The effects of sleep deprivation and quality of sleep on cognitive performance and mental wellbeing

María Ósk Stefánsdóttir

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BSc in Psychology
Foreword

Submitted in partial fulfillment of the requirements of the BSc Psychology degree, Reykjavík University, this theses is presented in the style of an article for submission to a peer-reviewed journal.
SLEEP DEPRIVATION, COGNITIVE PERFORMANCE AND MENTAL WELLBEING

Abstract – Íslenska


Lykilorð: Gæði svefn, svefnlengd, hugræn geta, þunglyndi, kvíði.

Abstract - English

Studies in the field of sleep have shown that sleep deprivation can affect mental wellbeing and furthermore that sleep is necessary for cognitive abilities. Few studies have examined the effect from both sleep duration and quality of sleep so the purpose of this study was to analyze the impact from both sleep duration and quality of sleep on mental health and cognitive performance. The present study used data from an ongoing research, monitoring cognitive workload using speech analysis. A total of 69 students in Reykjavík University were initially sampled. The sample contained 22 male (32%) and 47 female (68%). The participants age was from 20 years and older, 85% of the group where 20-30 years old. Two tasks were used to measure cognitive performance, Stroop test and the Ospan test. Questionnaires were used to measure psychological factors such as depression and anxiety and sleep behavior. Results from mixed ANOVA showed significant interaction between sleep duration and Stroop. Fixed factor ANOVA showed a significant interaction between quality of sleep and depression. No significant main effect or interactions were found between quality of sleep and sleep duration on anxiety and Ospan working memory. This results means that the worse quality of sleep participants got, the lower score on a Stroop attention test. Worse quality of sleep increases depression symptoms.

Keywords: Quality of sleep, sleep deprivation, cognitive performance, anxiety and depression.
The effects of sleep deprivation and quality of sleep on cognitive performance and mental wellbeing.

Most studies in the field of sleep have shown that sleep deprivation and poor quality of sleep has a negative impact on mental factors such as anxiety and depression (Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010; Minkel et al., 2012) as well as cognitive functions such as memory and attention (J. V. Baranski, Pigeau, & Angus, 1994; Sagaspe et al., 2006).

Sleep deprivation is defined as either a lack of sleep over a specified period or not achieving enough sleep at night on average (Orzegr-Gryglewska, 2010). Enough sleep is essential both to carry out daily tasks and to maintain mental health (Baglioni et al., 2010; 2004; Liu & Zhou, 2002; Orzegr-Gryglewska, 2010). The need for sleep varies between individuals, but it is estimated that 7 to 8.5 hours is sufficient for the average person (Alhola & Polo-Kantola, 2007; Kronholm, Härmä, Hublin, Aro, & Partonen, 2006).

A lack of sleep is a very prevalent problem according to Morrison (1992) especially for adolescents. In his research about 25% of the sample reported not getting sufficient sleep. The age group that suffered most frequently from sleep deprivation was from 13-15 years old. Participants that felt they needed more sleep showed more signs of anxiety and found themselves more easily distracted compared to those who got sufficient sleep (Morrison et al., 1992). Noland et.al (2009) studied sleep habits of 400 university students and found out that 10% of participants slept less than six hours on school nights. Almost 60% of all participants that got insufficient sleep experienced stress and anxiety, the same group of participants also
had difficulty sustaining attention compared to those who got enough sleep (Noland et al., 2009).

Sleep disturbance is a well-known problem for depressed patients and it has often been suggested that depression is the main cause for poor sleep (Ivanenko, McLaughlin Crabtree, & Gozal, 2005; Roberts & Duong, 2014). Riemann, Berger and Voderholzer (2001) examined the relationship between sleep-medicine and reduction in depression symptoms. They found out that medicine that increases REM-sleep alleviate depressive symptoms and these data indicate that the relationship between sleep and depression are in both directions (Riemann, Berger, & Voderholzer, 2001)

Baglioni et al (2010) linked poor sleep quality with highly negative emotions and a lack of positive emotions. Individuals who reported poor quality of sleep showed significantly more signs of depression which was measured with EMG scan and the PANAS questionnaires. Interestingly, poor sleep quality had significantly worse impact on females well-being compared to males.

