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Who Are the Online Medication Shoppers? A Market Segmentation of the Swedish Welfare State

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Abstract: The present study aimed to explore the online shopping of medicines from demographic, geographic, psychographic, and behavioral factors. A quantitative survey design was used with a quote sample representing the Swedish population regarding age, gender, and residential area. In total, 1863 persons responded to a survey, including measures of age, gender, income, education, area of residence, personality traits (BFI-10), values (Rokeach Value Survey), self-estimated health-status, internet usage, online shopping in general, and online shopping of medicines. Firstly, the data were analyzed with chi-squares and independent *t*-tests. From these initial analyses, online shopping of medicines was associated with young age, female gender, high income and education, living in a big city, extraversion, several values of desirable end-states of existence (e.g., self-respect, a sense of accomplishment, and pleasure), internet usage, and general online shopping. Secondly, the significant ($p < 0.05$) variables from the initial analysis were included in a logistic regression analysis. This comprehensive model showed that online medication shoppers are best predicted by being female and the use of internet. Unlike what was previously known about medication shoppers, the typical online medication shopper appears to be driven by hedonistic values and self-actualization, rather than health status. We suggest that further research replicate this study outside and inside Sweden, and that health status is measured in a different way.

Keywords: market segmentation; online shopping of medicines; psychographic factors; personality; traits; values



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1. Introduction

1.1. Background

Sweden and the other Scandinavian countries are some of the most digitalized countries in Europe. In the Digital Economy and Society index from 2022, Sweden ranked 4th of the European Union member states [1]. The digitalization includes many different aspects, including trade in pharmaceuticals. National data from Statistics Sweden [2], indicate that medicines was the type of product that increased most in online shopping between 2014 and 2018. In 2018, twenty percent of the Swedish population reported having bought medicines online [2].

In Sweden, most medical drugs are still purchased in physical pharmacies, but the proportion being sold online is increasing [3]. This move is most likely caused by general trends in digitalization, but also by specific deregulations of the Swedish pharmacy market (e.g., the state-owned pharmacy monopoly ended in 2009) and an increased demand for medicines during the pandemic—when social distancing was the norm [4]. Swedish research has indicated that availability in terms of long opening hours and geographic

proximity are important factors when consumers decide where to buy over the counter (OTC) medicines [5].

Online pharmacies are regulated in a similar way as physical pharmacies in Sweden. All pharmacies must be authorized by the National Medical Product Agency. Online pharmacies do not need to be connected to a physical pharmacy, but they must be located within Sweden. All pharmacies, including online pharmacies, must be able to provide, within 24 h, all medicines that are included in the pharmaceutical benefits scheme. The pricing of these medications is the same in all pharmacies, physical as well as online. Prescription medication can only be sold by pharmacies. Over the counter (OTC) medicines are also sold in pharmacies and some OTC products can furthermore be sold in regular retail. It should also be recognized that although Swedish online pharmacies are strictly regulated, medicines are also sold illegally online [6]. Relatively little is known about the nature and extent of illicit trade with medicines.

Among the Swedish public, there is a tendency that more and more people purchase medicines online [7]. However, knowledge about the demand side is scarce and insufficient to delineate reasons why people choose to purchase medicines online instead of at physical pharmacies [7–9]. In the present study, we draw on findings from a national representative survey with the aim of examining the characteristics of the Swedish public who buy medicines online.

In total, four research questions are based on classic market segmentation [10]: (1) Do demographic factors (i.e., gender, age, education, income) influence online shopping of medicines? (2) Do geographic factors (e.g., city–country) influence online shopping of medicines? (3) Do psychographic factors (i.e., personality, values, self-estimated health status) influence whether one buys medicine online? (4) Do behavioral factors, or more precisely digital behavioral factors (i.e., use of internet, online shopping in general) influence online shopping of medicines? To answer these questions, those who buy medicines online will be compared with those who do not buy medicines online in the Swedish population. In addition, the factors will be included in a comprehensive model to explore interrelationship among them.

