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Health Perception of French SME Owners During the 2020 COVID-19 Pandemic

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Abstract. The COVID-19 pandemic has immense impact on the conditions and behaviours of people and on those of small business owners in particular. Using two samples of some 3700 French business owners, collected before and during the pandemic, this study finds that on average, health perceptions in terms of physical and mental health differ: while perceptions of good mental health declined, those of good physical health improved. We also find that the size of business and the growth of turnover are mechanisms that contributed to the decline of the total health score. This novel finding implies that during the pandemic, business size and growth of turnover are seen as liabilities rather than assets by business owners. The results of our study have strong implications both for business owners as well as for policy makers.

Keywords: small business owners, entrepreneurs, COVID-19 pandemic, mental health, physical health.

Contributions: OT data and writing; ChF statistics and writing; JM and FL writing; RT setup, design and writing

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1. Introduction

The 2020 COVID-19 pandemic has immensely impacted the economy and its actors (Baldwin and Di Mauro, 2020). Small-and-medium-sized enterprises (SMEs) and their owners are particularly affected. Business owners (also referred to as entrepreneurs in the current paper) are facing a variety of threats. Similar to the general population, they are confronted with health risks (infection and hospitalization), the effects of quarantining and lockdown (loneliness and frustration), and fear for their economic and financial future. But, as opposed to the general population, these threats are augmented by the fact that they also carry this burden for their employees, which is not usually the case for general salaried workers (Brooks et al., 2020; Cullen et al., 2020; Pfefferbaum and North, 2020).

The precarity faced by SMEs during the COVID-19 has brought about substantial public support schemes in the hope of flattening the curve of the economic downturn. Such measures have also been driven by the belief that SMEs would be playing a vital role in the post-pandemic economic recovery period (Eggers, 2020).

One can thus assume that the exceptional situation caused by the COVID-19 pandemic has consequences for the physical and mental health of small business owners. We investigate this issue in the current paper. More specifically, we ask two questions: is there a physical and mental health consequence for small business owners caused by the COVID-19 pandemic? And, if so, what is the mechanism behind it?

To answer these questions, we compare the perception of health indicators of small business owners before and during the pandemic, and investigate their links with several factors pertaining to the owners as well as their business. We do so by using two independent but comparable (collected in the same fashion) and representative data sets of some 3700 French business owners. As health indicators, we use both physical and mental health. We investigate the relationship of these health indicators with factors like age, gender, educational level, experience, size of business, financial involvement, business growth, and opportunity and necessity of being in business. We propose two hypotheses. *First*, the health indicators show lower values during the COVID-19 pandemic period than before this period. *Second*, the links between these health indicators and the

nine factors under consideration are different between the two periods. The second hypothesis is based on the idea that it is not just the level of health perception that is affected by the COVID-19 pandemic but also its underlying structure due to the pervasive, sudden and profound effect of the pandemic.

Our results show that while the perceptions of good mental health reduced during the pandemic as compared to before, the perception of good physical health increased during the pandemic. We also find that seven of the nine coefficients of the links between these health indicators stay similar before and during the pandemic. However, the influences of two mechanisms stand out in a novel, significant and interesting way: that of the size of business, and the growth of turnover. It seems that during the crisis, they become a liability rather than an asset. This finding has immediate consequences for entrepreneurial support schemes which are likely to play an important role during the current crisis and its aftermath. These schemes should not only prioritize the mental health of business owners in general, but also pay particular attention to the businesses that are bigger and growing faster than the less successful ones (in terms of size and growth). Taken together, the COVID-19 pandemic can be considered as a natural experiment for analysing small business owners' health in terms of its level and its link to different factors that pertains to the owners as well as their business.

Our study focuses on the impact of health perception due to the advent of the COVID-19 pandemic in 2020. In that sense it contributes to the avalanche of empirical studies and reviews in this topic concerning the general population (Gloster et al., 2020; Serafini et al., 2020; Salazar de Pablo et al., 2020; Shaukat et al., 2020; Wang et al., 2021), as well as responds to the call for more such research (Arden and Chilcot, 2020; Holmes et al., 2020; Kniffin et al., 2020). However, the present study is unique as it is squarely focused on entrepreneurs, and the factors that are typical for their business. We investigate entrepreneurs' perceptions of physical and mental health before and during the COVID-19 pandemic and try to find an explanation for it. Changes in the perceptions of physical and mental health can be easily compared to other parts of the general population. By doing so, our work contributes to the literature on the effects of the COVID-19 pandemic. However, the explanation of health perception before and during the COVID-19 pandemic is specific for entrepreneurs. See also Patel and Rietveld (2020) and Yue and Cowling (2021). Here, we aim to contribute to the entrepreneurship literature. We refrain from formulating specific hypotheses per factor on entrepreneurs' perception of health and instead empirically explore if their influence changed between before and during the pandemic. Since such a strategy may call for cherry picking and p-hacking, we limited our investigation from the beginning to ten factors from which we dropped only one (feelings of loneliness) because of its endogenous nature.²

