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The coronavirus's effect on the decisions and habits of food purchases in Hungary

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Abstract. This article was inspired by current events. The shopping craze generated by the coronavirus pandemic raised some questions that this article aims to answer by analysing a variety of suppositions. The coronavirus pandemic caused panic shopping amongst consumers, whose motivation for increasing the volumes of shopping revolved around ensuring a safety margin of groceries while also reducing the number of shopping trips. The consumers did most of their shopping in hyper, and supermarkets, as well as in bigger ABCs and grocery stores (Lidl), where there's a wider range of products and larger stock. The average consumer bought much more than the basic groceries during this period. Our research started in March 2020 and ended in May 2020. To validate our assumptions, primary information is derived from the statistical processing of a large number of data from a representative questionnaire survey of 724 respondents. The results show that for many people this period was about stockpiling storages of groceries. Flour saw the biggest increase in purchase volumes, but chicken and pastas were also amongst the more popular items. Stores with the biggest range of selection were able to satisfy this demand. As

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evidenced by data, consumers also purchased items, which are needed for any household during an emergency and are easy to store in higher volumes. These items include different oils and fats, which are required for cooking, and non-perishables, such as salamis, canned foods, rice and mineral water.

Keywords: consumer, COVID-19, market, shopping behavior, purchaser

JEL Classification: D12, O52

1. INTRODUCTION

The food economy of the developed countries of the world has undergone radical changes over the last century. After the World War, the main task of food production was to provide sufficient food for the starving masses. As the economy recovered, so did social welfare - particularly overseas and in Western Europe. At the same time, there was a growing emphasis on health promotion and the emergence of concepts and, of course, products such as functional foods.

The emphasis on nutrition and healthy living is not the invention of the 'health-conscious man' of the 21st century, although it is undeniable that many of today's press releases suggest as much. Even Hippocrates, the famous ancient Greek physician, considered the support of the body's natural healing powers to be the most important task of the doctor. "Let your food be your medicine and your medicine be your food", the ancient scientist said (Witkamp & van Norren, 2018).

The study of consumer behaviour in relation to food was a major area of research in the 20th century and, of course, still is today. However, it seems that the unexpected events of our time may significantly rewrite or modify our earlier 'non-war' models. For example, Lehota's (2001) 'System analysis of factors influencing food consumption' does not 'account' for the panic buying of our time. Microbiologically, the Coronaviridae family includes the genus Coronavirus. The name comes from the fact that the virus particle resembles the sun's corona with its surface projections (Pillania, 2020). The emergence of the virus is reshaping the lives of not only our country, but the whole world, and affecting our shopping habits (Crick & Crick, 2020). Health is defined by the World Health Organization (WHO) as a person's physical, mental and social well-being, not merely the absence of disease or disability.

Health is only sustainable when its dimensions are functioning at a satisfactory level, such as biological health, which includes the proper functioning of our bodies, and mental health, which represents our worldview, moral principles, peace of mind and inner peace. No less important are mental health, which involves clear, rational and logical thinking, emotional health - the ability to recognise, experience and express feelings - and social health, which involves, among other things, forming appropriate relationships with our fellow human beings (Kományi, 2014).

Health is not only a goal, but also a resource that we use in our everyday lives. Indeed, good health is not only in the interest of the individual, but also of society, as the 'working person' as a labour force is an important element in the production and value creation (transformation) process. It is therefore in the fundamental interest of society to maintain and improve his or her health. The most important objective is therefore to ensure the physical and mental well-being and health of individuals and communities as far as possible over the long term. The events that took place in Hungary (also) in spring 2020 made it clear even to a layman that there is a close link between health and the economy. The pandemic of today has resulted in many job losses, the disruption of the supply chain has exacerbated this process, and government measures to slow the spread of the virus have made work and employment in many sectors (tourism, hospitality, and of course many retail activities) difficult (Chesbrough, 2020, Stewart, 2020; Kinnunen et al.,

2021). This has led to an increase in unemployment, the negative economic effects of which are undeniable. The outbreak of COVID-19 has influenced almost all the aspects of human life (Marona & Tomal, 2020).

This publication was prompted by the global events of our time. The buying frenzy surrounding the epidemic has attracted our interest - and in this publication we have sought to answer some questions focusing on consumer behaviour in this area.

There is a large body of research on this subject both in Hungary and worldwide (Zwanka & Buff, 2020, Sirkeci, 2020, Yulianeu, 2020). Nevertheless, the authors of this paper believe that any publication on this topic can contribute to a better understanding of the causes of changes in consumer behaviour (often only at the local level) (Němcová & Staňková, 2019).

2. THEORETICAL BACKGROUND

2.1. Some issues on health and health condition

It's a well-known fact that there are close to 10 million people dying each year due to not having access to a sufficient amount and quality of water. Additionally, as of April 2020 there are approximately 850 million people regarded as undernourished. There is not enough food in the developing countries, and other parts of the world are suffering from civilizational illnesses (high blood pressure, excess weight). This fact is well proven, as there are 1.6 billion people who as of April 2020 can be regarded as overweight (WORLDOMETERS, 2020).

Today's pandemic is obviously a different kind of illness, which also must be treated in a different way. The virus is not something unique for more developed countries, nor is it due to poor circumstances of developing countries.