Sleep deprivation doesn’t just affect mental health, it also affects cognitive function and ability (Chee & Choo, 2004; Gradisar, Terrill, Johnston, & Douglas, 2008; Lieberman, Tharion, Shukitt-Hale, Speckman, & Tulley, 2002). Chee and Choo (2004) used functional imaging (fMRI) to see how sleep deprivation could affect cognitive performance. 14 participants at ages 19-24 years old had to be awake for 24 hours and then take two different working memory tests. First they took the LRT-test and then the PLUS-test, which both measure verbal working memory (Chee & Choo, 2004). The participants also took the same tests after sufficient amount of sleep. There was significantly lower brain function in both of the memory tests after
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the 24 hour sleep deprivation and the response time was therefore slower (Chee & Choo, 2004).

Gradisar et al (2008) found out that eight to nine hours sleep is the ideal sleep duration for working memory to be fully active. In their study they used two tests to predict working memory, OSPAN and the letter-number sequencing test. The less the participants slept, the worse was the working memory (Gradisar et al., 2008).

Sagaspe et al (2006) used a stroop task to measure participants’ attention after sleep deprivation. The results showed that the longer each participant had been awake the worse performance on the stroop task.

Lieberman et al (2002) studied whether sleep-loss, stress or caffeine would affect cognitive performance. Participants were 68 volunteers and they were randomly assigned to four groups depending on whether they received placebo, 100, 200 or 300mg of caffeine after 72 hour of total sleep deprivation. All groups went through working memory task and a test to measure their motor learning. The results showed that participants who got placebo and suffer from total sleep deprivation had the worst cognitive performance (Lieberman et al., 2002).

Previous studies all have in common that they demonstrate that lack of sleep has negative effects on either well-being or cognitive abilities but the main deficiency of previous studies is that they tend to ignore the quality of sleep individuals are getting, measuring only the duration. Studies have however shown that quality of sleep plays a major role and is equally as important as sleep duration (Meijer, Habekothé, & Van Den Wittenboer, 2000; Pilcher, Ginter, & Sadowsky, 1997). The goal of the present study is to examine the effect on cognitive function and mental health by measuring both sleep quality and sleep length. Based on previous studies,
the following hypotheses are tested:

H₁ Poor quality of sleep increases anxiety and depression.

H₂ Short sleep duration increases anxiety and depression.

H₃ Poor quality of sleep decreases cognitive performance.

H₄ Short sleep duration decreases cognitive performance.

In addition the study will explore whether the impact of sleep duration on mental health and cognitive function will vary with sleep quality.

Method

Participants

The present study used data from an ongoing research: monitoring cognitive workload using speech analysis by Kamilla Rún Jóhannsdóttir and Jón Guðnason. A total of 69 students in Reykjavík University took part in the study. The sample contained 22 males (32%) and 47 females (68%). The participants age was from 20 years and older, with 85% of the group being 20-30 years old. Participants gave their informed consent before participating. Some of the participants were recruited from research participant pool at the psychology department. Those participants received course credits for their participation. Participants were allowed to withdraw their participation at any point during the research.

Measures

Two tasks were used to measure cognitive performance, a stroop test and the OSPAN task. GAD-7 and PHQ-9 questionnaires were used to measure psychological factors such as depression and anxiety, separate questionnaire was used to measure sleep length and quality.
The Stroop test

A Stroop test was used to measure selective attention (Stroop, 1935). The Stroop test was divided into two parts. First a baseline measurement was conducted where color names and printed color matched 100% together and the participants had to name the color of the word that was written: for example the word “red” was printed in red ink. The second part of the Stroop the word doesn’t match the colors for example the word “blue” was in green ink instead of blue ink but the participants had to name the color of the word that was written. In both parts of Stroop 36 words were presented in five different colors.