Psychographic factors (i.e., personality and values) need further conceptual explanation. According to the Big Five model of personality traits, there are five major and universal personality traits: Openness (e.g., behavioral flexibility, intellectual curiosity, unconventional attitudes), Conscientiousness (e.g., responsibility, self-discipline, dutifulness), Extraversion (e.g., sociability, positive emotions, wellbeing), Agreeableness (e.g., tolerance, altruism, cooperativeness), Neuroticism (e.g., anxiety, distress, emotional instability) [11,12]. According to the Rokeach Value Survey, there are 18 terminal human values or end-states of existence: True friendship, Mature love, Self-respect, Happiness, Inner harmony, Equality, Freedom, Pleasure, Social recognition, Wisdom, Salvation, Family security, National security, A sense of accomplishment, A world of beauty, A world of peace, A comfortable life, and an exciting life [13]. Both traits and values separate individuals from one another in a way that is relatively consistent and stable over time [11].

1.2. Previous Research

Since previous research regarding the demand side of medicines online is scarce [7] this research is foremost based on the general consumption of medicines and online shopping in general. At the end of this section, we briefly describe the previous research that relates to the online shopping of medicines. Throughout, the focus is on demographic factors, simply because most research is conducted in this area. Furthermore, a large proportion of the statistics are from Sweden and thus adapted to the present study.

1.2.1. Predictors of Medicine Consumption

Use of medicines is linked to the prevalence of diseases and symptoms that can be pharmacologically treated [14]. In Sweden, all purchases of prescription medication are registered in a national prescription database [15]. Public statistics [16] based on data

from this register show that in 2022, around 66% of the population purchased at least one prescription medication. Purchases of prescription medications were more common among women than among men and the prevalence increased with age. There are socioeconomic differences in medication use; a Danish study has shown that use of prescription medication increased with decreasing socioeconomic position even after adjusting for health status [17].

Use of over the counter (OTC) medication is less documented than the use of prescription medication, but research from 2019 indicates that 86% of the adult Swedish population reported using OTC medication over a period of 6 months [18]. Monthly use of OTC medication was more common among women than among men. No significant differences related to educational level were detected [5].

1.2.2. Predictors of Online Shopping in General

In general, women shop more online than men, and younger people shop more online than older people [19,20]. Education and income are positively related to general online shopping [21–23]. People in big cities shop more online as they are generally more interested in shopping and fashion. Online sales of beauty products are, for example, significantly larger in Stockholm, Gothenburg and Malmö than in the rest of Sweden [19].

When it comes to the psychographic profile of e-shoppers in Sweden, online shopping seems to be positively associated with Openness to experience and Extraversion, and negatively associated with Conscientiousness and Agreeableness. When demographic factors such as age, gender, income, and education are included, the significant effects of personality traits are reduced or disappear completely [22,24]. According to Roos [24], general online shopping is also positively related to hedonic capacity.

1.2.3. Predictors of Online Shopping of Medicines

A Swedish study from 2016 showed that around 0.6% of those who reported buying OTC medication had made their last purchase online [5]. Considering the progression of digitalization since then, it is likely that this proportion has increased significantly. Public statistics from Statistics Sweden [2] indicate that 20% of the adult Swedish population reported having bought medicines online in 2018 and that online purchase of medicines was more common among women than among men.

According to the E-barometern (2020), older people in Sweden shop more for pharmacy products online, although they shop less online in general. This can be explained by the fact that the older population buys more prescription drugs. On the other hand, there are many restrictions on selling prescription drugs online in Sweden which means that physical pharmacies accounted for 75% of the total turnover. According to the E-barometern (2020), it is foremost non-prescription hygiene and health products that the Swedish population buy from online pharmacies which is motivated by a lower price and a larger selection compared to in physical stores [25].

Although people in general shop more online in Stockholm, Gothenburg, and Malmö, the distribution is the same throughout Sweden when it comes to pharmacy products [25].

Research from other countries has indicated that the perception of risk versus trust towards online pharmacies are important for the consumers experience towards buying medicines online [8] and that digital pharmaceutical marketing as well as convenience are important factors for the consumers decision making when it comes to buying OTC medicine online [9,26].

