The Impact of Mobility on Shopping Preferences during the COVID-19 Pandemic: The Evidence from the Slovak Republic

Veronika Harantová¹, Alica Kalašová¹,*, Simona Skřivánek Kubíková¹, Jaroslav Mazanec² and Radomíra Jordová³

¹ Department of Road and Urban Transport, Faculty of Operation and Economics of Transport and Communications, University of Zilina, Univerzitna 1, 01026 Zilina, Slovakia; veronika.harantova@fpedas.uniza.sk (V.H.); simona.kubikova@fpedas.uniza.sk (S.S.K.)
² Department of Quantitative Methods and Economic Informatics, Faculty of Operation and Economics of Transport and Communications, University of Zilina, Univerzitna 1, 01026 Zilina, Slovakia; jaroslav.mazanec@fpedas.uniza.sk
³ Faculty of Social and Economic Studies, Jan Evangelista Purkyně University in Ústí nad Labem, Pasteurova 3544/1, 40096 Ústí nad Labem, Czech Republic; radomira.jordova@ujep.cz

* Correspondence: alica.kalasova@fpedas.uniza.sk

Abstract: The COVID-19 global pandemic has affected normal human behaviour in day-to-day activities. As a result of various restrictions, people have significantly changed their shopping and mobility to limit the spread of the pandemic. This article aims to determine the association between consumers’ shopping preferences and the frequency of selected daily activities during and before the COVID-19 pandemic using correspondence analysis. The total sample consists of 407 respondents from Slovakia. The data are obtained from an online questionnaire divided into several sections such as socio-demographic factors, shopping preferences, and frequency of selected activities per week. The results show that there is an association between consumers’ preference for shopping in supermarkets and the frequency of family visits per week during the pandemic, among other factors. These findings follow up on previous studies on the consequences of changing mobility as a result of the global crisis.

Keywords: COVID-19; correspondence analysis; mobility; pandemic; shopping preferences

MSC: 37F05; 62H25

1. Introduction

The new COVID-19 coronavirus pandemic has affected the world through several global measures to limit the spread of the disease in early 2020 [1]. Governments around the world have imposed transport and mobility restrictions on an unprecedented scale. The first positive cases of COVID-19 occurred as early as December 2019 in Wuhan (capital of the Chinese province of Hubei), and the pandemic gradually spread around the world. In January, the first positive cases were reported in the US, Canada, and Europe [2,3]. From the beginning of January to the end of February 2020, a total of 54 countries were affected, as well as the African continent. The WHO declared the outbreak of the disease an international public health crisis on 30 January 2020. Restrictions on face-to-face meetings are the most effective way to address the spread of the disease. In Slovakia, the first positive case of the disease occurred at the beginning of March 2020 [4,5].

In this study, using these facts, we found changes in human behaviour due to the pandemic, compared with the previous period. Specifically, we focused on the mobility and frequency of shopping behaviour. This paper aimed to determine the association between shopping preferences and the frequency of selected activities as part of everyday mobility in non-pandemic and pandemic periods for Slovak residents. We analysed a correspondence
map to outline statistically significant associations between consumer shopping preferences and selected activities in both periods. Subsequently, these findings were compared to determine the different behaviour for the implementation of anti-pandemic measures during the COVID-19 pandemic. In this article, theoretical and empirical findings were established from previous research on consumer preferences. In addition, these results may serve as output for the potential distribution of business operations and alternative modes of transport based on the frequency of selected activities and purchasing preferences. Our findings also provide new insights for academics, practitioners, and policymakers during the COVID-19 pandemic.

2. Literature Review

The transport system is key in controlling epidemics, but transport activity is very prone to outbreaks [6,7]. Many studies explain the spread of epidemics using modern one- and two-way transport networks [8,9]. It is well known that long-distance travel and commuting to shopping are dangerous activities for spreading diseases [10–12].

Travel and consumer behaviour is a complex issue that involves many factors, such as age, gender, social status, lifestyle, and occupation. Most non-business travel models focus on travel models with activities for home interactions, recreational activities, and mode selection during holidays or weekends. However, individuals may have a priori preferences for a specific category of good consumption—in this case, the duration of the leisure activity. Travel time and choice of mode of transport are strongly linked to the duration of the activity. Extracurricular travel models cover a wide range of travel purposes, such as family visits, shopping, and school-related activities [13,14]. Different modes of transport are chosen by students, employed individuals, and pensioners, but this also applies to choice and shopping opportunities. These facts help the current possibilities of travel by various modes of transport and the movement of people in crowded areas to move the infected without symptoms. Transport in overcrowded vehicles spread the disease [15,16]. It is the human movement that facilitates the transmission of infectious diseases. Individual mobility by purpose has decreased dramatically except for shopping-related journeys [17]. People are less willing to use public and shared transport due to the negative impacts of perceived COVID-19 threats.

The authors in [18] found a reduction in mobility for various road purposes such as retail and recreation, food, and public transport using the multiple correspondence analysis. The recorded mobility model shows that there are spatiotemporal differences in compliance with mobility restrictions. The symptoms of COVID-19 can be detected in humans only a few days after travel, and the disease can be transmitted during daily activities [19,20]. Strict social measures have been taken against the spread of COVID-19 in countries around the world [21–23]. All social events were banned, and work and school moved to the home environment. Fear of an unknown disease has caused automatic changes in people’s daily activities and habits. During the COVID-19 pandemic, people have to work or replenish food supplies, and therefore, there have been changes in consumer behaviour. The current research has important implications for consumers, retail managers, and public policymakers. Consumption has eased, and sustainability has come to the fore again; thus, traders have had to adapt to this new era.

All consumption and consumer behaviour are associated with a specific time and place. It is questionable that consumers change their habits, as new technologies can make everyday habits easier. However, some consumers will go back to their pre-pandemic habits [24]. In [25], the authors focused on the relationship between fear, gender, and age of the consumer using a structural equation model. Fears of infection have forced consumers to shop quickly and prefer online stores pushing traditional ‘stone’ stores to the background. However, all respondents reported a decrease in visits to shops, restaurants, and meeting places. In addition to changes in consumer behaviour, there is research where the authors point to the accumulation of stocks. The results show that attitude and subjective norms significantly influenced the intent or stockpiling behaviour during the COVID-19 pandemic.
using the theory of planned stockpiling behaviour. Concerns and fears of infection and expectations of supply shortages lead to stockpiling. Both motives grew in the early stages and declined in the later stages of the crisis [26,27]. Fear and lack of people began to shop more online to avoid crowded spaces [28,29]. The frequency of shopping has also changed, and people have started to buy a different range of foods [30–32], according to several studies that examine the factors associated with the increase and decrease in shopping frequency.

