# Knowledge overconfidence among entrepreneurs from Austria and North Macedonia*

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## Abstract

Entrepreneurial decision-making is often characterized by unrealistic optimism. This so-called "overconfidence bias" has consequently received an increasing amount attention from the authors of literature on entrepreneurship research. Most empirical studies, however, that target the overconfidence bias have been conducted with students or samples from the general population. This study contributes to the entrepreneurial decision-making literature by explicitly targeting entrepreneurs from Austria and North Macedonia ($n$ = 187), defined as individuals who have started their own businesses or are in the process of doing so. The entrepreneurs were asked to complete a general-knowledge questionnaire and to estimate the accuracy of their answers. The results suggest that the most of these entrepreneurs exhibit overconfidence (and some, underconfidence) with regard to the accuracy of their knowledge. Significant differences were observed between the bias scores and confidence scores of the Austrian and Macedonian respondents, but not the accuracy scores. The so-called "hard-easy effect," which indicates that individuals display overconfidence when answering hard questions, but underconfidence when answering easy questions, was observed among the Austrian but not among the Macedonian entrepreneurs.

**Keywords:** biases, entrepreneurial overconfidence, Austria, North Macedonia
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## 1. Introduction

Overconfidence bias is considered to be one of the most robust findings in the area of judgment and decision-making (De Bondt/Thaler 1994). As such, it has been viewed as the engine of capitalism (Kahneman 2011). This cognitive bias has often been referred to as an explanation for various economic and business failures, ranging from the last financial crisis to the high failure rate of newly established businesses. Overconfidence is defined as the overestimation of the relevance of personal knowledge (De Bondt/Thaler 1994), the overestimation of personal competence, or a description of how individuals interpret their skills and knowledge limits (Chira/Adams/Thornton 2008). Some authors have suggested that individuals display overconfidence when they are overoptimistic while making an initial assessment of a situation and fail to consider new information as it becomes available in the process of decision-making (Fitzsimmons/Douglas 2005).

In general, heuristics and biases are a popular topic in entrepreneurship research (Cossette 2014; Nuijten/Benschop/Rijsenbilt/Wilmink 2020). Special attention in research on biases in entrepreneurship has been devoted to the overconfidence bias (Chen/Elfenbein/Posen/Wang 2020; Gutierrez/Astebro/Obloj 2020; Hietschold/Voegtlin 2021; Szerb/Vörös 2021). In the entrepreneurial context, overconfidence is defined as the tendency of entrepreneurs to expect positive results or to perceive increased chances of success (Frese/Gielnik 2014). The study of Koellinger/Minniti/Schade (2007) showed that the market-entry decisions of these entrepreneurs are mostly based on overconfidence rather than on their accurate estimation of their own skills. The overconfidence bias is cited as an explanation for the high rate of market entry and persistence in spite of the small chances of success, as shown by statistical data and the low returns from entrepreneurship (Cassar 2010). These returns might be low, but they also display high variance; while most of the startups fail entirely, some startups also achieve great success (Åstebro/Herz/Nanda/Weber 2014).

Research on entrepreneurial overconfidence provides two important insights. Firstly, entrepreneurs are generally overconfident and, in fact, more so than other decision-makers (Busenitz/Barney 1997). This is in part due to their specific work environment. Secondly, previous research shows that overconfidence can be a crucial determinant of the success of new ventures (Ben Fatma/Ezzeddine/Dana/Boudabbous 2021). This particular cognitive bias is related to the high rate of business failure in the first years of their existence, when the founder plays a dominant role in the process of decision-making. The high rate of market failure among newly established businesses represents a persistent trend worldwide (Trevelyan 2007; Verheul/Carree 2008), explaining the principal place overconfidence holds in the research on entrepreneurial cognitive biases (Chen et al. 2020).

Although this research on entrepreneurial cognition is evidently popular, several limitations to this research have been consistently pointed out in the existing studies. These limitations are either obstacles that do not allow the researchers to directly compare results from different studies or indicate research gaps. Some of the main limitations are related to the following aspects:

1) Different ways of defining and measuring overconfidence provide inconsistent findings (Moore/Dev/Goncharova 2018; Vörös 2020)
2) The existing studies have presented respondents with only a few questions and failed to examine the hard-easy effect
3) Culture as a factor has so far been only marginally studied in research on entrepreneurial overprecision

Given the challenges that have been identified in the already well-established research stream on entrepreneurial overconfidence, this study makes several contributions: 1) A clear focus is placed on overprecision as the most prevalent and persistent form of overconfidence and 2) actual entrepreneurs from Austria and North Macedonia were asked to complete a general-knowledge questionnaire, enabling the comparison of their accuracy, confidence and bias scores. In this study, a survey instrument was used consisting of 18 questions to overcome some of the limitations of previously used measures of overconfidence. The use of this instrument also allowed us to study the hard-easy effect. A third contribution (3) was that we considered the fact that the entrepreneurs in this study work in two different countries (i.e., individuals from a individualistic and a collectivistic country, according to Hofstede/Hofstede/Minkov (2010:92) were included. These individuals were observed separately, and the results were discussed in the context of the two different cultures. This study was performed with reference to the literature suggesting that the cultural dimension of individualism/collectivism is an important aspect of the entrepreneurial working environment and, as such, can be linked to the entrepreneurial overconfidence bias.

