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The influence of uncertainty (in)tolerance on decision-making behaviour of entrepreneurs

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Abstract

What an entrepreneur decides is related to *how* it is decided: the decision logic. Scholars have asked for a better understanding of the effects of individual-level variables such as personality traits on entrepreneurial decision-making research. This study examined the relation between the attitude towards uncertainty and the decision-making behaviour of entrepreneurs. To examine this, 20 semi-structured interviews were held with craft beer brewers from the Netherlands. The interviews were coded by 2 students and 1 effectuation expert based on the 4 dimensions of effectuation and causation. The attitude towards uncertainty was measured for both prospective, inhibitory, and general anxiety based on the Intolerance of Uncertainty Scale. The results show no clear relation between effectual and causal decision-making and the uncertainty (in)tolerance of entrepreneurs, but rather a relation between the levels of anxiety and some dimensions of entrepreneurial decision-making. The conclusion that the attitude towards uncertainty influences only certain aspects of decision-making behaviour gives us a better understanding of how entrepreneurial decision-making processes take place and challenges some previous studies. As this study took place during the covid-19 pandemic, future (longitudinal) research could investigate what the (long-term) influence is of the covid-19 pandemic on the attitude towards uncertainty and the decision-making behaviour of entrepreneurs.

Keywords: Entrepreneurship, Entrepreneurs, Decision-making, Effectuation, Causation, Uncertainty intolerance, Prospective anxiety, Inhibitory anxiety

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1. Introduction

In the last decades, there has been a lot of scholarly attention for entrepreneurial decision-making processes (Grégoire & Cherchem, 2020; Shepherd et al., 2015; Stroe et al., 2018). Especially risk is a key concept in entrepreneurship research, as uncertainty, ambiguity, setbacks, and stressful situations are part of the daily life of an entrepreneur (Liu, 2020). Since the beginning of economic thought on entrepreneurship, entrepreneurial expertise has been inextricably intertwined with uncertainty (Herbert & Link, 1988). Even though there might be a lot of uncertainty, entrepreneurs are still required to take action. Higgins and Kruglanski (2000) state that these actions both involve knowledge and motivation, which make it evident that different entrepreneurs will act differently. *What* an entrepreneur decides is related to *how* it is decided: the decision logic.

Although there is already a lot of scholarly attention on entrepreneurial decision making (Arend et al., 2015), this research still faces several theoretical and methodological challenges (Grégoire & Cherchem, 2020). Therefore, there still is a desire for a better understanding of how, when, where and by whom decisions are made in certain, but also uncertain conditions in several fields, including management, psychology, sociology, and political science (Shepherd et al., 2015). Stroe et al. (2018) specifically proposed that future research should focus on the effect of individual-level variables such as personality traits or motivational constructs on decision-making. They argue that individual-level factors interact and influence the decision-making of entrepreneurs (Stroe et al., 2018), but Grégoire and Cherchem (2020) state that real evidence for possible relationships remains inconclusive. If relationships could be found, they could provide valuable input for hiring procedures of new employees or interesting information for competitor analyses.

In 2001 Sarasvathy introduced effectuation theory as two different approaches to new venture creation which advanced the understanding of the entrepreneurial process (Chandler et al., 2011). It differentiates between causal and effectual decision-making. The distinction can be made using the fact that causation predicts, and effectuation is non-predicting (Sarasvathy, 2001). In causal decision-making, one chooses the effect using a particular set of means, whereas with effectual decision-making one selects the means in order to create a certain effect. Effectuation theory was a newly proposed theory that challenged the traditional understanding of entrepreneurial decision-making and behaviour (Sarasvathy, 2001). Naturally, that led to quite some debates (Grégoire & Cherchem, 2020). Alsos et al. (2016) state that the research on effectuation theory is still in its infancy and somewhat fragmented, and thus presents ample opportunity for future research. They proposed further research on the possible relations between effectuation as a theory of entrepreneurship and other concepts, models, and theories. Arend et al. (2015) urge to identify which behavioural

fundamentals drive the observed patterns. Stroe et al. (2018) suggested that psychological constructs, like for example an individual's perception or attitude towards risk, are central in understanding entrepreneurial behaviour. Risk propensity, an individual´s attitude towards taking or avoiding risks, is also often referred to as risk-taking tendency or willingness to take risk (Wang et al., 2016). Stewart and Roth (2001) claim that entrepreneurs generally have higher risk propensities than non-entrepreneurs and therefore Perry et al. (2011) suggest a possible relationship between an individual's risk propensity and the degree to which an individual uses effectuation versus causation. To investigate whether there is a relationship between an entrepreneur's decision-making and the entrepreneur's (in)tolerance of risk further qualitative research is necessary. Therefore, to gain more insights into the influence of uncertainty avoidance on the decision-making process of entrepreneurs the following research question is addressed:

To what extent is entrepreneurial decision-making behaviour, effectuation and causation, influenced by uncertainty (in)tolerance?

To answer this research question, 20 entrepreneurs have been interviewed. In these semi-structured interviews the uncertainty (in)tolerance is measured using questions based on the intolerance of uncertainty scale which is developed by Carleton et al. (2007) and improved by Walker et al. (2010). In chapter 2 there is further elaborated upon why this framework is chosen to measure uncertainty (in)tolerance and the theory behind it. The effectuation theory and measures are mainly based on the articles of Chandler et al. (2011) and Reymen et al. (2015).

This research has several important contributions. First, it contributes to the request for a better understanding of how, when, where and by whom decisions are made in both certain and uncertain conditions (Shepherd et al., 2015). By linking the personality traits of entrepreneurs to their decision-making logic valuable lessons can be learned about this process. Second, by linking these one also gains more insights into the influence of individual-level factors on the decision-making logic an entrepreneur uses (Stroe et al., 2018), and third, it provides evidence for possible relationships which remained inconclusive until now. Fourth, it contributes to the identification of behavioural fundamentals which drive observed patterns of effectuation and causation (Arend et al., 2015). These lessons learned are also relevant for both researchers and entrepreneurs, as entrepreneurs can use them in business operations.

To get a better understanding of effectuation, causation, and uncertainty avoidance this research starts with a theoretical framework. In this framework, these concepts are further elaborated upon. Then, in the methodology chapter the data sampling, data collection methods and the data analysis of this research are explained. Next, the results are presented. This research ends with a discussion of the results and the conclusions that could be drawn.

2. Theory

In this chapter, more theoretical background is given to the key concepts of this study. In order to answer the research question, first, there is elaborated upon the concepts of effectual and causal decision-making. By describing the different dimensions of effectuation and causation one is able to identify the differences. Second, to fully understand the concept of uncertainty avoidance, the theory behind uncertainty intolerance is elaborated upon. At last, the concepts are combined in several propositions.

2.1 Decision-making: effectuation and causation

When Sarasvathy (2001) introduced effectuation she defined it as: *"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."* (p. 245). Several years later it is seen as a healthy and growing theoretical perspective that has led to a major shift in entrepreneurial understanding (McKelvie et al., 2020). However, there are also some critical scholars. For example, Arend et al. (2015) argue that there are difficulties in measurement. According to McKelvie et al. (2020), numerous approaches exist which are all based on fundamentally different views of effectuation theory. This leads to little consensus on the more detailed aspects of effectuation and how it should empirically be examined (McKelvie et al., 2020). Where Sarasvathy focussed on single decisions in a series of decisions, this research focuses on series of decisions that are part of a whole process. Because of this assumption and other assumptions which are stated in the methodology section, this research most closely follows the approach of Chandler et al. (2011) and Reymen et al. (2015).

One of the differences of this study with, among others, Sarasvathy (2001), Alsos et al. (2014), and Werhahn et al. (2015) is the fact that they use five dimensions to capture the underlying believes of entrepreneurs, whereas Chandler et al. (2011), Brettel et al. (2012), and Reymen et al. (2015) use four because they believe that the 'view of the future' dimension is represented within the others. I agree with the latter, which state that effectual approaches focus on reducing uncertainty through emphasizing control, and causal approaches that emphasize prediction (Reymen et al., 2015). Therefore, in the next part of this chapter, I elucidate upon four dimensions of effectuation and causation. Another ongoing discussion in the effectuation literature is whether there is a relationship between expert and novice entrepreneurs and their decision-making behaviour (Stroe et al., 2018). The assumption that Sarasvathy (2008) made was that the number of expertise entrepreneurs has, influences how they make their decisions. However, this assumption was never directly tested, and both expert and novice entrepreneurs show both causal and effectual behaviour (Stroe et al., 2018). Therefore, the level of expertise is not taken into account in this study.