Overall, the pandemic had a massive impact on changes in mobility. Population mobility data are available from mobile applications [33,34]. During the COVID-19 pandemic, the European Commission asked Google and Apple for daily population mobility data over time to analyse mobility trends [35–37]. At the beginning of 2020, there was a significant decline in mobility following the declaration of COVID-19 as a global pandemic. The change in mobility probably occurred for measures to prevent the spread of a pandemic. Subsequently, the mobility of the population correlated with the gradual arrival of other waves of the pandemic. Mobility is likely to increase gradually as a result of vaccination [38–40]. For this reason, the use of mobility data is an important issue and a major problem in studying the impact of the COVID-19 pandemic. Since the outbreak of COVID-19 and the reduction in human interactions, there has been a large decline in mobility worldwide [41–43].

In this study, we found a significant association between the frequency of visits per week for various activities such as school visits, commuting, doctor’s visits, shopping, social events, family visits or nature walks and consumer preferences about shopping in hypermarkets, supermarkets, local shops, second hand, and alternative ways of shopping such as a delivery service and online shopping before and during the COVID-19 pandemic.

Hypothesis 1 (H1). There is a significant association between the frequency of day-to-day activities (school visits, commuting, doctor’s visits, shopping, social events, family visits, and nature walks) and consumer’s preference for shopping in selected shops (hypermarkets, supermarkets, local shops, second hand, delivery service, and online shopping) in the non-pandemic period.

Hypothesis 2 (H2). There is a significant association between the frequency of day-to-day activities (school visits, commuting, doctor’s visits, shopping, social events, family visits, and nature walks) and consumer’s preference for shopping in selected shops (hypermarkets, supermarkets, local shops, second hand, delivery service, and online shopping) in the pandemic period.

First, we hypothesised that there is a statistically significant association between the frequency of school visits per week and shopping preferences in supermarkets and local stores as opposed to other pre-COVID-19 pandemic shopping patterns. We assumed that supermarkets and local shops are located near schools. Second, we assumed that there is a statistically significant association between the frequency of work visits per week and shopping preferences in traditional stores such as supermarkets and hypermarkets, unlike others. We considered that many employees go shopping after working hours. Third, we believed that there is a statistically significant association between the frequency of shopping per week and shopping preferences related to traditional and alternative ways of shopping, such as supermarkets, hypermarkets, and online shopping. We assumed that consumers prefer a wider range of products and online shopping for quick and convenient purchases. Fourth, we considered that there is a statistically significant association between the frequency of hospital visits per week and shopping preferences in supermarkets and local shops, unlike others. Fifth, we expected that there is a statistically significant association between the frequency of social events per week and consumer preferences in local shops and supermarkets near cultural canters. Sixth, we expected that there is a statistically significant association between the frequency of family visits per week and the shopping preferences in the hypermarket, unlike others. We assumed that visitors plan to buy a gift in advance and choose stores with a wide range. Finally, we assumed there is a statistically
significant association between the frequency of walks per week and shopping preferences in the supermarket and local shops. These shops are often located near parks.

On the other hand, during the COVID-19 pandemic, we expected that there is a statistically significant association between the frequency of school visits per week and consumer preferences for online shopping and delivery services for online education. Second, we assumed that there is a statistically significant association between the frequency of work visits per week and consumer preferences for online shopping and delivery service. Third, we assumed that there is a statistically significant association between the frequency of shopping per week and consumer preferences associated with hypermarkets, online shopping, and delivery service to minimise the spread of the pandemic. Fourth, we expected that there is a statistically significant association between the frequency of hospital visits per week and consumer preferences for restrictions on hospital visits during the COVID-19 pandemic. Fifth, we did not expect a statistically significant association between the frequency of social events per week and consumer preferences during a pandemic, as opposed to a period outside the pandemic or severe constraints. Sixth, we expected a statistically significant association between the frequency of family visits per week and consumer preferences in supermarkets and local shops. We assumed that customers prefer smaller stores with a lower customer incidence. Seventh, we assumed that there is a statistically significant association between the frequency of walking in nature per week and shopping preferences in local shops and supermarkets. We did not assume that the pandemic changes these consumer preferences.

3. Methodology and Data

Data were collected through an online questionnaire from 8 June 2021 to 8 November 2021 (a total of six months). This tool is acceptable given anti-pandemic measures and social isolation. The survey was conducted in cooperation with the University of Zilina and residents of Slovakia. The content of the questionnaire is based on previous research [7].

The methodology consists of six steps towards fulfilling the research objects such as determining sample size, determining research hypotheses, drafting a scientific questionnaire, modifying the database by unifying the categories of the categorical variables to meet the minimum frequency, analysing the relationship between quantitative variables using correspondence analysis, and interpreting the results.

3.1. Sample

The questionnaire consists of 29 questions divided into 3 parts—namely, socio-demographic characteristics, frequency of day-to-day activities a week, and shopping preferences. We only used a subset of the total subset for this article. The sample size was determined according to Formula (1) [44–46]. We applied Formula (1) to determine the sample size. The result demonstrates the minimum number of respondents.

\[
\text{minimum number} = \frac{z^2 \times p \times (1 - p)}{1 + \frac{e^2}{n}}
\]

where

n: The sample size is 5,449,652 inhabitants in Slovakia [47];
z: Critical minimal value for 95% confidence level is equal to 1.96;
p: The estimated proportion of the population that has the attribute in question (0.5 is recommended for unknown values);
e: Margin of error is equal to 0.05.
We found that the minimum sample size consists of 384 respondents according to Formula (2).

$$384 = \frac{1.96^2 \times 0.5 \times (1 - 0.5)}{0.05^2}$$

$$1 + \frac{1.96^2 \times 0.5 \times (1 - 0.5)}{0.05^2 \times 5,449,652}$$

The final error obtained was approx. 4.72% in this research. The sample includes random respondents. Our sample consists of 407 respondents (more than the recommended sample size). As can be seen in Table 1, the sample consists mainly of women (more than 52% of all). It is obvious that employees with a university diploma (at least a bachelor’s degree) represent the largest sub-sample (327 respondents, almost 63% of all), and other employees, regardless of gender, have a secondary education. All questions from the questionnaire are shown in Table 1 (see Appendix A).

Table 1. Sample.

| Gender | Basic education | Secondary education | University education | No reply | Total |
|--------|-----------------|---------------------|----------------------|----------|-------|
| Male   | Student         | Businessman         | Employee             | Unemployed| Retiree| Other |
| Education | 3               | 0                   | 0                    | 0        | 0     | 0     | 3     |
|         | 18              | 2                   | 12                   | 0        | 0     | 0     | 32    |
|         | 26              | 4                   | 120                  | 0        | 5     | 3     | 158   |
|         | 1               | 0                   | 0                    | 0        | 0     | 0     | 1     |
|         | 48              | 6                   | 132                  | 0        | 5     | 3     | 194   |
| Female | Basic education | 5                   | 0                    | 0        | 0     | 0     | 5     |
| Education | 8               | 0                   | 24                   | 2        | 5     | 0     | 39    |
|         | 22              | 6                   | 135                  | 1        | 5     | 0     | 169   |
|         | 35              | 6                   | 159                  | 3        | 10    | 0     | 213   |
| Total  | Basic education | 8                   | 0                    | 0        | 0     | 0     | 8     |
|         | 26              | 2                   | 36                   | 2        | 5     | 0     | 71    |
|         | 48              | 10                  | 255                  | 1        | 10    | 3     | 327   |
|         | 1               | 0                   | 0                    | 0        | 0     | 0     | 1     |
|         | 83              | 12                  | 291                  | 3        | 15    | 3     | 407   |

The second-largest sub-sample consists of 48 students. This group consists mainly of male students, as opposed to employees, with most of the students having at least a bachelor’s degree. Finally, three respondents did not choose any of the possible categories of the social status such as student, entrepreneur, employee, unemployed, and retiree.