This paper thus makes the following contribution to the literature: Firstly, the study design enabled us to precisely define and measure overconfidence bias, as well as to apply a validated methodology that allowed us to consider the hard-easy effect. Secondly, respondents from two countries were selected. These countries differ in terms of their entrepreneurial traditions, motivations and cultural dimensions. On the one hand, one country has a traditional market economy where self-employment has a long history, meaning that entrepreneurs are opportunity-driven and a high level of individualism can be found. On the other hand, the other country is a transition country where the intensive process of founding SMEs began only after 1990, meaning that entrepreneurship is necessity-driven, and collectivistic values prevail over individualism. These contributions enabled us to study overprecision in entrepreneurial decision-making

in the context of these two different cultures while simultaneously considering the hard-easy effect.

This study builds on another study of Austrian entrepreneurs (Ilieva/Brudermann/Drakulevski 2018) which investigated the determinants of overconfidence in general knowledge among these entrepreneurs. Their results showed that Austrian entrepreneurs expressed overconfidence, but not when answering questions with low levels of difficulty. Having founded the business alone rather than with a business partner was identified as a significant predictor of overconfidence.

## 2. Conceptual background and hypotheses

### *2.1. Overconfidence in entrepreneurial decision-making*

Overconfidence can take three forms: overprecision, overestimation and overplacement (Moore/Schatz 2017). *Overprecision* is the most pervasive but the least understood of these forms. This cognitive bias is based on the individuals' tendency to overestimate the accuracy of their knowledge (Ackert/Deaves 2010), as well as to practice systematic deviations from perfect calibration, express unjustified beliefs in the accuracy of their answers (Michailova 2010), or display overconfidence that they know "the truth" (Moore/Schatz 2017). Another term that is used in the literature to describe the concept of overprecision is *miscalibration*. The inclination of humans to display overly precise behavior has been examined in different contexts and in different individuals ranging from doctors to engineers and managers (Barber/Odean 1999; Hansson 2005; Huang/Tan/Sulaeman/Faff 2016).

*Overestimation* is assumed to be motivated by imagining what is desired, especially when it comes to making optimistic predictions about the future. Researchers have usually examined the individuals' tendencies to overestimate their abilities, performance, or chances of success (e.g., students usually overestimate their exam scores and doctors usually overestimate the accuracy of their diagnostic performance). *Overplacement* is also referred to as the better-than-average effect; this is present when an individual believes that they are better than a reference group with respect to a particular attribute. One common finding is that people regard themselves as superior when compared to others. These people measure this superiority with reference to skills they are familiar with (e.g., driving a car), but believe they are below the average with reference to tasks that they consider as difficult.

Why is overprecision of particular interest in an entrepreneurial context? Empirical research has provided consistent evidence of this bias among entrepreneurs (Busenitz/Barney 1997; Forbes 2005; Herz/Schunk/Zehnder 2014; Adomdza/Åstebro/Yong 2016; Arend/Cao/Grego-Nagel/Im/Yang/Canavati 2016) and its negative effect on their entrepreneurial success (Bonnefon/ Hilton/Molina 2006,

in Hogarth/Karelaia 2012). Interestingly, respondents seldom display overprecision when answering questions of all difficulty levels. A common finding is that overprecision is identified when these respondents answer hard questions or tasks, where the percentage of correct answers is below 75 %. In contrast, when questions/tasks are easy, respondents generally display underconfidence. This phenomenon is known as the hard-easy effect (Lichtenstein/Fischhoff/Phillips 1982; Kirkebøen 2009; van Boven/Travers/Westfall/McClelland 2013). Overconfidence is also evident when the respondents cannot receive quick or clear feedback and when they need to make forecasts with a low level of predictability – working conditions that are typical for entrepreneurs (Barber/Odean 2001; Singh 2020). These aspects were addressed by Peter Drucker (1985: 29), who wrote "entrepreneurship is 'risky' mainly because so few of the so-called entrepreneurs know what they are doing."

### *2.2. Entrepreneurial overconfidence and culture*

Culture shapes entrepreneurial perceptions and intentions as well as the way entrepreneurship is generally seen (Giacomin/Janssen/Shinnar 2016). Hayton and Cacciotti's (2013) review of research on culture and entrepreneurship shows that two research streams exist. The first stream includes studies on the relationship between national/regional culture and aggregate levels of entrepreneurship. The second stream includes studies on the relationship between national culture and the entrepreneurial characteristics of individuals (values, motives, traits, intentions, cognitions and mindset). The current study is positioned in the second stream and was carried out to examine the relationship between national culture and entrepreneurial cognition or, more precisely, the overconfidence bias defined and measured as overprecision.