2. Torrès et al. (2021a) use a similar set of factors for an investigation of the effects of the 2020 COVID-19 pandemic on another mental health outcome, i.e., entrepreneurs' perception of burnout.

The current article is organized as follows. First, we provide a brief literature review on perceived health in general and for small business owners in particular to support our two hypotheses. Then, we present a description of the samples and the variables, followed by the method we employed in this study and the results. We conclude with the section titled ‘discussion, limitations and future research directions’.

2. Some Literature Backgrounds

Although small businesses play a vital role in economic development (Carree and Thurik, 2010; Koellinger and Thurik, 2012; Vyas and Vyas, 2019), it is only recently that scholars have started to pay attention to both the physical and mental health of their owners (Shepherd and Patzelt, 2015; Stephan and Roesler, 2010; Stephan, 2018; Torrès and Thurik, 2019) whom we will refer to as entrepreneurs in the present paper. The study of entrepreneurs’ health merits separate attention because they are a ‘breed apart’ from managers (Buttner, 1992) in terms of their personality traits (Steward and Roth, 2001; Zhao and Seibert, 2006), the influence they exert on their business, and the way their health (both physical and mental) influences the profitability or even the survival of their business (Chao et al., 2007; Torrès, 2017). They often cope with limited resources and support, wear several ‘hats’ in terms of roles that they play in their organization, and heavily bear the cost of any mistake that they make (Cardon et al., 2013; Torrès and Julien, 2005; Jaouen and Lasch, 2015). Not surprisingly, these entrepreneurs are often under a lot of stress (Wincent and Örtqvist, 2009) which impacts their health (Lechat and Torrès, 2017; Perrewé and Harms, 2020; Wach et al., 2020) and well-being more broadly (Berrill et al., 2020; Van der Zwan and Hessels, 2019).

2.1. Health Perception

Our study looks at French entrepreneurs’ perception of health, before and during the COVID-19 pandemic lockdown decree in France on March 17, 2020. Lasting 55 days, this lockdown was one of the longest and strictest in Europe during the first wave of the 2020 pandemic. During the prolonged lockdown, the general population was exposed to health consequences like the risk of infection and hospitalization. Moreover, the lockdown had mental health consequences created by loneliness, frustration, and worries about economic survival (Brooks et al., 2020; Cullen et al., 2020; Pfefferbaum and North, 2020). Business owners are however likely to experience additional stress since they are also responsible for their employees (Grant and Ferris, 2012). The ensuing increased level of stress is destined to have an impact on their health (Hammen, 2005; Lee and Ashforth, 1996; Van der Doef and Maes, 1999).³

Along with the supposition that perceptions of good health of entrepreneurs decrease during the COVID-19 pandemic, in the present study, we aim to understand factors that influence this perception. We briefly discuss these factors in the next section.

2.2. Factors Linked to Health Perception

Perception of health amongst entrepreneurs is subject to many factors. We have identified nine factors that may be linked to perceived health, and categorized them into three broad categories. *First*, demographic factors that are usually associated with perceived health such as age, gender, education and experience. *Second*, factors specifically associated with risks and uncertainties in the context of entrepreneurship, such as size of business, financial involvement and growth of turnover. And *third*, the motive related to running a business in the first place – opportunity-seeking and/or necessity-driven. Of course, there are many more factors that could be associated with perception of health amongst business owners. However, we believe that these nine factors are a sufficiently broad set to show whether the links with health perception changed during the COVID-19 pandemic or not. The common denominator of these nine factors is that there is a low probability of a danger of endogeneity, and that they are among the ‘usual suspects’ in the domain of entrepreneurship (Parker, 2018). To avoid the pitfalls of cherry picking and running into multiple testing issues we started out with a fixed set of ten factors. We had to drop only one (feelings of loneliness) of which we overlooked the endogenous nature and which (obviously) contributed considerably to the statistical explanation of health perceptions.