There have been about 400 infectious illness discovered since the 1940s and 60% of these have originated from animals (Morse et al., 2012). Usually in the case of animals infecting people there needs to be a physical contact (e.g., malaria) but sometimes illnesses can spread through the consumption of infected animals or with contact to them (e.g., through droplets), exactly like the COVID-19 virus. At the beginning of January 2020, a new and unknown virus, attacking the respiratory tract, emerged in Wuhan, China, a city with 12 million inhabitants. (Song & Zhou, 2020). The virus was not only unknown to the world, but to our immune systems as well, so it was quick to cause a global epidemic. By the end of next month, the virus will have emerged in another 50 countries, causing serious illnesses (Efebeh, 2020).

In this article we would like to point out that as of Easter Monday, 2020, there were 1 923 937 confirmed coronavirus cases worldwide, with 452 402 recoveries and, sadly, 119 730 deaths (WORLDOMETERS, 2020). On this same day in Hungary, there were 1512 confirmed cases, with 122 deaths.

Following the growth of the pandemic, unemployment has increased significantly, and the break in the supply chain has caused hardships for many sectors (tourism, hospitality, and other retail sectors) (Nayak et al., 2020; Soni, 2020; Pelle & Tabajdi, 2021). It's enough to take a look at the fact that on the previously mentioned day there were 16 million jobs lost in the USA due to the pandemic. The retail sector in the USA, compared to the previous year, is expected to fall 9.1 per cent, which can be converted into a 320 billion USD loss. According to forecasts it will take at least 4 years for this sector to get back up to the level it was at before the COVID-19 outbreak. (https://www.absatzwirtschaft.de/livestreaming-bringt-den-laden-zum-konsumenten-172638/).

Both in Hungary and around the world, the pandemic came hand in hand with a food crisis (Mayurnikova et al., 2020). The agricultural and food processing industries have both felt the loss of many employees, restrictions, change of consumer behaviour, and decrease in logistical services, which all in all

brought a decrease in output. Besides this, the consumers started a shopping panic, which caused a temporary shortage in food (Yu et al., 2020, Vasa et al., 2020).

The governmental provisions, independent from one's decisions, have changed the lives of the citizens. In Hungary, the closing of the kindergarten and nursery schools has affected around 369 thousand children, and in higher levels of education there were 1.4 million students forced to study from home, which also affected their parents as well (KSH, 2020).

The employment and economic data published on the KSH's webpage shows that unemployment in Hungary significantly increased during April and the unemployment rate reached 6.5 per cent. By the end of the month, 140 thousand people lost their jobs due to the COVID-19 crisis. This drop in the economy can been seen in the volume change of the GDP compared to the same period in the previous year. When adjusted to seasonal changes in the calendar it only reaches 2 per cent (www.ksh.hu/heti-monitor). According to KSH, the number of people working from home is ten times the amount compared to previous years, which stands at 16.7 per cent

It was positive that China, on the 12 March 2020, announced that the coronavirus pandemic came to an end in their country. Unfortunately, there were 80 thousand still infected and more than 3 thousand dead, but life seemed to get back to normal, and slowly but surely the economy started to stand back up.

At the beginning of June 2020, the epidemic seemed to slow down both in Europe and in Hungary and the restrictions placed to fight the spread of the virus were lifted in the middle of June. On the 10 June 2020, there were 7 325 401 confirmed coronavirus cases, while 3 605 284 people recovered from it, and unfortunately 414 749 had died due to the virus (WORLDOMETERS, 2020). On the same day in Hungary there were 4 017 current cases with 550 deaths, and 2 324 recovered.

The global pandemic, however, regained its strength, and in September 2020 there came a so-called second wave, which resulted in a huge number of cases. Due to the exponential growth of the pandemic, on the 11 September 2020, there were 28 630 146 confirmed coronavirus cases, with 20 587 784 recovered and, unfortunately, 919 797 deaths (WORLDOMETERS, 2020). On the same day in Hungary there were 6 264 cases with 631 deaths, due to the virus.

What all these facts are showcase is the importance of staying healthy. The spread of the virus could be easily slowed down or even stopped by keeping a close eye on personal hygiene, paying attention to the appearance of symptoms, and self-isolation. Furthermore, a huge amount of helpful information can be found on the web (Figure 1). The system of staying healthy is flexible in today's world thanks to widespread spread communication and information technologies. This also has an effect on the accuracy and reliability of health information (e.g., the virus and the spread of it) and additionally this can have a huge impact on our health. The most important factors can be found in figure 1.