The OSPAN task

The OSPAN task was used to measure working memory (Unsworth, Heitz, Schrock, & Engle, 2005). In the OSPAN task participants had to solve a several mathematical equations. After solving each equation the participants read a word. After solving three equations the participant had to recall the three previous words and then the process was repeated.

Sleep quality and length

The questions about sleeping behavior were eight and discussed both the length and quality of sleep in the past two weeks. The participation was asked about their sleep quality “What do you think in general your sleep quality are” and the answer were on three-point scale “good, moderate or poor”. Question about sleep length was for examples “How many hours do you sleep at nights on average on weekdays?” and the answer options were “Less than 4 hours, 4-6 hours, 6-8 hours, 8-10 hours or longer than 10 hours”. (See Appendix A for the complete questionnaire).

GAD-7
The questions that measured anxiety were seven and came from the GAD-7 which is a self-report anxiety-related screening list (Spitzer, Kroenke, Williams, & Löwe, 2006). An example of a question is “I feel a kind of fear feelings, such as tingling in the stomach”. Participants answered on a 4 point likert scale with answer options ranging from 0=never, 1=almost never, 2=sometimes, 3=almost always (see Appendix B for the complete questionnaire). Total score from GAD-7 ranged from zero to 21 where higher GAD-7 score indicated greater anxiety. Studies have shown that GAD-7 has a good reliability (Cronbach’s Alpha =.92) (Spitzer et al., 2006).

PHQ-9

PHQ-9 is self-report questionnaires with nine questions and are used to screen for depression symptoms from previous two weeks (Kroenke, Spitzer, & Williams, 2001). An example of question from PHQ-9 list was “Last two weeks I have felt sensitive” and the answer options were on 4 point scale: rarely, sometimes, often or always (see Appendix C for complete questionnaire). Possible score can range from zero to 27 but scores of 0, 5, 10, 15, and 20 represented minimal, mild, moderate, moderately severe, and severe depression. According to Kroenke et al (2001) PHQ-9 is a reliable and valid measure of depression severity.

Design and Procedure

Participants were divided into two sleep duration groups; high and low sleep duration and two quality of sleep groups; high or low quality using median split. Data was analyzed in 2x2x2 mixed ANOVA for the stroop performance with type of stroop (baseline, non-matching), sleep duration (high, low) and sleep quality (high, low) as the independent variables. For other dependent measures (working memory
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performance, depression, anxiety) the data was analyzed in 2x2 fixed factor ANOVAs with sleep duration and sleep quality (high, low) as the between subject variables.

At the beginning of the study, participants registered themselves and then the researcher contacted every participant to arrange a meeting. Participants attended the study session during school hours and the study took around 75 minutes for each participant. The participants were alone with the researcher in the room while the study took place. Before the tests were administered every participant signed an informed consent form where there was information about the research and it was clearly stated that they could withdraw their participation at any point during the research. After signing the consent form participant began to take the stroop test, which measured their selective attention. First they took the baseline measurement stroop test and then the stroop tests were word (color names) and colors did not match. The order of the stroop tests was counterbalanced between participants. After the stroop test was completed participants took the OSPAN task that measured their working memory. The last thing that participants did was to answer questions about their sleep patterns as well as their mental wellbeing. The questions were answered on a computer and while participants answered the questions they were in a private room. Participants were anonymous in order to preserve the integrity of the study, full confidentiality was fulfilled.

Data analyses

SPSS IBM statistic version 20 was used to analyze all the statistics in this research. The scores on the questions on sleep quality were added up and a new variable equaling the mean sum of all questions regarding sleep quality were gained. Participants were then divided into two groups high and low quality using median
split. Questions on sleep duration were added up and a total score gained and
participants were then divided into two groups high and low duration using median
split. Total score was calculated by adding up questions for GAD-7 to gain anxiety
score and PHQ-9 to gain depression score. For the working memory task score was
calculated by adding and total score gained.