In addition, two respondents refused to state their education levels such as primary education, secondary education, and university education. Table 1 shows the detailed structure of the overall sample based on demographic characteristics such as gender and social status. We should note that the working-age population makes up most respondents.

3.2. Categorical Variables

The dataset includes various data on the impact of the pandemic on changes in mobility behaviour based on an online questionnaire. All questions were mandatory for the respondents. In addition, the respondents could choose one of the options for each question. The first part of the questionnaire contains mainly demographic data on respondents such as gender, age, residence, education, and social status. The second part of the questionnaire focuses on the frequency of mobility to schools, work, shops, hospitals, and others during and before the COVID-19 pandemic.

3.3. Method

Correspondence analysis is a suitable statistical technique for analysing categorical variables. The method is applied by [48–50]. We performed correspondence analysis using
the statistical–analytical program IBM SPSS Statistics Faculty Pack 28 based on data from an online questionnaire. The questionnaire contains a wide range of data, but we used a subset of these data to present statistically significant associations. The main output of the correspondence analysis is a map that visually explains the association between the categories examined. However, the correspondence analysis is relevant provided that the association is statistically significant based on the chi-squared test. Correspondence analysis is one of the few analyses that does not require the assumption of a normal distribution. On the other hand, the assumptions of the correspondence analysis include the homogeneity of variance for row and column variables. Second, the analysis assumes that the data are discrete. Third, the data should contain at least three categories of categorical variables. Finally, all frequencies in the contingency table must be non-negative.

The input matrix is a contingency table of the absolute frequencies \( n_{ij} \). The table is used to calculate row marginal absolute frequencies \( n_{i+} \) of variable \( X \) and column marginal absolute frequencies \( n_{+j} \) of variable \( Y \):

\[
\begin{align*}
n_{i+} &= \sum_j n_{ij} \\
n_{+j} &= \sum_i n_{ij}
\end{align*}
\]

The row and column marginal frequencies are used in the correspondence matrix. Matrix elements represent frequencies \( p_{ij} \):

\[
p_{ij} = \frac{n_{ij}}{n}
\]

The row profiles \( p_{i/j} \) are given relative frequencies representing the structure of the column variable in the case of the \( i \)-th category of the row variable. On the other hand, the column profiles’ subscript is \( p_{j/i} \), and they are given relative frequencies representing the structure of the row variable in the case of the \( j \)-th category of the column variable.

\[
\begin{align*}
p_{j/i} &= \frac{n_{ij}}{n_{i+}} = \frac{p_{ij}}{p_{+j}} \\
p_{ij} &= \frac{n_{ij}}{n_{+j}} = \frac{p_{ij}}{p_{+j}}
\end{align*}
\]

The row and column profiles identify the coordinates of points in the multidimensional space. If the points are closer in the correspondence map, the categories are more similar, and the mutual dependence is stronger. The variability of multidimensional points is determined by projecting multidimensional points into a correspondence map. The variability of the points is given by the total inertia. We should emphasise that this procedure applies similarly to column and row categories.

\[
I^2 = \sum_i p_{+j}d_j^2
\]

where
- \( I \) Total inertia;
- \( p_{+j} \) Marginal relative frequency of the column \( j \);
- \( d_j \) Chi-squared distance between \( j \)'s profile.
4. Results

We compared respondents’ preferences for shopping and means of transport before and during the COVID-19 pandemic. Figure 1 shows shopping preferences before and during the COVID-19 pandemic.

![Figure 1](image-url)

**Figure 1.** The shopping preferences before and during the COVID-19 pandemic. Before the COVID-19 pandemic (0) and during the COVID-19 pandemic (1) on the horizontal axis. Legend: least used mode of transport (1), previously used mode of transport (2), neither nor (3) previously used mode of transport (4), and the most used mode of transport (5) on the vertical axis.

As can be seen in Figure 1, consumers preferred shopping in stores with larger shopping areas such as hypermarkets (174) and supermarkets (64) before the pandemic. However, the pandemic has dramatically changed shopping preferences. Our results show that consumers changed large stores for local stores (from 50 to 71, an increase of 42%) and alternative shopping methods to brick-and-mortar stores such as online shopping (from 64 to 157, an increase of more than 145%) and delivery services (from 42 to 101, an increase of more than 140%). On the other hand, Figure 2 reveals preferences for using means of transport for the COVID-19 pandemic, compared with the previous period.
Figure 2. The preferences for using means of transport before and during the COVID-19 pandemic. Before the COVID-19 pandemic (0) and during the COVID-19 pandemic (1) on the horizontal axis. Legend: least used mode of transport (1), previously used mode of transport (2), neither nor previously used mode of transport (3), and the most used mode of transport (5) on the vertical axis.
As can be seen, the respondents prefer the car compared to other modes of transport. Of course, these results relate mainly to private vehicles as opposed to shared space. However, many respondents prefer a healthy lifestyle because walking is also the preferred way to move. On the other hand, less than 10 respondents prefer a shared bicycle, a private bicycle, and a shared bicycle. The pandemic affected mobility during the COVID-19 pandemic.

The research results show that cars and walking are even more preferred modes of transport during a pandemic. We found that more than 250 respondents chose the car as the most preferred means of transport (an increase of more than 22% from 205 to 251) and more than 180 respondents chose walking (an increase of up to 19% from 153 to 182 respondents). On the other hand, the results reveal that the population did not prefer public transport such as urban public transport, suburban transport, or rail transport. Public transport, including urban public transport, suburban transport, and rail transport, was one of the least preferred modes of transport, regardless of the pandemic situation. However, the results show that respondents preferred urban public transport even less, compared with the previous period. In all these modes of transport, there was a dramatic decline, for example, in urban transport (a decrease of more than 63% from 52 to 19 respondents), suburban transport (a decrease of 60% from 15 to 6 passengers), rail passenger transport (a decrease of almost 70% from 29 to 9 respondents).

Figure 3 shows that mobility has changed significantly depending on individual activities such as school, work, shopping, health care, social events, family visits, or walking in nature.