2.1.1 Basis for taking action: Means-orientated vs Goal-orientated

The first dimension focuses on which basis entrepreneurs take action. The effectual and causal approach differ fundamentally in how they take action. Using the causal approach, one focuses on selecting means in order to reach a certain given effect or goal (Reymen et al., 2015). Entrepreneurs who show causal decision-making behaviour try to map the environment by analysing the competition, trends in the market and perceived competitive advantage. They use this to create a strategic plan to make sure they assemble the right resources in order to achieve that certain goal or effect (Reymen et al., 2015). Causation can be compared with cooking based on a recipe, whereas effectuation can be compared with creating a dish based on the available ingredients (Sarasvathy, 2001). Using the effectual approach one starts with the means available and subsequently focuses on selecting between possible effects or goals (Reymen et al., 2015). Entrepreneurs who show effectual decision-making behaviour choose an effect they want to achieve using the assets they currently possess. However, due to developing assets and growing means, it is possible the possible effects or goals change over time.

2.1.2 Risk and resources: Affordable loss vs Expected returns

A typical causal approach would be to make a well-defined business plan in order to attract large investments which enable the maximisation of expected returns (Reymen et al., 2015). Entrepreneurs who show causal behaviour would do this by calculating several different possible scenarios. The effectual approach is completely different regarding the size and flexibility of investments made and sought. Entrepreneurs who show effectual behaviour would only make or seek investments that are not larger than the maximum they can afford to lose (Reymen et al., 2015). Instead of investing as much as possible in order to create maximal potential future returns, they make small investments and use, or repurpose, local resources. They thus focus on the current situation and assets they already possess while remaining flexible.

2.1.3 Attitude towards others: Pre-Commitment vs Competitive analysis

The entrepreneur's attitude towards others is quite different depending upon whether they show causal or effectual behaviour. Using the causal approach, one is protecting knowledge from other people and organisations, because they want to use it for building a competitive advantage (Reymen et al., 2015). If they do partner with others, the partners are carefully selected based on the expertise they can add to reach the entrepreneur's goals. So, using the causal approach one performs a competitive analysis, and only if the other can add something to the goals of the company the other party is considered as a potential partner. Whereas using the effectual logic, other people and organisations are seen as pathways to new resources

(Reymen et al., 2015). These entrepreneurs reduce uncertainty by using pre-commitments and strategic alliances in order to control an unpredictable future (Chandler et al., 2011).

2.1.4 Attitude towards unexpected events/contingencies: Leveraging contingencies vs Avoiding contingencies

Entrepreneurs can have different reactions to unexpected events. Entrepreneurs who use the causal approach try to avoid those events and will try to keep carrying out the planned strategy (Reymen et al., 2015). They see them as interruptions of the execution of their plan and instead want to keep exploiting pre-existing capabilities and resources (Chandler et al., 2011). The effectual approach, in contrast, tries to leverage these contingencies and unexpected events. Entrepreneurs who use this approach are actively seeking feedback and are trying to incorporate this in the process (Reymen et al., 2015). They try to remain flexible because this allows them to exploit these environmental contingencies (Chandler et al., 2011).

2.2 Uncertainty avoidance

The future is truly unpredictable Knight (1921) and thus entrepreneurs operate in an uncertain environment (Mintzberg, 1973). Entrepreneurs can encounter uncertainty in technology, organizational design, target customers, customer preferences, marketing channels, competitive strategies, and employee recruitment (Wiltbank et al., 2009). However, uncertainty also gives opportunities for profit that one does not get in situations where risks can be calculated (Knight, 1921). To define uncertainty Knight (1921) divided it into three distributions: known, unknown and unknowable. Read et al. (2009) stated that the known and unknown distributions can be tackled using predictive techniques, thus causation. According to Read and Sarasvathy (2005), the unknowable can be tackled using effectuation. However, the decision-making logics an entrepreneur uses is closely related to the willingness to bear uncertainty. Uncertainty avoidance, also known as intolerance of uncertainty, is defined as a *"cognitive bias that affects how a person perceives, interprets, and responds to uncertain situations on a cognitive, emotional, and behavioural level"* (Dugas et al., 2005, p. 58). According to Bottesi et al. (2019) people who possess high levels of intolerance of uncertainty see uncertain events in the future as threatening, upsetting, and undesirable. They will try to either control or avoid uncertainty and potentially make impulsive decisions or show excessive information-seeking behaviour (Bottesi et al., 2019).

The Intolerance of Uncertainty Scale (IUS) is the most widely adopted measure for intolerance of uncertainty (Birrell et al., 2011) which has developed throughout the years. Originally, Carleton et al. (2007) were able to develop a reliable 12-item two-factor version of the IUS that has a high internal consistency (IUS-12). In a successful attempt to further improve this questionnaire Walker et al. (2010) rephrased some items, so it is suitable for all ages (Bottesi

et al., 2019). This version with simplified language, Uncertainty Scale-Revised (IUS-R), also has 2 factors. The first factor, prospective intolerance of uncertainty, involves fear and anxiety based on future events (Carleton et al., 2007). It demonstrates the tendency of a person to reduce uncertainty by actively seeking for information (Bottesi et al., 2019). The second factor, inhibitory intolerance of uncertainty, describes uncertainty inhibiting action or experience (Carleton et al., 2007). It is related to avoidance-orientated behaviour in response to uncertainty (Bottesi et al., 2019). Using these two factors one is able to make a reliable assessment of the uncertainty avoidance levels of entrepreneurs.

2.3 Propositions

In this section, several propositions are formulated which link the concepts of effectuation, causation, and uncertainty avoidance. As stated before, there is still a desire for a better understanding of the effects of personality traits on entrepreneurial decision-making behaviour. Nicholson et al. (2005) showed that risk propensity is strongly rooted in an individual's personality, and thus it is especially relevant to further investigate this relationship. Kornilova et al. already suggested that the *"tolerance and intolerance for uncertainty are key variables in the overarching system of personal regulation of choice and decision making under conditions of uncertainty"* (2018, p. 88).

Individuals who score high on uncertainty avoidance tend to avoid uncertain situations. One of the methods to avoid these situations is by trying to predict the uncertain future. According to Sarasvathy (2001) the focus of entrepreneurs who show causal behaviour is on predicting uncertainties. Since the first factor, prospective intolerance of uncertainty is related to the tendency of an individual to reduce uncertainty by actively seeking for information it is reasonable to expect a relationship between these two.

Proposition 1: *Entrepreneurs with a high level of prospective intolerance of uncertainty, more often show causal decision-making behaviour*

On the other hand, individuals who score low on uncertainty avoidance probably have less of a problem with uncertain situations. They decide what they will do when the situation comes and do not try to write a whole plan which limits their flexibility. As Chandler et al. (2011) stated, entrepreneurs who show effectual behaviour try to make use of uncertain situations by leveraging contingencies and unexpected events, thus they do not have the urge to actively seek for information all the time. Therefore, a negative relationship is expected between entrepreneurs who score high on prospective intolerance of uncertainty and show effectual behaviour.

Proposition 2A: *Entrepreneurs with a low level of prospective intolerance of uncertainty, more often show effectual decision-making behaviour*

Proposition 2B: *Entrepreneurs with a low level of prospective intolerance of uncertainty, less often show causal decision-making behaviour*

The second factor, inhibitory intolerance of uncertainty, describes the inhibitory role uncertainty can have on the actions or experiences of entrepreneurs. For example, people who show causal behaviour can feel threatened by unexpected events and therefore tend to work in isolation (Reymen et al., 2015). This suggests a possible relationship between high levels of inhibitory intolerance of uncertainty and causal behaviour.

Proposition 3: *Entrepreneurs with a high level of inhibitory intolerance of uncertainty, more often show causal decision-making behaviour*

Contrary to this, people who score low on inhibitory intolerance of uncertainty do not feel the inhibiting role uncertainty can have. Reymen et al. (2015) state that entrepreneurs who show effectual decision-making behaviour even react positively to unexpected events. They try to incorporate unforeseen developments and sometimes even actively expose themselves or the company to outside influences. Therefore, a negative relationship is expected between entrepreneurs who score high on inhibitory intolerance of uncertainty and show effectual behaviour.

Proposition 4A: *Entrepreneurs with a low level of inhibitory intolerance of uncertainty, more often show effectual decision-making behaviour*

Proposition 4B: *Entrepreneurs with a low level of inhibitory intolerance of uncertainty, less often show causal decision-making behaviour*

As the correlation between the two factors, prospective and inhibitory intolerance of uncertainty, is high (r = .73) (Carleton et al., 2007), it makes sense to also investigate the general tolerance of uncertainty. The general intolerance of uncertainty is defined as the combination of the two factors. Therefore, the following two propositions are made.

Proposition 5: *Entrepreneurs with a high level of general intolerance of uncertainty, more often show causal decision-making behaviour*

Proposition 6A: *Entrepreneurs with a low level of general intolerance of uncertainty, more often show effectual decision-making behaviour*

Proposition 6B: *Entrepreneurs with a low level of general intolerance of uncertainty, less often show causal decision-making behaviour*

3. Methodology

This study aims to gain more insights into the influence of uncertainty avoidance on the decision-making process of entrepreneurs. Since multiple scholars stated there is a need for a deeper understanding of how and why events play out over time, which can most effectively be achieved by collecting rich data (Gupta et al., 2016), this study uses qualitative research methods. In the remaining part of this chapter, there will be elaborated upon what conditions the sample should meet, how they were collected and how they were analysed.