Box’s test showed that the assumption of homogeneity of covariance was not
broken ($X^2 (9, 952) = 9.604, p = .605$). For cognitive performance the Box’s test
showed that the assumption of homogeneity of covariance was not broken ($X^2 (10,
696) = 10.460, p = 0.687$). Levene’s test showed that assumption of homogeneity of
variance was not broken for any of the dependent variables ($p > .05$).

**Ethical issues**

Every participant was informed about the research. The participants had to
give written approval for their participation before the research began. The Icelandic
human review committee approved the data collection.

**Results**

This study examined the effects of quality of sleep and sleep duration on
depression, anxiety and cognitive performance (attention and working memory). 2x2
fixed factor ANOVAs with sleep length (high, low) and sleep quality (high, low) as
the independent variables were used to analyze the data for depression, anxiety and
working memory. 2x2x2 mixed ANOVA with stroop (baseline and non matching
color), sleep length (high and low) and sleep quality (high, low) was used to analyze
the data for the Stroop test, which measured attention. The alpha criterion for
significance was set at .05.

**Sleep and mental factors**
Descriptive statistics for quality of sleep, sleep duration and the mental factors, anxiety and depression can be seen in Table 1.

Table 1

The Mean, Standard Deviation and Participants’ Anxiety and Depression Scores, Depending on Their Sleep Duration and Quality of Sleep

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High quality sleep</strong></td>
<td>4.02</td>
<td>3.67</td>
<td>35</td>
</tr>
<tr>
<td><strong>Low quality sleep</strong></td>
<td>6.16</td>
<td>3.53</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5.3</td>
<td>3.8</td>
<td>69</td>
</tr>
<tr>
<td><strong>Depression</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High sleep duration</strong></td>
<td>5.38</td>
<td>3.04</td>
<td>34</td>
</tr>
<tr>
<td><strong>Low sleep duration</strong></td>
<td>5.22</td>
<td>4.47</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5.3</td>
<td>3.8</td>
<td>69</td>
</tr>
<tr>
<td><strong>High quality sleep</strong></td>
<td>4.31</td>
<td>3.07</td>
<td>35</td>
</tr>
<tr>
<td><strong>Low quality sleep</strong></td>
<td>5.7</td>
<td>3.52</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5</td>
<td>3.35</td>
<td>69</td>
</tr>
<tr>
<td><strong>Anxiety</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High sleep duration</strong></td>
<td>4.79</td>
<td>3.33</td>
<td>34</td>
</tr>
<tr>
<td><strong>Low sleep duration</strong></td>
<td>5.2</td>
<td>3.4</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5</td>
<td>3.35</td>
<td>69</td>
</tr>
</tbody>
</table>

The results from the fixed factor ANOVA from depression showed a significant main effect of sleep quality $F (1, 65) = 8.956, p = .004$. There was a non-significant main effect of sleep duration $F (1, 65) = .165, p = .686$. The interaction between sleep duration and sleep quality was not significant.
Figure 1. Depression after sleep duration and quality of sleep.

Figure 1 above shows that low sleep quality increased depression significantly. There was also a difference between high and low quality of sleep for participants with low sleep duration although the difference was not significant.

The 2x2 ANOVA for anxiety showed a close to significant main effect of sleep quality $F(1, 65) = 3.460$, $p = .067$. Main effect of sleep duration and interaction between sleep duration and sleep effect were not significant.

**Sleep and cognitive performance**

Cognitive performance was measured as performance on attention (stroop) and working memory (OSSPAN) tasks. Table 2 summarizes the descriptive statistics for participants’ Stroop score depending on their sleep duration (low vs. high) and quality of sleep (low vs. high).

Table 2

*The Mean and Standard Deviation for Time to Complete Stroop, Depending on Sleep Duration and Quality of Sleep*
As can be seen in Table 2 the participants who reported having high quality sleep had a higher reaction time than participants who reported low quality sleep in stroop test 2. Participants who reported low sleep duration had a lower reaction time in both stroop test 1 and 2.