![Figure 3](image-url)

**Figure 3.** The frequency per week for selected activities before and during the COVID-19 pandemic. Seldom (0–1 per week), occasionally (2–3 per week), sometimes (4–5 per week), often (6–7 per week).
The results show that respondents visited nature more often during the COVID-19 pandemic than before. In addition, most respondents restricted family visits and various cultural events. However, mobility was also reduced in everyday activities such as school, work, and shopping. The greatest change in mobility was found in commuting to work. More than half of the respondents stopped going to the physical workplace and shifted to the home office.

4.1. Correspondence Analysis I

Table 2 shows an overview of all hypotheses about the associations between the frequency of selected activities during the week—namely, school attendance, commuting, shopping, doctor’s visit, cultural events, nature walks, and family visits—with consumer preferences about shopping in hypermarkets, supermarkets, local shops, and alternative ways of shopping such as online shopping and delivery service before the COVID-19 pandemic.

The results show that 6 out of 42 hypotheses are rejected. We found that there is a significant association between the frequency of attending school per week and the preference for shopping at the supermarket. Moreover, the results show that there is a significant association between the frequency of commuting to work per week and consumer preferences about shopping through the delivery service.

Table 2. Hypothesis summary with statistical significance divided into six sections.

| No. | Hypothesis                                                                                                           | p-Value |
|-----|----------------------------------------------------------------------------------------------------------------------|---------|
| 1   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05   |
| 2   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in the supermarket. | 0.032   |
| 3   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in the local shop. | >0.05   |
| 4   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05   |
| 5   | There is a significant association between the frequency of school visits per week and the consumer’s preference for online shopping. | >0.05   |
| 6   | There is a significant association between the frequency of school visits and the consumer’s preference for shopping through the delivery service. | >0.05   |
| 7   | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05   |
| 8   | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in the supermarket. | >0.05   |
| 9   | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in the local shop. | >0.05   |
| 10  | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05   |
| 11  | There is a significant association between the frequency of work visits per week and the consumer’s preference for online shopping. | >0.05   |
| 12  | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping through the delivery service. | 0.006   |
| 13  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in the hypermarket. | 0.034   |
| No. | Hypothesis                                                                 | p-Value |
|-----|---------------------------------------------------------------------------|---------|
| 14  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in the supermarket. | 0.000   |
| 15  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in the local shop. | >0.05   |
| 16  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in a second-hand shop. | >0.05   |
| 17  | There is a significant association between the frequency of shopping per week and the consumer’s preference for online shopping. | 0.042   |
| 18  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping through the delivery service. | >0.05   |
| 19  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05   |
| 20  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in the supermarket. | >0.05   |
| 21  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in the local shop. | >0.05   |
| 22  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05   |
| 23  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for online shopping. | >0.05   |
| 24  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping through the delivery service. | >0.05   |
| 25  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in the hypermarket. | >0.05   |
| 26  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in the supermarket. | >0.05   |
| 27  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in the local shop. | >0.05   |
| 28  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in a second-hand shop. | >0.05   |
| 29  | There is a significant association between the frequency of social events per week and the consumer’s preference for online shopping. | >0.05   |
| 30  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping through the delivery service. | >0.05   |
| 31  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05   |
| 32  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in the supermarket. | >0.05   |
| 33  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in the local shop. | >0.05   |
| 34  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05   |
| 35  | There is a significant association between the frequency of family visits per week and the consumer’s preference for online shopping. | >0.05   |
| 36  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping through the delivery service. | >0.05   |
Table 2. Cont.

| No. | Hypothesis                                                                 | p-Value |
|-----|-----------------------------------------------------------------------------|---------|
| 37  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in the hypermarket. | >0.05   |
| 38  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in the supermarket. | >0.05   |
| 39  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in the local shop. | 0.035   |
| 40  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in a second-hand shop. | >0.05   |
| 41  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for online shopping. | >0.05   |
| 42  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping through the delivery service. | >0.05   |

We reject three hypotheses about the non-existence of the significant association between the frequency of shopping a week and selected consumer preferences with shopping in brick-and-mortar stores such as hypermarkets and supermarkets, but also online shopping. Similarly, there is a significant association between the frequency of commuting a week and consumer preferences for delivery service before a pandemic. Finally, we found that the frequency of walking in nature a week is associated with the preference for shopping in local stores. Other hypotheses are not rejected; in other words, there is no significant association between categorical variables based on the significance level. Table 2 demonstrates all hypotheses with a hypothesis decision based on Pearson’s chi-square test ($p > 0.05$).

We focused exclusively on the statistically significant association between selected categorical variables to present the results of qualitative research using correspondence analysis.

Figure 4a demonstrates that supermarkets are preferred for students often attending school. On the other hand, the supermarket was not preferred mainly by students attending school from two to five times a week before the pandemic. Figure 4b shows that delivery service is not popular for employees going to work more than six times a week. However, many consumers have no preference for the alternative way of shopping through the delivery service. Delivery service is popular, especially for employees at the home office. Figure 4c–e reveals the frequency of shopping a week is statistically significant with shopping preferences in hypermarkets, supermarkets, and online shopping. The results show that hypermarkets and supermarkets are popular stores for consumers going to shop from four to five times a week before the COVID-19 pandemic.

Moreover, supermarkets are also preferred for employees going to the shops from six to seven times a week. Online shopping is preferred by consumers shopping from four to five times a week. All three ways of shopping—i.e., shopping in a hypermarket, supermarket, or online shopping—are not popular with consumers shopping at most once a week. Finally, Figure 4f demonstrates that local shops are popular with consumers often visiting nature or mountains. However, many consumers shop at local stores without any preference. Local shops are sought after for their distance between the residence and the park in the city.
Figure 4. Correspondence maps I: (a) there is significant association between the frequency of school visits and the consumer’s preference for shopping in the supermarket before the COVID-19 pandemic; (b) there is significant association between the frequency of work visits and the consumer’s preference for shopping through the delivery service before the COVID-19 pandemic; (c) there is significant association between the frequency of shopping and the consumer’s preference for shopping in the hypermarket before the COVID-19 pandemic; (d) there is significant association between the frequency of shopping and the consumer’s preference for shopping in the supermarket before the COVID-19 pandemic; (e) there is significant association between the frequency of shopping and the consumer’s preference for shopping through the delivery service before the COVID-19 pandemic; (f) there is significant association between the frequency of shopping and the consumer’s preference for shopping in the supermarket before the COVID-19 pandemic.
between the frequency of shopping and the consumer’s preference for shopping in the hypermarket before the COVID-19 pandemic; (d) there is significant association between the frequency of shopping and the consumer’s preference for shopping in the supermarket before the COVID-19 pandemic; (e) there is significant association between the frequency of shopping and the consumer’s preference for online shopping before the COVID-19 pandemic; (f) there is significant association between the frequency of walking in nature and the consumer’s preference for shopping in the local shop before the COVID-19 pandemic.

