The Association Between Sugar Consumption and Mental Well-Being and Perceived Energy
Foreword

Submitted in partial fulfillment of the requirements of the BSc Psychology degree, Reykjavík University, this thesis is presented in the style of an article for submission to a peer-reviewed journal.
Abstract

Sugar consumption has a correlation with obesity, numerous physiological and psychological illnesses, and has been found to be potentially addictive. It has also been found that sugar consumption can change the brain neurochemistry, especially when consumed in excessive quantities. Sugar consumption has been linked to a variety of psychological issues, such as stress, major depression, psychological distress, and suicidal ideation. Nevertheless, research on the association between sugar consumption and mental well-being are immensely scarce. Furthermore, no studies were found concerning sugar consumption and perceived energy. The current study assessed the association between sugar consumption and mental well-being as well as perceived energy. Participants were 300, thereof 239 females and 60 males. Participants answered a questionnaire about their dietary habits and well-being. Correlation was found between sugar consumption and stress and perceived energy. Evaluation of physical shape, stress symptoms, and perceived energy were found to predict sugar consumption. However, sugar consumption did not predict mental-well being or perceived energy. The results of the study, strengths and weaknesses are discussed, as well as future research.

Útdráttur

The Association Between Sugar Consumption and Physical and Mental Well-Being

We live in a world where being overweight and obese is a greater cause of death than being underweight (World Health Organization, 2016). In 2014, 39% of the world’s adult population were overweight, and 13% were obese. Obesity has been positively associated with greater intake of sugar and sugar sweetened beverages (Grimes, Riddell, Campbell, & Nowson, 2013; Ludwig, Peterson, & Gortmaker, 2001; V. S. Malik, Schulze, & Hu, 2006). The general public consumes an excessive amount of sugar, contributing to 13% of total food energy intake, but according to the World Health Organization (2015), should account for less than 10% (Bates et al., 2014). Research has shown that decreased food group intakes and nutrient intake is correlated with increased added sugar consumption (Kranz, Smiciklas-Wright, Siega-Riz, & Mitchell, 2005), which can then lead to an increased calorie intake in attempt to satisfy the body’s nutrient necessities.

Research has found that high consumption of sugar sweetened beverages is associated with higher blood-pressure which can then lead to hypertension (Brownell et al., 2009; A. H. Malik, Akram, Shetty, Malik, & Njike, 2014; Sayon-Orea et al., 2015). Sugar consumption also has a correlation with increased risk of coronary heart disease (Brownell et al., 2009; Huang, Huang, Tian, Yang, & Gu, 2014) and cancer (Bristol, Emmett, Heaton, & Williamson, 1985; Colli & Colli, 2006; Slattery et al., 1997).

A number of studies have found evidence that sugar can be potentially addictive, and even change brain neurochemistry, especially when consumed in excessive quantities (Avena, Long, & Hoebel, 2005; Avena, Rada, & Hoebel, 2008; Colantuoni et al., 2002; Fortuna, 2010; Lenoir, Serre, Cantin, & Ahmed, 2007; Nantha, 2014; Spangler et al., 2004). Avena and colleagues (2005, 2008) experimented on rats, using operant conditioning, and found that under certain circumstances, where the rats had access to sugar for the majority of the day, the rats
became dependent on the substance. Another study found that rats preferred intense sweetness over cocaine reward, even though the rats were addicted or sensitized to cocaine (Lenoir et al., 2007). This may be because foods high in sugar affect the serotonergic, dopamine, and opioid receptors in the brain, changing the neurochemistry of the brain in similar ways as seen in the consumption of addictive drugs (Colantuoni et al., 2002; Fortuna, 2010). Disproportionate and recurrent exposure to food dense in energy, such as sugar, causes equivalent effects as demonstrated in drug abuse, such as craving, bingeing, and withdrawal (Avena et al., 2005; Colantuoni et al., 2002). It has also been found that the number of dopamine receptors in the brain is increased by recurrent bingeing of sugar, as sugar bingeing causes intermittent and excessive dopamine to be released in the brain, as well as opioid stimulation (Hoebel, Avena, Bocarsly, & Rada, 2009; Spangler et al., 2004). Although this is unproven in humans, it may be converted to humans and serve as a preliminary point to reduce excess sugar consumption (Avena et al., 2005, 2008; Lenoir et al., 2007).

Sugar consumption not only has an effect on the human body, but also seems to have an effect on mental health (Lien, Lien, Heyerdahl, Thoresen, & Bjertness, 2006; Shi, Taylor, Wittert, Goldney, & Gill, 2010; Westover & Marangell, 2002). In addition to the physiological effects, sugar consumption has been linked to a variety of psychological issues, such as stress, major depression, psychological distress, and suicidal ideation (Lien et al., 2006; Shi et al., 2010; Westover & Marangell, 2002). Such psychological issues may become severe health conditions, negatively affecting peoples’ lives and causing them tremendous suffering (World Health Organization, 2017a). Depression is a common mental illness which affects over 300 million people in the world. The most serious consequence of depression is suicide. A common comorbid disorder of depression is anxiety, which affects 250 million people worldwide (World Health Organization, 2017b). Anxiety disorders vary greatly, but like depression and other psychological issues, they may have a serious impact on an individual’s life, and cause
them colossal suffering. Regardless of available research findings and the seriousness of mental
disorders, data on the subject of the correlation between sugar consumption and mental health
are immensely scarce (Shi et al., 2010).

Seeing as how consumption of foods high in sugar can affect the dopamine, opioid and
serotonergic receptors in the brain, it has been argued that sugar consumption may have a direct
influence on mental health and mood disorders, such as depression, with serotonin and
dopamine being central elements of the disorders (Colantuoni et al., 2002; Fortuna, 2010;
Holford, 2003; Klempan et al., 2007; Meyers, 2000).