2. Materials and Methods

2.1. Design, Sample and Procedure

The research design is of quantitative character. The data were collected through a survey study by the SOM Institute. The SOM Institute (the Institute for Society, Opinion, and Media) is a research institute at the University of Gothenburg, Sweden. A postal survey was distributed to 3750 randomly selected residents in Sweden, in the age of 16 to 85. The data were collected between 7 September and 21 December 2020. Each participant received

the survey in the middle of September. The initial survey was followed up by four postal reminders including the same survey, and five other reminders via post and SMS. The research design was a mixed mode, implying that the respondents could use a web survey or a pen and pencil survey. In total, 1863 persons responded to the survey, corresponding to a response rate of 50%. Of the respondents, 32% used the web survey.

2.2. Measures

Online shopping of medicines was measured with the question: "How often did you buy medicines online during the past twelve months"? The response alternatives were: Never (45.0%), One time the last 12 months (10.3%), One time every 6th month (19.8%), Once a month (21.4%), Once a week (2.4%), Several times a week (0.5%), or Daily (0.6%). The variable was dummy coded. Online shopping of medicines at least once during the past twelve months was coded as 1 (52.6%) and never was coded as 0 (47.4%).

Register data from the selection frame were used for gender and age. Gender was dummy coded. Female was coded as 1 and male as 0. We also used a question in the survey regarding gender, with an "other" alternative. Only three respondents were selecting this alternative. These persons were not gender coded. Age was coded in the range 16–85. Income was measured by "What is your current annual household income?", 1–12 (each interval representing SEK 100,000 SEK, e.g., 1 is less than SEK 100,000 and 12, more than SEK 1,100,000). Educational attainment was measured by "What is your highest attained level of education", ranging from 1 ("not completed primary school") to 8 ("postgraduate education"). The variable was dummy coded. University degree was coded as 1 and not having a university degree was coded as 0.

Area of residence was measured with registration data in combination with the question: "In what kind of area do you live?" followed by seven response alternatives: (1) "Big city: city center", (2) "Big city: outskirts/suburb", (3) "City: city center", (4) "City: outskirts", (5) "Big town", (6) "Small town", (7) "Countryside". The variable was dummy coded; residents in Sweden's three largest cities (Stockholm, Malmö, or Göteborg) were coded as 1 and residents somewhere else were coded as 0. Respondents who were coded as 1 answered with response alternative 1–5 and lived in Stockholm, Malmö, or Göteborg, according to the register data.

Personality traits were measured using the Big Five Inventory, BFI-10 [27], which consists of eleven items (i.e., 2 items per personality trait). The BFI-10 has shown satisfactory levels of convergent and discriminant validity as well as test–retest reliability [26]. The scale ranged from 1 ("strongly disagree") to 5 ("strongly agree"). The Neuroticism index was constructed by averaging the responses to "is relaxed, handles stress well" (reversed) and "gets nervous easily" ($r = 0.40, p < 0.01, M = 2.61, SD = 0.92$). The Extraversion index was constructed by averaging the responses to "is reserved" (reversed) and "is outgoing, sociable" ($r = 0.44, p < 0.01, M = 3.49, SD = 0.93$). The Openness to experience index was constructed by averaging the responses to "has few artistic interests" (reversed) and "has an active imagination" ($r = 0.12, p < 0.01, M = 3.08, SD = 0.97$). The Agreeableness index was constructed by averaging the responses to "tend to find fault with others" (reversed), "is generally trusting", and "is considerate and kind to almost everyone" ($\alpha = 0.34, M = 3.71, SD = 0.62$). The Conscientiousness index was constructed by averaging the responses to "tend to be lazy" (reversed) and "does a thorough job" ($r = 0.18, p < 0.01, M = 3.98, SD = 0.76$).

Human values were measured through the Rokeach Value Survey [13]. The overall question was "How important are the following values". The list consisted of 18 values, each measured on a five-point scale ranging from 1 ("not at all important") to 5 ("very important"). Health status was measured by "How do you rate your general rate of health"? The scale ranged from 0 ("very bad") to 10 ("very good").

Use of the internet was measured with the question: "How often did you use the internet during the past twelve months"? The respondents were asked to indicate frequency of internet use on a seven-point scale ranging from 1 ("never") to 7 ("every day"). The

variable was dummy coded. Internet use at least once a month was coded as 1 (93.6%) and internet use less frequent than once a month was coded as 0 (6.4%). Online shopping was measured with the question: "How often did you buy products or services online during the past twelve months?", followed by a seven-point scale ranging from 1 ("never") to 7 ("every day"). The variable was dummy coded. Online shopping at least once a month was coded as 1 (36.2%) and online shopping less frequent than once a month was coded as 0 (63.8%).

