 | ,001 | ,061 | ,001 | ,552 | ,191 |
| | N | | | | | | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| E2Affordable_Loss | Pearson Correlation | | | | | | | 1 | ,496 | ,358 | ,487 | ,036 | -,041 |
| | Sig. (2-tailed) | | | | | | | | ,000 | ,002 | ,000 | ,769 | ,736 |
| | N | | | | | | | 69 | 69 | 69 | 69 | 69 | 69 |
| E3Exploiting_Cont | Pearson Correlation | | | | | | | | 1 | ,476 | ,616 | ,244 | -,220 |
| | Sig. (2-tailed) | | | | | | | | | ,000 | ,000 | ,043 | ,069 |
| | N | | | | | | | | 69 | 69 | 69 | 69 | 69 |
| E4Commitment | Pearson Correlation | | | | | | | | | 1 | ,558 | ,064 | -,173 |
| | Sig. (2-tailed) | | | | | | | | | | ,000 | ,603 | ,156 |
| | N | | | | | | | | | 69 | 69 | 69 | 69 |
| E5Control_UnpredictFut | Pearson Correlation | | | | | | | | | | 1 | ,269 | -,062 |
| | Sig. (2-tailed) | | | | | | | | | | | ,025 | ,613 |
| | N | | | | | | | | | | 69 | 69 | 69 |
| Faith_in_Intuition | Pearson Correlation | | | | | | | | | | | 1 | ,188 |
| | Sig. (2-tailed) | | | | | | | | | | | | ,122 |
| | N | | | | | | | | | | | 69 | 69 |
| Need_For_CognitionR | Pearson Correlation | | | | | | | | | | | | 1 |
| | N | | | | | | | | | | | | 69 |

## 10.8 Hypotheses: Regression analysis

### *10.8.1 H1a Multiple regression: Thinking styles and effectual decision-making*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,252[a] | ,064 | ,035 | 1,30205 |

a. Predictors: (Constant), Need_For_CognitionR, Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7,597 | 2 | 3,799 | 2,241 | ,114[b] |
| | Residual | 111,893 | 66 | 1,695 | | |
| | Total | 119,490 | 68 | | | |

a. Dependent Variable: Effectual_DecisionMaking

b. Predictors: (Constant), Need_For_CognitionR, Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3,935 | 1,110 | | 3,547 | ,001 |
| | Faith_in_Intuition | ,324 | ,216 | ,182 | 1,505 | ,137 |
| | Need_For_CognitionR | -,388 | ,222 | -,212 | -1,745 | ,086 |

a. Dependent Variable: Effectual_DecisionMaking

### *10.8.2 H1b Multiple regression: Thinking styles and causational decision-making*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,093[a] | ,009 | -,021 | 1,02997 |

a. Predictors: (Constant), Need_For_CognitionR, Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | ,614 | 2 | ,307 | ,289 | ,750[b] |
| | Residual | 70,015 | 66 | 1,061 | | |
| | Total | 70,630 | 68 | | | |

a. Dependent Variable: Causational_DecisonMaking

b. Predictors: (Constant), Need_For_CognitionR, Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3,897 | ,878 | | 4,440 | ,000 |
| | Faith_in_Intuition | ,068 | ,171 | ,049 | ,396 | ,693 |
| | Need_For_CognitionR | ,099 | ,176 | ,070 | ,563 | ,575 |

a. Dependent Variable: Causational_DecisonMaking

### *10.8.3 H2: Faith in intuition/Means-oriented*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,073[a] | ,005 | -,010 | 1,8687 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1,245 | 1 | 1,245 | ,357 | ,552[b] |
| | Residual | 233,972 | 67 | 3,492 | | |
| | Total | 235,217 | 68 | | | |

a. Dependent Variable: E1Means_oriented

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 4,160 | 1,165 | | 3,573 | ,001 |
| | Faith_in_Intuition | -,181 | ,304 | -,073 | -,597 | ,552 |

