

University Students and Sugar: Consumption Habits

Blanka Maderová - East and Central European Studies, FFUK, Prague

1. The “Sweet” Consumption in Czech Republic

The World Health Organization recommends that both adults and children should reduce their daily intake of free (added) sugars to less than 10% of their total energy intake. In adults, it amounts to 25-50 grams of added sugar per day (1). However, an average Czech person consumes around 120 grams of sugar per day. Czech dietary habits have manifested several transformations in the past decades. Concerning consumption of sweet drinks and food, previous data (from HBSC study, ČSÚ, National Statistics) indicated that their consumption was stabilized or lowered. Only the consumption of chocolate products rose to 7,5 kg in 2020 compared to 6,8 in 2019 (2). As for sugar-sweetened beverages, according to the Czech Statistical Institute's surveys monitoring the years 2011-2020, these were on a slow decline after 2011 (from 106 liters per person in 2011 to 90,7 in 2020). While the consumption of sugar increased only slightly, to 35,7 kg per person in 2020, the consumption of honey dropped to 0,6 kg (compared to 0,9 kg per person in 2019) (2). Yet, that number may not be exact, since many Czechs buy honey directly from the beehive owners. To compare the consumption of sugar and other sweeteners, BERANOVÁ and NAVRÁTILOVÁ (3) described the preference of Czech youth (15-35 years old) for traditional white sugar and honey in 2018, where only a small percentage (8,2) selected other, alternative, sweeteners. As no significant studies that would be focused on the amounts of sugar, education, sweet products, and reasons for consumption related to the age group 18-29 in the Czech Republic were done, we explored these issues within the project *Healthy Eating: Utopia or a Contemporary Must* (EEA/Norway grants) shared between Reskata z.s. organization and SIFO, OsloMet in Norway.

This study focuses on the patterns of Czech university students regarding sugar and sweet products' consumption during the second wave of the Covid-19 pandemic (winter 2020/2021). We investigated various relationships between sugar, other sweeteners and students' after-consumption feelings, sweetening practices, and education about sugar.

2. Methods

We focused on Czech and Norwegian university students ranging between 18 and 29 years of age. Our methods included a 28-question online survey, qualitative research of the written responses, research of the articles, books and other media regarding the cultural and social aspects influencing the consumption of sweet products in Norway and the Czech Republic. In this article, we will limit the scope to the theme of sugar and sweet products' consumption in the Czech Republic.

2.1 Survey

The online survey had 28 questions on the individual's background and health lifestyle. There were 9 background questions (age, weight, height, university name, education of mother and father, etc.) and 19 health lifestyle questions. Most questions were multiple-choice types of questions.

With reference to any socioeconomic questions regarding the students' income and price of beverages in each country, these were not (apart from the education of the mother and education of the father) included in the questionnaire. The decision was made that if economic questions were introduced, another article would have to be undertaken to address all additional issues raised.

2.2 Sample Selection and Analysis

Due to governmental restrictions related to the Covid-19 pandemic, universities were closed, which meant that we could not distribute the survey in person to the students directly, but only in the online form. The link to the online survey was distributed to students at universities in the Czech Republic via professors. Students responded to the questionnaire that was available online (on the website www.reskata.cz of the educational organization Reskata z.s.) during November-December of 2020. The number of respondents included 579 Czech university students, 498 were women, 81 were men. The first and youngest group (18-21) included 254 students, the second group (22-25) included 261 students, and the third group (26-29) comprised of 64 students. We analyzed the data from the surveys by means of the SPSS statistical program and qualitative research (examining individual written responses and their correlations).

3. Results and Discussion

The survey revealed interesting features that characterized Czech culture and the consumption habits of Czech students. We focused more on sugar and sweet beverages. Our first hypothesis was 1) The amount of sugar put in hot drinks decreased in 2020 in the age group 18-29 - compared to the amounts of sugar consumed in 2019 in the Czech Republic in a similar age group (21-30 years old) and education level (minimum high school education or higher). The second hypothesis was 2) Lower amounts of sugar-sweetened beverages were consumed in the age group of 18-29 years in 2020 than in the age group 11-15 years of age in 2018. The third hypothesis was 3) There exists a significant correlation between the education of the mother and the amount of sugar-sweetened beverages consumed by the respondents.