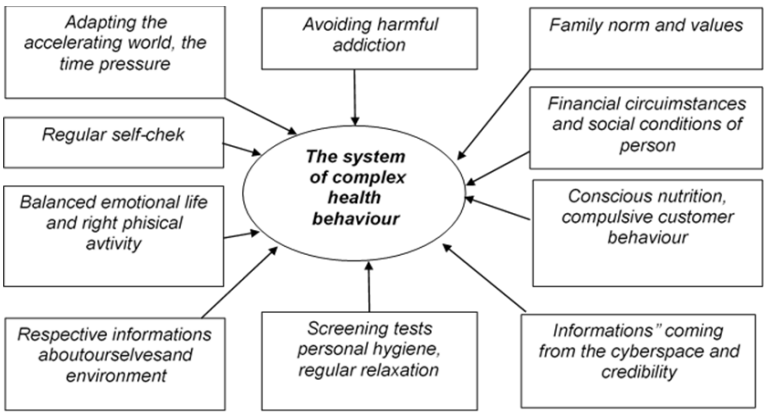

Figure 1. The complex system of health-behaviour

Source: Own construction based on Harris and Guten, 1979; Huszka, 2012

2.2. From needs to panic buying

Needs are the requirement of some biologically or psychologically elementary unsatisfied desire. The desire to need triggers an action to end it. Needs can be satisfied by shopping, ownership, and usage of product or services. Needs can be caused by an internal or external impact, or if one's elementary requisites reach their breaking point (Kotler & Keller, 2012; Huszka, 2015; Szalka & Tamándl, 2019).

Needs can be found on the first level of the Maslow pyramid. External impacts can be mass communication, advertisement, etc., or simply bad news, just like COVID-19, and the fear generated by it. We could witness the latter, in the spring of 2020, both in Hungary and in the world. This fear, maybe mostly the fear of not being able to shop, generated panic buying reminiscent of war-like circumstances (Lins & Aquino, 2020; Wang & Hao, 2020; Kitukutha et al., 2021; Ryadi, Kurniasari & Sudiyono, 2021). The analysis of aspects impacting the food consumption does not take into consideration the panic and the stocking up craze, so this model needs to be expanded.

Both national and international data supports the fact that the global spread of the coronavirus caused more and more people to take precautions and to increase their shopping volumes. In February 2020, Hungary, the traffic increased in the grocery stores by 10.7 per cent and by 11.3 per cent in other, non-food related smaller retail shops, including seasonal adjustments. Panic buying already started towards the end of February and accounted for at least 5.7 per cent of the total 11 per cent growth of small retail volumes, according to KSH (2020). In analysing the commercial data of March 2020, it is easy to see a connection between governmental decisions and shopping behaviour as it was reported by the Nielsen national survey. According to this, there was a 50 per cent increase in the value of small retail chains, compared to similar period in the previous year (Forbes, 2020).

This effect has spread to the entire world just like the virus itself. For example, in Singapore social media was flooded with the pictures of empty shelves and people stocking up on huge amounts of food. In Northern Italy, there were many areas where the consumer was greeted with empty shelves, boosting the fear of shortages (Penzcentrum, 2020).

Following the panic buying, many countries had its supermarkets shelves cleared out, and face masks that were worn during the illness became a missing item as well. Wearing masks became mandatory in public areas in many countries around the world (Infostart, 2020). In Germany, people mostly stocked up on flour and canned foods, but the demand for toilet paper was significant as well (Stuttgarter-zeitung, 2020).

In France they ran out of red wine. When Dutch people found out about the closing of coffeeshops – where they legally sold Marijuana – the real panic struck (Sokszinuvidek, 2020; Trendfm, 2020). In New Zealand the demand for rice was most prominent, however medicines and diet supplements turnover rose sharply as well (Shaw, 2020).

Increased demand and the emergence of deficit products all increase prices and trigger an inflationary process for certain products affected by the epidemic. In contrast, other prices, mainly for luxury products or fuel, are falling due to significant decline in demand. In China, due to its large population, the food problem has become even more significant due to the coronavirus (Yu et al., 2020).

Research has also pointed out that the coronavirus pandemic has caused an increase in the spread of digitalization more than ever. The more powerful importance of digital devices not only at work and home, but also in regards to shopping, is perceptible. It is proven that both in Hungary and worldwide many people chose the opportunity to shop online (Moneta & Sinclair, 2020; INDEX, 2020).

In the era of digitalization is very common for customers to use online applications during the purchasing of products (Petrů, et al., 2020; Ivanov et al., 2020). For instance, in Germany shopping shifted to more online (KSTA, 2020). As COVID-19 spread through the US (according to the Apptopia App Store news company), the number of downloaded online shopping applications also jumped. Compared to the

average daily downloading data from February to March 15, 2020, Instacart, Walmart Grocery and Shipt rose by 218%, 160% and 124% respectively (Figure 2).

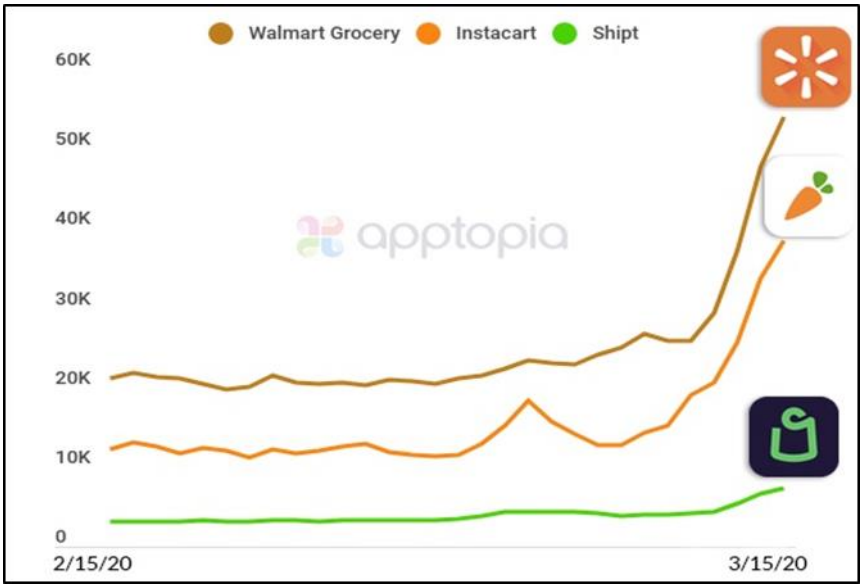

Figure 2. Daily downloads of online shopping applications, thousands
Source: Perez, 2020