Most studies that have been conducted on the subject of sugar consumption and its various
complications have used preexisting data regarding sugar consumption and depression or use
biological and behavioral measures when measuring obesity or addiction (Colli & Colli, 2006;
Grimes et al., 2013; Lenoir et al., 2007; Shi et al., 2010; Westover & Marangell, 2002), but few
or no studies have asked participants about their own perceived experience regarding sugar
intake and well-being. Furthermore, no studies were found concerning sugar consumption and
perceived energy during the day. It has been demonstrated that cognition has tremendous
influence on emotion (Ochsner & Gross, 2005; Storbeck & Clore, 2007), and as every
individual perceives themselves and their actions in different ways, it is important to research
how sugar intake can affect people’s mental well-being as well as their perceived energy.

This study was conducted in order to examine the correlation between sugar consumption
and mental well-being, as well as peoples’ perceived energy. It was hypothesized that: 1) 
Participants that consume a lot of sugar would show more symptoms of depression, than
participants who consume less or no sugar; 2) Participants that consume a lot of sugar would
show more symptoms of anxiety, than participants who consume less or no sugar; 3) 
Participants that consume a lot of sugar would show more symptoms of stress, than participants
who consume less or no sugar; 4) Participants that consume a lot of sugar would perceive themselves to have less energy than participants who consume less or no sugar.

**Method**

**Participants**

This study was conducted on a convenience sample of 300 participants. Participation was voluntary and thus, participants took part in the study at their own interest. Participant’s age varied greatly, as answer possibilities in the questionnaire used, regarding age, ranged from 16 years to older than 66 years. Gender distribution was quite uneven, with 238 females and 61 males, leaving females in the greater majority. One participant did not give an account of his or her gender. Before participating in the study, participants were informed about their role in the study, potential harm or benefit from participation, and that they could discontinue participation at any time without consequences or skip individual questions if they did not want to answer them. They were also informed that by participating in the study they agreed to the terms and conditions of the study. The study was conducted in Icelandic, and so only Icelandic-speaking individuals could participate. None of the participants received any payment for their participation.

**Instruments and measures**

This study was conducted by an online questionnaire, created on Surveymonkey.com (Appendix A), which was then shared on the social media network Facebook. The questionnaire was made up of 23 questions. Therof were 5 demographic questions (gender, age, education, marital status, and residence) and 17 questions that the researcher prepared to assess the participants’ dietary and exercise habits, as well as their own evaluation of their lifestyle, diet, and body image, and perceived energy. The validity and
reliability of the questions created by the researcher, has not been tested, as many of them are being used for the first time.

There were five dependent variables in the study: depressive symptoms, anxiety symptoms, stress symptoms, perceived energy, and sugar consumption, and 13 independent variables. The independent variables regarded demographic information (i.e. gender, age, education), dietary and exercise habits, and evaluation of one’s own lifestyle, diet, and body image, as well as symptoms of depression, anxiety and stress, and perceived energy.

**DASS21 (Depression Anxiety Stress Scale)**

The last question in the questionnaire was made up of the shorter Icelandic version of the Depression Anxiety Stress Scale (DASS21). The DASS21 is made up of 21 questions, of which seven assess symptoms of depression, seven assess symptoms of anxiety, and seven assess symptoms of stress (Appendix B). Participants’ mental well-being was defined as their total score on each of the DASS21 subscales. The DASS21 has acceptable validity and reliability (Björgvin Ingimarsson, 2010). The correlation of the subscales was moderate to strong, or between .57 and .66 (depression-anxiety r = .57, depression-stress r = .66, and anxiety-stress r = .66). The reliability of the subscales was between α = 0.73 and α = 0.85, and thus, the reliability was acceptable. The DASS has a decisive convergent and distinctive validity between the anxiety and the depression subscales, and the stress subscale had a correlation with the Penn State Worry Questionnaire (PSWQ).

**Depression**

Seven questions in the DASS21 assess symptoms of depression. Each question has four answer options; did not apply to me at all; applied to me to some degree, or some of the time; applied to me to a considerable degree, or a good part of time; applied to me very much, or most of the time. Each question is then scored according to the chosen answer possibility,
which get the values 0 = “did not apply to me at all”, 1 = “applied to me to some degree”, 2 = “applied to me to a considerable degree”, and 3 = “applied to me very much”. The scores for each question are added up to a number ranging from zero – 21, depending on the answers chosen by the participant. Because the DASS21 is a short version of the DASS, which contains 42 questions, that number is multiplied by two, so that scores can be interpreted according to the DASS severity ratings. In accordance with Björgvin Ingimarsson (2010), the Icelandic severity ratings of the DASS are as follows; normal depression score ranges from zero to eight, mild depression score from 9-12, moderate depression score from 13-20, severe depression score from 21-16, and extremely severe depression score from 27-42. Participants’ total score on the depression subscale was used as measure of participants’ depressive symptoms.

**Anxiety**

Seven questions in the DASS21 assess symptoms of anxiety. Each question has four answer options; did not apply to me at all; applied to me to some degree, or some of the time; applied to me to a considerable degree, or a good part of time; applied to me very much, or most of the time. Each question is then scored according to the chosen answer possibility, which get the values 0 = “did not apply to me at all”, 1 = “applied to me to some degree”, 2 = “applied to me to a considerable degree”, and 3 = “applied to me very much”. The scores for each question are added up to a number ranging from zero – 21, depending on the answers chosen by the participant. Because the DASS21 is a short version of the DASS, which contains 42 questions, that number is multiplied by two, so that scores can be interpreted according to the DASS severity ratings. In accordance with Björgvin Ingimarsson (2010), the Icelandic severity ratings of the DASS are as follows; normal anxiety score ranges from zero to six, mild anxiety score from 7-8, moderate anxiety score from 9-14, severe anxiety score from 15-20, and extremely severe anxiety score from 21-42. Participants’ total score on the anxiety subscale was used as measure of participants’ anxiety symptoms.
**Stress**

Seven questions in the DASS21 assess symptoms of stress. Each question has four answer options; did not apply to me at all; applied to me to some degree, or some of the time; applied to me to a considerable degree, or a good part of time; applied to me very much, or most of the time. Each question is then scored according to the chosen answer possibility, which get the values 0 = “did not apply to me at all”, 1 = “applied to me to some degree”, 2 = “applied to me to a considerable degree”, and 3 = “applied to me very much”. The scores for each question are added up to a number ranging from zero – 21, depending on the answers chosen by the participant. Because the DASS21 is a short version of the DASS, which contains 42 questions, that number is multiplied by two, so that scores can be interpreted according to the DASS severity ratings. In accordance with Björgvin Ingimarsson (2010), the Icelandic severity ratings of the DASS are as follows; normal stress score ranges from zero to 12, mild stress score from 13-16, moderate stress score from 17-22, severe stress score from 23 – 28, and extremely sever stress score from 29-42. Participants’ total score on the stress subscale was used as measure of participants’ stress symptoms.