a. Dependent Variable: E1Means_oriented

### *10.8.3.1 Faith in intuition/Goals-oriented*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,181[a] | ,033 | ,018 | 1,3796 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4,310 | 1 | 4,310 | 2,265 | ,137[b] |
| | Residual | 127,516 | 67 | 1,903 | | |
| | Total | 131,826 | 68 | | | |

a. Dependent Variable: C1Goal_oriented

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3,861 | ,860 | | 4,491 | ,000 |
| | Faith_in_Intuition | ,338 | ,224 | ,181 | 1,505 | ,137 |

a. Dependent Variable: C1Goal_oriented

### *10.8.4 H3: Faith in intuition/Affordable loss*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,036[a] | ,001 | -,014 | 1,7018 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | ,252 | 1 | ,252 | ,087 | ,769[b] |
| | Residual | 194,038 | 67 | 2,896 | | |
| | Total | 194,290 | 68 | | | |

a. Dependent Variable: E2Affordable_Loss

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3,795 | 1,060 | | 3,578 | ,001 |
| | Faith_in_Intuition | ,082 | ,277 | ,036 | ,295 | ,769 |

a. Dependent Variable: E2Affordable_Loss

### *10.8.4.1 Faith in intuition /Expected returns*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,055[a] | ,003 | -,012 | 1,4591 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | ,439 | 1 | ,439 | ,206 | ,651[b] |
| | Residual | 142,633 | 67 | 2,129 | | |
| | Total | 143,072 | 68 | | | |

a. Dependent Variable: C2Expected_Returns

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 4,479 | ,909 | | 4,926 | ,000 |
| | Faith_in_Intuition | ,108 | ,237 | ,055 | ,454 | ,651 |

a. Dependent Variable: C2Expected_Returns

### *10.8.5 H3: Faith in intuition/Exploiting contingencies*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,244[a] | ,060 | ,046 | 1,8313 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 14,258 | 1 | 14,258 | 4,251 | ,043[b] |
| | Residual | 224,698 | 67 | 3,354 | | |
| | Total | 238,957 | 68 | | | |

a. Dependent Variable: E3Exploiting_Cont

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1,126 | 1,141 | | ,987 | ,327 |
| | Faith_in_Intuition | ,614 | ,298 | ,244 | 2,062 | ,043 |

a. Dependent Variable: E3Exploiting_Cont

### *10.8.5.1 Faith in Intuition/ Pre-existing Knowledge*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,102[a] | ,010 | -,004 | 1,3945 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1,361 | 1 | 1,361 | ,700 | ,406[b] |
| | Residual | 130,291 | 67 | 1,945 | | |
| | Total | 131,652 | 68 | | | |

a. Dependent Variable: C3PreExisting_Know

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 2,634 | ,869 | | 3,032 | ,003 |
| | Faith_in_Intuition | ,190 | ,227 | ,102 | ,837 | ,406 |

a. Dependent Variable: C3PreExisting_Know

### *10.8.6 Faith in Intuition/Pre-Commitments*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,064[a] | ,004 | -,011 | 1,7039 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | ,791 | 1 | ,791 | ,273 | ,603[b] |
| | Residual | 194,513 | 67 | 2,903 | | |
| | Total | 195,304 | 68 | | | |

a. Dependent Variable: E4Commitment

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3,195 | 1,062 | | 3,009 | ,004 |
| | Faith_in_Intuition | ,145 | ,277 | ,064 | ,522 | ,603 |

a. Dependent Variable: E4Commitment

### *10.8.6.1 Faith in intuition/ competitive analysis*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,036[a] | ,001 | -,014 | 1,4717 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | ,189 | 1 | ,189 | ,087 | ,769[b] |
| | Residual | 145,116 | 67 | 2,166 | | |
| | Total | 145,304 | 68 | | | |