Observations of various aspects of national cultures have often been made through the lens of Geert Hofstede's cultural dimensions. Cultural dimensions usually considered as relevant to entrepreneurship are: individualism-collectivism, uncertainty avoidance, power distance and masculinity-femininity. In general, the research findings show that entrepreneurship is associated with high levels of individualism, low levels of uncertainty avoidance, a low power distance and high levels of masculinity (Hayton/Cacciotti 2013). With reference to overconfidence, as a salient cognitive bias exhibited by many entrepreneurs, the psychology literature suggests that a link between this bias and individualism exists as a cultural dimension. Individualism pertains to societies in which the ties between individuals are loose: Everyone is expected to look after themselves and their immediate family (Hofstede et al. 2010:92). Intuitively, one would expect that overconfidence is more common in individualistic cultures as compared to in collectivistic cultures. Individuals who have grown up in individualistic cultures focus strongly on improving their abilities and even

children are taught to see themselves as above-average. Cross-cultural psychology researchers differentiate between overconfidence in general knowledge and peer-comparison overconfidence (Chui/Titman/Wei 2010). The way overconfidence is defined and measured affects how the relationship between this bias and individualism as a cultural dimension is studied.

The original research findings on intercultural variation in calibration and probabilistic thinking show that British students were better calibrated than Asian students (Wright/Phillips 1980). However, this generalization did not hold for Japanese students (Yates/Lee/Shinotsuka/Patalano/Sieck 1998). Ji and Kaulius (2013) emphasized the great variability in probabilistic judgment between similar cultures. The research stream that includes studies on overconfidence conducted in different countries (i.e. with various regions and samples) encompasses: US students and Taiwanese students regarding overconfidence about general knowledge (Yates/Lee/Shinotsuka 1996; Yates/Lee/Bush 1997); students from Confucian Asia and Europe regarding mathematical self-beliefs (Morony/Kleitman/Lee/Stankov 2013); Confucians, Europeans and Americans regarding the overestimation of performance on cognitive tasks (Stankov /Lee 2014); participants from individualistic cultures (the USA and UK) versus participants from collectivistic cultures (India and China) regarding overprecision, overestimation and overplacement (Moore et al. 2018); the degree to which culture shapes entrepreneurial overconfidence and optimism among university entrepreneurship students from the USA, India and Spain (Giacomin et al. 2016); variations in perceptions about one's own skills, knowledge and ability to start a business in 18 countries (Koellinger et al. 2007).

### *2.2.1. Background information about the target countries*

Austria is a traditional market economy where self-employment has a long history (Rezaei/Goli/Dana 2014). The number of enterprises founded in 2016 was 41,790, i.e. 7.7 % of the total number of active enterprises that year. Statistical data for Austria show that 50.2 % of the businesses founded in 2011 were still active in 2016 (Statistik Austria 2019). According to data from the world's foremost study of entrepreneurship, The Global Entrepreneurship Monitor (GEM), the vast majority (82 %) of people engaged in entrepreneurship in Austria were motivated by a desire to pursue an opportunity, rather than motivated by necessity. Austria ranks as 10th among the innovation-driven economies. The Female/Male TEA Ratio (percentage of the female population aged 18–64 who are either nascent entrepreneurs or owner-managers of a "new business", divided by the equivalent percentage of the male population) is 0.72. Statistical data for Austria show that 52.2 % of new sole proprietorships founded in 2015 were founded by women (Mayr-Birklbauer 2018). With respect to Hofstede's cultural dimension, which previous researchers have identified as

relevant when studying overconfidence, this country is an individualist society with a pragmatic orientation (Hofstede Insights n.d.). Individualistic values are adaptive to the Western countries with a developed market economy, stimulating competition between individuals and organizations. Research has illustrated the connection between market economy, economic growth, innovativeness and individualism. In individualistic cultures, individuals are the focus of attention, whereas the relationships with others are viewed as superficial (Velichkovsky/Solovyev/Bochkarev/Ishkineeva 2017). Success is ascribed to the individual's stable characteristics, and people consider themselves responsible for shaping their future.

In North Macedonia, as in other transition countries, the intensive process of founding SMEs started only after 1990 (Fiti/Hadzi Vasileva-Markoska/Bateman 2007). This was a normal reaction of the population to the destruction of economic and social security that resulted from the transition, privatization and unemployment. The number of newly founded enterprises in North Macedonia in 2016 was 7,132 or 10.4 % of the total number of active enterprises in that year. The five-year survival rate in North Macedonia for the period 2011–2016 is 37.1 % (State Statistical Office 2018). According to GEM, over half (52.1 %) of the entrepreneurs in North Macedonia have founded a business motivated by necessity, rather than motivated by opportunity. The Female/Male TEA Ratio is 0.40. The individualism score for North Macedonia could not be directly obtained from Geert Hofstede's original research, because it was conducted in an earlier period when North Macedonia was part of Yugoslavia. However, North Macedonia has been referred to as a country with a collectivistic orientation in the relevant literature (Kenig 2006, in Spasovski 2013). Collectivistic values are adaptive in an environment where resources are limited, and receiving support from others is vital. In collectivistic cultures, individuals are oriented towards the group and characteristics such as sharing, support, help and self-sacrifice are favored. The success is usually ascribed to the individual's effort and the help they receive from others.