**Perceived energy**

An energy scale was created by the researcher to assess perceived energy. The energy scale was computed into one variable from five questions in the questionnaire, which asked about participants’ perceived energy. The energy scale took values from zero to 18, where zero represented least perceived energy and 18 represented most perceived energy. The total score on the energy scale was then used to measure participants’ perceived energy.

**Sugar consumption**

In the questionnaire participants were asked six times about their frequency and amount of sugar consumption. Answer possibilities for questions regarding frequency of sugar
consumption ranged from “once a week or less” to “more than once a day”, where the former was coded as 1 and the latter as 5. Answer possibilities for the question which regarded the amount of sugar sweetened soda consumed ranged from “I do not drink soda” to “more than six liters”, where the former was coded as 0 and the latter as 7. Answer possibilities for the question which regarded the amount of sweets consumed ranged from “I do not eat sweets” to “more than 500grs”, where the former was coded as 0 and the latter as 6. The before mentioned questions were computed into one variable to represent overall sugar consumption. The overall sugar consumption variable had values from three to 22, where a higher value represented more amount and higher frequency of sugar consumption. Overall sugar consumption was then recoded into a different variable where participants were split into three groups based on how much sugar they consumed on average, and how often. Values three to nine were recoded into the low sugar group, which represented participants that consumed the least amount of sugar and in the lowest frequency. Values 10-16 were recoded into the moderate sugar group, which represented participants with moderate sugar consumption, and values 17-22 were recoded into the high sugar group, which represented participants who consumed the most amount of sugar and in the highest frequency.

Procedure

Participants were requested to answer a questionnaire online at Surveymonkey.com, which was distributed on the social media network Facebook. The questionnaire was available online from 31. March 2017 to 4. April 2017, and participants could take part anonymously at any time within the available time range. In their own time, each participant accessed and filled out the questionnaire. Participation took about 10 minutes and if the participant had any questions regarding participation or the questionnaire, they were informed of the researcher’s email and phone number and that they could contact her at any time. The researcher could then
access the participants’ answers online at Surveymonkey.com and enter the data into the statistics program IBM SPSS 20.

Design and data analysis

This study was a cross-sectional study, conducted to assess whether sugar consumption was correlated with mental and physical well-being. T-tests were used to identify if there were any differences between various groups in the sample, and one-way ANOVA and comparison of group means were used to examine differences better. A hierarchical multiple regression was used to test whether sugar consumption predicted well-being, and whether well-being predicted sugar consumption. A criterion of $\alpha = .05$ was used in significance tests.

Results

Descriptive Statistics

The purpose of this study was to examine whether there was a difference in well-being and perceived energy between those who consume a lot of sugar and those who consume less or no sugar. Participants in the study were of all ages, but the gender distribution was quite uneven.

Table 1 shows the gender and age distribution of participants. It shows the number of participants belonging to each age group and gender, the percentage each group represents of the total sample and the cumulative percent of the groups.
Table 1.
*Gender and age distribution of participants*

<table>
<thead>
<tr>
<th>Categorical variables</th>
<th>N</th>
<th>Percentage %</th>
<th>Cumulative Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-35 years</td>
<td>127</td>
<td>42.3</td>
<td>42.3</td>
</tr>
<tr>
<td>36-50 years</td>
<td>134</td>
<td>38</td>
<td>8.3</td>
</tr>
<tr>
<td>51-66 years and older</td>
<td>59</td>
<td>19.7</td>
<td>100</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>61</td>
<td>20.3</td>
<td>20.3</td>
</tr>
<tr>
<td>Female</td>
<td>238</td>
<td>79.1</td>
<td>99.7</td>
</tr>
</tbody>
</table>

The research questions were assessed with a questionnaire prepared by the researcher, along with symptoms of depression, anxiety, and stress, where the lowest obtainable score was zero and the highest obtainable score was 42. A higher score represents more severe depression, anxiety or stress. Perceived energy of participants was also measured using an energy scale prepared by the researcher, which was constructed by computing five variables into one variable. The lowest obtainable score was zero and the highest obtainable score was 18, where a higher score represents greater perceived energy. Sugar consumption was also measured using a variable which was computed from six variables, to assess total sugar consumption. The lowest obtainable score was three and the 22, where a higher score represented greater consumption of sugar.

Table 2 shows descriptive statistics for the dependent variables of the study. It shows the number of participants which answered each question, the minimum and maximum obtained scores on each variable, as well as mean scores and standard deviations.
Table 2

Minimum and maximum scores, means, and standard deviations for dependent variables

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>270</td>
<td>0.00</td>
<td>42.00</td>
<td>4.97</td>
<td>7.21</td>
</tr>
<tr>
<td>Anxiety</td>
<td>270</td>
<td>0.00</td>
<td>38.00</td>
<td>3.42</td>
<td>5.99</td>
</tr>
<tr>
<td>Stress</td>
<td>270</td>
<td>0.00</td>
<td>42.00</td>
<td>7.36</td>
<td>7.70</td>
</tr>
<tr>
<td>Energy</td>
<td>262</td>
<td>0.00</td>
<td>18.00</td>
<td>10.31</td>
<td>4.09</td>
</tr>
<tr>
<td>Sugar</td>
<td>282</td>
<td>3.00</td>
<td>22.00</td>
<td>9.12</td>
<td>3.97</td>
</tr>
</tbody>
</table>