4.2. Correspondence Analysis II

Table 3 summarises all hypotheses about the association between the frequency of the selected activities a week—namely, attending school, commuting, shopping, visiting doctors, attending cultural events, and visiting family—with consumer preferences about shopping in hypermarkets, supermarkets, local stores, alternative shopping methods such as online shopping, or delivery service during the COVID-19 pandemic. As can be seen, Table 3 shows there are 6 statistically significant hypotheses out of 42. In other words, we reject the null hypothesis that there is no significant association between categorical variables. Other hypotheses are not statistically significant based on Pearson’s chi-squared test ($p > 0.05$).

Table 3. Hypothesis summary with statistical significance divided into six sections.

| No. | Hypothesis                                                                 | $p$-Value |
|-----|---------------------------------------------------------------------------|-----------|
| #   | **Frequency of school visits per week and shopping preferences**          |           |
| 1   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05     |
| 2   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in the supermarket. | >0.05     |
| 3   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in the local shop. | >0.05     |
| 4   | There is a significant association between the frequency of school visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05     |
| 5   | There is a significant association between the frequency of school visits per week and the consumer’s preference for online shopping. | >0.05     |
| 6   | There is a significant association between the frequency of school visits and the consumer’s preference for shopping through the delivery service. | >0.05     |
| #   | **Frequency of work visits per week and shopping preferences**            |           |
| 7   | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05     |
| 8   | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in the supermarket. | >0.05     |
| 9   | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in the local shop. | >0.05     |
| 10  | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05     |
| 11  | There is a significant association between the frequency of work visits per week and the consumer’s preference for online shopping. | 0.024     |
| 12  | There is a significant association between the frequency of work visits per week and the consumer’s preference for shopping through the delivery service. | >0.05     |
| 13  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in the hypermarket. | 0.000     |
Table 3. Cont.

| No. | Hypothesis | p-Value |
|-----|------------|---------|
| 14  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in the supermarket. | 0.005 |
| 15  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in the local shop. | >0.05 |
| 16  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping in a second-hand shop. | >0.05 |
| 17  | There is a significant association between the frequency of shopping per week and the consumer’s preference for online shopping. | >0.05 |
| 18  | There is a significant association between the frequency of shopping per week and the consumer’s preference for shopping through the delivery service. | 0.028 |

# Frequency of hospital visits per week and shopping preferences

| No. | Hypothesis | p-Value |
|-----|------------|---------|
| 19  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05 |
| 20  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in the supermarket. | >0.05 |
| 21  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in the local shop. | >0.05 |
| 22  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05 |
| 23  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for online shopping. | >0.05 |
| 24  | There is a significant association between the frequency of hospital visits per week and the consumer’s preference for shopping through the delivery service. | >0.05 |

# Frequency of social events per week and shopping preferences

| No. | Hypothesis | p-Value |
|-----|------------|---------|
| 25  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in the hypermarket. | >0.05 |
| 26  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in the supermarket. | >0.05 |
| 27  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in the local shop. | >0.05 |
| 28  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping in a second-hand shop. | >0.05 |
| 29  | There is a significant association between the frequency of social events per week and the consumer’s preference for online shopping. | >0.05 |
| 30  | There is a significant association between the frequency of social events per week and the consumer’s preference for shopping through the delivery service. | >0.05 |

# Frequency of family visits per week and shopping preferences

| No. | Hypothesis | p-Value |
|-----|------------|---------|
| 31  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in the hypermarket. | >0.05 |
| 32  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in the supermarket. | 0.004 |
| 33  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in the local shop. | >0.05 |
| 34  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping in a second-hand shop. | >0.05 |
| 35  | There is a significant association between the frequency of family visits per week and the consumer’s preference for online shopping. | >0.05 |
| 36  | There is a significant association between the frequency of family visits per week and the consumer’s preference for shopping through the delivery service. | >0.05 |
Table 3. Cont.

| No. | Frequency of walking in nature per week and shopping preferences | Hypothesis | p-Value |
|-----|---------------------------------------------------------------|------------|---------|
| 37  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in the hypermarket. | >0.05      |         |
| 38  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in the supermarket. | >0.05      |         |
| 39  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in the local shop. | 0.046      |         |
| 40  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping in a second-hand shop. | >0.05      |         |
| 41  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for online shopping. | >0.05      |         |
| 42  | There is a significant association between the frequency of walking in nature per week and the consumer’s preference for shopping through the delivery service. | >0.05      |         |

All statistically significant associations are shown in the correspondence map to identify respondents’ behaviour during a pandemic. Figure 5a proves that there is a statistically significant association between the frequency of commuting a week and the consumer’s preference for online shopping during a pandemic. The correspondence map shows that online shopping is the preferred way to shop for employees commuting to work at most once a week. On the other hand, online shopping is not a current way for employees to shop more than twice a week. Figure 5b reveals that hypermarkets as a way of shopping are popular with consumers shopping more than six times a week. On the other hand, hypermarkets are not popular with customers who shop at most once a week.

Figure 5c shows a supermarket as a store is a neutral way of shopping for consumers shopping from two to three times a week. The supermarket is especially unpopular with consumers shopping less than once a week. Figure 5d demonstrates that delivery service as an alternative way of shopping is not popular for consumers shopping more than twice a week. However, delivery service is preferred for consumers shopping at most once a week. Figure 5e indicates that the supermarket is the preferred way of shopping for respondents going often on family visits. We assume that this association is related to purchases for older family members. Figure 5f expresses those local shops are popular with respondents going outdoors more than four times a week.

![Correspondence Map (a)](image1.png)

![Correspondence Map (b)](image2.png)

Figure 5. Cont.
Figure 5. Correspondence maps II: (a) there is an association between the frequency of work visits per week and the consumer’s preference for online shopping during the COVID-19 pandemic; (b) there is an association between the frequency of shopping per week and the consumer’s preference for shopping in the hypermarket during the COVID-19 pandemic; (c) there is an association between the frequency of shopping per week and the consumer’s preference for shopping in the supermarket during the COVID-19 pandemic; (d) there is an association between the frequency of shopping per week and the consumer’s preference for shopping through the delivery service during the COVID-19 pandemic; (e) there is an association between the frequency of family visits per week and the consumer’s preference for shopping in the supermarket during the COVID-19 pandemic; (f) there is an association between the frequency of walking in nature per week and the consumer’s preference for shopping in the local shop during the COVID-19 pandemic.

The results show that the association between the frequency of shopping a week and consumer preferences for shopping at a hypermarket or supermarket is statistically significant in both periods. Similarly, we identified that the frequency of walking in nature a week has a statistically significant association with shopping preferences in local stores. These results indicate that purchasing preferences in selected stores about the frequency of selected activities have not changed. Hypermarkets and supermarkets are preferred by consumers shopping very often during the week. Similarly, local shops are preferred by consumers going out very often, compared with other respondents. Moreover, we found statistically significant associations between selected categorical variables either before or
during the COVID-19 pandemic. In other words, it is revealed that respondents behave differently in the pre-pandemic and pandemic periods. As can be seen, the frequency of commuting a week has a statistically significant correlation to consumer preferences for shopping using the delivery service before the COVID-19 pandemic.