Age (Milunpalo et al., 1997; Andersen et al., 2007) and *gender* are common control variables in the study of perceived health. The so-called ‘Global self-rated health scale’ (physical and mental) has been shown to decline with age in both cross-sectional and longitudinal analyses (Andersen et al., 2007). The relation between gender and perceived health is however not always that straightforward. Some studies show that men are more likely than women to consider themselves to be in good health (Bora and Saikia, 2015; Pinillos-Franco and Garcia-Prieto, 2017; OECD, 2019). On the other hand, we also know that women are socialized to be more mindful about their health than men (Davidson and Freudenburg, 1996; Siegrist et al., 2005), and hence seek out more information related to maintaining good health (Deeks et al., 2009).

Studies indicate a persistent association between health and *education* (Pinillos-Franco and Garcia-Prieto, 2017; Schellekens and Ziv, 2020). This could be because education leads to a change in the decision-making patterns (Cutler

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3. Entrepreneurs often experience a high level of stress due to high business risks and work overload (Douglas and Shepherd, 2002; Shepherd and Patzelt, 2015) which impacts both their physical and mental health (Lechat and Torrès, 2017).

and Lleras-Muney, 2006). Moreover, education is a ‘resource’ that helps people cope better with their job demands (Demerouti et al., 2001). This explanation can also justify a link between perceived health and *experience*.

The risks and uncertainties associated with the entrepreneurial journey can cause fear and anxiety (Boyd and Gumpert, 1983). Running a business demands both physical and mental rigor. It can also lead to loneliness and social isolation (Akande, 1994). In the current study we examine the *size of the business*, the *level of financial involvement* of the entrepreneur and the *recent growth of turnover*, as these factors can impact business owners’ perceived stress, optimism and self-esteem (Mäkikangas and Kinnunen, 2003; Rauch et al., 2018).

The motive for which an entrepreneur starts his/her business also impacts the entrepreneurial process. Thus, the literature has made a distinction between *necessity-driven* entrepreneurs who are pushed into starting a business as other options for work are either unsatisfactory or absent, and *opportunity-driven* entrepreneurs who are pulled into entrepreneurship out of choice (Valdez et al., 2011; Bosma and Harding, 2007; Van der Zwan et al., 2016).⁴ This distinction originates from the early research by the Global Entrepreneurship Monitor (Bosma and Harding, 2007; Reynolds, 2012).⁵ Necessity-driven entrepreneurs often have a lower opportunity cost for starting a business; their activities require less financial and human capital, and they often face more risks but less uncertainty (Sambharya and Musteen, 2014; Thurik et al., 2008; Van der Zwan et al., 2016). Opportunity-driven entrepreneurs, however, engage in activities that are more complex, necessitating an intensive creative process and resulting in a higher level of uncertainty (Block and Wagner, 2007; Valdez et al., 2011). In our surveys these questions pertain rather to the current motives of entrepreneurs than to their motives when setting up shop. We suggest that the motive for being in a business will affect how business owners cope with a situation of high uncertainty and isolation like the COVID-19 pandemic lockdown, which in turn will impact their perception of health.

Taken together, we posit the following two hypotheses:

H1, perceived physical and mental health indicators of entrepreneurs go down during the COVID-19 period.

We investigate hypothesis 1 by comparing average health indicator values of two independent but comparable samples of French small business owners before and during the pandemic.

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4. In the present study necessity-driven and opportunity-driven are not conceived as mutually exclusive options. Indeed, in sample 1 407 of the 1437 business owners expressed both a feeling of necessity and one of opportunity. In sample 2 this number is 503 out of 2297. Clearly, the overall correlation between the two concepts is negative and significantly so. See Tables 2 and 3.
 5. See Liñán and Jaén (2020) for a recent discussion on the use of the opportunity necessity nexus for potential, nascent or new entrepreneurs.

H2, the underlying structure of the determinants of perceived physical and mental health indicators of entrepreneurs, is affected by the COVID-19 pandemic.