The first hypothesis regarding the sweetening of hot drinks was confirmed. The amount of sugar that students put in their drinks was significantly lower in 2020 than (what the studies have shown) in previous years. The second hypothesis regarding sweet cold beverages was disproved. For, we found in our selected age group (18-29) that one half of Czech respondents (51 %) selected sugar-sweetened beverages as their favourite drink (sugary sodas and/or energy drinks) and almost half of them drank it every day.

The third hypothesis was disproved. It was surprising but our findings indicated clearly that it was the father and his education - and not the mother - that influenced the drinking of sugar-sweetened beverages by the respondents (18-29 years old) the most.

3.1 Consumption of sugar in hot drinks before and during the Covid-19 pandemic

The Czech Statistical Institute (ČSÚ) indicated in 2020 that Czechs consumed 35,7 kg of sugar a year per person and 0,6 kg of honey (2). There has been a slight increase in the sugar category and a decline in the honey category. It is, of course, hard to measure the consumption with precision. As for honey, which one third of the students of our survey mentioned as a sweetener in their drinks, many Czechs buy it directly from the owners of beehives, which is quite impossible to measure.

Regarding the sweetening of drinks, according to the research done by Dr. Veselá in 2019, 59 % of men and 58 % of women sweetened their drinks regularly. However, when we look at the young generation (21 – 30 years old, with high school education or higher) 67 % of the respondents sweetened their drinks (6). That is a high number. As for the preferred form of sweetener, in all the mentioned studies (6) (3) (9), the favourite type was refined sugar, and after that honey, and other sweeteners such as stevia, xylitol, fruit and date sirup, and others.

Our survey from 2020 (winter, second wave of the Covid-19 pandemic) has indicated that the respondents (university students 18-29) did not put too much sugar into their coffee, hot chocolate, and tea. 70 % of female respondents claimed that they did not sweeten their tea or coffee at all. 17 % used 1 teaspoon only. As for the male respondents, 61 % did not sweeten their drinks at all. And 18 % used 1 teaspoon only.

These findings, when compared to the findings before the Covid-19 pandemic manifest a significant decrease in the degree of sweetening. Only 40 % of young Czechs sweetened their drinks in 2017 (3). And 33 % of young men and women (21-30 years of age) did not sweeten their drinks before the pandemic in the study from 2019 (6). As for the sweeteners used by the respondents of the Reskata z.s. survey, the dominant sweetener was, even in 2020, still the white sugar 34 %, then honey (30 %), brown sugar (16 %) but also other sweeteners such as stevia, fructose sirup, and others (8 % of respondents mentioned using them, compared to 8,2 % respondents from Beranová's survey in 2017).

The reasons for the lower consumption of sugar in hot drinks might be that the respondents drank their drinks at home (universities were closed, many jobs were administered in the home office form) and could choose the number of spoons of sugar. While there are vending machines at the university (and many work places) where one cannot select the amount of sugar especially in hot cocoa, hot chocolate, and hot tea. Further, the students who count their calories intake often use it up on sweets and do not add extra sugar to their drinks because that would bring them "over the limit". With the lack of exercise during the pandemic, more youth could be careful not to gain weight. Plus, it has been shown in previous studies (8) (7) (5) that education of the respondents (and their fathers, as will be indicated in part 3.4) plays a role (the higher the education, the lower is the sugar consumption). These are just suggestions and more research needs to be done. What was clear from our research, compared to the situation in Norway, was that Czech students preferred sugar-sweetened drinks and only 21 percent of them drank artificially sweetened drinks (compared to more than 50 percent of Norwegians who drank artificially sweetened drinks on a regular basis).