Result from 2x2x2 mixed ANOVA showed significant main effect of quality of sleep on Stroop, $F(1, 65) = 4.245, p = .043$. There were also significant interaction between Stroop, quality of sleep and sleep duration, $F(1, 65) = 5.326, p = .024$. No other main effects or interactions were significant.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low quality sleep</td>
<td>158.91</td>
<td>28.73</td>
<td>34</td>
</tr>
<tr>
<td>High quality sleep</td>
<td>165.2</td>
<td>30.91</td>
<td>35</td>
</tr>
<tr>
<td><strong>Stroop 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>162.1</td>
<td>29.81</td>
<td>69</td>
</tr>
<tr>
<td>Low sleep duration</td>
<td>162.97</td>
<td>32.96</td>
<td>35</td>
</tr>
<tr>
<td>High sleep duration</td>
<td>161.2</td>
<td>26.64</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>162.1</td>
<td>29.81</td>
<td>69</td>
</tr>
<tr>
<td>Low quality sleep</td>
<td>194.32</td>
<td>43.31</td>
<td>34</td>
</tr>
<tr>
<td>High quality sleep</td>
<td>184.51</td>
<td>29.08</td>
<td>35</td>
</tr>
<tr>
<td><strong>Stroop 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>189.34</td>
<td>36.85</td>
<td>69</td>
</tr>
<tr>
<td>Low sleep duration</td>
<td>193.57</td>
<td>41.39</td>
<td>35</td>
</tr>
<tr>
<td>High sleep duration</td>
<td>185</td>
<td>31.54</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>189.34</td>
<td>36.85</td>
<td>69</td>
</tr>
</tbody>
</table>
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Table 3 summarizes the descriptive statistics for participant’s OSPAN score depending on their sleep duration (low vs. high) and quality of sleep (low vs. high).

Table 3

*The Mean and Standard Deviation for Participants’ Score in OSPAN, Depending on Sleep Duration and Quality of Sleep*

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low quality sleep</strong></td>
<td>57.14</td>
<td>18.67</td>
<td>35</td>
</tr>
<tr>
<td><strong>High quality sleep</strong></td>
<td>54.08</td>
<td>17.55</td>
<td>34</td>
</tr>
<tr>
<td><strong>OSPAN</strong></td>
<td><strong>55.59</strong></td>
<td><strong>18.04</strong></td>
<td><strong>69</strong></td>
</tr>
<tr>
<td><strong>Low sleep duration</strong></td>
<td>59.31</td>
<td>18.67</td>
<td>34</td>
</tr>
<tr>
<td><strong>High sleep duration</strong></td>
<td>51.75</td>
<td>17.55</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>55.59</strong></td>
<td><strong>18.04</strong></td>
<td><strong>69</strong></td>
</tr>
</tbody>
</table>

Results from a 2x2x2 fixed factor ANOVA showed no significant main effects or interactions between OSPAN test for working memory and sleep duration and quality of sleep.

**Discussion**

The aims of this study were to examine the relationship between sleep duration and quality of sleep on the one hand and mental wellbeing and on cognitive performance on the other hand. The findings support that poor quality of sleep significantly increases depression and also increases anxiety although not significantly but therefore hypotheses 1 stands. The hypothesis stating that short sleep duration increases anxiety and depression was not supported. The findings indicate
that quality of sleep affects some aspects of cognitive performance where results of present study showed that there was a significant main effect of quality of sleep on stroop and therefore hypothesis 3 is supported. Hypotheses 4 stating that short sleep duration decreases cognitive performance can be rejected since no significant effects where found.

These findings are similar to results from Riemann, Berger and Voderholzer’s (2001) study. They found that by improving individuals sleep quality, depression symptoms would sharply decrease. Previous studies have also showed that sleep deprivation have negative effect on mental health (Baglioni et al., 2010; Morrison et al., 1992; Noland et al., 2009; Riemann & Voderholzer, 2003) which are the same as findings in present study.