We conducted a thorough literature review on overconfidence in entrepreneurial decision-making and how this is shaped by culture and gathered background information about the target countries. On the basis of this information, we developed the following hypotheses:

*Hypothesis 1:* *Entrepreneurs, both from Austria and North Macedonia, will be overconfident about their knowledge.*

*Hypothesis 2:* *Austrian and Macedonian entrepreneurs will be overconfident only when answering hard questions and underconfident when answering easy questions.*

*Hypothesis 3:* *A difference between the overconfidence level between entrepreneurs from a country with individualistic values (Austria) and entrepreneurs from a country with collectivistic values (North Macedonia) exists. Austrian entrepreneurs will be more overconfident about their knowledge than entrepreneurs from North Macedonia.*

## 3. Sample and methods

### *3.1. Sample and data collection*

We recruited 92 entrepreneurs from Austria and 95 entrepreneurs from North Macedonia to participate in the study. The data were collected in November and December 2017 by conducting an online survey. Individuals who had already started or were in the process of starting a business at the time of the survey were target participants in the study. These individuals were recruited with the help of economic chambers, incubators, accelerators and other entrepreneurial networks in the two target countries.

Male entrepreneurs dominated the two samples, representing 81.52 % of the Austrian sample and 68.42 % of the Macedonian sample. The modal age range in the Austrian sample was 31–32 years and 37–38 years in the Macedonian sample. In the Austrian sample, the majority of respondents had a master's degree (52.17 %), 19.57 % had finished high school/compulsory education, 17.39 % had a doctoral degree and 10.87 % had a bachelor's degree. In the Macedonian sample, no great differentiation was observed among respondents with reference to their education level: Most respondents (52.63 %) had a bachelor's degree, 30.53 % had a master's degree, 13.68 % had finished high school/compulsory education, and 3.16 % had a doctoral degree. As would be expected considering the age structure of the two samples, the Austrian sample was dominated by founders who had run their own business for up to two years (55.43 %), followed by those who had owned a business for 3–5 years (20.65 %), 6–10 years (15.22 %), 11–20 years (7.61 %), or more than 20 years (1.09 %). In the Macedonian sample, the largest group were entrepreneurs who had run their own businesses for 6–10 years (25.26 %), followed by those who had been involved in entrepreneurship for more than 20 years (23.16 %), 11–20 years (21.05 %), up to two years (20.00 %) and 3–5 years (10.53 %). The majority of Austrian entrepreneurs had founded their business with a partner or partners (57.61 %), whereas the Macedonian sample was slightly dominated by entrepreneurs who had founded their business alone (54.74 %) (Table 1).

**Table 1: Descriptive statistics of the sample**

| | | Austria | North Macedonia |
|---|---|---|---|
| Gender | Male | 81.52 % | 68.42 % |
| | Female | 18.48 % | 31.58 % |
| Age | Modal age range | 31–32 years | 37–38 years |
| Education | Doctoral degree | 17.39 % | 3.16 % |
| | Master's degree | 52.17 % | 30.53 % |
| | Bachelor's degree | 10.87 % | 52.63 % |
| | High school/compulsory education | 19.57 % | 13.68 % |
| Experience as entrepreneurs | 2 years or less | 55.43 % | 20.00 % |
| | 3–5 years | 20.65 % | 10.53 % |
| | 6–10 years | 15.22 % | 25.26 % |
| | 11–20 years | 7.61 % | 21.05 % |
| | 21 years or more | 1.09 % | 23.16 % |
| Ownership structure | Single founder | 42.39 % | 54.74 % |
| | Co-founder | 57.61 % | 45.26 % |

### *3.2. Measures*

Measuring overconfidence about knowledge by asking general-knowledge questions is originally based on Fischhoff et al. (1977) and Lichtenstein and Fischhoff (1977). The main part of the study, addressing the level of cognitive bias among respondents, relied on a general-knowledge questionnaire consisting of 18 questions (Table 2). The questions were based on the test-18 (Michailova 2010; Michailova/Katter 2014), with two questions being replaced with similar ones. The test-18 overcomes some limitations of previously used measures of overconfidence.