3.1 Data sampling

For this research, 20 Dutch entrepreneurs from 20 different ventures were interviewed. In order to limit the contextual factors, they were all selected from the same market as they most likely experience the same external forces on their decision-making behaviour. For this research, I selected a market of which I assumed had a relatively low entry threshold, the craft beer brewers. This market is easy to step into, as van Dijk et al. (2018) state that increasingly more brewers successfully founded a company after they learned the art of brewing through home brewing without having any prior professional experience. This low threshold was acknowledged by the craft beer brewers when I asked them about it. There has been a huge increase in breweries. In the Netherlands, there were only 13 craft breweries in 1980 (van Dijk et al., 2018), but since 2001 that amount has only been growing, as there are of today around 699 active breweries (Biernet, 2020). This might also be explained by the fact that new entrants of the craft brewery industry are assisted by established organizations and there is a friendly competition going on (Mathias et al., 2018).

The entrepreneurs who were all purposeful selected were all invited using the invitation mail that can be found in Appendix V. They all needed to have founded the company less than 10 years ago, but more than 2, and still need to fulfil a relevant position in which they are responsible for the big decisions. This is in line with Reymen et al. (2015) and was done to make sure they were part of most, maybe all, decisions that were made in the start-up process. Also, the fact that companies are at least two years old ensures that they are at least established up to a certain level. This resulted in a quite diverse sample as the ventures are founded between 2011 and 2018. Of the 20 entrepreneurs, 9 had prior entrepreneurial experience. They were aged between 27 and 71 and are situated in 7 different provinces all across the Netherlands. Another important requirement was that the interviewee needs to aim at having a healthy business, so at least trying to make a profit before reinvesting. This leads to an exclusion of hobby brewers, as they do not fit the description of the desired unit of analysis. The desired unit of analysis description is given by the primary professional

association of U.S. craft brewers: small, independent, and traditional breweries that focus on innovation and quality (Mathias et al., 2018).

3.2 Data collection

To collect rich data regarding the decision-making behaviour of entrepreneurs, semi-structured interviews were held. The interview questions were mainly based upon Chandler et al. (2011), which is one of the most used approaches in studies that need to measure effectuation and causation (McKelvie et al., 2020). McKelvie et al. (2020) compared several studies in effectuation research and their measurement methods and elaborated upon the tensions between them. For my study, it was best to base our interview questions on Chandler et al. (2011). Since the questions of Chandler et al. (2011) were based on a quantitative scale I had to adapt them to open questions. So, for example, I transformed "*We analysed long-run opportunities and selected what we thought would provide the best returns"* into *"To what extent did you analyse long-run opportunities and how did you select the one to implement".* The interviews, which protocol can be found in Appendix I, were focused on the behaviour of entrepreneurs in the past two years. By making use of semi-structured interviews instead of surveys one is able to gain more insights into the reasoning behind certain decision-making behaviours as this method creates the opportunity for dialogue (Kallio et al., 2016). The interviews were structured in 6 parts. First, some background information from the entrepreneur and venture is asked. Next, the four dimensions of effectuation and causations are explored. The interviews were conducted online and in the entrepreneurs' native language as this establishes trust and can 'open doors' which otherwise may be kept closed (Welch & Piekkari, 2006).

The sixth part of the interview was about measuring the level of uncertainty avoidance of entrepreneurs. This study conducted semi-structured interviews based on the Intolerance of Uncertainty Scale developed by Walker et al. (2010). The 12-item two-factor version was originally developed by Carleton et al. (2007) and uses a 5 item Likert scale. However, for this study, the questions were adjusted to open questions, see Appendix II. So, for example, I transformed "*When things happen suddenly, I get very upset"* into "*How do you feel when things happen suddenly"*. The IUS is the most widely adopted standard measure of intolerance of uncertainty and has a good internal consistency while also being cross-cultural valid (Bottesi et al., 2019).

3.3 Analysis

For the analysis of the collected data, the coding scheme of Reymen et al. (2015) is used. This is a validated coding scheme that was developed for a retrospective analysis of multiple decision events in several ventures (McKelvie et al., 2020). This scheme consists of ample empirical indicators of both effectuation and causation and is stated in Appendix III. As stated by McKelvie et al. (2020) it is important to outline assumptions that were taken in order to allow greater measurement accuracy. Therefore, I will now state the assumptions I took. This study used a variance-based approach, as this could lead to better identification of motivating factors for effectuation or causation (McKelvie et al., 2020), such as uncertainty avoidance. By taking a behavioural approach this study examined the actual actions of a single entrepreneur. Grégoire and Cherchem (2020) argue that the causation-OR-effectuation rhetoric might have become an empirical dead-end that was useful to introduce effectuation (Sarasvathy, 2001). However, even when Sarasvathy introduced effectuation in 2001 she already stated that it is not mutually exclusive. She deliberately put them next to each other as a dichotomy to enable clearer theoretical exposition (Sarasvathy, 2001). Therefore, this study measured causation AND effectuation instead of VERSUS.

To analyse the uncertainty avoidance this study used a coding scheme that is based on the questions from the Intolerance of Uncertainty Scale developed by Walker et al. (2010), see Appendix IV. The questions are all stated in such a way that they ask the opinion or attitude of the entrepreneur towards a certain aspect of uncertainty. If the entrepreneurs agree with the statement, they try to avoid uncertainty, when they disagree, they are not bothered by that specific topic and are coded accordingly. So, for question PA1 the description for low prospective anxiety (LPA1) is *“Does not care when things happen suddenly”*, and the description for high prospective anxiety (HPA1) is *“Gets very upset when things happen suddenly*”.

As the levels of uncertainty of entrepreneurs are neither black nor white, neither low nor high, I do not just look at the number of codes assigned to each entrepreneur regarding uncertainty intolerance. Some entrepreneurs mention their attitude regarding uncertainty more often or with more words, but that does not necessarily mean that they have a higher or lower level of anxiety. Therefore, to add some nuance, I also looked at what they say and how strong they state something. So, for example, when I asked how they feel when things happen suddenly, entrepreneur 6 answered that *“he as a human being constantly needs (unexpected) change”,* just like entrepreneur 18 who said, *“yes, that is lovely”*. Whereas entrepreneur 4 said that when things happen suddenly, for example, something goes wrong with a product, he *“first has a kind of shock, but does usually fine if something different happens all of a sudden”*. All these entrepreneurs would get an LPA1 code for low prospective anxiety, but there obviously is a

difference in how strong/weak they state it. Therefore, after all the transcripts are coded, the entrepreneurs will be categorised for prospective, inhibitory, and general anxiety on a low, medium, high scale based on what they actually say, instead of on just how often they say something. So, the quotes of entrepreneurs 6 and 18 are considered as ‘strong’ low prospective anxiety examples as they say they even love/need those sudden events. The quote of entrepreneur 4 is considered a ‘weak’ low anxiety example as he says he first experiences a shock but eventually manages to deal well with unexpected events. If an entrepreneur has relatively a lot of ‘strong’ low (or high) codes, he will be categorised in the low (or high) category respectively. If the entrepreneur has more weak low and/or more weak high anxiety codes, he will be categorised as medium level of anxiety.

After the semi-structured interviews were transcribed, they were coded primarily based on the methods of Burnard (1991). This stage-by-stage process was performed by an effectuation expert and two students. Everyone first coded the transcript individually and later the results were compared. Once an agreement was reached between the three of them on how to code the transcripts, the two students continued to code all the other transcripts. In order to guarantee anonymity to the interviewees and for the sake of ease of reading, I will only use male pronouns.

4. Results

This chapter shows the results of this study. The purpose of this chapter is to analyse the results from the semi-structured interviews and check whether the propositions should be discarded or not.

4.1 General descriptive results

In Table 1 the number of effectual and causal codes given to each venture is presented. The number of codes given to each venture shows quite a bit of variation. Examples of the broad range could be found with venture 1 which got 45 codes for decision-making whereas venture 6 and venture 17 only have 17 codes assigned to them. So, the spread of codes was between 17 and 45 codes. On average the number of codes was 26.3. Some entrepreneurs are more talkative than others and gave longer and more elaborated answers during the interview. The shortest interview took 24 minutes whereas the longest interview took 67 minutes, on average they took 45 minutes. This resulted also in a wide spread in the number of words in the transcripts. The transcripts ranged between 3502 and 10249 words with an average of 4278 words. As this could influence the number of codes given to each venture and therefore potentially lead to skewed results, I do not just look at the absolute number of effectual and causal codes, but also the percentage difference.