In Hungary due to the pandemic, 9% of the population tried online grocery shopping for the first time. In addition, behaviours related to food safety changed, for example people are less likely to touch baked goods with their hands (Kasza et al., 2020). In line with the above-mentioned statistics, since the virus hit Hungary in March the number of searches regarding online shopping has more than doubled (Google Trends, 2020).

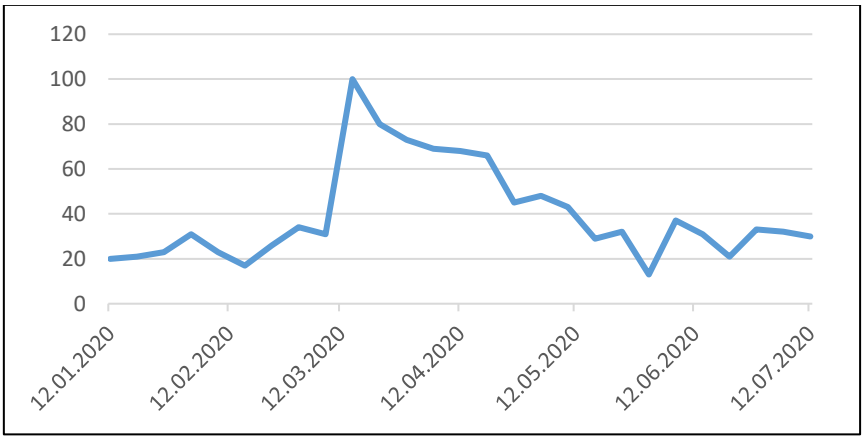

Figure 3. Search for online shopping in Hungary in the last 12 months, %
Source: Google Trends, 2020

3. RESEARCH METHODOLOGY

The research started in March and ended in May in this year (at the beginning of the research the Prime Minister announced the crisis situation). Throughout the research (including but not limited to) respondents were asked to estimate how much more they bought of groceries on a "main big shopping" compared to a normal "main big shopping". Approximately how much (kg/ liters/pieces, etc.) was bought from a given product. Where and what kind of stores did they shop at? What do they think of the buying panic? What were the motivations for their purchases?

The analysis of all these questions provides an opportunity for our research to provide an answer to the impact of the pandemic on consumer behaviour and how it has changed decision-making factors related to food purchases.

The questionnaire mentioned 27 basic groceries, but we also asked about the purchase of cleaning and disinfecting products, as well as other products. With the help of interviewers, we had the opportunity to not only ask the questions in hypermarkets (Tesco, Metro, etc.), but also in small shops (e.g., Coop) and in grocery stores with larger floor space (e.g., Lidl, Aldi) and in the parking lots of these places too.

The majority of the research was based on a quantitative survey along with personal interviews. Samples were set up based on the last national census of KSH. The preparation and the national representative interviews were carried out according to the following plan of sampling: 724 individuals were chosen for the sample. This sample size provided, on the one hand, subgroups that were formed with different background variables and sufficient sample sizes to receive statistically reliable results, and on the other hand a sample size that is acceptable for international and national market research and a public opinion poll.

In setting up the samples the primary aim was to ensure that there was enough representation in the sample. A multiple-stage sampling method was created to provide diverse representation. Its steps include the following:

- The basic population was divided according to the seven regions of the country.
- It was determined according to population data of each region that out of the 724 questionnaires how many consumers should be surveyed in the given region.
- In every region a county was chosen, then with the help of the latest published data of KSH we calculated a sample size that was respective of the ratio of the inhabitants living in the county seat, cities, and villages.
- The next step was to group the 16 years or older people according to data of the CSO based on gender, age and education, and to compile the quota of the people to be interviewed based on the obtained proportions. During processing the people who graduated from the 8th class and vocational training group were placed in one group (primary school).
- Additionally, we examined the three types of settlements concerning the distribution of inhabitants by sex, age and school qualification.
- Finally, a sampling system was worked out, and the questionnaire was distributed according to this.

The basis of the reliable results by representation is that the possibility of chance choice has to be provided. For this to occur we applied the method of "random walking", which allows for the possibility that all people had the same chance to come into the sample.

Using the methods mentioned above, 724 purchases were included in the scope of the analysis (Table 1).