**Table 2: Questions used for measuring the bias score**

| Question | Provided options (correct answer in Italic) |
|---|---|
| **Q1.** What is an instant camera also called? | Canon camera; *Polaroid camera*; Minolta camera |
| **Q2.** Where are flounders mainly to be found? | In coral reefs; *at the bottom of the sea*; in common reed |
| **Q3.** Which sauce is traditionally served with Thanksgiving turkey in the USA? | Blueberry sauce; red currant sauce; *cranberry sauce* |
| **Q4.** Where does the Nobel Prize winner in Literature, Gabriel Garcia Marquez, come from? | *Colombia;* Spain; Venezuela |
| **Q5.** What artistic movement does Anacreontics belong to? | *Rococo*; Romanticism; Realism |
| **Q6.** What is the name of a spicy chili sauce? | *Tabasco*; Curacao; Macao |
| **Q7.** How many letters are there in the Russian alphabet? | 40, *33*, 26 |
| **Q8.** Tosca is an opera by...? | *G. Puccini*, G. Verdi, A. Vivaldi |
| **Q9.** What is the name of the Greek Goddess of Wisdom? | *Pallas Athena*, Nike, Penelope |
| **Q10**. What is the most abundant metal in the Earth's crust? | Iron, *aluminum*, copper |
| **Q11.** What is the word for an "uninformed person"? | Ignatius, *ignorant*, ideologue |
| **Q12.** Who was the first person to fly around the Eiffel tower in an airship? | *Santos-Dumont*; Count Zeppelin, Saint Exupéry |
| **Q13.** What is the snow house of Eskimos called? | Wigwam; *Iglu*; Tipi |
| **Q14**. Which enterprise was co-founded by Bill Gates? | Intel; *Microsoft*; Dell Computers |
| **Q15.** What is the fastening month in Islam called? | Sharia; *Ramadan*; Imam |
| **Q16.** What language does the term "Fata morgana" come from? | *Italian*, Arabic, Swahili |
| **Q17.** What do camels store in their humps? | *Fat*, water, milk |
| **Q18.** What is ascorbic acid? | Apple vinegar, *vitamin C*, vitamin A |

Notes: Q – question; The original questionnaires used in the study were translated to German for the Austrian sample and Macedonian for the Macedonian entrepreneurs.

The procedure consisted of two basic steps for each of the general-knowledge questions: 1) Respondents were asked to choose the correct answer to questions with three alternative answers, and 2) they were required to assign their confidence level for the accuracy of the provided answer on a scale from 33–100 %. After obtaining the answers to the general-knowledge questions for each sample, questions were categorized as easy, medium and hard based on the rate of correct answers among respondents: 0–33 % for hard questions, 34–66 % for medium and 67–100 % for easy questions (Pulford and Colman 1997). In order

to include an equal number of questions from each difficulty level when calculating the bias score, four questions were retained in each category or twelve questions per sample (Table 3).

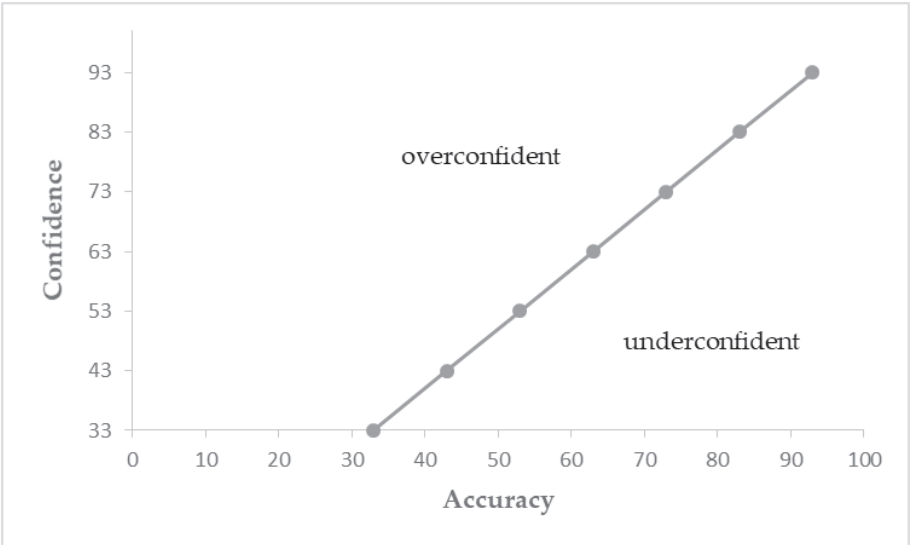
**Table 3: Categorization of questions**

| | | | | |
|---|---|---|---|---|
| | | Austrian sample | | |
| Easy | Q3 = 88 % | Q11 = 81.5 % | Q18 = 77.2 % | Q9 = 77.2 % |
| Medium | Q7 = 59.8 % | Q8 = 50 % | Q4 = 47.8 % | Q5 = 40.2 % |
| Hard | Q17* = 35.9 % | Q12 = 27.2 % | Q10 = 9.8 % | Q16 = 6.5 % |
| | | Macedonian sample | | |
| Easy | Q6 = 86.3 % | Q7 = 71.65 | Q18 = 68.4 % | Q8 = 68.4 % |
| Medium | Q16 = 47.4 % | Q11 = 44.2 % | Q2 = 42.1 % | Q5 = 41.1 % |
| Hard | Q12 = 25.3 % | Q3 = 25.3 % | Q10 = 20 % | Q17 = 18.9 % |

Notes: Q – question; * The percentage of correct answers for Q17 in the Austrian sample is 35.9 %, which is close to the upper border in this category (33 %).