The correspondence map determines that online shopping is preferred for employees working from home. Delivery service as an alternative way of shopping is not preferred for consumers shopping often during the week during the COVID-19 pandemic. Moreover, we did not find an association between the frequency of school visits per week with consumer preferences for shopping in the supermarket and the frequency of commuting per week with shopping preferences for online shopping during a pandemic, unlike in the previous period. On the other hand, the findings show an association between commuting frequency and shopping preferences for online shopping during a pandemic. In this case, online shopping is not popular with employees working in a regular workplace. Finally, the results indicate that the frequency of the family visits is associated with shopping preferences in the supermarket, probably for purchases of various assortments, especially for older family members. This result shows specific behaviour compared with before the pandemic period.

5. Discussion

The results of our research can be compared with other studies conducted around the world. The authors of [51] found that 68.9% of all go shopping less than once a week. The decrease in the frequency of purchases was caused by a one-off purchase. In fact, based on other studies, 64.3% or 75.8% of food purchases were made in supermarkets [52,53]. Australia achieved the highest online shopping record, rising to 41% in April 2020, compared with 17% in 2019 [54]. On the other hand, most (62.7%) consumers shop once a week, and only 8.5% of all shop every day in Spain. In contrast, 34.5% of consumers shop daily even during the pandemic [55]. In our research, we found that consumers most often shop in hypermarkets.

Online food shopping shows that the COVID-19 pandemic has significantly increased online food shopping based on an analysis of the platform’s financial performance indicators in Taiwan. Online food sales increased by 5.7% during the average week before the pandemic and sales increased by 18% increase after the COVID-19 pandemic in Taiwan [56]. It is important to identify the specific ways in which consumers have changed their grocery shopping behaviour, such as the frequency of purchases and the time spent in the store during mobility restrictions.

Authors of another study explain that cramped spaces and surfaces in vehicles and taxis, rental vehicles, and used vehicles sold to future users are high-risk factors for the spread of the virus during the COVID-19 pandemic [57]. In Slovakia, the COVID-19 pandemic had a significant impact on the mobility and sharing of bicycles based on the bicycle sharing system. In this survey, the authors declared a decline in the use of shared bicycles. People prefer their car or bicycle [58].

The authors of a study in the US recorded a decrease of about 70% in walks and 50% in average distance travelled in all metropolitan areas. On the other hand, walking has been steadily increasing since mid-April 2020. Despite the resumption of some commercial and business activities, walking was still about 18% below pre-pandemic levels [59]. The results show that 74% of respondents changed their mode of transport to more active transport than walking and cycling [60]. The results also show that the use of public transport has decreased, compared with walking and cycling, especially over shorter distances during a pandemic [61]. In Gdansk, the public feels less safe on public transport during a pandemic, which significantly influences attitudes towards using this mode of transport in everyday life. In the survey, 44% of respondents declared a decrease in the use of public transport, and 47% of all declared a complete resignation for these means of transport. In other words, only 9% of respondents use public transport as often as before the pandemic [62]. The same findings are shown by another study [63], which declares a decrease of about 50% in public transport capacity. They also found a reduction in the number of trips and
departures of passengers from some areas to be relatively unavailable. Tian et al. found that public transport restrictions and suspensions were associated with a reduction in COVID-19 cases [64].

Cycling and walking can be alternatives ways of transport for necessary access to services such as pharmacy, food, and others for people who consider public transport risky. Kotkin explains that cities need to change public transport to safer options than autonomous vehicles. In addition, cities need to build lower-emission suburbs with shorter commuting routes [65]. The same results were observed in the students. The authors of [7] focused on the overall reduction in daily travel and the factors influencing decisions to limit daily travel. The reduction in time depends on the purpose of the journeys, the means of transport, the size of the passenger’s household, coronavirus concerns, employment, and the changes caused by the epidemic. In a study from Sweden, they found that the pandemic did not change the ability of almost half of the respondents to work from home. They found a decrease of 46.6% in commuting to work [66]. Several studies from different countries, such as the Americas and Australia, have shown similar results to our research [67–70]. In addition, the results demonstrate increased mobility in the individual activities of people such as sports and walks in nature. On the other hand, commuting to work, attending school, and going shopping have decreased. Several studies have shown that most students prefer online shopping due to mobility restrictions [71,72].

Authors of [73] examined the impact of a pandemic on shopping in three European countries. The results show that shopping in the supermarket before and during the pandemic is more popular in Poland than in other countries, for example, 41.03% of respondents shop in discount stores several times a week. Before the COVID-19 pandemic, local suppliers and food markets were very popular; for example, 40.51% of respondents from Austria and 46.30% of respondents from the United Kingdom shopped several times a week. Similar results are reported in other studies around the world [52–54], where the authors declared a decrease in the frequency of purchases but also changes in the selection of goods. Skotnicka et al. found that most respondents made purchases several times a week before the restrictions, for example, 61.67% of respondents in Poland, 55.52% of respondents in Austria, and 54.98% in the United Kingdom. On the other hand, during the pandemic, consumers shopped once a week—for example, 46.44% of respondents in Poland, 43.73% of respondents in the United Kingdom 43.73%—or several times a month, for example, 41.28% of respondents in Poland, 34.84% of respondents in Austria, and 33.12% of respondents in the United Kingdom 43.73%—or several times a month, for example, 41.28% of respondents in Poland, 34.84% of respondents in Austria, and 33.12% of respondents in the United Kingdom [74].

Shopping has many determinants such as employment, education, household income, and more. Before the pandemic, 73% of Austrians, 80% of Britons, and 74% of Poles did not buy food online at all or occasionally. On the other hand, 42.49% of respondents from Austria, 38.91% of respondents from the United Kingdom, and 41.52% of respondents from Poland shopped online at least twice a month during the pandemic [75,76]. The survey of consumer shopping in Slovakia showed that Slovak consumers increased online shopping by 72%. The results show that online purchases increased from 6% to 10% in most product categories. The largest increases were recorded in electronics, gardening tools, pharmacies, and drugstores [76]. In a US survey [77], the results show that almost 55% of respondents shopped online in June 2020. Model estimates show an impact on the likelihood and frequency of online shopping, including demographics, employment, and previous online shopping. Other respondents who did not shop online preferred shopping in local stores despite the pandemic.

6. Conclusions

The results show consumers’ shopping behaviour is different during the pandemic period. We applied correspondence analysis as a suitable method based on the data obtained from the questionnaire. We found that online shopping preferences are related to the frequency of commuting per week, compared with the non-pandemic period. On the other hand, consumer shopping preferences in a hypermarket or supermarket regarding the
frequency of shopping are statistically significant in both periods. However, we determined that consumers who often go on family visits for a week prefer supermarkets over the previous period. We assume many family members shop for older family members in a store with a wider range in terms of vicinity for precautionary reasons. Supermarkets are a better choice for consumers as opposed to local stores due to the wider variety of assortment. In addition, supermarkets are located closer to customers as opposed to hypermarkets. These results serve as an extension of previous theoretical and empirical knowledge from previous research.