The total number of coded decision events/intentions in the 20 interviews is 526, of which 310 for effectuation and 216 for causation. From those 20 ventures 5 ventures used more causation than effectuation, 14 ventures used more effectuation than causation, and 1 venture is exactly in the middle. Venture 20 showed the most effectual decision-making behaviour (84%), which makes sense as the founding entrepreneur stated that *“Forecasts are the most stupid idiotic business instruments there are in my opinion”*. This entrepreneur is clearly not trying to predict the future but instead wants to be in control. On the other end of the spectrum is venture 12 which used the most causal approach (76%). When talking about investing in resources, he tries to predict the future: *“If it is a small investment of a few hundred euros to a few thousand euros, then it is very simple. Then you weigh up how quickly you will earn it back, what is the use of it, how much will we function better as a result, how will the operation be better, that sort of thing, and then it's a question of either you do it or you don't.”.*

Table 1: number of effectual and causal codes given to each venture

Venture	Effectual	Causal	Difference E-C	Effectual %	Causal %	Difference % E-C
1	30	15	15	67%	33%	33%
2	14	11	3	56%	44%	12%
3	9	15	-6	37%	63%	-26%
4	22	8	14	73%	27%	47%
5	15	3	12	83%	17%	67%
6	13	4	9	76%	24%	53%
7	12	10	2	55%	45%	9%
8	11	10	1	52%	48%	5%
9	18	9	9	67%	33%	33%
10	14	9	5	61%	39%	22%
11	15	18	-3	45%	55%	-9%
12	5	16	-11	24%	76%	-52%
13	22	11	11	67%	33%	33%
14	18	5	13	78%	22%	57%
15	14	14	0	50%	50%	0%
16	27	11	16	71%	29%	42%
17	13	4	9	76%	24%	53%
18	14	21	-7	40%	60%	-20%
19	8	19	-11	30%	70%	-41%
20	16	3	13	84%	16%	68%
Average	15.5	10.8	4.7	60%	40%	19%
Total	310	216	94			

In Table 2 the number of codes linked to anxiety that are given to each entrepreneur is presented. In total 217 codes were given to the 20 entrepreneurs of which 139 linked to low anxiety and 78 to high anxiety. Overall, there are more indications of low anxiety than of high anxiety. The biggest contrast is seen in inhibitory anxiety. For this factor 11 out of 20 entrepreneurs showed indications of high inhibitory anxiety and 19 out of 20 showed signals of low inhibitory anxiety. An outlier is entrepreneur 15, as he did not show any signs of low inhibitory anxiety. He explained that he gets really stressed in uncertain situations: *"It affects me in a bad way".* In Table 3, all the entrepreneurs are labelled for prospective, inhibitory, and general anxiety on a low, medium, or high scale.

Table **2: number of anxiety codes given to each venture**

Entrepreneur	Low prospective anxiety	Low inhibitory anxiety	Low Anxiety	High prospective anxiety	High inhibitory anxiety	High Anxiety
1	1	3	4	8	1	9
2	7	2	9	0	3	3
3	7	8	15	2	1	3
4	4	3	7	2	3	5
5	1	3	4	4	3	7
6	3	2	5	3	3	6
7	3	5	8	1	0	1
8	4	1	5	2	2	4
9	3	4	7	3	1	4
10	3	3	6	2	1	3
11	3	3	6	2	0	2
12	4	1	5	1	0	1
13	1	5	6	4	0	4
14	7	8	15	2	0	2
15	2	0	2	5	3	8
16	5	3	8	2	0	2
17	1	1	2	6	1	7
18	2	6	8	2	0	2
19	3	3	6	4	0	4
20	7	4	11	1	0	1
Average	3.55	3.4	6.95	2.8	1.1	3.9
Total	71	68	139	56	22	78

Table 3: levels of anxiety of each entrepreneur

Entrepreneur	Prospective Anxiety	Inhibitory Anxiety	General Anxiety
1	High	Low	Medium
2	Low	Low	Low
3	Low	Low	Low
4	Low	Low	Low
5	High	Medium	Medium
6	Medium	Medium	Medium
7	Low	Low	Low
8	Medium	Medium	Medium
9	High	Medium	Medium
10	Medium	Low	Medium
11	Medium	Low	Medium
12	Low	Low	Low
13	High	Low	Medium
14	Low	Low	Low
15	High	High	High
16	Medium	Low	Medium
17	High	Medium	Medium
18	Medium	Low	Low
19	High	Low	Medium
20	Low	Low	Low

As can be seen in Table 3, there is only 1 entrepreneur who has a high level of anxiety in all 3 categories: prospective, inhibitory, and general anxiety. Entrepreneur 15 said *"I do want to know everything that is going on here in the company."* and when asked how he reacts if he does not know what is going to happen, he answers with: *"I find that difficult. Yes, I like to be in control."* Which are both clear indicators for high prospective and inhibitory anxiety. The fact that he wants to know everything is an example of reducing uncertainty by actively seeking for information, which is prospective anxiety. When he states that he finds it difficult when he does not know what will happen, he is also showing avoidance-orientated behaviour in response to uncertainty, which is inhibitory anxiety.

Of all the entrepreneurs there are 7 who score low on all 3 categories of anxiety. What they generally agree on is that they do not feel bothered when things happen suddenly. An example of this attitude can be found with entrepreneur 4, he said: *"For me, that usually gives energy and also some creativity to see things that you haven't seen before. In that respect, I think the past year was also very inspiring that you are just thrown back to basics and can put things into perspective: what are you doing and what do we want to do."* These 7 entrepreneurs also can perform pretty well when not sure what to do or if they do not know what will happen. Entrepreneur 2 is a good example of an entrepreneur who even enjoys situations of great uncertainty where he does not know what is going to happen: *"Oh great, then I will stay awake and see what is going to happen."* However, entrepreneur 14 is an even better example of someone with a low level of anxiety as he states: "*If I create bigger problems, bigger solutions will come along."* During the interview, he mentioned multiple times he is actively seeking for new and unknown terrains where he is out of his comfort zone.

What is interesting to note is that there is no relationship between the levels of anxiety of an entrepreneur and whether they describe the craft beer market as certain or uncertain. During the interviews, I asked the entrepreneurs how they experience the craft beer market and if this has changed due to the covid-19 pandemic. The results showed that half of them described it as an uncertain market, however, almost the other half experienced it as a certain market. The entrepreneurs often see mixed signals of (un)certainty. 11 entrepreneurs think the market keeps on growing, like for example entrepreneur 18: "*We are only just starting out in this market. Consumer tastes are developing very strongly and very quickly, so that makes it that demand will also continue, hence it is a very certain market"*. Entrepreneur 19 described it like this: *"When we started, it was a bit uncertain about where the market was going, but now it's clear that this market is here to stay. It is important, however, that you keep playing along with what you offer, whether it still suits the consumer"*. This ever-changing demand of consumer taste is seen as an uncertainty by entrepreneur 10: *"…there is also a great deal of uncertainty*

in the fact that many customers are always looking for something new, so you have to keep coming back to the market with new initiatives in order to maintain sales".

The other big factor that drives uncertainty in the market according to most entrepreneurs is the huge increase in breweries. Entrepreneur 8 noticed that *"every year 100-150 more were added and not so many stopped"*. Entrepreneur 5 also experienced this growth, he said: *"there are 800 breweries. When I started there were 200"*. According to some entrepreneurs, this huge increase has led to a saturation of the market. Entrepreneur 6 thinks that *"the supply is even greater than the demand coming from the market"*. As the market kept growing, the interest from the big beer brewing companies also started to rise. This led to even stronger competition as *"the large breweries that increasingly want a bite of the craft beer market"* started to compete for the same customers as well, according to entrepreneur 8. There is a complicated process going on between craft beer brewers and the big breweries as entrepreneur 5 explains *"We very slowly eat up market share from them, from the lager pool. However, they eat up us too, every now and then they buy some companies. So, it's actually a bit of a love-hate relationship"*. This leads to extra uncertainty according to entrepreneur 1 as he explained that in this consolidating market the strongest competitors are acquired by some large breweries and "*then go and brew with the big boys. That does something to margins, of course"*. This could also explain why the threshold to enter the market is getting higher as the market matures, as stated by entrepreneur 2.

Even though there is no consensus between the entrepreneurs on whether the craft bear market is certain or uncertain, I think entrepreneur 4 gave a great summary about what is going on in the market. *"It's a pretty certain market if you want to do something in terms of sales, but I think it's a pretty uncertain market if you want to make real money in it. I think that's the difference."*

4.2 Prospective intolerance of uncertainty

Table 4 presents the entrepreneurs ranked from low to high for prospective anxiety and the percentage difference between effectuation and causation. There are 7 entrepreneurs who score low on prospective anxiety, 6 have a medium score and 7 have a high score. From the 7 entrepreneurs with a high level of prospective intolerance of uncertainty, only 1 showed more causal behaviour than effectual behaviour (**proposition 1**). These results suggest that entrepreneurs with high prospective anxiety do not show causal behaviour more often, and thus that the proposition should be discarded. Using Table 5 we can get a better understanding of the underlying effectual and causal dimensions of the entrepreneurs with high prospective anxiety. What is interesting to note is that even though these entrepreneurs tend to avoid uncertain situations, they rather leverage contingencies than avoid them. Entrepreneur 9 is a

good example of how this group of entrepreneurs cope with unexpected events. He said that when negative unexpected events happen, he can feel down and heavy from the inside. *"I become very quiet, I sit in a corner and I will think."* However, they do not try to avoid these situations by carrying plans out as defined in case of unforeseen developments, they try to leverage them. *"Then you start making little scenarios. Small strategic scenarios. With most favourable and least favourable circumstances. Thinking about options, what can we do? And yes, we always try to gather together the options that are closest to each other and, in most situations, which one has the best outcome".* So, by means of a thorough analysis, which limits uncertainty, they try to leverage contingencies.