Of the 300 participants that took part in the study, 270 completed the DASS21 questionnaire, 262 completed the questions that asked about their perceived energy, and 282 completed the questions regarding sugar consumption. There was no difference between men and women on any of the dependent variables, but there was a difference in the consumption of various sugary products (Table 3). Women reported eating significantly more sweets than men, $t(285) = -2.25, p = .025$, and more often, $t(286) = -2.36, p = .019$, but men reported eating fast food more often than women, $t(282) = -2.74, p = .008$, as well as drinking more sugar sweetened soda, $t(287) = 2.32, p = .023$. However, women reported drinking sugar sweetened soda more often than men, $t(281) = 2.15, p = .034$. Men reported eating sweet pastry more often than women, although the difference was not significant, $t(283) = 0.92, p = .385$. 
Table 3

Means and standard deviations of difference in dietary habits between males and females

<table>
<thead>
<tr>
<th>Food consumed</th>
<th>Males</th>
<th></th>
<th></th>
<th>Females</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Amount of sweets</td>
<td>1.81</td>
<td>2.27</td>
<td>2.27</td>
<td>1.44</td>
<td></td>
</tr>
<tr>
<td>Frequency of sweets</td>
<td>1.74</td>
<td>2.09</td>
<td>2.09</td>
<td>1.02</td>
<td></td>
</tr>
<tr>
<td>Frequency of fast food</td>
<td>1.44</td>
<td>1.19</td>
<td>1.19</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td>Amount of soda</td>
<td>1.66</td>
<td>1.65</td>
<td>1.11</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>Frequency of soda</td>
<td>1.16</td>
<td>1.28</td>
<td>1.28</td>
<td>.79</td>
<td></td>
</tr>
<tr>
<td>Frequency of sweet pastry</td>
<td>1.07</td>
<td>.88</td>
<td>.97</td>
<td>.60</td>
<td></td>
</tr>
</tbody>
</table>

In general, women reported eating a little over 200gr of sweets per week and consuming the sweets approximately a little over twice a week, compared to men who reported eating approximately 150gr of sweets per week on average, and eating sweets a little less than twice a week. Men reported eating fast food approximately 1.5 days a week on average, compared to women who reported 1.2 days per week. Men also reported drinking approximately 1.5 liters of sugar sweetened soda on average, compared to women who reported approximately 1 liter. Women, however, reported drinking sugar sweetened soda about 1.3 times a week, compared to men who reported approximately once a week on average. Men reported eating sweet pastry approximately once a week, compared to women who reported less than once a week on average.

To determine whether there was a difference in mental well-being and perceived energy between participants who consume a lot of sugar and participants who consume less or no sugar, participants were split into three groups based on how much sugar they consumed on average. One-way ANOVA was used to examine if there was a difference between the groups and means were compared to establish which group reported most
symptoms of depression, anxiety, and stress, and which group reported greatest perceived energy (Table 4).

Table 4

*Differences in mental well-being and perceived energy based on sugar consumption*

<table>
<thead>
<tr>
<th>Groups</th>
<th>Depression</th>
<th>Anxiety</th>
<th>Stress</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Low sugar</td>
<td>4.70</td>
<td>6.91</td>
<td>3.12</td>
<td>5.61</td>
</tr>
<tr>
<td>Moderate sugar</td>
<td>5.30</td>
<td>7.83</td>
<td>3.87</td>
<td>6.78</td>
</tr>
<tr>
<td>High sugar</td>
<td>7.25</td>
<td>8.32</td>
<td>4.75</td>
<td>6.23</td>
</tr>
</tbody>
</table>

Participants in the low sugar group reported eating the least amount of sugar as well as least frequently, as compared to participants in the high sugar group who reported eating the most amount of sugar and most frequently. There was a difference between groups regarding perceived energy, $F(2,255) = 6.90, p = .001$, but no difference was found between the groups in depression, $F(2,255) = 0.88, p = .417$, anxiety, $F(2,255) = 0.60, p = .548$, or stress, $F(2,255) = 1.86, p = .158$. Although the low sugar group appeared to experience greater perceived energy, as well as least symptoms of depression, anxiety, and stress, and the high sugar group appeared to experience the least perceived energy, as well as most symptoms of depression, anxiety, and stress, the difference between the groups was insignificant.

A hierarchical multiple regression was conducted to predict mental well-being and perceived energy based on participants’ diet and exercise habits, and demography.
Predictors of symptoms of depression, anxiety, and stress, and perceived energy

Depressive symptoms

Significant predictors for depressive symptoms were educational status, marital status, and participants’ evaluation of their lifestyle, as shown in Table 5.

Table 5
Variables in hierarchical regression model for depressive symptoms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-1.29</td>
<td>-0.88</td>
<td>-0.90</td>
</tr>
<tr>
<td>Age</td>
<td>-0.21</td>
<td>-0.18</td>
<td>-0.20</td>
</tr>
<tr>
<td>Education</td>
<td>-0.61*</td>
<td>-0.65*</td>
<td>-0.64*</td>
</tr>
<tr>
<td>Marital status</td>
<td>-2.87**</td>
<td>-2.58**</td>
<td>-2.50**</td>
</tr>
<tr>
<td>Frequency of exercise</td>
<td>0.52</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>Evaluation of healthy lifestyle</td>
<td>-3.66**</td>
<td>-3.87**</td>
<td></td>
</tr>
<tr>
<td>Sugar consumed</td>
<td></td>
<td>-0.10</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05*, *p < .01**

A very weak negative correlation was found between educational status and depressive symptoms, where participants with higher educational status reported less depressive symptoms than participants with lower educational status ($\beta = -0.614, p = .043$). A very weak negative correlation was also found between depressive symptoms and marital status, where participants that were in a romantic relationship reported less depressive symptoms ($\beta = -2.872, p = .005$). Evaluation of lifestyle had a weak negative correlation with depressive symptoms, where participants who evaluated their lifestyle as healthy reported less depressive symptoms than participants that evaluated their lifestyle to be less healthy ($\beta = -3.663, p < .001$). Sugar consumption had a very weak positive correlation with depressive symptoms, although it was not significant ($\beta = -0.099, p = .393$).
Participants’ background information significantly predicted depressive symptoms, explaining 6.7% of variance in depressive symptoms, $R^2 = .067$, $F(4,256) = 4.62$, $p = .001$.