3.2 Consumption of sugar-sweetened cold beverages

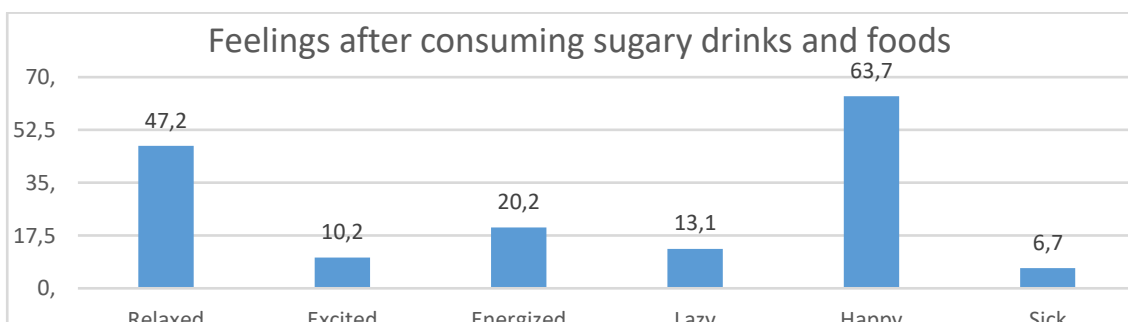
In the HBSC study focused on adolescents (11-15 years old), 14 percent drank soft drinks, plus 3,3 percent drank energy drinks every day). The prediction done by the HBSC study was that when adolescents get older they will consume sugar-sweetened drinks less. However, our study from 2020 has shown that one half of Czech respondents (51 %) selected SSBs as their favourite drink (sugary sodas and/or energy drinks). From the 51 % of SSB drinkers, 45 % of them consume their favorite soft drinks every day (at least one glass a day). That constitutes 20 % of all of our respondents who consume soft drinks every day. When we use the term SSBs in this report, we refer to sugary soda and energy drinks. By ABSs, we designate "light" soda such as Coke Zero, and other cold soft drinks with artificial sweeteners. Plus, Czechs, being a traditionally beer drinking nation, consume flavored beer a lot (almost 30 % of Czechs drink it). Ice-tea drinkers, in our survey, constituted 34 % in the Czech Republic. As for the non-drinkers of sweet beverages, 13 % of Czech students did not drink sweet drinks at all.

3.3 How do students feel after consumption of sweet products

As no significant studies on the consumption of sweet substances related to the age group 18-29 in the Czech Republic explored psycho-social feelings after eating and drinking of sugar and sweet products, questions on this topic were included in our survey.

Figure 1 below reports students' feelings after consuming sugary drinks and foods. The most common feeling in both countries is contentment/happiness, followed by feeling relaxed. Concretely, 366 Czech students (63,7 % of all the Czech respondents) selected the category contentment/happiness when asked about how they felt after consuming sweet products. Out of those, 49 % of Czechs mentioned that they drank sugary soda (SSBs) (among other drinks), 35 % drank non-alcoholic beer, and 21 % drank "light" soda (ASBs). This again reinforces the association between consuming these products and positive emotional states.

Figure 1. Feelings after consuming sugary drink and sweets, in percentages



We also asked whether there was an association between the reasons for consuming SSBs and sweets, and the feelings they have afterwards. That was done via Pearson coefficients in SPSS.

Table 1. Bivariate correlations between reasons for eating and drinking sweet products, and how students feel after consumption. ** indicates significance at the .01 level, and * indicates significance at the .05 level (these are also in bold for easy identification).

	Czech Republic					
	Relaxed	Excited	Energized	Lazy	Happy	Sick
Drink: stress	0.065	0.058	.143**	.095*	0.071	0.076
Drink: thirst	0.067	0.011	.143**	-0.046	0.079	0.026
Drink: depression	0.057	.118**	.109**	.116**	0.069	.132**
Drink: lack of energy	0.019	.099*	.282**	0.009	0.048	-0.014
Drink: celebration	0.079	-0.005	0.006	.134**	.174**	-0.029
Drink: reward	.098*	0.044	.101*	.129**	.140**	-0.005
Drink: craving after meal	.124**	0.067	0.052	0.011	0.071	-0.033
Sweets: stress	.241**	.115**	0.079	.166**	.156**	0.071
Sweets: hunger	.132**	.181**	.126**	.082*	.095*	.152**
Sweets: depression	.159**	.135**	0.061	.148**	.093*	.121**
Sweets: lack of energy	0.070	.112**	.260**	0.036	.109**	0.032
Sweets: celebration	.152**	.090*	0.022	.152**	.215**	.114**
Sweets: reward	.202**	.101*	0.071	.189**	.228**	0.065
Sweets: craving after meal	.114**	0.007	-0.070	.087*	.222**	-0.055

There is a strong association between experiencing stress before consuming sweets, as was mentioned above, and then feeling relaxed afterwards. There is a relatively weak association between the reasons for consuming SSBs and how students feel afterwards. The main exception is with lack of energy and feeling or being energized afterwards. Overall, it seems that in the Czech Republic there is a stronger link between why students consume sweets and the feelings they have afterwards, as opposed to SSBs.