2.3. Statistical Analyses

Firstly, chi-square tests for independence (with Pearson chi-square) and independent *t*-tests were used in order to investigate if people who buy medicines online differ from others. Secondly, a multivariate logistic regression, with online shopping of medicines as the dependent variable, was performed. Only significant factors ($p < 0.05$) from the first analyses were included in the regression.

2.4. Ethical Considerations

The data collection used in this study was approved by the Swedish Ethical Review Authority (2018/296-18). The Swedish Ethical Review Authority are approving research only if it can be carried out with respect for human dignity. The review takes human rights and freedoms into consideration and is based on the Act (2003:460) concerning the ethical review of research involving humans [28,29]. In the present study, informed consent was obtained from all respondents included in the study and they were informed about it voluntarily and confidentially.

3. Results

3.1. Demographic Factors

A chi-square test for independence (with Yates Continuity Correlation) indicated a significant association between gender and buying medicines online, $\chi^2(1, n = 1791) = 31.90$, $p \leq 0.001$, $\phi = 0.14$. It is more likely that women buy medicines online than men (Table 1).

An independent-samples *t*-test was conducted to compare age for people who buy medicines online and for those who do not buy medicines online. There was a significant difference in age for people who buy medicines online ($M = 50.28$, $SD = 17.87$) and others ($M = 54.66$, $SD = 19.34$; $t(1739) = 4.97$, $p < 0.001$, two-tailed).

An independent-samples *t*-test was conducted to compare household income for people who buy medicines online and others. There was a significant difference in income for people who buy medicines online ($M = 6.32$, $SD = 3.11$) and others ($M = 5.88$, $SD = 3.19$; $t(1664) = -2.84$, $p = 0.005$, two-tailed).

A chi-square test for independence (with Yates Continuity Correlation) indicated a significant association between education and buying medicines online, $\chi^2(1, n = 1774) = 7.19$, $p = 0.007$, $\phi = 0.07$. It is more likely that people with university degrees buy medicines online than people without a university degree (Table 1).

3.2. Geographic Factors

A chi-square test for independence (with Yates Continuity Correlation) indicated a significant association between being a resident in a big city (i.e., Stockholm, Gothenburg, Malmö) and buying medicines online, $\chi^2 (1, n = 1764) = 4.80, p = 0.028, phi = 0.05$. It is more likely that residents in big cities buy medicines online than people who do not live in big cities (Table 1).

Table 1. Demographic, geographic, and behavior factors of people who buy medicine online and others.

	Online Shoppers (%)	Others (%)
Gender (female) ***	58.9	45.4
University degree **	57.7	50.7
Big city *	19.0	15.0
Use internet every month ***	99.0	87.6
Shop online every month ***	46.5	24.7

Note. Buying medicine online was defined as having reported at least one online purchase during the last 12 months. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. p -values are from chi-square tests.

3.3. Psychographic Factors

Several independent-sample t -tests were used to explore the associations between psychographic factors (i.e., values and personality traits) and the online shopping of medicines. Table 2 shows that the following values were positively related to buying medicines online: A comfortable life, Happiness, A sense of accomplishment, Pleasure, An exciting life, Self-respect, Inner harmony, Wisdom, Mature love and True friendship (Table 2). Regarding personality traits, Extraversion was associated with buying medicines online.

An independent-sample t -test was conducted to compare self-estimated health status for people who buy medicines online and others. There was no significant difference in health status for people who buy medicines online ($M = 8.82, SD = 10.83$) and others ($M = 8.92, SD = 11.37; t (1796) = 0.20, p = 0.84$, two-tailed).

3.4. Digital Behavioral Factors

A chi-square test for independence (with Yates Continuity Correlation) indicated a significant association between internet use and buying medicines online, $\chi^2 (1, n = 1749) = 92.16, p < 0.001, phi = 0.232$. It is more likely that people who use the internet every month buy medicines online than people who do not use the internet every month (Table 1).

A chi-square test for independence (with Yates Continuity Correlation) indicated a significant association between general online shopping and buying medicines online, $\chi^2 (1, n = 1788) = 91.36, p < 0.001, phi = 0.227$. It is more likely that people who shop online every month buy medicines online than people who do not shop online every month (Table 1).