The entrepreneur's bias score was determined as the difference between the average level of confidence and the percentage of correct answers for each respondent. If the result was a positive number (i.e. the average confidence level was higher than the percentage of correct answers), the entrepreneur was rated as overconfident; entrepreneurs with negative bias scores (i.e. the average confidence level was lower than the percentage of correct answers) were rated as underconfident; and when no difference between the average confidence level and the percent of correct answers was identified, the founder was rated as ideally calibrated (Figure 1). The lowest possible bias score was -67 (i.e. the respondent assigned the minimum confidence level possible across all questions, but answered all of the questions correctly), and the highest possible bias score was 100 (i.e. the respondent assigned the maximum confidence level possible across all questions, but answered none of the questions correctly).

**Figure 1: Illustration of the bias score**




In addition to including the general-knowledge questionnaire in the survey, we also included questions about each entrepreneur's gender, age, education, entrepreneurial experience and the ownership structure of their business.

The data analysis included: descriptive statistics to determine the confidence, accuracy and bias scores in each sample; an independent samples *t*-test to compare the two samples by these three scores; the Pearson correlation coefficient to present the relationship between the three scores; descriptive statistics to determine the hard-easy effect in each sample; and the Wilcoxon signed-rank test to analyze whether a significant median increase in overconfidence score occurred when respondents answered the hard questions as compared to their overconfidence score when they answered the easy questions.

## 4. Results

As previous researchers have found, most of the entrepreneurs in both samples displayed overconfidence about their knowledge (H1). As shown in Table 4, the average bias score of the Austrian sample was 13.63 (SD = 16.24; Range: -29.58 – 66.67). The average bias score of the Macedonian sample was 21.35 (SD = 16.64; Range: -14.25 – 66.67). As cited by Stankov and Lee (2014), the tendency to consider having solved more items correctly than the objective performance measure shows does not necessarily hold for each person. In the Austrian sample, 15.2 % of the founders were underconfident (with negative bias scores), 1.1 % were ideally calibrated, and 83.7 % were overconfident (with

positive bias scores). In the Macedonian sample, 10.5 % of the entrepreneurs were underconfident, and 89.5 % were overconfident. Our results were also in accordance with those of Stankov and Lee (2014), since the standard deviations for accuracy are higher than those for confidence in the two samples.

**Table 4: Descriptive statistics for confidence, accuracy and the bias score in the two samples (all questions)**

| | M | SD | Min | Max |
|---|---|---|---|---|
| | | Austrian sample | | |
| Confidence | 63.72 | 12.04 | 39.33 | 91.67 |
| Accuracy | 50.09 | 16.23 | 16.67 | 91.67 |
| Bias score | 13.63 | 16.24 | -29.58 | 66.67 |
| | | Macedonian sample | | |
| Confidence | 67.93 | 13.88 | 33.00 | 93.17 |
| Accuracy | 46.58 | 16.29 | 16.67 | 91.67 |
| Bias score | 21.35 | 16.64 | -14.25 | 66.67 |

The independent samples *t*-test results show that the difference between the two samples regarding the bias score and the confidence level was statistically significant. This finding only partially supports H3. Although we expected that Austrian entrepreneurs would be more overconfident, our study findings show that Macedonian entrepreneurs were more overconfident ($t(185) = 3.208$, $p = 0.002$) as well as more confident ($t(185) = 2.210$, $p = 0.028$) than Austrian entrepreneurs. No statistically significant difference was found between the two samples regarding the percentage of correct answers.

As shown in Table 5, a significant moderate positive correlation was observed between accuracy and confidence in both samples (Austria: Pearson's $r = 0.37$, $p = 0.000$; North Macedonia: Pearson's $r = 0.40$, $p = 0.000$).

**Table 5: Pearson correlation for confidence, accuracy and the bias score**

| | Confidence | Accuracy | Bias score |
|---|---|---|---|
| Confidence | 1 | 0.40*** | 0.44*** |
| Accuracy | 0.37*** | 1 | -0.65*** |
| Bias score | 0.37*** | -0.73*** | 1 |

Notes: Upper right – Macedonian entrepreneurs, lower left – Austrian entrepreneurs
***Correlation is significant at the 0.01 level (two-tailed)

With respect to the hard-easy effect (H2), our results show that entrepreneurs in Austria were overconfident when answering hard questions and underconfident when answering easy and medium questions. Entrepreneurs in North Macedonia were overconfident when answering questions in all three categories (Table 6).