Table 4: levels of prospective anxiety and the percentage difference between effectuation and causation

Entrepreneur	Prospective Anxiety	Difference % E-C	Effectuation or Causation
12	Low	-52%	Causation
3	Low	-26%	Causation
7	Low	9%	Effectuation
2	Low	12%	Effectuation
4	Low	47%	Effectuation
14	Low	57%	Effectuation
20	Low	68%	Effectuation
18	Medium	-20%	Causation
11	Medium	-9%	Causation
8	Medium	5%	Effectuation
10	Medium	22%	Effectuation
16	Medium	42%	Effectuation
6	Medium	53%	Effectuation
19	High	-41%	Causation
15	High	0%	Effectuation & Causation
1	High	33%	Effectuation
9	High	33%	Effectuation
13	High	33%	Effectuation
17	High	53%	Effectuation
5	High	67%	Effectuation

Table 5: dimensions of entrepreneurs with high prospective anxiety

Entrepreneur	MO	AL	PC	LC	Effectuation	GO	ER	CA	AC	Causation
19	2	0	3	3	8	10	5	2	2	19
15	5	4	1	4	14	6	2	6	0	14
1	9	5	8	8	30	3	5	3	4	15
9	8	4	2	4	18	3	1	3	2	9
13	9	3	5	5	22	6	2	1	2	11
17	3	5	0	5	13	0	0	2	2	4
5	7	3	3	2	15	1	0	1	1	3
Total	**43**	**24**	**22**	**31**	**120**	**29**	**15**	**18**	**13**	**75**

In Table 4 we see that from the 7 entrepreneurs with a low level of prospective anxiety, 5 showed more effectual behaviour (**proposition 2A**) and 2 showed more causal behaviour (**proposition 2B**). This suggests that entrepreneurs with a low level of prospective anxiety indeed more often show effectual behaviour and less often show causal behaviour. In Table 6 we see the underlying dimension of the entrepreneurs with low prospective anxiety and note that they on average 3.5 times more leveraged contingencies than that they avoided them. When entrepreneur 3 talks about how he reacts to unexpected events, he starts to talk about himself: *"I am known, if I may say so, as a creative entrepreneur, someone who thinks, if A does not work and B does not work, why do we not try C? I am someone who thinks outside the box".* So, he tries to leverage contingencies by trial and error.

I think this is where we see a clear distinction between entrepreneurs with low and high levels of prospective anxiety. They both try to leverage contingencies, but they do this in different ways. The low levels embrace uncertainty and just start to experiment and see what happens, whereas the high levels act more strategically by making several scenarios which they thoroughly analyse and then choose the best one.

Table 6: dimensions of entrepreneurs with low prospective anxiety

Entrepreneur	MO	AL	PC	LC	Effectuation	GO	ER	CA	AC	Causation
12	1	0	0	4	5	5	5	4	2	16
3	6	0	0	3	9	2	4	8	1	15
7	3	4	4	1	12	4	1	2	3	10
2	3	0	4	7	14	1	7	3	0	11
4	10	7	1	4	22	4	2	1	1	8
14	7	3	3	5	18	3	1	1	0	5
20	5	4	3	4	16	2	0	0	1	3
Total	**35**	**18**	**15**	**28**	**96**	**21**	**20**	**19**	**8**	**68**

4.3 Inhibitory intolerance of uncertainty

In Table 7 the 20 entrepreneurs are ranked from low to high for inhibitor anxiety and the percentage difference between effectuation and causation. Of those 20, 14 entrepreneurs score low inhibitory anxiety, 5 medium and only 1 entrepreneur scores high. This one entrepreneur with a high level of inhibitory anxiety did not show more often causal behaviour (**proposition 3**) and thus the data suggests we should discard this proposition, even though this is based on just one entrepreneur.

Table 7: levels of inhibitory anxiety and the percentage difference between effectuation and causation

Entrepreneur	Inhibitory Anxiety	Difference % E-C	Effectuation or Causation
12	Low	-52%	Causation
19	Low	-41%	Causation
3	Low	-26%	Causation
18	Low	-20%	Causation
11	Low	-9%	Causation
7	Low	9%	Effectuation
2	Low	12%	Effectuation
10	Low	22%	Effectuation
1	Low	33%	Effectuation
13	Low	33%	Effectuation
16	Low	42%	Effectuation
4	Low	47%	Effectuation
14	Low	57%	Effectuation
20	Low	68%	Effectuation
8	Medium	5%	Effectuation
9	Medium	33%	Effectuation
6	Medium	53%	Effectuation
17	Medium	53%	Effectuation
5	Medium	67%	Effectuation
15	High	0%	Effectuation & Causation

In Table 8 we see the dimensions of entrepreneur 15. What is interesting to see is that entrepreneur 15 used significantly more competitive analysis than he used pre-commitments. So, instead of a relationship between high inhibitory anxiety and causation, these results suggest a positive relation between high inhibitor anxiety and the competitive analysis dimension.

Table 8: dimensions of entrepreneurs with high inhibitory anxiety and high general anxiety

Entrepreneur	MO	AL	PC	LC	Effectuation	GO	ER	CA	AC	Causation
15	5	4	1	4	14	6	2	6	0	14
Total	**5**	**4**	**1**	**4**	**14**	**6**	**2**	**6**	**0**	**14**

In Table 7 we see that from the 14 entrepreneurs with a low inhibitory anxiety level, 9 showed more effectual behaviour (**proposition 4A**), and 5 showed more causal behaviour (**proposition 4B**). There is a wide variety between entrepreneurs with low inhibitory anxiety. Entrepreneur 12 used 76% causation and 24% effectuation (-52% difference), whereas entrepreneur 20 used 84% effectuation and 16% causation (68% difference). To better understand these results we can take a look at the dimensions in Table 9. What we see is that even though these entrepreneurs all have low inhibitory anxiety, there is a split in their most-used dimensions. The group that shows more causal behaviour has in general a higher score for goal-orientated behaviour compared to means orientated. For the group that shows more effectual behaviour, it is the other way around, they show in general more means orientated behaviour. What we see in the codes given to each entrepreneur is that the group with low inhibitory anxiety that shows more causal than effectual behaviour has the tendency to define and pursue goals. Whereas the group with low inhibitory anxiety that shows more effectual than causal behaviour likes to build on his knowledge base and other available existing resources. Next to that they also like to build on their existing network of contacts to identify/create opportunities. So, what is interesting to note is that the group of entrepreneurs that is not inhibited by uncertainty has a relatively high number of codes for the 'basis for taking action' dimension but do differ in how they take action.

Table 9: dimensions of entrepreneurs low high inhibitor anxiety

Entrepreneur	MO	AL	PC	LC	Effectuation	GO	ER	CA	AC	Causation
12	1	0	0	4	5	5	5	4	2	16
19	2	0	3	3	8	10	5	2	2	19
3	6	0	0	3	9	2	4	8	1	15
18	2	1	3	8	14	7	4	8	2	21
11	4	2	6	3	15	4	8	5	1	18
7	3	4	4	1	12	4	1	2	3	10
2	3	0	4	7	14	1	7	3	0	11
10	6	3	4	1	14	1	1	2	5	9
1	9	5	8	8	30	3	5	3	4	15
13	9	3	5	5	22	6	2	1	2	11
16	8	4	5	10	27	4	3	3	1	11
4	10	7	1	4	22	4	2	1	1	8
14	7	3	3	5	18	3	1	1	0	5
20	5	4	3	4	16	2	0	0	1	3
Total	**75**	**36**	**49**	**66**	**226**	**56**	**48**	**43**	**25**	**172**

4.4 General intolerance of uncertainty

In Table 10 we see that from the 20 entrepreneurs, 8 score low on general anxiety, 11 score medium, and only 1 scores high. Entrepreneur 15, the only entrepreneur that has high general anxiety, shows the same amount of effectual and causal behaviour. This suggests that **proposition 5**, which stated that entrepreneurs with a high level of general intolerance of uncertainty more often show causal behaviour, should be discarded. Even though this is based on a single entrepreneur. The dimensions of entrepreneur 15 can again be found in Table 8. As entrepreneur 15 is the only entrepreneur in this study that scores high on all 3 types of anxiety, it is interesting to note that he has the same number of effectual and causal codes. This entrepreneur is combining and mixing effectual and causal decision-making behaviour. He shows causal behaviour as he is defining and pursuing goals. He states that he *"wanted to continue this growth, so this year I will add one or two staff members, which will allow us to take another step forward. The goal is to make our own beer more prominent. At the moment, we do 50% for rental brewers and 50% for ourselves and that should become 80-20."* However, when I ask him how he tries to accomplish this and whether he tries to predict the future he clearly shows effectual behaviour. He says: *"You know, we're just doing something, really. We just do something, and we have been doing it all these years and we have built quite a business with it".* So, a causal preparation, but an effectual implementation.