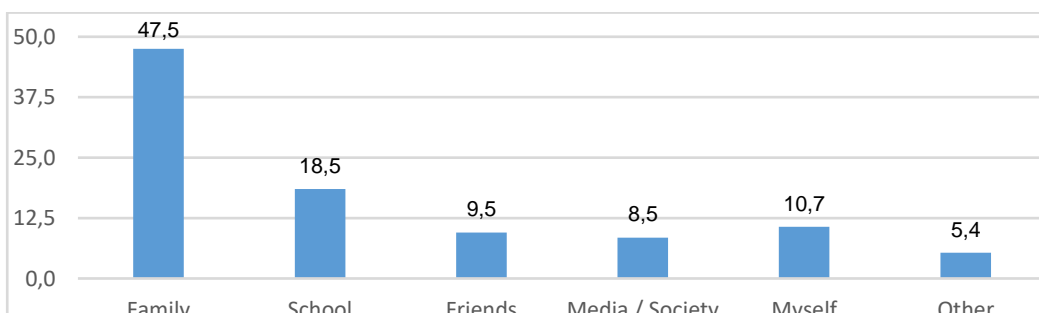
3.4 Education matters

In our study, we have also focused on finding the relationship between factors, such as: education of mother and father, school, friends, media or self-education, and the level of their importance in shaping the emotions and knowledge related to the consumption of sugar, sweets and SSBs among Czech students. Interestingly, several studies prioritize maternal education as being particularly important for shaping dietary behaviors of children pointing to the greater involvement of the mother, rather than the father in early exposure to food choices and eating habits (7). The predicted frequency in the consumption of SSBs by standard predictors unveiled another surprising analogy regarding Czech students.

Students with college-educated fathers are much less likely to drink SSBs by a large $-.312$ drop on the 7-point scale (compared to students without college-educated fathers). Similarly, students who exercise more often also drink SSBs less frequently. The mother's education does not seem to have a direct association with the elevated frequency of SSBs.

We conducted an analysis with predicted frequency of consuming SSBs (Drinks scale) by standard predictors. These findings regarding the education of the father - i.e. that in the households of college-educated fathers, the purchasing (and therefore also consumption) of sugar-sweetened beverages was lower than in those where the father had a lower degree of education - the were surprising for us. However, many other studies confirmed that the level of education of the parents (and also of the respondents) influenced the amount of sugar and sugar-sweetened beverages consumed by youth and young adults. One can see it, for instance, Dr. Veselá and Doc. Severov's article Sweet Life - Lifestyle of Generation Z? (8), or the Zdravá generace website (5) based on the HBSC survey, and in other international surveys.

Figure 2. Influences in the Consumption of Sugar in the Czech Republic.



a. N=579

In further analysis of the social institutions and other factors which affect the consumption of sweets and SSBs, family emerges as the most significant influencer in providing guidance and co-creating the affective responses to the consumption of SSBs among the students. Schools emerge as the second most important factor. This may indicate that the school education system in the Czech Republic does not provide enough guidance on healthy diet and education targeting the consumption of SSBs. We also conducted a correlation analysis of two variables: how much sugar should be consumed to stay healthy and who or what, independently, played the most important role in providing this knowledge. There is a clear indication that while family and schools are recognized by respondents as playing the most important role in their eating habits of both sweets and SSBs, they failed in their teaching of youth the fundamental understanding of how much sugar might healthily be consumed on a daily basis. In this respect, the self-interest and media have been the most influential.

4. Conclusion

In conclusion, our SPSS analyses and research into this topic found that there are a variety of different factors that impact the amount of sugar and sugar-sweetened beverages that students consume. As for the types of soft drinks they prefer, students in the Czech Republic drink SSBs, ice tea and non-alcoholic flavored beer the most. What was surprising for us was that even Czech beer culture was “affected” by sweetening. There are many varieties of sugar-sweetened non-alcoholic flavored beer and their sales have been on the rise since 2012. Another surprising factor was the low level of sweetening of hot drinks that our survey revealed. Students sweetened their beverages much less during the pandemic than before (by 30 percent less). Men sweetened their drinks more than women.