Table 1

Distribution of people involved in the study according to the most important background variables (N, %)

Variable	Number of people	%
Gender		
Male	335	46.30
Female	389	53.70
Age		
between 15-29	161	22.20
between 30-39	149	20.60
between 40-59	236	32.60
60 and above	178	24.60
Educational level		
Graduated from 8th grade or vocational training	427	59.0
Secondary	212	29.30
Higher	85	11.70
Region		
Central Hungary	185	25.60
Central Transdanubia	81	11.20
Western Transdanubia	90	12.40
Southern Transdanubia	84	11.60
Northern Hungary	93	12.80
Northern Great Plain	95	13.10
Southern Great Plain	96	13.30
Place of residence		
County town	250	34.50
Town	242	33.40
Village	232	32.00

Source: the authors' original table, 2020

Regarding the average monthly net income per capita in a given household and the amount that respondents could spend on living 4.3% of respondents was below HUF 20 000, 39.9% of them exceeded HUF 20 000 but did not exceed HUF 40 000. 33.6% of them have more than HUF 40 thousand but not more than 60 thousand in income, while 16.9% of them have more than HUF 60 thousand. In the sample, the region of Northern Hungary (25.8%) had the highest average monthly net income per capita below HUF 20 000, while those above HUF 60 000 (32.8%) live in Budapest and Central Hungary.

In the case of residency and average monthly income per capita it can be seen that there is a significant difference among those living in villages, in cities and in county cities. While in the villages, about 7% of the respondents lived on amounts of less than HUF 20 000 per family member; this proportion was only 2.6% in the case of cities with county status. Similarly, in villages, 10.6% of the participants stated that the amount per person living together is over 60 thousand HUF per month. This number was more than double in the county cities (23.1%). The Chi-square test proved significant difference (Chi-square: 18.579, df: 6, sign.: 0.005 $p<0.05$).

The sample's large amount of data was further processed using the mathematical-statistical software package SPSS 25, which also required pre-coding of answers. The authors used the following statistical methods: frequency studies, cross-tabulation analysis, non-parametric tests, correlation analysis.

The tests were performed according to the following hypotheses:

Hypothesis I. *The coronavirus epidemic caused panic purchases among shoppers, and the primary motivations for the panic buying and the increase in purchases were the formation of contingency reserves and the reduction of shopping occasions.*

Hypothesis II. *Shoppers shop in hypermarkets and supermarkets, larger ABCs, and grocery stores (e.g., Lidl) where there is a plentiful and wide selection of goods.*

Hypothesis III. *Due to the Covid epidemic, respondents purchased significantly more staple food products during this period.*

4. RESEARCH RESULTS

4.1. Analysis of buying decisions

Following the transition, a series of changes began in almost every area of the economy. The food industry and commerce were also among these rapidly developing and transforming areas. Concurrently, with the development of the market economy a huge and abundant selection of goods appeared on store shelves, in department store chains, monumental shopping malls, hypermarkets and supermarkets. The abundant choice of goods gave consumers freedom of choice (abundance). However, the coronavirus epidemic in Hungary in the spring of 2020, as presented above (and also in the results of research), caused panic buying and freedom of choice was once again replaced by consumer vulnerability, as it was before the regime change. In view of the previous statement, which can also be considered a hypothesis, we will examine the purchasing decisions of consumers.

The respondents first had to decide on how much they agreed with some statements (which were related to the situation that had arisen). The opinions were measured on a five-point Likert-scale, where the value "1" meant "strongly disagree" and the value "5" meant "strongly agree". The given answers are presented in Table 2.

Table 2

Opinions of the situation related to the coronavirus

Conclusions	N		Mean
	Real	Missing	
I don't fear the coronavirus	712	12	1.9846
I'm really optimistic about the future	715	9	2.8881
Epidemiological rules must be followed	715	9	3.5483
I stock food	717	7	3.5537
We should pay closer attention to our environment	721	3	4.8280

Source: the authors' original table, 2020

The data (Table 2) clearly shows that the people were already intimidated in this time period by the coronavirus. The respondents agreed that the rules made to prevent and control the spread of the virus must be followed. The fear of the unknown disease and the following uncertainty could have been the reasons that respondents felt the need to create a stockpile of food supplies (or "to hoard"). Attention to the environment appears to been even greater than the necessity of food accumulation. The reason behind this may have been to avoid throwing away the leftover supplies.

The authors used ANOVA test to determine whether there were any differences related to the statements in the sample, based on gender, age, education, place of residence and income.

The results were the following:

Women were significantly more intimidated by the coronavirus than men (Mann-Whitney U: 57762.00 szign.: .019 $p<.05$). Those under the age of 30 feared the disease the least, while those over 60 dreaded it the most, which is understandable given that they are the most vulnerable of all age groups (Kruskal-Wallis

H: 28.959, df: 3, szign.: .000 p<.05). They were similarly afraid of the coronavirus and their fear didn't differ in terms of their place of residence, education or income.

The respondents weren't of different opinions in terms of statements of optimism and attention to the environment.

The data also showed that women prefer following the epidemiological rules significantly more than men (Mann-Whitney U: 40955.00 szign.: .000 p<.05). Women were also more motivated in stocking up on food supplies than men (Mann-Whitney U: 49041.00 szign.: .000 p<.05) in which the generation over 60 also stood out (Kruskal-Wallis H: 122,663, df: 3, szign.: .000 p<.05).

It could be seen from the data that the older someone was, the more likely they were to stock up on food supplies.

It was examined whether there was a connection between the given answers, and if yes, what kind. Table 3 summarizes the correlations found by the authors.

Table 3

Opinions of the coronavirus (nonparametric correlations, Spearman's corr.)