**Table 6: The hard-easy effect**

| | | Easy | | Medium | | Hard | |
|---|---|---|---|---|---|---|---|
| | | **M** | **SD** | **M** | **SD** | **M** | **SD** |
| Austria | **Confidence** | 73.23 | 15.72 | 48.87 | 14.48 | 69.07 | 14.06 |
| | **Accuracy** | 80.98 | 24.69 | 49.46 | 27.48 | 19.84 | 19.45 |
| | **Bias score** | -7.75 | 19.91 | -0.59 | 26.95 | 49.23 | 24.97 |
| North Macedonia | **Confidence** | 77.89 | 17.12 | 59.83 | 16.34 | 66.06 | 17.54 |
| | **Accuracy** | 73.68 | 24.83 | 43.68 | 27.52 | 22.37 | 23.20 |
| | **Bias score** | 4.21 | 19.56 | 16.14 | 27.26 | 43.69 | 28.58 |

As reported in previous studies (e.g. Michailova/Katter 2014), the overconfidence scores for easy and hard questions are significantly different in the two samples. In the Austrian sample, 90 out of 92 entrepreneurs had a higher bias score for hard questions as compared to their score for easy questions, and only two respondents had a higher bias score for easy questions than for hard questions. The Wilcoxon signed-rank test results indicate a significant median increase in the bias score for hard questions ($Mdn$ = 49.75) as compared to the bias score for easy questions ($Mdn$ = -11.88), $z$ = 8.290, $p$ = 0.000. In the Macedonian sample, 81 out of 95 entrepreneurs had a higher bias score for hard questions as compared to their bias score for easy questions, 13 were more overconfident for easy questions and one respondent showed no difference in the overconfidence score for hard versus easy questions. The Wilcoxon signed-rank test results indicate a significant median increase in the bias score when respondents answered the hard questions (Mdn = 45.75) as compared to their overconfidence score when they answered the easy questions (Mdn = 0.00), $z$ = 7.499, $p$ = 0.000.

## 5. Discussion

One limitation of this study might be the sample size, as real entrepreneurs are more difficult to recruit as participants in a study than, for example, students. We also noted that the two samples have slightly different structures with regard to the gender, age, education and entrepreneurial experience of the participants. This is a rather obvious side effect when applying identical, or at least very similar, sampling strategies in two different countries. These limitations influence the results. Nonetheless, both samples have a size which is comparable to the sample sizes in related studies; thus, we argue that these samples allowed for a proper investigation of overconfidence and knowledge calibration.

The age and experience structure of Macedonian entrepreneurs included in this study reflects the phenomenon of "insider entrepreneurship", which is common for transition economies. Namely, new ventures are more likely to be

started and run by those who have already established themselves in business (Estrin/Mickiewicz 2011). The differences between the two samples in terms of the education level of the respondents support the argument that different types of entrepreneurs exist in different stages of transition. The so-called "low level" entrepreneurs who offer customers goods and services which are in short supply are more common at the beginning of a transition, while later stages of transition stimulate "high level" entrepreneurs who move beyond simple trading and engage in long-term economic activity (Hashi/Krasniqi 2011:457). This discussion about "low level" versus "high level" entrepreneurs is supported by GEM data which show that most entrepreneurs in North Macedonia are driven by necessity, while Austrian entrepreneurs are mainly driven by opportunity.

With the above-mentioned limitations in mind, our study results confirm the well-established finding that entrepreneurs are overconfident, in particular regarding overprecision as a specific type of overconfidence. Previous studies on entrepreneurial decision-making have corroborated this assumption by investigating mostly students and only marginally entrepreneurs. This study was conducted among entrepreneurs from Austria, a traditional market economy, and from North Macedonia, a country that has come a long way in its transition towards a market economy in the last three decades. The accuracy and confidence scores were correlated in both samples. As reported by Stankov et al. (2014) and Stankov and Lee (2014), the higher the respondents' percentage of correct answers, the higher the respondents' level of confidence in their knowledge, and indeed the correlation between the scores in this study ranges from 0.20 to 0.60. The relationship between confidence, accuracy and bias scores in the two samples suggests that entrepreneurial overconfidence is related to the cognitive component of overconfidence. However, the alternative explanation of overconfidence, which is related to confidence (Stankov/Lee 2014), seems to be of specific relevance in the entrepreneurial context. The interpretation of overconfidence in terms of a "motivational bias" implies that being confident offers psychological benefits, such as task motivation and persistence. Staying motivated and persevering in the face of adversity, but also able to convince other people of the value of one's idea and endeavors, determines the success of a business founder.