Looking at the feelings and education during the “sweet” consumption young Czechs, our findings - in the whole project - were somewhat unexpected in the sense that were not completely in sync with the predictions of the HBSC and neither did they resonate with the statistics regarding the consumption of sugar and honey in the Czech Republic. These age groups (18-21, 22-25, 26-29) exhibited special traits and patterns of behavior that were connected with the feelings of contentment, happiness, relaxation, lack of energy, events such as celebrations, and other psycho-social phenomena connected with the consumption of sugar and sweet products.

Our hypothesis that the consumption of sugar-sweetened drinks would be lower than in previous studies was not confirmed. As no research of this kind had been done so far, we could only compare the consumption of SSBs to the HBSC study done with adolescents in 2018. The prediction was that the number of drinkers of SSBs would decrease (in the future years). However, our survey from 2020 showed that 20 % of Czech students (18-29 years old) drank soft drinks (including energy drinks) every day (at least one glass a day). As Czech students are a different age group, further research in this group needs to be done.

All things considered, consumption of sugar and sweet beverages seems to be associated with positive social and psychological states, and that there are strong associations between the reasons for

consuming these products, the feelings students have afterwards, and the education level in the family.

Abstract

This study focuses on the patterns of Czech university students regarding sugar and sweet products' consumption during the second wave of the Covid-19 pandemic (winter 2020/2021). We investigated various relationships between sugar, other sweeteners and students' after-consumption feelings, sweetening practices, and education about sugar. The research sample constituted 579 students (aged 18-29) from Czech universities across the country. Our findings have manifested that the consumption of sugar in hot drinks decreased during the pandemic by 30 percent compared to the studies and results from 2019. As for sugar-sweetened drinks and flavored beer, their consumption was higher - in this age group - than in the younger generation (11-15 years). Students' amount of soft beverages drinking was influenced by the education of the father primarily, and other factors. Further, the connection of consumption of sweet products and positive social and psychological states has been driving the consumption of most of the young respondents that were addressed by the survey.

Acknowledgements

Financial support: The project Healthy Eating: Utopia or a Contemporary Must (EHP-BFNU-OVNKM-3-059-2020) was financed by the EEA/Norway grants 2014-2021.

Website with information about our research: www.reskata.cz

Keywords: Consumption of Sugar, Sweet Products, Education, Sweetening, Food Cultural Codes, SSBs, ASBs.

References

1. WHO: *Guideline: Sugars intake for adults and children*. Geneva: World Health Organization, 2015, [online] <https://www.who.int/publications/i/item/9789241549028>
2. *Spotřeba potravin a nealkoholických nápojů (na obyvatele za rok) 2019*. Praha: ČSÚ, 2020, [online] <https://www.czso.cz/csu/czso/spotreba-potravin>, accessed on November 1, 2021.
3. BERANOVÁ, M.; NAVRÁTILOVÁ, M.: Assessment of consumer preferences in sweetening and sugar consumption among young Population in Czech Republic. *LČaŘ*, 134, 2018 (5-6), p. 202-205.
4. HBSC (2020). Health behaviour in school-aged children. World Health Organization collaborative cross-national study. Glasgow: University of Glasgow, [online] www.hbsc.org. Accessed on October 30, 2021.
5. KALMAN, M.: Školáci pijí méně limonád. Ale objevili energetické nápoje. Olomouc: HBSC, 2020, [online] <https://zdravagenerace.cz/reporty/energeticke-napoje/>, accessed on October 30, 2021.
6. VESELÁ, K.: Demand for sugar by at least high-school-educated population in Czech Republic. *LČaŘ*, 134, 2020 (11), p. 387-389.

7. KAREL, T. et al: Regulate or educate? Parental perception of food advertising targeting children, its regulation and food industry self-regulation in the Czech Republic. *European Food and Feed Law Review*, 2016 (11), no. 2, p. 94-106.

8. VESELÁ, K.; SEVEROVÁ, L. Sweet Life - Lifestyle of Generation Z? *LCaŘ*, 137, 2021 (9-10), p. 326-331.

9. Healthy Eating: Utopia or a Contemporary Must - research, 2020-2021, [online]
<http://reskata.cz/438-2/>.

Contact address: bmadero@ncsu.edu, Department of East and Central European Studies (ECES), Faculty of Arts, Charles University, Nam. Jana Palacha 2 (office 128), Prague 1, 116 38, and Department of Humanities, NC State University in Prague, Male namesti 1, Prague 1, 110 00.