Similar to other studies, results of this study showed that lack of sleep and sleep deprivation affects cognitive abilities such as attention and memory (J. Baranski & Pigeau, 1997; Gradisar et al., 2008; Lieberman et al., 2002; Sagaspe et al., 2006).

Results from this study indicate that quality of sleep plays a major role in depression, and by improving the quality of sleep the depression symptoms could decrease. The results from above also indicate that by improving quality of sleep, an individual’s attentions will also increase and consequently their cognitive performance. These results emphasize the importance of focusing more on the quality of sleep rather than just sleep duration by itself.

Lack of significant effects might by due to a few participants. There would have been better to have bigger sample. Other limitation is that most participants were from 20-30 years old, it would have been better to have greater distribution in participants’ age. Participants self-reported information about their sleeping behavior
such as their quality of sleep which can be adjective opinion and different to value. Self-report was as well used to measure anxiety and depression. Despite these limitations this study gives us new evidence for the importance of good quality of sleep. Further study could examine what causes the differences in individuals’ quality of sleep.

The results of this study could open discussion and interest in the importance of finding the cause for poor sleep quality and ways to improve the quality of sleep.
Heimildaskrá


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Appendix A
The questions that form the sleep quality and sleep duration


( ) Það tók mig örfáar mínútur að sofna
( ) Það tók mig styttra en 30 mínútur
( ) Það tók mig á bilinu 1/2 til 1 klst.
( ) Það tók mig 1-3 klst.
( ) Það tók mig meira en 3 klst. eða ég sofnaði ekki

Hve oft vaknaðir þú að meðaltali á nóttu sl. tvær vikur? Merktu aðeins í EINN reit.

( ) Aldrei
( ) Einu sinni
( ) 2 eða 3 sinnum
( ) Oftar en 3 sinnum
( ) Ég hef ekki hugmynd

Á sl. tveimur vikum, hve oft hefur þér fundist þú vakna óþarflega snemma á morgnana og ekki náð að sofna aftur? Merktu aðeins í EINN reit.

( ) Aldrei
( ) Einu sinni
( ) 2 eða 3 sinnum
( ) Oft
( ) Á hverjum morgni/nóttu

Hversu margar klukkustundir að meðaltali sefur þú á nóttu virka daga? Merktu aðeins í EINN reit.

( ) Minna en 4 klst. 4-6 klst.
( ) 6-8 klst.
( ) 8-10 klst.
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( ) Lengur en 10 klst.
Hversu margar klukkustundir að meðaltali sefur þú á nóttu um helgar? Merktu aðeins í EINN reit.
( ) Minna en 4 klst. 4-6 klst.
( ) 6-8 klst.
( ) 8-10 klst.
( ) Lengur en 10 klst.

Á síðastliðnum tveimur vikum, hve oft finnst þér þú hafa fengið nægan svefn?
Merktu aðeins í EINN reit.
( ) Allt af
( ) Oftast
( ) Stundum
( ) Sjaldnast
( ) Aldrei
Appendix B
The questions that form the anxiety