Our research has several limitations. One of the limitations is its time-consuming data collection. The sample included random respondents because the online system did not allow us to set up a representative structure of respondents based on socio-demographic criteria. On other hand, we are aware that a stratified sample could bring more relevant results. The total number of respondents mainly consists of employees and students with a university degree (at least a bachelor’s degree), as this online questionnaire was mainly sent through the internal university system. Therefore, the selection of respondents could become stratified. Finally, the questionnaire can expand on new factors in choosing a mode of transport.

In addition to the frequency of shopping, it would be beneficial to know the preferred goods, the length of shopping, and the choice of transport, which may vary according to the size of the city, the type of store, or the type of operation. It would also be effective to consider whether a store is a stand-alone operation or an operation in a shopping centre where people often go to make more spontaneous or efficient purchases. To better understand behaviour and shopping preferences, further research should be considered to obtain information in processing new patterns of human behaviour. In addition to shopping, the choice of transport and other factors must be considered. Future research may focus on examining changes in respondents’ behaviour when choosing preferred shopping. Moreover, we could identify associations between the choice of means of transport and the type of store, or other determinants.

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Appendix A

Table 1. Dataset summary.

| No. | Question                                                                | Variable type | Category                  | N    | %     | Missing | Median | Mode |
|-----|-------------------------------------------------------------------------|---------------|---------------------------|------|-------|---------|--------|------|
| 1   | What is your gender?                                                   | nominal       | male                      | 194  | 47.7  | 0       | -      | 2    |
|     |                                                                         | variable      | female                    | 213  | 52.3  |         |        |      |
| 2   | What is your highest level of education?                               | nominal       | basic education           | 8    | 2.0   |         | -      | 3    |
|     |                                                                         | variable      | secondary education       | 71   | 17.4  |         |        |      |
|     |                                                                         |               | university education      | 327  | 80.3  | 1       | -      |      |
|     |                                                                         |               | no reply (missing)        | 1    | 0.2   |         |        |      |
| 3   | What is your status?                                                   | nominal       | student                   | 83   | 20.4  |         | 3      |      |
|     |                                                                         | variable      | businessman/woman         | 12   | 2.9   |         |        |      |
|     |                                                                         |               | employee                  | 291  | 71.5  |         |        |      |
|     |                                                                         |               | unemployed                | 3    | 0.7   |         |        |      |
|     |                                                                         |               | retiree                   | 15   | 3.7   |         |        |      |
|     |                                                                         |               | other (missing)           | 3    | 0.7   |         |        |      |
| 4   | How many times a week did you attend school before the COVID-19 pandemic? | ordinal       | seldom                    | 275  | 67.6  | 0       | 1      | 1    |
|     |                                                                         | variable      | occasionally              | 18   | 4.4   |         |        |      |
|     |                                                                         |               | sometimes                 | 30   | 7.4   |         |        |      |
|     |                                                                         |               | often                      | 84   | 20.6  |         |        |      |
| 5   | How many times a week did you go to work before the COVID-19 pandemic?  | ordinal       | seldom                    | 77   | 18.9  | 0       | 4      | 4    |
|     |                                                                         | variable      | occasionally              | 23   | 5.7   |         |        |      |
|     |                                                                         |               | sometimes                 | 56   | 13.8  |         |        |      |
|     |                                                                         |               | often                      | 251  | 61.7  |         |        |      |
| 6   | How many times a week did you shop before the COVID-19 pandemic?        | ordinal       | seldom                    | 107  | 26.3  | 0       | 2      | 2    |
|     |                                                                         | variable      | occasionally              | 165  | 40.5  |         |        |      |
|     |                                                                         |               | sometimes                 | 89   | 21.9  |         |        |      |
|     |                                                                         |               | often                      | 46   | 11.3  |         |        |      |
| 7   | How many times a week did you go to the doctor before the COVID-19 pandemic? | ordinal       | seldom                    | 360  | 88.5  | 0       | 1      | 1    |
|     |                                                                         | variable      | occasionally              | 32   | 7.9   |         |        |      |
|     |                                                                         |               | sometimes                 | 7    | 1.7   |         |        |      |
|     |                                                                         |               | often                      | 8    | 2.0   |         |        |      |
| No. | Question                                                                 | Variable type | Category       | N   | %   | Missing | Median | Mode |
|-----|--------------------------------------------------------------------------|---------------|----------------|-----|-----|---------|--------|------|
| 8   | How many times a week did you go to a social event before the COVID-19 pandemic? | ordinal variable | seldom         | 275 | 67.6 | 0       | 1      | 1    |
|     |                                                                          |               | occasionally   | 86  | 21.1 |         |        |      |
|     |                                                                          |               | sometimes      | 36  | 8.8  |         |        |      |
|     |                                                                          |               | often          | 10  | 2.5  |         |        |      |
| 9   | How many times a week did you go on a family visit before the COVID-19 pandemic? | ordinal variable | seldom         | 192 | 47.2 | 0       | 2      | 1    |
|     |                                                                          |               | occasionally   | 100 | 24.6 |         |        |      |
|     |                                                                          |               | sometimes      | 69  | 17.0 |         |        |      |
|     |                                                                          |               | often          | 46  | 11.3 |         |        |      |
| 10  | How many times a week did you go for a walk in nature before the COVID-19 pandemic? | ordinal variable | seldom         | 140 | 34.4 | 0       | 2      | 1    |
|     |                                                                          |               | occasionally   | 125 | 30.7 |         |        |      |
|     |                                                                          |               | sometimes      | 82  | 20.1 |         |        |      |
|     |                                                                          |               | often          | 60  | 14.7 |         |        |      |
| 11  | How many times a week have you attended school during the COVID-19 pandemic? | ordinal variable | seldom         | 346 | 85.0 | 0       | 1      | 1    |
|     |                                                                          |               | occasionally   | 27  | 6.6  |         |        |      |
|     |                                                                          |               | sometimes      | 14  | 3.4  |         |        |      |
|     |                                                                          |               | often          | 20  | 4.9  |         |        |      |
| 12  | How many times a week have you gone to work during the COVID-19 pandemic? | ordinal variable | seldom         | 235 | 57.7 | 0       | 1      | 1    |
|     |                                                                          |               | occasionally   | 37  | 9.1  |         |        |      |
|     |                                                                          |               | sometimes      | 35  | 8.6  |         |        |      |
|     |                                                                          |               | often          | 100 | 24.6 |         |        |      |
| 13  | How many times a week have you gone shopping during the COVID-19 pandemic? | ordinal variable | seldom         | 225 | 55.3 | 0       | 1      | 1    |
|     |                                                                          |               | occasionally   | 112 | 27.5 |         |        |      |
|     |                                                                          |               | sometimes      | 35  | 8.68 |         |        |      |
|     |                                                                          |               | often          | 35  | 8.6  |         |        |      |
| 14  | How many times a week have you gone to the doctor during the COVID-19 pandemic? | ordinal variable | seldom         | 371 | 91.2 | 0       | 1      | 1    |
|     |                                                                          |               | occasionally   | 26  | 6.4  |         |        |      |
|     |                                                                          |               | sometimes      | 4   | 1.0  |         |        |      |
|     |                                                                          |               | often          | 6   | 1.5  |         |        |      |
| 15  | How many times a week have you gone to a social event during the COVID-19 pandemic? | ordinal variable | seldom         | 388 | 95.3 | 0       | 1      | 1    |
|     |                                                                          |               | occasionally   | 12  | 2.9  |         |        |      |
|     |                                                                          |               | sometimes      | 3   | 0.7  |         |        |      |
|     |                                                                          |               | often          | 4   | 1.0  |         |        |      |
| No. | Question                                                                 | Variable type | Category          | N    | %    | Missing | Median | Mode |
|-----|---------------------------------------------------------------------------|---------------|-------------------|------|------|---------|--------|------|
| 16  | How many times a week have you gone on a family visit during the COVID-19 pandemic? | ordinal variable | seldom          | 305  | 74.9 | 0       | 1      | 1    |
|     |                                                                           |               | occasionally     | 59   | 14.5 |         |        |      |
|     |                                                                           |               | sometimes        | 19   | 4.7  |         |        |      |
|     |                                                                           |               | often            | 24   | 5.9  |         |        |      |
| 17  | How many times a week have you gone for a walk in nature during the COVID-19 pandemic? | ordinal variable | seldom          | 146  | 35.9 | 0       | 2      | 1    |
|     |                                                                           |               | occasionally     | 99   | 24.3 |         |        |      |
|     |                                                                           |               | sometimes        | 70   | 17.2 |         |        |      |
|     |                                                                           |               | often            | 92   | 22.6 |         |        |      |
| 18  | What was your preference for shopping before the COVID-19 pandemic? (hypermarket) | ordinal variable | definitely/rather not preferred | 65   | 16.0 |         |        |      |
|     |                                                                           |               | neither nor      | 77   | 18.9 | 0       | 3      | 3    |
| 19  | What was your preference for shopping before the COVID-19 pandemic? (supermarket) | ordinal variable | definitely/rather not preferred | 114  | 28.0 | 0       | 2      | 3    |
|     |                                                                           |               | neither nor      | 138  | 33.9 |         |        |      |
|     |                                                                           |               | definitely/rather preferred | 155  | 38.1 |         |        |      |
| 20  | What was your preference for shopping before the COVID-19 pandemic? (local shop) | ordinal variable | definitely/rather not preferred | 177  | 43.5 | 0       | 2      | 1    |
|     |                                                                           |               | neither nor      | 118  | 29.0 |         |        |      |
|     |                                                                           |               | definitely/rather preferred | 112  | 27.5 |         |        |      |
| 21  | What was your preference for shopping before the COVID-19 pandemic? (second hand) | ordinal variable | definitely/rather not preferred | 379  | 93.1 | 0       | 1      | 1    |
|     |                                                                           |               | neither nor      | 10   | 2.5  |         |        |      |
|     |                                                                           |               | definitely/rather preferred | 18   | 4.4  |         |        |      |
| 22  | What was your preference for shopping before the COVID-19 pandemic? (online shopping) | ordinal variable | definitely/rather not preferred | 163  | 40.0 | 0       | 2      | 1    |
|     |                                                                           |               | neither nor      | 114  | 28.0 |         |        |      |
|     |                                                                           |               | definitely/rather preferred | 130  | 31.9 |         |        |      |
Table 1. Cont.