What makes Macedonian entrepreneurs more overconfident (and more confident) than Austrian entrepreneurs? And why did Macedonian entrepreneurs display overconfidence when answering all three categories of questions? Firstly, the structure of the two samples should be considered when discussing the results of this study. For example, we would expect the entrepreneurial experience to be positively related to overconfidence. The entrepreneurs from the Macedonian sample were older than the Austrian entrepreneurs and had run their businesses for longer periods of time. Working in an environment characterized by information overload, high uncertainty, novelty, emotions and time

pressure makes individuals more likely to become overconfident (Baron 1998). Another possible reason the Macedonian entrepreneurs were more overconfident than their Austrian counterparts can be found if we examine the education structure of the samples. In the Austrian sample, most of the entrepreneurs have master's or doctoral degree (69.56 %), and, in the Macedonian sample, only one-third (33.69 %) have a degree higher than a bachelor's. Those who are more highly educated are not always aware of their knowledge, and this could lead to underconfidence (Lichtenstein/Fischhoff 1977). A third explanation could be associated with the ownership structure of the businesses. Previous research on the determinants of entrepreneurial overconfidence identified that being a single founder makes entrepreneurs more overconfident than being a co-founder (Ilieva et al. 2018). While most entrepreneurs in the Austrian sample founded their businesses with a business partner, single founders prevail in the Macedonian sample. Previous study findings suggest that men are generally more overconfident than women (Barber/Odean 2001), and men also tend to report more business success than women in a study with French and German entrepreneurs (Eib/Siegert 2019). It is somewhat surprising that, although the percentage of male founders was higher in the Austrian sample than in the Macedonian sample, this did not contribute to surpassing the bias score of the latter sample.

Secondly, in the specific context in which the entrepreneurs live and work may have influenced the results. Some evidence is available on how cross-cultural differences influence overprecision in non-entrepreneurial contexts (Yates et al., 1996; Yates et al. 1997), but these findings are not straightforward, and especially if we examine the link between individualism as a commonly considered cultural dimension in relevant research and overconfidence. Austria is an individualistic society, and we expected Austrian entrepreneurs to be overconfident. But our study findings clearly show that entrepreneurs from North Macedonia – referred to as a country with collectivistic orientation – are even more overconfident than their Austrian counterparts. Some authors have argued that economic changes also bring about value shifts (Velichkovsky et al. 2017), and North Macedonia has been undergoing a transition to a free market economy since the early 1990s. The transition to a market economy, based on competition among individuals and organizations, is accompanied by a shift from collectivistic to individualistic values. Another possible explanation is that entrepreneurs per se are more typical representatives of an individualistic orientation, regardless of their country of origin. Previous relevant studies noted that 30 % or more respondents from a non-entrepreneurial context show good calibration or even underconfidence (Stankov/Lee 2014). This percentage is lower in our calibration study, which again confirms that an entrepreneurial inclination towards overconfidence is more pronounced than in other decision-makers.

Our study results agree with other results in the existing literature, if we consider the broad living and working environment of the entrepreneurs included in this

study. Koellinger et al.'s (2007) study showed that the average survival chances of nascent entrepreneurs are lower in countries with high rates of entrepreneurial self-confidence. The five-year survival rate in the country with more overconfident entrepreneurs in 2016, i.e. North Macedonia, was lower than that in Austria. Calculations show that entrepreneurial ventures become less successful in terms of normal risk aversion, probability of success and probability to exit the market with a zero exit value, indicating that individuals should not choose to become entrepreneurs (Åstebro et al. 2014). However, the enterprise birth rate in North Macedonia in 2016 was still higher than the rate in Austria.

## 6. Conclusions

These study findings add to the body of knowledge about entrepreneurial cognition, and in particular to the knowledge about cognitive biases in entrepreneurial decision-making. The overconfidence bias has been only marginally investigated among real entrepreneurs, e.g. various measures have been used, and the hard-easy effect has not been always considered. In this study, we targeted real business founders, used a survey instrument to overcome the identified limitations of previously used instruments and considered the hard-easy effect. Furthermore, it was possible to draw comparisons between entrepreneurs from two different countries regarding their particular decision-making bias. These findings make an important contribution to the research stream encompassing aspects of national culture and the cognition of entrepreneurs.

No straightforward connection could be found between individualism as a cultural dimension and entrepreneurial overconfidence; therefore, this relation should be further investigated. We also demonstrate that the hard-easy effect is not constant across different samples. Thus, general observations that have been made in previous studies need to be more carefully scrutinized in future research. In addition, the specific entrepreneurial environment(s) where entrepreneurs live and work should be considered.

This study makes a practical contribution to the field by demonstrating that, no matter how far entrepreneurial judgment might be from the ideal calibration point, this can be improved if entrepreneurs became more aware of how cognition works. If entrepreneurs became more aware of their cognitive biases, they can make better judgments and decisions for themselves, their families and their stakeholders (Rietveld/Groenen/Koellinger/van der Loos/Thurik 2013). The purpose of this research on entrepreneurial cognition is not to create completely rational individuals that are immune to all possible cognitive errors. Instead, this research stream potential contributes to growth by raising the awareness of business founders during their decision-making processes and by helping them maximize their chances for personal progress and, in turn, the progress of the society.

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