Table 2. Psychographic factors of people who buy medicine online and others.

	Online Shoppers	Others
	Mean (SD)	Mean (SD)
<i>Values</i>		
A comfortable life *	4.61 (0.59)	4.55 (0.66)
Happiness **	4.67 (0.57)	4.58 (0.63)
Social recognition	3.55 (0.98)	3.53 (0.99)
A sense of accomplishment ***	3.83 (0.88)	3.67 (0.90)
Pleasure **	3.98 (0.92)	3.84 (0.95)
An exciting life *	3.66 (0.98)	3.56 (0.98)
Self-respect ***	4.22 (0.82)	4.08 (0.86)
Freedom	4.86 (0.40)	4.82 (0.44)
A world of beauty	4.36 (0.75)	4.39 (0.74)
Equality	4.61 (0.66)	4.57 (0.69)
Inner harmony **	4.67 (0.57)	4.58 (0.65)
Wisdom **	4.27 (0.75)	4.17 (0.81)
A world of peace	4.70 (0.58)	4.70 (0.63)
Mature love *	4.68 (0.61)	4.60 (0.66)
True friendship ***	4.71 (0.53)	4.59 (0.66)
Salvation	2.26 (1.30)	2.25 (1.30)
Family security	4.84 (0.45)	4.83 (0.46)
National security	4.70 (0.60)	4.66 (0.63)
<i>Personality traits</i>		
Openness	3.11 (0.99)	3.05 (0.96)
Conscientiousness	4.01 (0.74)	3.96 (0.76)
Extraversion *	3.53 (0.93)	3.44 (0.94)
Agreeableness	3.70 (0.63)	3.71 (0.60)
Neuroticism	2.61 (0.91)	2.60 (0.93)

Note. Buying medicine online was defined as having reported at least one online purchase during the last 12 months. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. $N = 1716-1781$. p -values are from t -tests.

3.5. A Comprehensive Model

Direct, multivariate logistic regression was performed to assess the impact of a number of factors (i.e., all factors that showed independent, significant associations with buying medicines online in previous bivariate analyses) on the likelihood to buy medicines online. The model contained 17 independent variables (Table 3). The model was statistically significant, $\chi^2 (17, N = 1\ 463) = 129.81, p < 0.001$, indicating that it was able to distinguish between people who buy medicines online and others. The model as a whole explained 12.8% (Nagelkerke R^2) of the variance in online shopping of medicines. As shown in Table 3, only two of the independent variables made a unique, statistically significant contribution to the model (gender and internet use). The strongest predictor of buying medicines online was internet use, recording an odds ratio of 24.27. This indicates that people who used the internet at least one time per month were over 24 times more likely to buy medicines online during the last 12 months compared to people who did not use internet every month (controlling for all other factors in the model). Also, gender had a unique statistical effect in this model, recording an odds ratio of 1.80. This indicates that women were 1.80 times more likely to buy medicines online than men, controlling for all other factors in the model.

Table 3. Logistic regression with buying medicine online as dependent variable.

	<i>B</i>	<i>SE</i>	<i>OR</i>
Age	−0.01	0.00	0.99
Gender (female) ***	0.59	0.12	1.80
Household income	0.03	0.02	1.03
Education (university degree)	0.04	0.13	1.04
Resident (big city)	0.22	0.15	1.24
A comfortable life	−0.10	0.10	0.90
Happiness	0.04	0.13	1.05
A sense of accomplishment	0.07	0.08	1.07
Pleasure	0.10	0.08	1.10
An exciting life	−0.03	0.07	0.97
Self-respect	0.09	0.08	1.10
Inner harmony	0.09	0.12	1.10
Wisdom	−0.04	0.09	0.96
Mature love	0.05	0.11	1.05
True friendship	0.10	0.11	1.11
Extraversion	0.03	0.06	1.03
Internet use ***	3.19	0.60	24.27

Note. Buying medicine online was defined as having reported at least one online purchase during the last 12 months. *** $p < 0.001$. Nagelkerke $R^2 = 0.13$.