How often participants exercised and how healthy they evaluated their lifestyle to be, also significantly predicted depressive symptoms, $R^2 = .200$, $F(6,254) = 10.58$, $p < .001$, explaining a total of 20% of variance in depressive symptoms when combined with participants’ background information. All models combined, including how much and how often participants consumed sugar explained a total of 20.2% of variance in depressive symptoms, $R^2 = .202$, $F(7,253) = 9.16$, $p < .001$, where sugar consumption itself was not significant, $p = .393$.

**Anxiety symptoms**

Variables that significantly predicted anxiety symptoms were educational status and evaluation of a healthy lifestyle, as shown in Table 6.

Table 6

*Variables in hierarchical regression model for anxiety symptoms*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-0.37</td>
<td>-0.072</td>
<td>-0.09</td>
</tr>
<tr>
<td>Age</td>
<td>-0.23</td>
<td>-0.24</td>
<td>-0.25</td>
</tr>
<tr>
<td>Education</td>
<td>-0.59*</td>
<td>-0.61*</td>
<td>-0.61*</td>
</tr>
<tr>
<td>Marital status</td>
<td>-1.15</td>
<td>-0.95</td>
<td>-0.85</td>
</tr>
<tr>
<td>Frequency of exercise</td>
<td>0.21</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>Evaluation of healthy lifestyle</td>
<td>-2.36**</td>
<td>-2.56**</td>
<td></td>
</tr>
<tr>
<td>Sugar consumed</td>
<td></td>
<td></td>
<td>-0.09</td>
</tr>
</tbody>
</table>

$p < .05$, $p < .01**$

A very weak negative correlation was found between educational status and anxiety symptoms, where participants with higher educational status reported less anxiety symptoms.
than participants with lower educational status ($\beta = -0.59, p = .019$). A weak negative correlation was also found between evaluation of lifestyle and anxiety symptoms, where participants that evaluated their lifestyle to be healthier compared to other participants ($\beta = -2.36, p < .001$). Consumed sugar, however, had a very weak positive correlation with anxiety symptoms, although it did not significantly predict anxiety symptoms ($\beta = -0.092, p = .356$).

Participants’ background information significantly predicted anxiety symptoms, $R^2 = .048, F(4,256) = 3.26, p = .012$, explaining 4.8% of the variance in anxiety symptoms. How often participants exercised and how healthy they evaluated their lifestyle to be also significantly predicted anxiety symptoms, $R^2 = .137, F(6,254) = 6.70, p < .001$, explaining a total of 13.7% of variance in anxiety symptoms when combined with participants’ background information. All models combined including how much and how often participants consumed sugar also significantly predicted anxiety symptoms, $R^2 = .140, F(7,253) = 5.86, p < .001$, explaining a total of 14% of the variance in anxiety symptoms, although sugar consumption itself was not significant, $p = .356$.

**Stress symptoms**

Significant predictors for stress symptoms were age and evaluation of a healthy lifestyle, as shown in Table 7.
Table 7

*Variables in hierarchical regression model for stress symptoms*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.58</td>
<td>0.96</td>
<td>0.99</td>
</tr>
<tr>
<td>Age</td>
<td>-0.41*</td>
<td>-0.38*</td>
<td>-0.38*</td>
</tr>
<tr>
<td>Education</td>
<td>-0.23</td>
<td>-0.27</td>
<td>-0.27</td>
</tr>
<tr>
<td>Marital status</td>
<td>-0.85</td>
<td>-0.57</td>
<td>-0.59</td>
</tr>
<tr>
<td>Frequency of exercise</td>
<td></td>
<td>0.59</td>
<td>0.59</td>
</tr>
<tr>
<td>Evaluation of healthy lifestyle</td>
<td>-3.56**</td>
<td>-3.52**</td>
<td></td>
</tr>
<tr>
<td>Sugar consumption</td>
<td></td>
<td></td>
<td>0.02</td>
</tr>
</tbody>
</table>

*p < .05*, *p < .01***

A very weak negative correlation was found between age and stress symptoms, where older participants reported less stress symptoms than younger participants ($\beta = -0.41, p = .032$). A weak negative correlation was also found between evaluation of lifestyle and stress symptoms, where participants that evaluated their lifestyle to be healthier compared to other participants reported less symptoms of stress ($\beta = -3.56, p < .001$). However, sugar consumption had a very weak positive correlation with stress symptoms, although it was not significant ($\beta = 0.018, p = .887$).

Participants’ background information did not significantly predict stress symptoms, $R^2 = .026$, $F(4,256) = 1.71, p = .148$, explaining only 2.6% of the variance in stress symptoms. However, how often participants exercised and how healthy they evaluated their lifestyle to be, $R^2 = .134$, $F(6,254) = 6.53, p < .001$, did significantly predict stress symptoms and explained a total of 13.4% of variance in stress symptoms when combined with participants’ background information. All models combined also explained a total of 13.4% of variance in
stress symptoms, $R^2 = .134, F(7,253) = 5.58, p < .001$, where sugar consumption itself was not significant, $p = .887$, and did not explain any variance in stress symptoms.