We investigate hypothesis 2 using factors like age, gender, level of education and experience, size of business, financial involvement, growth of turnover, and whether one stays in the business because of an opportunity or out of necessity, that are plausible to be associated with health indicators – and test if they have a different association with the health indicators during the COVID-19 pandemic than before its advent. We use the individual data of the same two samples as used for investigating hypothesis 1. Hypothesis 2 represents the idea that the advent of the COVID-19 is so pervasive that it not only influences the level of perceived health indicators, but even the mechanism behind this influence. We refrain from hypothesising the effect of the COVID-19 pandemic on each of these factors of this mechanism, as it is beyond the scope of our analysis. Rather we focus on the underlying mechanism as a whole.

3. Samples and Variables

3.1. Two Samples

Two surveys were held in 2019 and 2020, respectively, in France by Amarok (see <http://www.observatoire-amarok.net>) in cooperation with the *Health of entrepreneurs and small business owners chair* of LabEx Entreprendre of the Université de Montpellier (see <https://labex-entreprendre.edu.umontpellier.fr/en/english-version/programs>).

Sample 1 (pre-COVID-19, n=1437) is the result of a survey held between February 11 and March 20, 2019 by the *Institut Français de Sondage*, Opinion Way, using computer-aided telephone interviewing. It consisted of 142 questions. Business owners were contacted until the telephone interviews reached a total of 1501 complete questionnaires, of which 1437 were used for the current study. This survey was financed by the *Fondation des Entrepreneurs du Future*, MMA. It is representative of businesses with less than 50 employees in twelve French regions (i.e., all thirteen French regions without Corsica) and nine sectors.⁶

Sample 2 (COVID-19, n=2297) is the result of a survey held between April 15 and April 21, 2020, by Amarok, using an on-line questionnaire. The survey consisted of 103 questions which took about 15 minutes to complete. 46220 Business owners were contacted of which some 3000 responded. This study was

6. Data on the representativeness in various dimensions such as the percentage of women, age, regions, and sectors are available from the authors.

financed by Amarok and LabEx Entreprendre. 2297 questionnaires were used for the current study. Its representativity is secured by comparison with sample 1.

3.2. Variables and Measurement

In this study, we restrict ourselves to the variables available in both samples.⁷

Physical health and mental health perception were measured using a one item scale with five categories from 1=bad to 5=excellent. The total health score was computed as the unweighted average of the two.

The other factors were measured as follows: gender (1=female); age (five categories from 1=less than 30 years to 5=more than 60 years); educational level (five categories from 1=autodidact to 5=university); level of experience (five categories from 1=less than 3 years to 5=more than 20 years); size of business (six categories from 1=0 employees to 6=more than 50 employees); financial involvement (five categories from 1=less than 24% financial ownership to 5=100% financial ownership); growth of turnover (five categories from 1=declining heavily to 5=growing significantly); opportunity=1 if the owner feels that she is in the business because she wants to/because of an opportunity; and necessity=1 if the owner feels that he is in the business because he has no satisfactory alternative choice. The opportunity/necessity questions were identical to the questions in the Global Entrepreneurship Monitor. But given that our context is not one of aspiring and starting entrepreneurs, they measure current sentiments rather than those while starting the business.

It is clear from Table 1 that while the average perception of good mental health deteriorated from 2019 to 2020, that of good physical health improved. However, the total health score diminished somewhat.

Table 1: Average health perception levels of sample 1 (pre-COVID-19) and sample 2 (COVID-19)

| Variable | Sample 1 (2019) | Sample 2 (2020) | Difference |
|--------------------------------|---------------------|-----------------|------------|
| 1=bad, , 5=excellent | pre-COVID-19 | COVID-19 | |
| Physical health | 3.132 | 3.351 | 0.219 |
| Mental health | 3.365 | 2.889 | -0.476 |
| Total health score | 3.248 | 3.119 | -0.129 |
| Observations | 1437 | 2297 | |

Footnote to Table 1: total health score is computed by taking the average of the two underlying dimensions. The correlation coefficient between physical and mental health for sample 1 is 0.59 and for sample 2 it is 0.53. All differences between the two samples are significant at $p < 0.01$.