4. Discussion

4.1. Discussion of the Findings

Behavioral factors explain most of the question of who the online medication shoppers are. Table 3 includes only one of the two behavioral variables, as multicollinearity is high between them. Internet use rather than general online shopping was included since the impact (i.e., the phi coefficient) of online shopping of medicines was slightly higher than for general online shopping. It is worth noticing that general online shopping, if it should replace internet use in the model, still would have been the variable with the largest contribution to the full model; although, the beta value and the odds ratio, as well as the contribution to the overall R^2 , would have been somewhat lower compared to internet use ($\beta = 0.84$, $p < 0.001$, $OR = 2.32$, Nagelkerke $R^2 = 0.11$; Table 3). This emphasizes the importance of behavioral factors by indicating that people who did general online shopping at least every month during the last 12 months are 2.32 times more likely to buy medicines online, compared to those who did not report shopping online.

Demographic factors, especially gender, are the secondly most important factor in explaining who buys medicines online. Women buy medicines more frequently online than men do. If the behavioral factors are excluded from the analysis, gender will explain even more at the same time as both age and income will have unique, statistically significant contributions to the model. This means that demographic factors in Sweden are subordinated behavioral factors, and that the online shopping of medicines therefore is explained by internet use, rather than young age and high income. In any case, it is worth pointing out that online medication shoppers are characterized by a higher income and education than the rest of the population, which distinguishes the group from the lower socioeconomic status in terms of income, which characterizes shoppers of medicines in general [17]. On the other hand, a high socioeconomic status corresponds to the typical online shopper in general [22,23], which might be related to having access to technologies.

The gender effect was unknown but expected, since previous research has shown that women are over represented in medicine consumption [5,20] and online shopping in general [24,25]. When it comes to the specific behavior of buying medicines online, the gendered difference may be further reinforced by gendered patterns of communication and information about health [20]. Obermeyer et al. (2020) found that gender is a key factor in the communication of information regarding medications, which indicates that health is more relevant for females.

Neither geographical nor psychographic factors are significant for online shopping of medicines as long as demographic and behavioral factors are included in the model. If demographic and behavioral factors are excluded, geographic factors become important for online shopping of medicines. Unlike previous research [23], the present study then shows that it is mainly in the big cities that online shopping for medicines takes place. Just like other shopping, the online medication shoppers in Sweden seem to be living in Stockholm, Gothenburg, and Malmö. As with socioeconomic status, the purchase of medications based on geographic factors appears to have a similar pattern as online shopping overall. Perhaps this is because online shopping for medicines is becoming more and more mainstream. The explanation to why online shopping is more popular in urban areas can be explained by the prevalence of infrastructure [21].

In the comprehensive model, the psychographic factors are of least importance for who buys medicines online and none of the variables from the bivariate analysis (Table 2) are important in relation to other factors. If we, in a first step of the regression model, include the psychographic variables from Table 3, those variables will explain 2% of who shops for medicines online ($R^2 = 0.02$). However, none of the psychographic variables will significantly ($p < 0.05$) contribute to the model. Unfortunately, there is a high multicollinearity between the psychographic variables (see method discussion). The benefit with psychographic variables is that they theoretically explain phenomena better than demographic, geographic and behavioral factors, in other words why the phenomenon occurs [8]. Therefore, it is interesting to notice from additional analyses (although not presented here) that certain psychographic variables are subordinate to gender, and therefore can help us understand why women buy more medicines online than men—women are, for instance, more extroverted and perceive inner harmony as more valuable. In the additional analysis, the statistically significant effect of Internal harmony on buying medicines online becomes weaker, while the effect of Extraversion on buying medicines online disappeared when gender was included in the same analysis.

To sum up, although some psychographic variables initially seemed promising, a more advanced statistical analysis indicated that behavioral, demographic, and geographic factors (in descending order) are better predictors of who buys medicine online. The psychographic factors can possibly be used in future analyses to explain other factors. Of particular interest is that many of the psychographic factors that appear to be relevant for the online shopping of medicine are linked to hedonism and wellbeing. In fact, Extraversion is the only personality trait that is positively associated to health and wellbeing [11]. The present study also found that online shopping of medicines is unrelated to self-rated health condition, which further indicates that it is not those with more health issues who order medicine online, which the previous and general research on drug consumption has shown [14]. This finding is particularly noteworthy considering that the data collection took place during the COVID-19 pandemic, when the so-called second wave was spreading across Sweden [27].