**Perceived energy**

Significant predictors for participants’ perceived energy were evaluation of a good physical shape and evaluation of a healthy diet, as shown in Table 8.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-0.16</td>
<td>-0.21</td>
<td>-0.21</td>
</tr>
<tr>
<td>Age</td>
<td>0.14</td>
<td>0.24*</td>
<td>0.24*</td>
</tr>
<tr>
<td>Education</td>
<td>0.23</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Marital status</td>
<td>0.39</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>Evaluation of shape</td>
<td>1.24**</td>
<td>1.24**</td>
<td></td>
</tr>
<tr>
<td>Evaluation of healthy diet</td>
<td>1.64**</td>
<td>1.64**</td>
<td></td>
</tr>
<tr>
<td>Sugar consumption</td>
<td>-0.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$p < .05^*, p < .01^{**}$

A moderate positive correlation was found between evaluation of diet and perceived energy, where participants that evaluated their diet to be healthier perceived themselves to have greater energy compared to other participants ($\beta = 1.64, p < .001$). A moderate positive correlation was also found between evaluation of physical shape and perceived energy, where participants that evaluated their physical shape to be good reported greater perceived energy than other participants ($\beta = 1.24, p < .001$). Sugar consumption had a weak negative correlation with perceived energy, although it did not predict perceived energy ($\beta = 0.00, p < .973$).
Participants’ background information did not significantly predict perceived energy, $R^2 = .019$, $F(4,252) = 1.24$, $p = .296$, explaining only 1.9% of the variance in perceived energy. However, how healthy participants evaluated their diet to be, and how good they evaluated their physical shape to be, $R^2 = .301$, $F(6,250) = 17.92$, $p < .001$, did significantly predict perceived energy and explained a total of 30.1% of variance in perceived energy when combined with participants’ background information. All models combined also explained 30.1% of variance in perceived energy, $R^2 = .301$, $F(7,249) = 15.30$, $p < .001$, where sugar consumption itself was not significant, $p = .973$, and did not explain any variance in perceived energy.

**Predictors of sugar consumption**

A hierarchical multiple regression was conducted to predict sugar consumption based on mental well-being and perceived energy. Significant predictors of sugar consumption were evaluation of shape, stress symptoms, and perceived energy, as shown in Table 9. Participants’ age was also a marginally significant predictor, $p = .063$.

Table 9

<table>
<thead>
<tr>
<th>Variables in hierarchical regression model for sugar consumption</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.19</td>
<td>-0.18</td>
<td>-0.19</td>
<td>-0.18</td>
<td>-0.14</td>
</tr>
<tr>
<td>Evaluation of shape</td>
<td>-1.05**</td>
<td>-1.04**</td>
<td>-1.04**</td>
<td>-1.09**</td>
<td>-0.82**</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>0.01</td>
<td>0.02</td>
<td>-0.04</td>
<td>-0.06</td>
<td></td>
</tr>
<tr>
<td>Anxiety symptoms</td>
<td></td>
<td>-0.02</td>
<td>-0.09</td>
<td>-0.09</td>
<td></td>
</tr>
<tr>
<td>Stress symptoms</td>
<td></td>
<td></td>
<td>0.12*</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td></td>
<td></td>
<td></td>
<td>-0.20*</td>
<td></td>
</tr>
</tbody>
</table>

$p < .05^*$, $p < .01^{**}$
A weak negative correlation was found between sugar consumption and evaluation of physical shape, where participants that evaluated themselves to be in good physical shape reported consuming less sugar than participants that evaluated themselves to be in worse physical shape ($\beta = -1.05, p < .001$). Further, a weak negative correlation was found between sugar consumption and perceived energy, where participants that perceived themselves to have greater energy reported consuming less sugar than participants that perceived themselves to have less energy ($\beta = -0.20, p = .01$). To the contrary, very weak positive correlation was found between stress symptoms and consumption of sugar, where participants that reported greater symptoms of stress consumed more sugar than participants that reported less symptoms of stress ($\beta = 0.12, p = .026$).

Participants’ age and evaluation of their own physical shape significantly predicted consumption of sugar, $R^2 = .074, F(2,255) = 2.095, p < .001$, explaining 7.4% of variance in sugar consumption, although age was marginally significant ($\beta = -0.19, p = .063$). As did symptoms of depression, $R^2 = .074, F(3,254) = 2.095, p < .001$, and anxiety, $R^2 = .074, F(4,253) = 1.045, p = .001$, when combined with model 1, although that did not explain any additional variance in sugar consumption. Symptoms of stress, $R^2 = .092, F(5,252) = 1.791, p < .001$, combined with previous variables, explained a total of 9.2% of sugar consumption. When perceived energy was added, all models combined explained a total of 11.6% of variance in sugar consumption, $R^2 = .116, F(6,251) = 5.641, p < .001$. However, symptoms of depression ($\beta = 0.01, p = .792$) and anxiety ($\beta = -0.02, p = .815$) were not significant.

**Discussion**

The results of the current study did not support the hypotheses that there would be a difference in depression, anxiety, or stress scores between participants that consumed a lot of sugar and participants who consumed less or no sugar. Further, sugar consumption did not
predict mental well-being. However, the results of the study supported the hypothesis that there would be a difference in perceived energy between participants that consumed a lot of sugar and participants that consumed less or no sugar. Although sugar consumption did not predict perceived energy, there was a weak negative correlation between the variables.

Interestingly, greater symptoms of stress and less perceived energy predicted more sugar consumption, even though sugar consumption had predicted neither perceived energy nor stress symptoms. Furthermore, participants that consumed little or no sugar seemed to experience greater well-being and perceived energy on average than participants that consumed more sugar. Although the difference was insignificant.

Few studies, if any, have addressed the same issues as the current study does. The strengths of the study were that participants were quite numerous, and they were asked a wide variety of questions which allowed for more accuracy in predicting the association between sugar consumption and mental well-being and perceived energy. The weakness of the current study is mainly uneven distribution in groups, especially regarding gender, considering the study was conducted on a convenience sample, and cross-sectional design, resulting in the inhibition of establishment of causational relationships.