7. Obviously, the pre-COVID 2019 survey was never meant to be confronted with the post-COVID 2020 survey.

Table 2: Correlation coefficients of sample 1 (pre-COVID-19, n=1437)

| Variable | Mean | SD | Min | Max | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---------------------------|------|------|------|------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|-------|--------------|--------------|
| (1) Physical health | 3.13 | 0.91 | 1.00 | 5.00 | | | | | | | | | | |
| (2) Mental health | 3.37 | 0.96 | 1.00 | 5.00 | 0.59 | | | | | | | | | |
| (3) Gender | 0.42 | 0.49 | 0.00 | 1.00 | -0.04 | -0.07 | | | | | | | | |
| (4) Age | 3.57 | 1.07 | 1.00 | 5.00 | 0.02 | 0.07 | -0.05 | | | | | | | |
| (5) Educational level | 3.61 | 1.30 | 1.00 | 5.00 | 0.07 | 0.07 | 0.00 | -0.09 | | | | | | |
| (6) Level of experience | 3.58 | 1.23 | 1.00 | 5.00 | 0.01 | -0.01 | 0.00 | 0.50 | -0.07 | | | | | |
| (7) Size of business | 2.48 | 1.18 | 1.00 | 5.00 | 0.07 | 0.05 | -0.02 | -0.16 | 0.08 | -0.15 | | | | |
| (8) Financial involvement | 3.86 | 1.40 | 1.00 | 5.00 | -0.03 | 0.01 | -0.11 | 0.15 | -0.03 | 0.18 | -0.29 | | | |
| (9) Growth of turnover | 3.18 | 0.83 | 1.00 | 5.00 | 0.11 | 0.15 | -0.05 | -0.15 | 0.02 | -0.18 | 0.15 | -0.04 | | |
| (10) Opportunity | 0.90 | 0.30 | 0.00 | 1.00 | 0.02 | 0.04 | -0.07 | -0.06 | 0.06 | -0.02 | 0.07 | -0.02 | 0.03 | |
| (11) Necessity | 0.38 | 0.49 | 0.00 | 1.00 | -0.04 | -0.10 | 0.08 | 0.06 | -0.07 | 0.06 | -0.05 | -0.02 | -0.07 | -0.41 |

Footnote to Table 2: SD is standard deviation; bold means p<0.01.

Table 3: Correlation coefficients of sample 2 (COVID-19, n=2297)

| Variable | Mean | SD | Min | Max | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---------------------------|------|------|------|------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|-------|--------------|--------------|
| (1) Physical health | 3.35 | 0.94 | 1.00 | 5.00 | | | | | | | | | | |
| (2) Mental health | 2.89 | 1.04 | 1.00 | 5.00 | 0.53 | | | | | | | | | |
| (3) Gender | 0.37 | 0.48 | 0.00 | 1.00 | 0.02 | -0.08 | | | | | | | | |
| (4) Age | 3.47 | 0.99 | 1.00 | 5.00 | -0.01 | 0.09 | -0.11 | | | | | | | |
| (5) Educational level | 3.46 | 1.18 | 1.00 | 5.00 | 0.00 | 0.03 | 0.07 | -0.04 | | | | | | |
| (6) Level of experience | 3.38 | 1.34 | 1.00 | 5.00 | -0.03 | 0.00 | -0.15 | 0.44 | -0.08 | | | | | |
| (7) Size of business | 2.49 | 0.93 | 1.00 | 6.00 | -0.02 | -0.06 | -0.18 | 0.07 | 0.15 | 0.22 | | | | |
| (8) Financial involvement | 4.14 | 1.27 | 1.00 | 5.00 | 0.03 | 0.03 | -0.04 | -0.01 | -0.05 | -0.04 | -0.19 | | | |
| (9) Growth of turnover | 3.39 | 0.80 | 1.00 | 5.00 | 0.05 | 0.05 | -0.05 | -0.12 | 0.07 | -0.09 | 0.08 | -0.01 | | |
| (10) Opportunity | 0.77 | 0.42 | 0.00 | 1.00 | 0.00 | -0.02 | 0.00 | -0.14 | 0.03 | -0.08 | 0.03 | 0.01 | 0.03 | |
| (11) Necessity | 0.33 | 0.47 | 0.00 | 1.00 | -0.04 | -0.03 | 0.03 | 0.07 | -0.04 | 0.02 | -0.05 | 0.01 | -0.07 | -0.18 |

Footnote to Table 3: SD is standard deviation; bold means p<0.01.

We observe apparent similarities between the levels and the correlations of the remaining nine factors before and during the COVID-19 period (Tables 2 and 3) given the samples were the result of similarly collected surveys. The exception is that, surprisingly, growth of turnover increased slightly.

The similarity between the two samples has one exception not captured in Tables 2 and 3: while the average size of business is similar between the two samples, its size distribution is not. About 23% of the businesses of sample 1 (pre-COVID-19) have no employees and there are no businesses with more than 50 employees. The size distribution of sample 2 (COVID-19) is different: about 2% have no employees and 1.6% have more than 50 employees. We will deal with this difference in the section below while testing the robustness of our regression outcomes.