| No. | Question                                                                 | Variable type | Category                                      | N   | %   | Missing | Median | Mode |
|-----|--------------------------------------------------------------------------|---------------|-----------------------------------------------|-----|-----|---------|--------|------|
| 23  | What was your preference for shopping before the COVID-19 pandemic? (delivery service) | ordinal variable | definitely/rather not preferred neither nor definitely/rather preferred | 270 | 66.3 | 0       | 1      | 1    |
|     |                                                                         |               | 2 neither nor preferred                        | 75  | 18.4 | 0       | 1      | 1    |
|     |                                                                         |               | 3 definitely/rather preferred                  | 62  | 15.2 | 0       | 1      | 1    |
| 24  | What is your preference for shopping during the COVID-19 pandemic? (hypermarket) | ordinal variable | definitely/rather not preferred neither nor definitely/rather preferred | 164 | 40.3 | 0       | 2      | 3    |
|     |                                                                         |               | 2 neither nor preferred                        | 60  | 14.7 | 0       | 3      | 1    |
|     |                                                                         |               | 3 definitely/rather preferred                  | 183 | 45.0 | 0       | 3      | 1    |
| 25  | What is your preference for shopping during the COVID-19 pandemic? (supermarket) | ordinal variable | definitely/rather not preferred neither nor definitely/rather preferred | 206 | 50.6 | 0       | 1      | 1    |
|     |                                                                         |               | 2 neither nor preferred                        | 90  | 22.1 | 0       | 1      | 1    |
|     |                                                                         |               | 3 definitely/rather preferred                  | 111 | 27.3 | 0       | 1      | 1    |
| 26  | What is your preference for shopping during the COVID-19 pandemic? (local shop) | ordinal variable | definitely/rather not preferred neither nor definitely/rather preferred | 199 | 48.9 | 0       | 2      | 1    |
|     |                                                                         |               | 2 neither nor preferred                        | 74  | 18.2 | 0       | 2      | 1    |
|     |                                                                         |               | 3 definitely/rather preferred                  | 134 | 32.9 | 0       | 2      | 1    |
| 27  | What is your preference for shopping during the COVID-19 pandemic? (second hand) | ordinal variable | definitely/rather not preferred neither nor definitely/rather preferred | 383 | 94.1 | 0       | 1      | 1    |
|     |                                                                         |               | 2 neither nor preferred                        | 12  | 2.9  | 0       | 1      | 1    |
|     |                                                                         |               | 3 definitely/rather preferred                  | 12  | 2.9  | 0       | 1      | 1    |
| 28  | What is your preference for shopping during the COVID-19 pandemic? (online shopping) | ordinal variable | definitely/rather not preferred neither nor definitely/rather preferred | 75  | 18.4 | 0       | 3      | 3    |
|     |                                                                         |               | 2 neither nor preferred                        | 73  | 17.9 | 0       | 3      | 3    |
|     |                                                                         |               | 3 definitely/rather preferred                  | 259 | 63.6 | 0       | 3      | 3    |
| 29  | What is your preference for shopping during the COVID-19 pandemic? (delivery service) | ordinal variable | definitely/rather not preferred neither nor definitely/rather preferred | 186 | 45.7 | 0       | 2      | 1    |
|     |                                                                         |               | 2 neither nor preferred                        | 58  | 14.3 | 0       | 2      | 1    |
|     |                                                                         |               | 3 definitely/rather preferred                  | 163 | 40.0 | 0       | 2      | 1    |
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