Seeing as how sugar consumption has previously been associated with various health issues, such as obesity, high-blood pressure, coronary disease, cancer, stress, depression, psychological distress, and suicidal ideation (Brownell et al., 2009; Colli & Colli, 2006; Grimes et al., 2013; Huang et al., 2014; Lien et al., 2006; V. S. Malik et al., 2006; Shi et al., 2010), many of which are preventable, more research would be appropriate on this matter. Future research could address the issue of uneven distribution in groups by controlling their sample, conducting the study on a clinical population with the general population serving as a control group.
It would also be in the interest of the population to conduct long-term studies addressing the causational relations between sugar consumption and various health issues, to be able to either conduct preventive measures, were sugar found to cause health issues, or introduce different coping strategies, if sugar consumption was found to result from health issues. Thus, research on the subject of sugar consumption could serve as part of behavioral science research, working towards a common goal of achieving maximum population health.

https://doi.org/10.1016/j.neubiorev.2007.04.019


https://doi.org/10.1136/bmj.291.6507.1467

https://doi.org/10.1056/NEJMc0905723


without major depression. *Molecular Psychiatry, 14*(2), 175–189.

https://doi.org/10.1038/sj.mp.4002110


Appendix A

1. Hvert er kyn þitt?
   Karlkyn □   Kvenkyn □   Annað □

2. Hver er aldur þinn?
   16 - 20 ára □
   21 - 25 ára □
   26 - 30 ára □
   31 - 35 ára □
   36 - 40 ára □
   41 - 45 ára □
   46 - 50 ára □
   51 - 55 ára □
   56 - 60 ára □
   61 - 65 ára □
   66 ára eða eldri □

3. Hver er hjúskaparstaða þín?
   Einhleyyp(ur) □
   Í sambandi □
   Í sambúð □
   Gift(ur) □
   Ekkill / ekkja □

4. Hver er menntun þín?
   Grunnskólapróf eða minna □
Hóf framhaldsskólanám; menntaskóla, fjölbrautaskóla eða iðnskóla, en lauk því ekki □

Lauk framhaldsskóla; menntaskóla, fjölbrautaskóla eða iðnskóla □

Hóf háskólanám en lauk því ekki □

Háskólapróf, BSc, BA □
Háskólapróf, MSc, MA □
Háskólapróf, doktorspróf □

5. **Hvar býrð þú?**

Á höfuðborgarsvæðinu □
Á Suðurlandi □
Á Vestfjörðum □
Á Norðurlandi □
Á Austurlandi □
Erlendis □

Hvar? __________________

6. **Hversu oft í viku stundar þú íþróttir eða líkamsrækt?**

Nær aldrei □
1 sinni í viku □
2 sinnum í viku □
3 sinnum í viku □
4-6 sinnum í viku □
Svo til á hverjum degi □

7. **Hve oft reynir þú á þig líkamlega þannig að þú mæðist verulega eða svitnir?**

Nær aldrei □
1 sinni í viku □
SUGAR CONSUMPTION, WELL-BEING AND ENERGY

2 sinnum í viku
3 sinnum í viku
4-6 sinnum í viku
Svo til á hverjum degi

8. Ef þú stundar ekki íþróttir eða líkamsrækt, slepptu þá þessari spurningu:

Ef þú stundar íþróttir eða líkamsrækt, hversu sammála eða ósammála ertu
eftirfarandi fullyrðingu?

Ég stunda íþróttir / líkamsrækt til að... (Merktu aðeins í EINN reit í HVERJUM
lið)

Mjög sammála Frekar sammála Hvorki né Frekar ósammála Mjög ósammála

a) halda mér í góðu formi
b) bæta færni mína í íþróttinni
c) hafa það skemmtilegt
d) bæta heilsuna
e) til að fitna ekki
f) gefa mér kraft og orku
g) til að eignast vini
h) til að vera með vinum mínun
i) til að léttta mig
j) annað, hvað?

9. Í hversu góðri eða slæmri líkamlegri þjálfun (formi) telur þú þig vera?

Mjög góðri þjálfun
Góðri þjálfun
Í meðallagi
10. Hversu oft borðar þú eða drekkur eftirtöldu af eftirtöldu?

1 sinni í viku eða sjaldnar, 2-3 sinnum í viku, 4-6 sinnum í viku, 1 sinni á dag, oftar en 1 sinni á dag

Sælgæti □ □ □ □ □ □
Skyndibitamat □ □ □ □ □ □
Sykraða gosdrykki □ □ □ □ □ □
Grænmeti □ □ □ □ □ □
Sætabrauð □ □ □ □ □ □
Ávexti □ □ □ □ □ □
Mjólkurvörur □ □ □ □ □ □

11. Hversu hollt finnst þér mataræði þitt vera almennt?

Mjög hollt □
Fremur hollt □
Í meðallagi □
Fremur óhollt □
Mjög óhollt □

12. Hversu heilsusamlegu lífi telur þú þig lifa almennt?

Mjög heilsusamlegu □
Fremur heilsusamlegu □
Í meðallagi □
Óheilsusamlegu □
Mjög óheilsusamlegu □

13. Hversu mikil sætindi finnst þér þú borða að jafnaði?
14. Hversu mikið af gosdrykkjum drekkur þú á viku?

- Drekk ekki gosdrykki
- Minna en einn líter
- Einn til tvo lítra
- Tvo til þrjá lítra
- Þrjá til fjóra lítra
- Fjóra til fimm lítra
- Fimm til sex lítra
- Meira en sex lítra

15. Hversu mikið sælgæti borðar þú að jafnaði á viku? Ef miðað er við að meðalþyngd súkkulaðistýkkis sé 45 grömm.

- Ég borða ekki sælgæti
- Minna en 100gr
- 100-200gr
- 200-300gr
- 300-400gr
- 400-500gr
- Meira en 500gr

Ég borða ekki bakarísbakkelsi □
1 sinni í viku eða sjaldnar □
2-3 sinnum í viku □
4-6 sinnum í viku □
1 sinni á dag □
Oftar en 1 sinni á dag □


Góða □
Frekar góða □
Í meðallagi □
Frekar slæma □
Slæma □


Góða □
Frekar góða □
Í meðallagi □
Frekar slæma □
Slæma □


Mjög sammála, frekar sammála, hvorki né, frekar ósammála, mjög ósammála

a) Mér finnst ég vera orkumikil(l) □ □ □ □ □
b) Orka mín er stöðug yfir daginn □ □ □ □ □
c) Mér finnst ég vera þreytt(ur)  

mest allan daginn / síþreytt(ur)  

[ ] [ ] [ ] [ ] [ ] [ ]


d) Ég á erfitt með að vakna á morgnanna  

[ ] [ ] [ ] [ ] [ ] [ ]

e) Ég fæ nægan svefn á nóttunni  

[ ] [ ] [ ] [ ] [ ] [ ]