a. Dependent Variable: C4Comp_Analysis

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 4,474 | ,917 | | 4,878 | ,000 |
| | Faith_in_Intuition | ,071 | ,239 | ,036 | ,295 | ,769 |

a. Dependent Variable: C4Comp_Analysis

### *10.8.7 Faith in intuition/Controlling future*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,269[a] | ,073 | ,059 | 1,6365 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 14,045 | 1 | 14,045 | 5,244 | ,025[b] |
| | Residual | 179,433 | 67 | 2,678 | | |
| | Total | 193,478 | 68 | | | |

a. Dependent Variable: E5Control_UnpredictFut

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | ,796 | 1,020 | | ,780 | ,438 |
| | Faith_in_Intuition | ,610 | ,266 | ,269 | 2,290 | ,025 |

a. Dependent Variable: E5Control_UnpredictFut

### *10.8.7.1 Faith in intuition/Predicting future*

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,134[a] | ,018 | ,003 | 1,5457 |

a. Predictors: (Constant), Faith_in_Intuition

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 2,912 | 1 | 2,912 | 1,219 | ,274[b] |
| | Residual | 160,073 | 67 | 2,389 | | |
| | Total | 162,986 | 68 | | | |

a. Dependent Variable: C5Pred_UncertainFut

b. Predictors: (Constant), Faith_in_Intuition

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 5,725 | ,963 | | 5,943 | ,000 |
| | Faith_in_Intuition | -,278 | ,251 | -,134 | -1,104 | ,274 |

a. Dependent Variable: C5Pred_UncertainFut

## 10.9 Correlation Matrix – Control variables

**Correlations**

| | | Familarity_Effectuation | Business_Administration_Study | Age | Work_Experience | Faith_in_Intuition | Need_For_CognitionR | Effectual_DM | Causational_DM |
|---|---|---|---|---|---|---|---|---|---|
| Familarity_Effectuation | Pearson Correlation | 1 | ,155 | -,070 | ,177 | ,050 | -,110 | ,072 | -,126 |
| | Sig. (2-tailed) | | ,203 | ,570 | ,145 | ,686 | ,369 | ,557 | ,302 |
| | N | 69 | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| Business_Administration_Study | Pearson Correlation | | 1 | ,269 | -,074 | ,106 | ,090 | ,082 | -,242 |
| | Sig. (2-tailed) | | | ,025 | ,547 | ,384 | ,460 | ,501 | ,045 |
| | N | | 69 | 69 | 69 | 69 | 69 | 69 | 69 |
| Age | Pearson Correlation | | | 1 | ,362 | ,053 | ,109 | -,014 | -,038 |
| | Sig. (2-tailed) | | | | ,002 | ,665 | ,372 | ,907 | ,757 |
| | N | | | 69 | 69 | 69 | 69 | 69 | 69 |
| Work_Experience | Pearson Correlation | | | | 1 | ,067 | -,136 | -,059 | -,116 |
| | Sig. (2-tailed) | | | | | ,584 | ,266 | ,632 | ,343 |
| | N | | | | 69 | 69 | 69 | 69 | 69 |
| Faith_in_Intuition | Pearson Correlation | | | | | 1 | ,188 | ,143 | ,063 |
| | Sig. (2-tailed) | | | | | | ,122 | ,242 | ,609 |
| | N | | | | | 69 | 69 | 69 | 69 |
| Need_For_CognitionR | Pearson Correlation | | | | | | 1 | -,177 | ,080 |
| | Sig. (2-tailed) | | | | | | | ,145 | ,516 |
| | N | | | | | | 69 | 69 | 69 |
| Effectual_DM | Pearson Correlation | | | | | | | 1 | -,344 |
| | Sig. (2-tailed) | | | | | | | | ,004 |
| | N | | | | | | | 69 | 69 |
| Causational_DM | Pearson Correlation | | | | | | | | 1 |
| | N | | | | | | | | 69 |