	I don't fear the coronavirus	I'm really optimistic about the future	Epidemiological rules must be followed	I stockpile food	We should pay closer attention to our environment
I don't fear the coronavirus		0.050	-0.069	-.179**	-0.046
I'm really optimistic about the future	0.050		.111**	-0.081*	0.006
The epidemiological rules must be followed	-0.069	.111**		.188**	.099**
I stockpile food	-.179**	-0.081*	.188**		0.085*
We should pay closer attention to our environment	-0.046	0.006	.099**	0. 085*	
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

Source: own research, 2020

Respondents who didn't fear the coronavirus generally didn't stock up on food and they thought that they didn't have to pay that much attention to the epidemiological rules or environment. They were also optimistic about the future.

One of the sources of positive thinkers' optimism was that they agreed that the epidemiological rules must be followed. This was probably from the belief that the pandemic could be over faster and more easily, and it's more likely to have a positive impact in the future spread of the virus.

"Food hoarders" didn't see the future promising at all. They feared the coronavirus infection and urged strongly to comply with the epidemiological measures.

The ones paying attention to their environment did fear the pandemic and were slightly optimistic about the future, thus they stock up on some food supplies too. This stocking up was a test of their environmental awareness.

The research's participants also had to answer question about why they bought more of the different products. 22.1% of them created a safety stock, 33% wanted to reduce the number of purchases, 15.4% bought more due to the possibility of a shortage, 7.8% thought the purchased products would be useful

later on, 6.6% bought more because they feared a possible curfew in the future, and 14.4% of the respondents did not buy more than they would have done normally. The authors summarized the respondents' most common reasons in the table 4, grouped by gender, age, education, income and place of residence.

Table 4

The reasons behind the surplus in consuming (%)

Analysed conditions		Safety stock	Possible shortage	Products can be used later	To reduce the number of purchases	Possible curfew	Did not buy more
Gender	Male	23.60	17.30	4.80	32.40	5.80	16.10
	Female	21.20	13.70	10.40	34.20	7.30	13.20
Age	15-29	25.30	15.20	4.40	27.20	7.00	20.90
	30-39	26.20	12.80	10.70	34.90	4.70	10.70
	40-59	21.40	16.70	9.40	35.90	6.40	10.30
	over the age of 60	17.70	16.00	6.30	34.30	8.00	17.70
Educational level	Primary ed.	44.50	27.40	16.8	66.60	12.70	31.90
	Secondary ed.	20.80	18.90	7.10	35.80	6.10	11.30
	Higher ed.	26.50	14.50	6.00	27.70	8.40	16.90
Monthly income	Below 20 thousand HUF	13.30	6.70	3.30	56.70	3.30	16.70
	Between 20 and 40 thousand HUF	23.60	14.90	8.30	31.30	6.90	14.90
	Between 40 and 60 thousand HUF	19.20	16.30	7.10	37.20	6.30	13.80
	Over 60 thousand HUF	24.80	18.20	10.70	27.30	5.80	13.20
Place of residence	Village	21.60	17.30	7.40	35.50	6.90	11.30
	City	21.30	13.00	8.40	38.90	5.00	13.40
	City with county rights	24.00	15.90	7.70	26.00	7.70	18.70

Source: own research, 2020

Those male respondents under the age of 30, who had a primary education, low-income, and lived in a city with county rights, didn't tend to stock up on food.

Women older than 40 with low-income and are city residents wanted to reduce the number of their purchases the most.

The possibility of a curfew caused fear mainly in low-income women living in villages or cities with county right, who were still under the age of 40, and had low educational attainment.

The safety reserves were the most relieving for men in their 30s, who had low educational attainment and income, and lived in cities with county rights. This opinion was mostly shared by people in their 40s (every third respondent), while those under the age of 30 shared this the least (22%).

Out of all the respondents ones with primary education were most probable to think that they need to have food reserves in their home (52.3%) while the ones with higher-level degrees were the least probable group to choose this option (22%).

When asked if it was worthwhile to stock up on food in this situation, 60% of respondents answered yes. Every third person living in a village agreed with this statement, while among the city residents this proportion was 35%. Women were more likely to approve of this (53%) than men (47%). People with relatively low-income agreed with stocking up (almost every second respondent's opinion reflected this).

It could be clearly seen from the analysis that people were afraid of the coronavirus, which has induced them to stock up, mostly to create a safety reserve for themselves and to reduce the number of their purchases. Considering this, the **authors accept hypothesis I**.

In the course of the analysis the authors also sought answers to which types of stores the consumers visited during this time frame to purchase goods, and what did they think about the necessity of these purchases. Table 5 shows the share of the different types of store in regards to purchases.

Table 5

Proportion of various shop types in purchasing, analysed by age groups (%)

Types of shops	**Age**			
	15-29 years old	30-39 years old	40-59 years old	over the age of 60
Super- and Hypermarkets	39.80	34.90	34.30	33.50
ABCs and grocery stores (e.g. Lidl)	20.70	23.70	33.20	22.40
Groceries	16.80	16.10	14.80	15.50
From Producer	0.60	0.00	4.70	6.30
Marketplaces	3.70	0.70	3.40	6.80

Source: own research, 2020

The studies confirmed that there is a relation between the age of the consumers and the location of the purchase (Chi-square: 26.849, df: 12, sign: 0.008 $p < 0.05$). The data in the table indicates that hypermarkets and supermarkets, as well as larger ABCs and grocery stores (e.g., Lidl) account for the largest share of domestic food trade. Purchases in smaller grocery stores and markets were negligible during the referenced period. This might be explained by the fact that the people were more afraid of the risk of infection in smaller shops and in high-traffic markets. On the other hand, customers could buy food they needed and other essential household products in larger stores with a wider range of goods.

