BSc in Psychology
Department of Psychology

Icelandic Translation of the Subjective Memory Complaint Questionnaire: Pattern Examination in an Icelandic Sample of all Age Groups

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Student: Patrekur Gunnaugsson
ID number: 241195-3339
Supervisor: María Kristín Jónsdóttir
Foreword

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

This thesis was completed in the Spring of 2020 and may therefore have been significantly impacted by the COVID-19 pandemic. The thesis and its findings should be viewed in the light of that.
Abstract

**Background:** Subjective cognitive decline (SCD) is a self-reported concern regarding a change in cognition that can be an important predictor of future development of dementia. **Objective:** Subjective Memory Complaint (SMC) scale and questionnaire is used to determine different daily life cognitive complaints. **Method:** Every participant was assessed with the SMC scale where they answered 20 individual items concerning difficulties in daily life memory tasks, with total scores ranging from 0 (no complaint) to 26 (maximum complaint score). **Results:** Two-hundred and sixty-one Icelandic volunteers above eighteen years of age completed the web-survey. The subjective memory complaints were frequent in the sample where the mean score was 8.47 out of a possible 26. Females had on average higher score on the SMC scale in contrast to males. The oldest age group had the highest score, youngest the second highest and the middle age group had the lowest SMC score. **Conclusion:** This study shows that there is a correlation between sex and education when it comes to daily life memory complaints. However, not a clear correlation between age and daily life memory complaints.

**Keywords:** Subjective cognitive decline, memory complaints, SMC scale, SMC questionnaire.

Útdráttur

**Bakgrunnur:** Subjective cognitive decline (SCD) er sjálf tilkynnt áhyggjuefni varðandi breytingar á vitsmunum sem getur verið mikilvægt varðandi framtíðarþróun heilabilunar. **Markmið:** Subjective memory complaint (SMC) kvarði og spurningarlisti var notaður til að ákvarða hugrænar kvartanir daglegs lífs. **Aðferð:** Hver einasti þátttakandi var metinn með SMC kvarðanum með því að svara 20 einstökum atriðum varðandi erfiðleika við minnisverkefni daglegs lífs, þar sem heildarstig voru á bilinu 0 (engin kvörtun) til 26 (hámarksfjöldi kvartana). **Niðurstöður:** Tvohundruð sextíu og einn íslenskir sjálfboðaliðar eldri en átján ára luku vefkönnunni. Minniskvartanir voru alengar í úrtaði þar sem meðal skorið var 8.47 af 26 mögulegum. Konur höfðu að meðaltali hærra skor á SMC kvarðanum en karlar. Elsti aldurshöpurinn var með hæsta skorið, sá yngsti næsthæsta og miðju aldurshöpurinn var með lægsta SMC skorið. **Ályktun:** Þessi rannsókn sýnir fram á fylgni á milli kyns og menntunar þegar kemur að minniskvörtunum. Aftur á móti var ekki skýr fylgni milli aldurs og minniskvartana.

**Lykilord:** Hugrænar kvartanir, minniskvartanir, SMC kvarði, SMC spurningarlisti.


**Introduction**

Subjective cognitive decline (SCD) is a complaint without a detectable impairment, but these complaints can be an important predictor of future development of dementia. These complaints can be interpreted differently by people (Jessen, 2014; Jessen et al., 2010) and there has been an increase in the interest of subjective cognitive decline as a future predictor for dementia over the years (Jessen, 2014; Reisberg & Gauthier, 2008). Studies to this date do not all support SCD as a marker of brain health because SCD is prevalent among older adults regardless of cognitive status and current SCD assessments methods lack specificity. Poor specificity prevents efficient identification of individuals at risk for cognitive decline (Gifford et al., 2015).

The term subjective cognitive decline (SCD) seems to go by different names, such as, subjective cognitive impairment (SCI) (Grambaite et al., 2013), subjective cognitive complaints (SCC) (Mitchell, 2008), subjective memory complaints (SMC) (Balash et al., 2013; van Oijen et al., 2007), subjective memory impairment (SMI) (Jessen et al., 2010) and more. These names revolve around the same subject but have some differences. A complaint is a self-report of a problem that differs between persons depending on their lifestyle, social expectations, and emotional states (Mäntylä, 2003) and does not always mean that the person is cognitively impaired. The issue needs to be detected before it is called an impairment. The term subjective cognitive decline is a self-reported concern regarding a change in cognition and seems to support both the impairment and complaint factor (Gifford et al., 2015), hence the author will use subjective cognitive decline as the main name for this cognitive condition.