<table>
<thead>
<tr>
<th>18. Vinsamlegast merktu í þann reit sem lýsir best reynslu þinni SÍÐASTLÍDNAR TVÆR VIKUR</th>
<th>Aldrei</th>
<th>Sjaldan</th>
<th>Stundum</th>
<th>Oft</th>
<th>Alltaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eg hef litið bjartsýnum augum til framtíðarinnar</td>
<td>Aldrei</td>
<td>Sjaldan</td>
<td>Stundum</td>
<td>Oft</td>
<td>Alltaf</td>
</tr>
<tr>
<td>Mér hefur þótt ég gera gagn</td>
<td>Aldrei</td>
<td>Sjaldan</td>
<td>Stundum</td>
<td>Oft</td>
<td>Alltaf</td>
</tr>
<tr>
<td>Ég hef verið afslöppuð/afslappaður</td>
<td>Aldrei</td>
<td>Sjaldan</td>
<td>Stundum</td>
<td>Oft</td>
<td>Alltaf</td>
</tr>
<tr>
<td>Mér hefur gengið vel að takast á við vandamál</td>
<td>Aldrei</td>
<td>Sjaldan</td>
<td>Stundum</td>
<td>Oft</td>
<td>Alltaf</td>
</tr>
<tr>
<td>Ég hef hugsað skýrt</td>
<td>Aldrei</td>
<td>Sjaldan</td>
<td>Stundum</td>
<td>Oft</td>
<td>Alltaf</td>
</tr>
<tr>
<td>Mér hefur fundist ég nán oðrum</td>
<td>Aldrei</td>
<td>Sjaldan</td>
<td>Stundum</td>
<td>Oft</td>
<td>Alltaf</td>
</tr>
<tr>
<td>Ég hef átt auðvelt með að gera upp hug minn</td>
<td>Aldrei</td>
<td>Sjaldan</td>
<td>Stundum</td>
<td>Oft</td>
<td>Alltaf</td>
</tr>
</tbody>
</table>
Appendix C
The questions that form the depression

<table>
<thead>
<tr>
<th>20. Hversu oft hefur eftirfarandi vandamál truflað pig slóastiðnar TV/VKUR?</th>
<th>Alls ekkí</th>
<th>Nokkrar daga</th>
<th>Meira en helming timans</th>
<th>Nánast að aða daga</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lítill áhugi eða gleið við að gera hluti</td>
<td>Alls ekkí</td>
<td>Nokkrar daga</td>
<td>Meira en helming timans</td>
<td>Nánast að aða daga</td>
</tr>
<tr>
<td>Venj niðurgrinín dapur/dópur eða vonlaus</td>
<td>Alls ekkí</td>
<td>Nokkrar daga</td>
<td>Meira en helming timans</td>
<td>Nánast að aða daga</td>
</tr>
<tr>
<td>Át erfitt með að sofnr eða sofa alla nóttina</td>
<td>Alls ekkí</td>
<td>Nokkrar daga</td>
<td>Meira en helming timans</td>
<td>Nánast að aða daga</td>
</tr>
<tr>
<td>Þreyta og orkuleysi</td>
<td>Alls ekkí</td>
<td>Nokkrar daga</td>
<td>Meira en helming timans</td>
<td>Nánast að aða daga</td>
</tr>
<tr>
<td>Lystarleysi eða ofát</td>
<td>Alls ekkí</td>
<td>Nokkrar daga</td>
<td>Meira en helming timans</td>
<td>Nánast að aða daga</td>
</tr>
<tr>
<td>Liðla ílla með sjálfa þig eða fundist að þær hafi mistekist eða ekki staðið þig í stykkinu gagnvart sjálfrí þar eða fjólskyldu þinni</td>
<td>Alls ekkí</td>
<td>Nokkrar daga</td>
<td>Meira en helming timans</td>
<td>Nánast að aða daga</td>
</tr>
<tr>
<td>Erföleikar með einbætingu við það að leisa blöðin eða horfta á sjónvarp</td>
<td>Alls ekkí</td>
<td>Nokkrar daga</td>
<td>Meira en helming timans</td>
<td>Nánast að aða daga</td>
</tr>
<tr>
<td>Hreyf þig eða taldu svo hægt að annað fölk hefur tekið eftir því? Eða þegar gagnstæða-venið svo einraðnað eða órlíðegur að þú hreyfað þig mikla meira en venjulega</td>
<td>Alls ekkí</td>
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</tr>
</tbody>
</table>

| Hugsað um að það væri betra að þu væri dæin í eða hugsað um að skanða þig á einvurn hátt | Alls ekkí | Nokkrar daga | Meira en helming timans | Nánast að aða daga |