Data in the table and data presented earlier show that during this period many have created a reserve stock from various products. Larger shop types with a wider range of products were more than capable of doing this. It can also be read from the table that these stores were also popular among the elderly. The authors' personal observational research also confirms that retirees' usual shopping sprees weren't noticeable.

Almost every age group chose the offer of larger stores, hoping that they could get every item at the same time, in the same place, and even in a larger quantities and variety.

In the study, the authors also analysed how much the given level of income affected the store choice in this period. The results showed that for every monthly net income per capita category, nearly 35% of the respondents shopped in larger super- and hypermarkets. Similarly, a high proportion was noticeable among customers in grocery stores.

Villagers bought their items mostly in the ABCs and grocery stores (41.7%) probably due to accessibility. In contrast, in cities with county rights this source of supply was nearly equal to that of supermarkets and hypermarkets (42.8% and 40.6%, respectively). The turnover of smaller grocery stores was mostly significant in the villages. Every fifth respondent living in such settlements bought food at the local shop.

The respondents were asked to share their opinions about the prices of products. The study's results show that 68.3% of respondents found these prices too high, 28.1% found them bearable, and only 3.4% found them realistic. There was no verifiable significant relation between the purchase in the different types of shops and the products' price (Chi-square: 12.717, df: 8, sign.: 122 $p > 0.05$). The respondents judged purchases at smaller grocery stores or from the producer too costly. This might be the reason why purchases in Hungary was realised in supermarkets and larger grocery stores during this period. Domestic consumers

who considered it necessary to build up safety stocks typically purchased in ABCs and in larger stores that also sold food (48.7%). Those who feared a curfew did the same as the previously mentioned group (59.6%).

After the different types of shops' share of purchases were presented, it raised the question about how much does a customer prepare for his/ her purchases, and whether there is a connection between "stocking up" and preparing for a purchase. Namely, customers have many impulses while shopping, which could cause them to be doubtful or could motive them to make more purchases. Part of the customers that arrive at a store have a defined goal but others decide only at the place of purchase on the kind of items they want to put into their cart. According to a survey, a significant portion of customer decisions are made in the stores, however 23% of customers do not change their mind from their original ideas.

In terms of purchases, only 9.7% of those in the study made a decision as to whether or not to buy the product at the point of purchase. It is possible that people planned their purchases because they were "afraid of something". This means they didn't just run to the store. This group of respondents carefully planned their purchases. All this is shown by the fact that nearly 17% of the respondents came to the store with a definite purpose and had already decided at home which products they would buy. 46% of them decide in advance and partly in the store, what products they wanted to buy.

In light of these results the **authors also accept their second hypothesis**.

4.2. Analysis of buying decisions in product categories

Continuing with the survey, respondents were asked (as per product group), how much did the respondents purchase during the studied period and how did this volume exceed a normal weekend shopping (in percent).

The data in table 6 shows that flour purchases increased the most, but also the amount of poultry, pasta, milk and sugar over this weekend was doubled.

The same data also indicates that we have also purchased significantly more products, which are needed in a household during an emergency and which can easily be stored. These include among others essential oils and fats for cooking and long-life foods (salami, canned food, rice, and mineral water).

Purchasing data for cleaning and disinfecting agents were also included in the table and it has to be mentioned that these products also were also bought in significant quantities, presumably for protection against infection.

The smallest reserves were made of alcoholic products, fish (the long-term freezing of this product is known to be impractical) and beef.

It was proven by correlation studies that purchases of durable foods (flour, pasta, sugar, oil, rice) are significantly positively correlated and dairy products as well (butter, cheese, fruit yogurt, sour cream). It means that many made conscious, targeted purchases.

The question that may arise is if there is any correlation with purchased food increases in regards to gender, age, and income level. There was no significant difference by gender and age (for the latter, the breakdown shown in Table 3 was used by the authors). There was a notable difference in the purchased amount of flour, fruit juices and toilet paper according to income level. In the case of the latter product those with an average per capita income of HUF 20 000 and 40 000 bought considerably more, while those with a high income bought significantly more flour and fruit juices.

The research also highlighted that there was some difference in terms of food purchases between those respondents who said they should not accumulate in a "viral" situation and who chose to stock up at the time of the epidemic. Respondents who said stockpiling was not necessary bought significantly less milk, butter, frozen products, poultry, canned food, oil, soft drinks, detergents, fruits than those who said it was necessary to build up a reserve during this period.