Table 10: levels of general anxiety and the percentage difference between effectuation and causation

Entrepreneur	General Anxiety	Difference % E-C	Effectuation or Causation
12	Low	-52%	Causation
3	Low	-26%	Causation
18	Low	-20%	Causation
7	Low	9%	Effectuation
2	Low	12%	Effectuation
4	Low	47%	Effectuation
14	Low	57%	Effectuation
20	Low	68%	Effectuation
19	Medium	-41%	Causation
11	Medium	-9%	Causation
8	Medium	5%	Effectuation
10	Medium	22%	Effectuation
1	Medium	33%	Effectuation
9	Medium	33%	Effectuation
13	Medium	33%	Effectuation
16	Medium	42%	Effectuation
6	Medium	53%	Effectuation
17	Medium	53%	Effectuation
5	Medium	67%	Effectuation
15	High	0%	Effectuation & Causation

In Table 10 we see that from the 8 entrepreneurs with a low level of general intolerance of uncertainty, 5 showed more effectual behaviour (**proposition 6A**), and 3 showed more causal behaviour (**proposition 6B**). As this seems inconclusive, we investigate the dimensions of the entrepreneurs with low general anxiety. In Table 11 we see again a spilt in most used dimensions between the entrepreneurs who show more effectual behaviour and those who show more causal behaviour. The attitude towards risks and resources of entrepreneurs with low general anxiety who show more causal behaviour tends to be regarding expected returns, instead of affordable loss. Entrepreneur 3 for example is always calculating and predicting outcomes and returns: *"Because if you take a decent account manager who earns, let us say, 2800 gross a month or so. ... It will cost you 50,000 euros on an annual basis. ... An account manager of 50,000 euros has to turn over 200,000 euros in order to break even".* Whereas entrepreneur 14, who shows more effectual behaviour, does the exact opposite, he said: *"I am trying my best to go bankrupt by taking on something exciting every time. Every time, I manage not to go bankrupt".* So, even though they both have low general anxiety, they have a completely different attitude towards risk and resources.

Table 11: dimensions of entrepreneurs with low general anxiety

Entrepreneur	MO	AL	PC	LC	Effectuation	GO	ER	CA	AC	Causation
12	1	0	0	4	5	5	5	4	2	16
3	6	0	0	3	9	2	4	8	1	15
18	2	1	3	8	14	7	4	8	2	21
7	3	4	4	1	12	4	1	2	3	10
2	3	0	4	7	14	1	7	3	0	11
4	10	7	1	4	22	4	2	1	1	8
14	7	3	3	5	18	3	1	1	0	5
20	5	4	3	4	16	2	0	0	1	3
Total	**37**	**19**	**18**	**36**	**110**	**28**	**24**	**27**	**10**	**89**

What we see in Table 11, but actually in the whole sample which can be found in Table 12, is that on average for these entrepreneurs the dimensions 'risks and resources' and the 'attitude towards others' is pretty well balanced between effectuation and causation. However, we see that the 'basis for taking action', but especially the 'attitude towards unexpected events/contingencies', is more effectual orientated. On average these entrepreneurs like more to leverage contingencies based on the means available to them, than to avoid contingencies while being focused on the goal.

Table 12: dimensions of all entrepreneurs

Entrepreneur	MO	AL	PC	LC	Effectuation	GO	ER	CA	AC	Causation
1	9	5	8	8	30	3	5	3	4	15
2	3	0	4	7	14	1	7	3	0	11
3	6	0	0	3	9	2	4	8	1	15
4	10	7	1	4	22	4	2	1	1	8
5	7	3	3	2	15	1	0	1	1	3
6	4	3	3	3	13	2	0	1	1	4
7	3	4	4	1	12	4	1	2	3	10
8	5	2	1	3	11	6	1	2	1	10
9	8	4	2	4	18	3	1	3	2	9
10	6	3	4	1	14	1	1	2	5	9
11	4	2	6	3	15	4	8	5	1	18
12	1	0	0	4	5	5	5	4	2	16
13	9	3	5	5	22	6	2	1	2	11
14	7	3	3	5	18	3	1	1	0	5
15	5	4	1	4	14	6	2	6	0	14
16	8	4	5	10	27	4	3	3	1	11
17	3	5	0	5	13	0	0	2	2	4
18	2	1	3	8	14	7	4	8	2	21
19	2	0	3	3	8	10	5	2	2	19
20	5	4	3	4	16	2	0	0	1	3
Total	**107**	**57**	**59**	**87**	**310**	**74**	**52**	**58**	**32**	**216**
Average	**5.4**	**2.9**	**3.0**	**4.4**	**15.5**	**3.7**	**2.6**	**2.9**	**1.6**	**10.8**

5. Discussion

5.1 Discussion

In this study, I examined whether the level of uncertainty avoidance has an influence on decision-making behaviour of entrepreneurs. In line with what Stroe et al. (2018) and Grégoire and Cherchem (2020) stated, I found that individual-level factors, in this case, uncertainty (in)tolerance, indeed influences decision-making behaviour, but real evidence for strong relationships between anxiety and effectuation/causation remain inconclusive. The findings of this qualitative study show that there seems to be a relation between different levels of anxiety and certain parts of effectual and causal behaviour. However, there does not seem to be a relation between high or low anxiety levels and effectuation or causation, as was suggested by for example Perry et al. (2011). It might as well be the case that the perceived uncertainty determines the choice for causal or effectual behaviour, rather than the attitude towards uncertainty. Next to that, in this study, there is only 1 entrepreneur who scored high on inhibitory anxiety and general anxiety. Thus, the sample size for the propositions regarding entrepreneurs with high inhibitory and general anxiety consists of only 1 entrepreneur. Such a small sample size is not representative of the whole population and therefore could lead to wrong conclusions.

Another explanation could be the fact that entrepreneurs with both low and high anxiety show some effectual dimensions, but do this in different, more causal or more effectual ways. For example, both entrepreneurs with low and high prospective anxiety try to leverage contingencies, which is an effectual dimension, but they differ in how they do this. The low levels embrace uncertainty and just start to experiment and see what happens, which is non-predicting effectual behaviour. Whereas the high levels act more strategically by making several scenarios which they then thoroughly analyse and eventually pick the best one, which is predicting causal behaviour. Thus, the effectual dimension of leveraging contingencies does not necessarily lead to an effectual approach. Due to the semi-structured interviews, we are able to understand the different approaches entrepreneurs use to leverage contingencies. These approaches do suggest some sort of relation between prospective anxiety and decision-making behaviour, however, further research is necessary to confirm this.

The fact that both types of entrepreneurs leverage contingencies might be explained by the covid-19 pandemic. Entrepreneur 17 explained that their company is in some sort of survival mode. This forces them unwillingly in a very operational mode, instead of their preferred strategic mode. When asked whether he is planning his future he was very straight: *“no, not at all. … If you asked me this a year ago, I would have said something along the lines of ‘we want to grow to this volume and…’. You get what I mean. At the moment, I am extremely happy if*

in 6 months' time I could say we will have an income soon". So, even though this entrepreneur does not prefer to make use of contingencies and work in an effectual way, he does not see any other option to survive. In line with this, one could also argue that even without a pandemic going on an individual is never completely able to show their preferred behaviour due to the fact that they need to interact with their environment. Nevertheless of their personality traits, entrepreneurs deal with stakeholders in their supply chain that sometimes require non-preferred decision-making behaviour.

The results do not suggest a relation between levels of inhibitory anxiety and effectuation or causation. What we did find is that the entrepreneur with a high level of inhibitory anxiety used significantly more competitive analysis than he used pre-commitments. Reymen et al. (2015) stated that people who feel threatened by unexpected events tend to work in isolation. So, instead of a relationship between high inhibitory anxiety and causation, these results suggest a positive relation between high inhibitor anxiety and the competitive analysis dimension. This makes sense as the competitive analysis dimension is a way of reducing unexpected events by having contract-based agreements. Next to that, by carrying out competitor analysis and competitive positioning, these entrepreneurs can work in isolation instead of cocreating business with others.

Entrepreneurs with a low level of inhibitory anxiety have a relatively large amount of codes for the 'basis for taking action' dimension. What this could imply is that they are above average conscious of how they take action. So, there is not necessarily a relation between the group of entrepreneurs that is not inhibited by uncertainty and an effectual or causal basis for taking action, but it seems like they are extra aware of how they take action. It could be the case that they do not feel the inhibiting role of uncertainty, because they deliberately chose a certain basis for taking action. So, they know in advance that they will either pursue their predefined organization goals, no matter the events along the way, or they know in advance that they will build on their means available to them and use the (unexpected) events to extend their knowledge.