4. Method and Results

Above we have shown the differences in the levels of perceptions of health before and during the pandemic (Tables 1, 2 and 3). In the present section, we will show

their links with nine factors both before and during the pandemic, as well as the difference between the two periods (Table 4) using OLS regressions.

Table 4: The links between total health score (2 items) and ten factors using sample 1 (pre-COVID-19) and sample 2 (COVID-19)

| Sample | Sample 1 (2019) pre-COVID-19 | Sample 2 (2020) COVID-19 | Difference |
|---|---------------------------------|-----------------------------|------------|
| Variables | coefficient (SE) | coefficient (SE) | |
| Gender (female=1) | -0.080 (0.044)* | -0.079 (0.039)** | -0.001 |
| Age (1=<30 years, 5=>60 years) | 0.067 (0.024)*** | 0.063 (0.020)*** | 0.004 |
| Educational level (1=autodidact, 5=university) | 0.050 (0.017)*** | 0.021 (0.016) | 0.029 |
| Level of experience (1=<3 years, 5=>20 years) | 0.002 (0.021) | -0.022 -0.02 | 0.024 |
| Size of business (1=0 employees, 6=>50 employees) | 0.034 (0.020)* | -0.057 (0.021)*** | 0.091 *** |
| Financial involvement (1=<25%, 5=100%) | -0.003 (0.016) | 0.015 (0.015) | -0.018 |
| Growth of turnover (1=declining heavily, 5=growing significantly) | 0.143 (0.027)*** | 0.067 (0.023)*** | 0.076 ** |
| Opportunity (yes=1) | -0.002 (0.079) | -0.018 (0.044) | 0.016 |
| Necessity (yes=1) | -0.110 (0.049)** | -0.079 (0.039)** | -0.031 |
| Observations | 1437 | 2297 | |
| R ² | 0.042 | 0.015 | |
| R ² (adj.) | 0.036 | 0.012 | |

Footnote to Table 4: SE is standard error. * indicates that $p < 0.10$; ** indicates that $p < 0.05$; *** indicates that $p < 0.01$. The final column shows the difference between the coefficients between sample 1 and sample 2 and reports the results of a Chow test (Wald test) that assesses the significance of these differences.

Table 4 shows that being male and growth of turnover link positively with health for both periods. The same is true for age and educational level (not significant in 2020). No effect is found for the level of experience (not surprising given its high correlation with age), financial involvement and opportunity (being in the business because one feels one wants to). Necessity (being in the business because one feels one has to) links negatively with health. Size of business shows different signs for both periods: positive for 2019 (only at $p < 0.10$) and negative for 2020. The most interesting finding is the difference in the links between both periods (as shown by the Chow difference tests): both that of the size of the business and the of growth of turnover decrease significantly.⁸

Moreover, we see that the explanation in terms of R^2 is much lower in the COVID-19 period. A Chow test (Chi^2) on the equality of all coefficients across both samples shows that, taken together, the coefficients of both periods are different ($\text{Chi}^2 = 24.76$ with $p = 0.003$).

Of the many robustness tests that we ran, we will devote some attention to whether the difference of the size distribution between the samples has an effect. *First*, leaving out all businesses with no employees does not alter the results: for sample 2 this is not surprising as only 2% are businesses without employees; but

8. A separate analysis for mental health and physical health shows that the decreases of the effects of the size of the business and of growth of turnover occur in both dimensions but only significantly so in the case of mental health.

for sample 1 which has 23% businesses without employees, it shows the stability of our results. *Second*, we tested if the results for businesses with less than and more than ten employees are similar. They are indeed similar, with the important finding that in line with the results for all observations, the coefficients of both periods are different for businesses with less than ten employees ($\text{Chi}^2=21.87$ with $p = 0.009$) and with more than ten employees ($\text{Chi}^2=19.59$ with $p = 0.021$). *Third*, deleting the size of business factor from our analyses did not affect the coefficients of the remaining factors. Taken together, the dissimilarity of the size distributions between both samples does not influence our findings.