Table 6

Average change in purchases (%) of each product during the surveyed period

Products	N	Average (percent)
Fruits	724	13.1492
Beef	724	18.4406
Spritis	724	23.7845
Toilet paper	724	27.5276
Beer	724	38.6464
Wine	724	44.1160
Fish – including frozen	724	44.1920
Convenience food, frozen products	724	54.4820
Cold meat	724	62.8232
Beverages (pl. Cola)	724	64.9309
Frozen vegetables	724	66.0773
Fruit juice with fibre	724	70.6852
Butter	724	72.4102
Pork	724	72.8399
Sour cream	724	74.5580
Matured cheese (eg. Trappista, Pannónia)	724	74.5720
(White/Brown) bread	724	74.9835
Potato	724	75.0733
Fruit yogurt	724	76.1064
Mineral waters	724	88.3373
Canned food (eg. liver paté, fish)	724	89.1091
Salami, sausages	724	93.0525
Rice	724	95.8881
Oil/Fat	724	95.8965
Sugar	724	100.4560
Milk	724	116.8260
Pastas	724	120.1990
Poultry	724	121.6960
Cleaning and disinfecting agents	724	123.9380
Flour	724	142.2560

Source: own research, 2020

The authors also analysed those products that were purchased by the highest percentage of customers in the case of the factors motivating purchase surplus. Table 7 shows the 5 most purchased items by motivation factors.

It is well observed that flour is among the most popular foods everywhere. The data also indicates that many of the basic foods, which are needed in a household and easy to store, are also located in the "first place". This is especially true for the respondents who think that the creation of a contingency reserve is essential, assume the possibility of a curfew, and fear a possible shortage.

Regarding the decrease in shopping occasions, as a motivational group, the purchase of cleaning and disinfecting agents is also very important. Obviously members of this group go to the store less often because they want to reduce the number of times they meet someone and/or are afraid of the epidemic situation. This may be the reason why the purchase of cleaning and disinfecting agents is preferred by them than members of other motivational groups.

Table 7

In terms of motivation the highest percentage of products purchased on average

Motivation	Products in order importance
Creating a contingency reserve	1. Flour 2. Poultry 3. Pastas 4. Cleaning and disinfecting agents 5. Mineral water
Possible shortage	1. Milk 2. Flour 3. Oil/Fat 4. Sugar 5. Cleaning and disinfecting agents
The product will be good later	1. Pastas 2. Cleaning and disinfecting agents 3. Canned food 4. Flour 5. Oil/Fat
The reduce of shopping occasions	1. Flour 2. Cleaning and disinfecting agents 3. Milk 4. Pastas 5. Salamis
There will be a curfew	1. Flour 2. Pastas 3. Poultry 4. Canned food 5. Sugar

Source: own research, 2020

Therefore, the results show that due to the Covid epidemic respondents purchased significantly more basic food products during this period, so the **authors also accept their third hypothesis**.

5. DISCUSSION

Based on the opinions of the respondents and the secondary data, it can be stated that the "system analysis" of the factors influencing food consumption does not take into account today's accumulation purchases; therefore it is definitely necessary to expand the model. It would be expedient to include panic buying as a "separate category" among the objective factors influencing food demand in the model.

Both in Hungary and globally during 2020 (due to the pandemic) there was a great deal of uncertainty, so it is no coincidence that the respondents agreed that the rules put in place to prevent and treat the spread of the virus should be followed (Lee, 2020). Furthermore, due to uncertainty people felt the need to build up (accumulate) food reserves.

The data also showed that compliance with epidemiological rules is significantly more preferred by female respondents than by men (F: 82.021, df: 1, sign: .000 $p < 0.05$).

Women were also more strongly motivated in food accumulation than men (F: 27.460, df: 1, sign: .000 $p < 0.05$). The results also showed that the older someone was, the more likely they were to "accumulate" food. These results are also confirmed by international research (Brough and Martin, 2020; Sheth, 2020).

Studies confirmed that there was a correlation between age and place of purchase (Chi-square: 26.849, df: 12, sign: 0.008 $p<0.05$). The data indicates that hypermarkets and supermarkets, as well as larger ABCs and grocery stores (e.g., Lidl) have the largest share in the domestic (Hungarian) food trade. In the larger types of stores with a wider range of goods shoppers were able to procure the food and other products they

needed in the household in one place. This result is also supported by a 1983 study by Wilson and Oulton, according to which small, local markets are being crowded out as large supermarkets were gaining ground.

The data also shows that we purchased significantly more products which are needed in a household during an emergency and which can easily be stored. These include, but are not limited to, essential oils and fats for cooking, and non-perishable foods (salami, canned food, rice, and mineral water). According to previous literature sources, this conclusion is also correct, as several international studies have shown that consumer habits change in times of crisis (Sharma & Sonwalkar, 2013; Abdel-Ghany & Oumlil, 1985; Ivanov et al., 2020).

It was proven by correlation studies that purchases of durable foods (flour, pasta, sugar, oil, rice) are significantly positively correlated, as are dairy products (butter, cheese, fruit yogurt, sour cream). This result is supported by a study of Mehta et al. 2020.

6. CONCLUSION

In the light of the survey (and literature) it can be stated that the coronavirus epidemic, which appeared in Hungary in the spring of 2020, caused panic buying and freedom of choice was again replaced by consumer vulnerability, as it was before the change of regime.

The research also highlighted that there are some differences in terms of food purchases between those respondents who say they should not accumulate in a "viral" situation and who chose to stock up at the time of the epidemic. Respondents who said stockpiling was not necessary bought significantly less milk, butter, frozen products, poultry, canned food, oil, soft drinks, detergents, and fruits than those who said it was necessary to build up a reserve during this period.

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