Mjög sammála, frekar sammála, hvorki né, frekar ósammála, mjög ósammála  

a) Þegar ég hugsa um hvernig ég muni líta  

út í framtíðinni er ég ánægð(ur)  

[ ] [ ] [ ] [ ] [ ] [ ]

b) Mér finnst ég oftast vera ófríð(ur) og óaðlaðandi  

c) Ég er ánægð(ur) með líkama minn  

d) Mér finnst ég vera sterk(ur) og hraust(ur)  

[ ] [ ] [ ] [ ] [ ] [ ]

21. Hefur sykurneysla þín breyst með aldrinum / tímanum?

Já, hún hefur aukist  

[ ]

Já, hún hefur minnkað  

[ ]

Nei  

[ ]

22. Hefur þú reynt að draga úr sykurneyslu?

Já, án árangurs  

[ ]

Já, með góðum árangri  

[ ]

Nei  

[ ]

23. Hversu vel eða illa áttu eftirfarandi fullyrðingar við um þig síðastliðna viku?

Merktu aðeins í EINN reit í HVERJUM lið.

Átti alls ekki við mig Átti við mig að einhveru leyti eða stundum Átti töluvvert vel við mig eða drjúgan hluta vikunnar Átti mjög vel við mig eða mest allan tímann  

a) Mér fannst erfitt að ná mér niður  

[ ] [ ] [ ] [ ] [ ] [ ]

b) Ég fann fyrir munnþurrki  

[ ] [ ] [ ] [ ] [ ] [ ]
c) Ég virtist alls ekki geta fundið fyrir neinum góðum tilfinningum

d) Ég átti í erfðuleikum með að anda (t.d. allt of hröð öndun, mæði án líkamlegrar áreynslu)

e) Mér fannst erfitt að hleypa í mig krafti til að gera hluti

f) Ég hafði tilhneigingu til að bregðast of harkalega við aðstæðum

g) Ég fann fyrir skjálfta (t.d. í höndum) Í

h) Mér fannst ég eyða mikilli andlegri orku

i) Ég hafði áhyggjur af aðstæðum þar sem ég fengi hræðslukast (panik) og gerði mig að fífli

j) Mér fannst ég ekki geta hlakkað til neins

k) Ég var ergileg(ur)

l) Mér fannst erfitt að slappa af

m) Ég var dapur/döpur og niðurdregin(n)

n) Ég þoldi ekki þegar eitthvað kom í veg fyrir að ég héldi áfram við það sem ég var að gera

o) Mér fannst ég nánast gripin(n) skelfingu

p) Ég gat ekki fengið brennandi áhuga á neinu
q) Mér fannst ég ekki vera mikils virði
    sem manneskja

r) Mér fannst ég frekar hörundsár

s) Ég varð var við hjartsláttinn í mér
    þó ég hefði ekki reynt á mig (t.d.
    hraðari hjartsláttur, hjartað sleppti úr slagi)

t) Êg fann fyrir ótta án nokkurra
    skynsamelgrar ástæðu

u) Mér fannst lífið vera tilgangslautst
DASS

Lestu hverju fullyrðingu og dragðu hring um tölu 0, 1, 2 eða 3 sem segir til um hver vel fullyrðing átti við í þínu tilviki síðustu vikuna. Það eru engin rétt eða röng svör. Eyddu ekki of mikulum tíma í að velta fyrir þér hverri fullyrðingu.

0 = Átti alls ekki við mig
1 = Átti við mig að einkverju leyti eða stundum
2 = Átti töluvert vel við mig eða drjúgan hluta vikunnar
3 = Átti mjög vel við mig eða mest allan tímann

<p>| 1 | Mér fannst erfitt að ná mér niður. | 0 | 1 | 2 | 3 |
| 2 | Ég fann fyrir munnpurkki. | 0 | 1 | 2 | 3 |
| 3 | Ég virtist alls ekki geta fundið fyrir neinum göðum tilfinningum. | 0 | 1 | 2 | 3 |
| 4 | Ég átti í erfðoleikum með að anda (t.d. allt of hröð öndun, mæði án líkamlegrar áreynslu). | 0 | 1 | 2 | 3 |
| 5 | Mér fannst erfitt að hleypa í mig krafti til að gera hluti. | 0 | 1 | 2 | 3 |
| 6 | Ég hafði tilhneigingu til að bregðast of harkalega við aðstæðum. | 0 | 1 | 2 | 3 |
| 7 | Ég fann fyrir skjalfta (t.d. í höndum). | 0 | 1 | 2 | 3 |
| 8 | Mér fannst ég eyða mikilli andlegri orku. | 0 | 1 | 2 | 3 |
| 9 | Ég hafði áhyggjur af aðstæðum þar sem ég fengu hraðslukast (panik) og gerði mig að fífli. | 0 | 1 | 2 | 3 |
| 10 | Mér fannst ég ekki geta hlakkað til neins. | 0 | 1 | 2 | 3 |
| 11 | Ég var ergileg(ur). | 0 | 1 | 2 | 3 |
| 12 | Mér fannst erfitt að slappa af. | 0 | 1 | 2 | 3 |
| 13 | Ég var dapur/döpur og niðurdregin(n). | 0 | 1 | 2 | 3 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Íslenska</th>
<th>Númer</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Ég þoldi ekki þegar eithvað kom í veg fyrir að ég héldi áfram við það sem ég var að gera.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>Mér fannst ég nánast gripin(n) skelfingu.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>Ég gat ekki fengið brennandi áhuga á neinu.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>Mér fannst ég ekki vera mikils virði sem manneskja.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>Mér fannst ég frekar hörundsár.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>Ég varð var við hjartsláttinn í mér þó ég hefði ekki reynt á mig (t.d. hraðari hjartsláttur, hjartað slepti úr slagi).</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>Ég fann fyrir ótta án nokkurra skynsamlægri ástæðu.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21</td>
<td>Mér fannst lífið vera tilgangslaust.</td>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>