5. Discussion, Limitations and Future Research Directions

Since December 2019, a new virus (Sars-Cov-2) and a new disease (COVID-19) spread across the entire world (Shereen et al. 2020; Li et al., 2020; Wu and McGoogan, 2020). The new disease was defined as a ‘pandemic’ by the World Health Organization on March 11, 2020. To slow down the spread of the virus, many countries decided to apply forms of general lockdown realizing that specific testing, tracing and isolating practices would not be practically feasible; this was especially the case in Europe (Bedford et al., 2020).

A unique set of two similar questionnaires sent out to French small business owners in March 2019 and April 2020 allowed us to study the effect of the COVID-19 pandemic on their perception of health, and its links to several factors pertaining to business owners and their venture. As expected, the perception of good mental health dropped during the COVID-19 pandemic. However, the perception of good physical health increased (Table 1). The latter effect could be due to a variety of reasons. During the strict lockdown in France, everyone (including business owners) stayed at home and rested, had less daily work-related stress, had more time to exercise, all of which could have contributed to higher physical health perception. In other words, prolonged and forced social confinement, the most important factor that the government highlighted as necessary for staying healthy during this period, led to a perception of better physical health for entrepreneurs. However, not surprisingly, and in line with what we anticipated (hypothesis 1), the total health score of entrepreneurs (the average of the physical and mental health scores) dropped during the COVID-19 pandemic. Unfortunately, we were unable to compare these data with similar data of French employees.⁹

9. Concerning the perceptions of mental health, Gloster et al. (2020) in a survey collected between April and June 2020, on a sample of 9565 individuals from 78 countries found that, on average, 10% of the sample indicated low levels of mental health. Concerning physical health, Wang et al. (2021) on a sample of 4479 individuals from various Asian countries found a deterioration of several physical symptoms such as headache, cough and sore throat.

Our results show that the relationship between health perception and most factors pertaining to the business owners and their firms, are aligned to the existing literature (Table 4). We found that both before and during the COVID-19 pandemic, females feel less healthy than men; age, level of education and growth of turnover is associated positively with health; necessity (being in the business because one feels one has to) is negatively linked with health. Three factors – level of experience, financial involvement and opportunity (i.e., being in the business because one wants to) show no links to health perceptions which contradict earlier literature findings. The intriguing exception is the link of size of business which we discuss below.

Most of the nine factors that we investigated due to their possible association with business owners' perception of health show similar effects before and during the pandemic with two notable exceptions: size of business and growth of turnover (Table 4). However, while the size of business does not seem to affect the perception of health before the pandemic (positive effect with $p < 0.10$), during the pandemic it had a negative effect on health. One explanation for this novel finding could be that due to the increased risk and uncertainty during the crisis, the greater responsibility which comes with a bigger business is detrimental to the perception of health. In other words, during the pandemic, bigger sized business became a liability, instead of an asset. Another explanation could be that reorganization efforts allowing for the novel phenomenon of mainly working from home, increase with increasing size of business, and that these efforts, for which the entrepreneurs had little experience, are ultimately detrimental to their mental state.

Following these lines of reasoning one would predict that growth of turnover would also have a negative effect on the perception of health during the pandemic. Growing turnover can create excess pressure on the entrepreneur which can in turn impact their health (Dijkhuizen et al., 2016; Rauch et al., 2018). During the pandemic, with its inherent risks and uncertainties, quarantine and/or lockdown restrictions, and novel forms of organization including working from home, the effect of this pressure may have been even more severe. Indeed, we found that the positive effect of growth of turnover during the crisis is lower than before ($p = 0.039$). This implies that the 'usual' positive health effect of the challenge for entrepreneurs of growing their business, which is what entrepreneurs like, is offset by the negative health effect of its risks during the pandemic. Further investigation is certainly warranted to clarify this novel effect of growth of turnover on health, including its potential mediators (Wach et al., 2020).

Financial involvement which is the third risk factor after size of business and growth of turnover, shows no separate links with the perception of health. One would expect a negative association with health for both periods, with the association being more negative during the pandemic. The lack of a separate effect is probably due to its high correlation with size of business.

If we compare the links between health perception and the nine factors between the two periods – before and during the COVID-19 pandemic (Table 4) – we can make two observations: the links are relatively similar with the exception of size of business and growth of turnover, and the explanation in terms of R^2 is much lower during the COVID-19 pandemic. In other words, while the structure of the relationship between perception of health and its underlying factors becomes weaker (the R^2 is lower) there are still many similarities between the two periods. However, a Chow test shows that we have to reject the equality of all coefficients, implying that we cannot reject hypothesis 2. Our provisional conclusion is that our results are indicative of the SME owners' short-term exposure to the pandemic outbreak. We observe that the structure of the relationship between perception of health and its underlying factors is already starting to change during the first wave of the pandemic in spring of 2020. This change is primarily due to the influence of two factors – the size of business and growth of turnover – which both seem to represent the increased risk and uncertainties small business owners encountered during the pandemic: the advantages of size and growth turn into liabilities.