The timing of the data collection, during an intense period of COVID-19, may also explain the high proportion of people reporting online shopping of medicines in the present study (i.e., 52.6%). The proportion in 2018 was 20% [2].

4.2. Methodological Discussion

Unlike previous research in the area, this study presents different factors in relation to each other, which is probably the most important contribution of this study. Factors from previous research that were expected to be important for online shopping of medicines appear to be subordinate to other factors, primarily digital behavior and gender. Perhaps the effect of gender also applies to the factors previously presented for the consumption of medicines and online shopping in general, respectively. Furthermore, this means that many of the conclusions drawn based on medicine consumption in general are not relevant for understanding the online consumption of medicines, since the digital behavior itself is what explains most of the online medicine consumption.

Finally, we want to highlight some shortcomings in the method. Firstly, we relied on self-reporting of online shopping of medicines, rather than a measure of factual frequencies of online shopping of medicines. We also relied on self-reporting for several sensitive questions, for instance health status. Self-reporting can introduce biases and may not always accurately reflect actual behavior [30]. We recommend future researchers to pay more attention to measuring actual online shopping behavior, for instance, through direct observations and automatic behavioral registrations. Secondly, shopping for medicines online is measured by a single-item question; “How often did you buy medicines online during the past twelve months”? We recommend further researcher to use multiple questions for reliability purpose, but also in order to conduct analyses across consumption categories, such as prescription medication versus non-prescription medicine as well as medications for different diseases and symptoms. Furthermore, the response alternatives are measured on an ordinal scale, which limited our analysis to chi-square tests, independent *t*-tests, and logistic regressions. Personality traits were also measured by short scales, which have been shown to be associated with lower reliability in the measures compared to longer versions of the Big Five personality factors [31]. Thirdly, although the ambition was to use a representative sample of the Swedish population 16–85 years, the sample was slightly underrepresented regarding young adults (i.e., 16–29) and residents with non-Swedish citizenships [32].

5. Conclusions and Further Direction

Our findings indicated that online shopping of medicines is associated with demographic, geographic, psychographic, and behavioral factors. Regarding demographic factors, online medication shoppers are younger, more often female, and from higher socio-economic backgrounds compared with others. Regarding geographic factors, online medication shoppers are more often living in the large cities in Sweden i.e., Stockholm, Gothenburg, and Malmö. There are several psychographic factors that distinguish online medication shoppers from other people in Sweden, for instance a higher degree of Extraversion and a higher priority of values related to pleasure and self-enhancement. Regarding behavioral factors, both internet use and online shopping in general were positively associated with online medication shoppers.

In a comprehensive model, we showed that several segmentation factors and measure variables are related to each other. According to the model, online medication shoppers were only predicted by being female and the use of the internet. However, the bivariate analyses can be used in order to understand gender and digital behavior. Unlike what was previously known, our findings suggest that the typical online medication shopper is driven by hedonistic values and self-actualization, rather than by poor health and subsequent medical needs.

Most data in the present study were gathered in September 2020 [32], about 6 months after the World Health Organization declared COVID-19 a global pandemic, which might be related to high reported rates of internet use, online shopping, and especially online shopping of medicines [33,34]. Thus, it would be interesting to follow up and investigate the validity of the present study. Caution should also be taken in generalizing the present findings to other countries. Online shopping of medicines might differ across national borders, due to technological development, regulations, treatment guidelines, and culture of medication use [35,36].

From the present study we would like to highlight some relevant directions for future research, that previously have been more or less discussed. Firstly, the present finding that online shopping for medicines is unrelated to health status is interesting. This needs to be further explored. We suggest that further research measures more variables related to self-reported health status and perhaps relies on a more validated scale rather than a single-item questions, such as the WHO 5 Well-Being Index [37]. Secondly, specific questions related to the purchase of medicines are relevant to study in the future, for instance what is purchased and for whom. Such studies will probably help us to better explain the gender differences

that are related to online shopping of medicines. Thirdly, values and personality traits are measures that have been developed for comparative analyses, over time or across cultures. Therefore, we suggest that the psychographic variables presented here are replicated in other cultures and in other times.

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