Another finding is that the possible relation between general anxiety and entrepreneurial decision-making is inconclusive. There is no real evidence found that certain groups of entrepreneurs use more effectuation than causation or the other way around. Based on the findings of prospective and inhibitory anxiety, this was what we could expect as general anxiety is a combination of prospective and inhibitory anxiety. So, what we see for the whole group of entrepreneurs is that in general their 'basis for taking action', but especially the 'attitude towards unexpected events/contingencies', is more effectual orientated. This could be explained by the fact that they are forced to be more short term orientated and need to make

use of every opportunity they can grasp. It could be the case they cannot afford to avoid contingencies. One could argue that this is also why they focus on the means available to them, rather than to be focused on the goal. If they do not think it is possible to predict or control the future, they have to work with the means available to them.

An interesting topic to discuss is the fact that tolerance and intolerance for uncertainty also could be seen as two partially independent constructs and dimensions of personality, instead of as two poles of the same concept (Kornilova et al., 2018). This would mean that someone who is not tolerant for uncertainty, is not necessarily intolerant for uncertainty. I could imagine that by taking two partially independent constructs even stronger relations between effectual and/or causal dimensions and these constructs could be found. As this study has defined it as two poles of the same concept, there are probably more medium levels of anxiety found.

The last point to discuss is the definition that is given to uncertainty by the interviewees. Bottesi et al. (2019) state that some people link uncertainty more than others to negativity and therefore are less confident about their own abilities in solving problems and managing uncertain events. They argue that respondents may not fully endorse certain items even when they are generally high in intolerance of uncertainty. This of course could potentially lead to biased results as this means that the results of a study are influenced by the interpretation of uncertainty by the respondent. Bottesi et al. (2019) also argued that these differences in interpretation might be linked to cross-cultural differences. As I did not measure the cross-cultural differences of the respondents of this study, it is difficult to say whether this bias is present in my sample.

5.2 Theoretical & practical implications

This study contributes to the current literature in several ways. Even though the concepts of effectuation and causation has been studied in several ways, there still was a desire for a better understanding for how, when, where and by whom decisions are made (Shepherd et al., 2015). By performing semi-structured interviews, we were able to gain a deeper understanding of how these decision-making processes take place. This could help solve the theoretical and methodological challenges in effectuation research (Grégoire & Cherchem, 2020). The second way this study contributed to the current research is that by investigating the influence of the (in)tolerance of uncertainty on decision-making behaviour we have shown that there is a relation between these two, but different than was suggested by for example Perry et al. (2011). What we found is that individual-level variables, such as personality traits, indeed influence the decision-making of entrepreneurs, but only certain dimensions of effectuation and causation.

This study could be relevant for a wide variety of people. My research indicates that entrepreneurs with a low level of prospective anxiety show effectual behaviour more often, and less often show causal behaviour. Next to that, I found a positive relation between high inhibitor anxiety and the competitive analysis dimension. These results start to be of real value for entrepreneurs when they are able to introduce this knowledge into the business operation. For example, during competitor analyses, one is better able to understand how other entrepreneurs make decisions in similar scenarios. I think it would also be a huge advantage for entrepreneurs to be aware of the traits and factors that influence the decision-making behaviour of colleagues. It could help understand why, for example, a business partner or employee, makes decisions completely different. By knowing this, one is able to make use of each other's strengths and avoid weaknesses. Next to that, while setting up a business one could deliberately choose to only work together with a business partner who has the same attitude towards uncertainty in order to simplify decision-making processes.

5.3 Limitations & future research

This study has several limitations which present opportunities for future research. The first limitation is the generalisability of this study. The data sample consists out of craft beer brewers from the Netherlands, so it is difficult to make a statement about entrepreneurship in general based on these results. Even though the sample consists of ventures of different ages, sizes, and locations, one should be careful in generalizing these results. Entrepreneurs from different industries, or different cultures, may behave differently than the craft beer brewers in the Netherlands. Also, ventures and entrepreneurs who have years of experience in the craft beer industry, or in entrepreneurship, have a different view on things than someone who just started. So, that could also lead to different results.

The second and maybe biggest limitation, or opportunity, is of course the covid-19 pandemic. The biggest economic recession since world war 2 has a major impact on entrepreneurs and their decision-making behaviour. The fact that some entrepreneurs do not prefer to show effectual behaviour, but do not see any other option in order to survive of course has a huge influence on my data collection. Without the pandemic, I would probably get different results, at least from some entrepreneurs who now feel forced to act differently. Therefore, I expect my results to be biased towards a more effectual approach due to the difficult situation these entrepreneurs are in. Even though these might not be 'normal times', they could give unique insights into how entrepreneurs behave in such uncertain situations. Future (longitudinal) research could investigate what the (long term) influence is of this type of disruptive events on the attitude towards uncertainty and the decision-making behaviour of entrepreneurs. It would also be very interesting to examine the resilience of the entrepreneurs and potential relations with uncertainty (in)tolerance and entrepreneurial decision-making.

Other interesting topics for future research could include the different measuring techniques of uncertainty (in)tolerance. It would be interesting to examine what the influence on this study would be when the tolerance and intolerance for uncertainty are measured as two partially independent constructs and dimensions of personality, instead of as two poles of the same concept. This might lead to stronger relations between uncertainty (in)tolerance and entrepreneurial decision-making. Due to the fact that there was a desire for more qualitative research regarding decision-making behaviour I choose to interview the entrepreneurs, however, this also brings its limitations. The actual measurement of the constructs and the propositions is slightly limited as the number of codes or the percentage difference does not always represent the actual level of the construct. However, this research design has also led to findings of how and why entrepreneurs behave as they behave which were otherwise not taken into account.

At last, it would be beneficial to take the cross-cultural differences between the respondents into account and their influence on the potential different interpretations of uncertainty. This could give more insights on whether the definition that is given to uncertainty by the interviewees leads to biased results.

6. Conclusion

The aim of this study was to gain more insights into the influence of uncertainty avoidance on the decision-making process of entrepreneurs. This resulted in the following research question: **To what extent is entrepreneurial decision-making behaviour, effectuation and causation, influenced by uncertainty (in)tolerance?**

The results of these interviews with 20 entrepreneurs in the craft beer market showed that there is no clear indication that entrepreneurs with high prospective anxiety show causal behaviour more often. However, it seems like entrepreneurs with a low level of prospective anxiety indeed show effectual behaviour more often, and less often show causal behaviour.

Entrepreneurs with a high level of inhibitory anxiety do not show causal behaviour more often, however, these results do suggest a positive relation between high inhibitor anxiety and the competitive analysis dimension. There is no clear relation between entrepreneurs with low inhibitory anxiety and how much effectuation and/or causation they show.

The results do not suggest that entrepreneurs with a high level of general intolerance of uncertainty more often show causal behaviour. Also, entrepreneurs with a low level of general intolerance of uncertainty did not necessarily show more causal or effectual behaviour.

This qualitative research has shown that there is no clear relation between effectual and causal decision-making and the uncertain (in)tolerance of entrepreneurs, but rather a relation between the levels of anxiety and some dimensions of entrepreneurial decision-making.

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Appendices

Appendix I: Interview framework effectuation/causation

Introduction of the study

- The purpose of this study is two-sided. First, the aim is to investigate the relation between the intolerance of uncertainty and the decision-making process of entrepreneurs. Secondly, the aim is to explore the relationship between decision-making processes and a ventures' performance.
- These interviews will become part of our Master thesis, which is the last step before obtaining our degree in Business administration.
- We would like to record this interview as they need to be transcribed and coded to extract useful data out of them. We are the only ones who have access to these recordings which we will not share with others without your permission. Is this okay for you?
- The interview will be fully confidential, all information will only be used for research purposes and all names or personal details will be made anonymous.
- First, we will ask you some questions regarding your decision-making behaviour, next we have some questions regarding the performance of the company, and at last, we will have a short questionnaire for you about your intolerance of uncertainty. We expect the interview to take approximately 30 to 45 minutes.

The entrepreneur and company

First, we would like to get to know you and your company a little better. Could you tell us your:

1. Age
2. Gender
3. Education
4. Work experience before you started the venture
5. Venture age
6. Region of sales
7. Method of sales
8. To what extent is the craft beer market a certain or uncertain market?
    a) Did this change during the covid-19 pandemic?

Effectuation/causation

B - The basis for taking action:

B1: Do you have a clear goal for the future?

B2: What role does the prediction of the future play in how you look at the future?

Explanation of resources: financial resources, knowledge, raw materials, people and other possessions that can be used by a person or organisation to function properly and effectively.

B3: Do you set a goal and then look at what resources you need? Or do you look at what resources you have at your disposal to achieve a goal? Can you explain that?

B4: How do you determine your strategies?

B5: To what extent do you analyse the market and the competitors?

P1: Do you consider analysing the long-term opportunities or defining the strategy as beneficial for the performance? Why or why not?