As more and more studies in the entrepreneurship literature indicate that entrepreneurs' health (both physical and mental) influences their activities, as well as the growth and sustainability of their ventures (Torrès and Thurik, 2019; Hessels et al., 2018; Shepherd and Patzelt, 2015), our study is relevant in its scholarly contribution as it takes a close look at the perception of entrepreneurs' health in general, and more specifically during the COVID-19 pandemic. Particularly, our work contributes to the literature on small business owners by showing the link between several factors relating to the business owner – the risks they incur and motives of being in business – on the one hand, and their perception of health on the other. Policy makers should prioritize the health of business owners, in general, and more specifically after a world-wide health crisis like the 2020 COVID-19 pandemic which has significantly affected their economic stability, and clearly, as our study indicates, altered their perception of health.

Our results show that entrepreneurs' health is connected to their economic environment. The general lockdown significantly reduced entrepreneurs' perception of good mental health, although their perception of good physical health improved, likely due to the imposed rest. At the time of writing the current paper, more (less stringent and more targeted) lockdowns are maintained and/or in the offing, which we reckon would certainly affect further the health of entrepreneurs. Given the expected prominent role of SMEs in the ensuing recovery phase of the world economy, it is of utmost importance to start thinking about how to support entrepreneurs. In several countries public employers and insurance organizations have already put their ideas on paper such as '*Le guide de l'entrepreneur en forme*' by the MMA foundation in France, '*Responding to coronavirus (COVID-19): A small business owner's guide to creating a mental*

health plan' by the Victorian Small Business Commission in Australia (Visentin et al., 2020), the '*Coronavirus (COVID-19): Advice and guidance for small businesses and the self-employed*' of the Federation of Small Businesses in the UK, and the '*Guia interina para empresas y empleadores en su respuesta a la enfermedad del coronavirus 2019*' by the Spanish CDC.

Since, the results of our study indicate that the advantages of size and growth of business turn into liabilities for maintaining good health, support systems for small business owners should aim at those businesses that are bigger and growing faster, rather than focus only on those which are smaller in size and growth.

The present crisis can well be interpreted as a serious wake-up call for the entrepreneurs' awareness of their own health, as well as for their employees, which has been largely neglected (Pinder et al., 2016; Torrès and Thurik, 2019). Webinars seem to be the perfect instrument (Markovic et al., 2017) for creating this awareness by offering therapeutic methods to cope with stress and loneliness, prevent burnout, educate entrepreneurs in relaxation techniques that can improve their sleep, teach them the practice of mindfulness, and stress management (Charoensukmongkol, 2019), to mention only a few.

The Observatoire Amarok which – along with its scientific goals – also plays a role in the area of prevention and therapies, organized 34 webinars in the period between April 9 to December 15, 2020 reaching out to thousands of French SME business owners. Some of the experiences of these webinars spilled over to the interpretation of the current analyses, such as the burden of size and growth in the face of new risks and uncertainties.

The present analysis of the health consequences of the pandemic also has a meaning for recent approaches such as the distinction between the pathogenic and salutogenic sides of professional activities (Torrès, 2013 and 2017; Torrès and Thurik, 2019; Klofsten et al., 2020).

Our study suffers from three specific *limitations*. First, we could not compare our results of entrepreneurs with that of regular employees. Second, the two dimensions of our health perception measures consisted of one item only. Moreover, we didn't measure some of the other health dimensions that could be worthy of analysis like burnout, loneliness, sleep, anxiety and depression.¹⁰ As *future research directions*, we think a post-COVID-19 follow-up study could contribute to our understanding of business owners' health perception at the aftermath of a global crisis, and its links to factors pertaining to them and their business. Moreover, this follow-up study could also analyse the crisis management strategies and the resilience of small business owners (Herbane, 2010).

10. See Torrès et al. (2021a) for a first investigation of the effects of the 2020 COVID-19 pandemic on entrepreneurs' perception of burnout. In Torrès et al. (2021b) the effects on the composition of the perception of burnout is analysed given a ten item scale.

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