R - Risk and resources:

R1: Could you talk about how you determine how many resources you use?

R1a: How do you take into account the number of resources you could afford to lose?

R2: To what extent did you risk more money than you were willing to lose?

P2: Do you consider the way you manage risks and resources to be beneficial for performance? Why or why not?

A - Attitude towards others:

A1: Could you talk about how you established agreements with suppliers, stakeholders or competitors?

A1a: To what extent do you avoid uncertainty by engaging with suppliers, stakeholders or competitors?

A2: What role do other suppliers and stakeholders play in your decision-making and did this change when the venture grew older?

P3: Do you consider the way you deal with suppliers, stakeholders or competitors as beneficial for performance? Why or why not?

U - Attitude towards unexpected events/contingencies:

U1: Could you talk about the way you approach unexpected events?

U1a: Covid-19

U2: Could you talk about the way you approach opportunities as they arose?

U3: Can you tell us something about the role of flexibility in your future plans for the company?

U3a: If so, how does this affect your current organisation?

P4: Do you consider the way you deal with unexpected events to be beneficial for performance? Why or why not?

Performance in general

P – Performance:

P6: Can you give an indication of sales in hectolitres in 2019 and 2020?

P7: What is the approximate percentage of sales growth in the last 3 years?

P8: How would you compare your growth with that of your competitors? (e.g. net sales, employees).

P9: How would you compare your profitability against your competitors? (e.g. return on investment, net income)

P9a: Has it grown in recent years relative to the competition?

Uncertainty avoidance

See Appendix II.

Appendix II: Measurement uncertainty intolerance

Based on the Intolerance of Uncertainty Scale Revised (IUS-R) by Walker et al. (2010).

Prospective Anxiety (PA):

PA1: How do you feel when things happen suddenly?

PA2: How do you feel when there are things you don't know?

PA3: What is your opinion about always thinking ahead about what will happen next?

PA4: What can be the influence of one little thing on a really well-planned plan?

PA5: How important is it for you to know what will happen to you in the future?

PA6: How do you react when things happen suddenly?

PA7: How important is it for you to always be prepared before things happen?

Inhibitory Anxiety (IA):

IA1: How do unsure feelings affect your actions?

IA2: How do you react when you are not sure what to do?

IA3: How do you react when you don't know what will happen?

IA4: What is the influence from small concerns on your actions?

IA5: How do you cope with things you are unsure of?

Appendix III: Coding scheme decision-making process

Table 13: Coding scheme adapted from Reymen et al. (2015)

MO = Means Orientated **AL** = Affordable Loss **PC** = Pre-commitment **LC** = Leverage Contingencies			**GO** = Goal Orientated **ER**= Expected Returns **CA** = Competitive Analysis **AC** = Avoid Contingencies	
		Effectuation		**Causation**
1	**MO**	1. Building on own knowledge base and other available existing own resources (including employees and material resources). 2. Defining only rough visions while leaving the details open. (incremental steps) 3. Using infrastructure of local environment and technological know-how available in environment. 4. Following personal preferences. 5. Building on existing network of contacts to identify/create opportunities (includes attracting employees).	**GO**	1. Basing actions upon expectations (market, technology, policy trends) and predictions (of founders, board members, investors). 2. Defining and pursuing project goals, product, customer needs, or market goals (more specific than 'profit,' 'a better planet'). 3. Defining and satisfying organizational needs (personnel, organization structure, infrastructure, technology, etc.) and selecting between options based on specific goals. 4. Evaluating planned progress and adapting means based upon feedback. 5. Searching and selecting contacts, clients and partners based upon predefined plans.
2	**AL**	1. Being willing to make affordable personal sacrifices (including nonmonetary ones) for the best of the venture. 2. Finding unused resources in local environment (including subsidies). 3. Investing limited, small amounts of personal/company money, time, and effort. (shared risk) 4. Managing growth expectations and ambitions. 5. Limiting stakeholders' commitments to levels that are uncritical to them.	**ER**	1. Maximizing personal profit. 2. Calculating and evaluating expected outcomes/returns. 3. Planning development in big steps and with large sums (including large recruitments) (large: relative for company). 4. Postponing stakeholder (including clients) contact at the expense of own funds (focus on internal development). 5. Searching for stakeholders to commit the amounts necessary for the execution of the plan.
3	**PC**	1. Reaching trust-based flexible stakeholder agreements and commitments. 2. Cocreating business with stakeholders. 3. Engaging in stakeholder collaborations to pursue opportunities (while commitment extends beyond what they have agreed on earlier). 4. Exposing (draft) products to potential clients early on.	**CA**	1. Acquiring resources through market transactions or contract-based agreements with stakeholders. 2. Creating and carrying out patent strategy. 3. Carrying out competitor analysis and competitive positioning. 4. Carrying out systematic market research activities.

4	**LC**	1. Accepting, gathering, and incorporating unexpected feedback, leading to changing paths of development. 2. Changing and adapting any potential plans made to accommodate unforeseen events. 3. Actively exposing company to outside influences, while being open-minded. 4. Positively reacting to and incorporating unforeseen developments.	**AC**	1. Carefully interacting with environment for secrecy reasons (feel threatened by unexpected events, therefore work in isolation as much as possible). 2. Carrying out plans as defined in cases of unforeseen developments. 3. In cases of unforeseen developments, focusing on activities within the firm rather than engaging in interactions with the environment. 4. Drawing back from project or quickly resolving in cases of unforeseen developments.

Appendix IV: Coding scheme decision-making process

Table 14: coding scheme prospective anxiety

Low prospective anxiety		**High prospective anxiety**	
How do you feel when things happen suddenly?			
LPA1	Does not care when things happen suddenly	**HPA1**	Gets very upset when things happen suddenly
How do you feel when there are things you don't know?			
LPA2	Doesn't care when there are things he/she doesn't know	**HPA2**	Bothered when there are things he/she doesn't know
What is your opinion about always thinking ahead about what will happen next?			
LPA3	Does not think that people always should think about what will happen next	**HPA3**	Thinks people should always think about what will happen next, as this will stop bad things from happening
What can be the influence of one little thing on a really well-planned plan?			
LPA4	Thinks that if you plan things really well, one little thing has little effects	**HPA4**	Thinks that even if you plan things really well, one little thing can ruin it
How important is it for you to know what will happen to you in the future?			
LPA5	Is not interested in what will happen to him/her in the future	**HPA5**	Always wants to know what will happen to him/her in the future
How do you react when things happen suddenly?			
LPA6	Has no problems with things happen suddenly	**HPA6**	Can't stand it when things happen suddenly
How important is it for you to always be prepared before things happen?			
LPA7	Does not always have to be prepared before things happen	**HPA7**	Wants always to be prepared before things happen

Table 15: coding scheme inhibitory anxiety

Low inhibitory anxiety		**High inhibitory anxiety**	
How do unsure feelings affect your actions?			
LIA1	Feeling unsure does not limit him/her from doing most things	**HIA1**	Feeling unsure stops him/her from doing most things
How do you react when you are not sure what to do?			
LIA2	Continues when not sure what to do	**HIA2**	Freezes when not sure what to do
How do you react when you don't know what will happen?			
LIA3	Stil can do things very well even though doesn't know what will happen	**HIA3**	Can't do things very well when doesn't know what will happen
What is the influence from small concerns on your actions?			
LIA4	Small concerns don't stop him/her from doing things	**HIA4**	Small concerns can stop him/her from doing things
How do you cope with things you are unsure of?			
LIA5	Does not run away from things he/she is unsure of	**HIA5**	Has to get away from all things he/she is unsure of

Appendix V: Invitation mail for interview

The original letter was sent in Dutch and thus is translated into English.

Dear Mr. / Mrs. …,

For our master's thesis, we are looking for entrepreneurs, craft-beer brewers, who would like to contribute to our thesis research. The research focuses on the decision-making processes of entrepreneurs. It is the final and most important part of obtaining our Master's degree in Business Administration at the University of Twente.

The first aim of this research is to gain more insight into the possible relationship between an entrepreneur's attitude towards uncertainty and what his/her decision-making process looks like. The second aim of this research is to understand the possible relationship between the decision-making processes used and the performance of the company. You as an entrepreneur and your brewery will remain completely anonymous.

In order to get the right information, we want to interview entrepreneurs who brew craft beer. Afterwards, the interviews will be transcribed and sent to you, if you prefer to have certain data deleted, that's no problem. The remaining data will only be kept for the duration of this research. Afterwards, we will share the results of the research with you, this can be very interesting for you, as an entrepreneur, and may contain valuable information.

That is why we would like to ask you if you are interested in participating in our research. We would be glad to get in touch with you to discuss a possible participation. Should you be unable to attend after all? No problem, you can always cancel the interview. You would be a great help to us and our research. We look forward to a good cooperation.

If you have any questions, don't hesitate to contact us!

With kind regards,

Kay Moekotte
Kristian Ruiter

Master students at the University of Twente