Earlier, SCD was not seen as a stage itself in the development of dementia, but just a complaint that might lead to mild cognitive impairment (MCI). The annual conversion rate from MCI to a probable Alzheimer’s Disease (AD) is around 10-15% per year in contrast to only 1-
2% per year in the general population (Yoon et al., 2012). Since dementia is one of the leading causes of disability and death in the elderly (Tangen et al., 2014) these cognitive complaints should not be taken lightly. However, such complaints can be very common and it was found that about 30% of unimpaired healthy elderly people reported that they sometimes forget where they keep their belongings and what has happened recently, so a sign of future dementia is not always certain when such complaints appear (Alex J. Mitchell, 2008). Here and now SCD is seen as a possible pre-MCI stage for dementia (Mitchell, 2008a) and is said to be a stage that lasts for about 15 years before declining to MCI (Reisberg & Gauthier, 2008). However, these 15 years could be debatable since the Kungholmen project found that one third of participants who were interviewed 3 years before developing dementia, did not report any subjective or cognitive complaints. (Palmer et al., 2008; Reisberg & Gauthier, 2008). The data from the Kungholmen Project was gathered during the years 1987-1996 which might make these results misrepresented, since the diagnosis of dementia often comes at a later stage when lack of insight on a subjective cognitive decline and dementia could be present, resulting in people not complaining if they lack insight (Zanetti et al., 1999). It can be difficult to distinguish if a person has subjective cognitive impairment or no impairment at all on cognitive tests because the smaller the cognitive impairment of an individual is, the lower is the validity of a cognitive test (Jessen, 2014). Shan et al. (1998) suggest some strategies that might reduce the diagnostic difficulties of dementia where they propose interviewing subjects at two time points and examining evidence of decline; using signs and symptoms which are unbiased in every culture. They also suggest addressing domains other than cognition that contribute to dementia, including mood, psychotic features, behavior disturbance, personality change and functional ability. SCD is very common among those who visit memory clinics, (Balash et al., 2013) and according to
Reisberg and Gauthier (2008) the SCD prevalence is quite high and associated with aging. They found out that 25% to 56% of people over 65 years of age suffer from these cognitive impairments and cognitive decline might only occur in part of the patients (Huijbregts et al., 2006).

The difference between SCD subjects and MCI subjects is not always clear. They show in some way similar symptoms but in nearly all aspects, the symptoms are more frequent and severe in MCI subjects. There is an obvious difference between SCD and MCI in some areas shown in a research by Yoon et al. (2012) which used the Korean Dementia Screening Questionnaire (KDSQ). They found that the biggest difference between SCD and MCI was that MCI patients were much more likely to answer the questions negatively related to operating appliances and using public transportation. Therefore, if a SCD patient complains about having impairments in any of these two domains, he or she is at a greater risk of developing MCI or AD. Overall, the daily life tasks that require good memory and complex reasoning have a higher impact on MCI subjects than the SCD ones.

Cognitive complaints do not only characterize older people. Ginó et al. (2010) compared memory complaints between young (18-44 years old) and elderly healthy people (45-92 years old). They found out that the total SMC score as measured by Pearson and point-biserial correlation coefficients was not significantly different between young and old participants. However, it is known that people, when asked to explain their own memory problems, give different reasons according to their age. Younger people tend to see their problems as being a reversible and more manageable issues that might be caused by stressful life events, while older people may perceive their memory problems as a less reversible and less manageable issue caused by ageing (Ginó et al., 2010).
The Global Deterioration Scale (GDS) is an effective age-associated scale to detect where the patient is located on the road to dementia, in conjunction with his age. The first stage on the GDS is the no cognitive impairment stage (NCI) where subjects are free of any subjective complaints or objective evidence of cognitive impairment and are normatively functioning. There are however some very mild problems with memory where spouses are not aware of any impairment. The second stage is where subjective cognitive impairment starts to present itself and is also sometimes titled as the “patient knows, but the doctor doesn’t know” stage (Reisberg et al., 2008). At this stage, the spouses become aware of the problem just as the subjects. This is the stage where subjective cognitive complaints of memory deficit first appear but no evidence of objective evidence of memory deficit, that comes in GDS stage 3. Stage 3 is the mild cognitive impairment stage which is the earliest clear-cut deficit of progression to dementia where spouses are more aware of the problem than the subject, and this pattern continues on for the rest of the dementia development. Most of the patients with MCI report symptoms of subjective cognitive difficulties (Mitchell, 2008b). When the subject is in the early stages on GDS, the spouses are not aware, or on the same page as the subject, but as the conditions become more severe, the spouses become more aware than the subject. Hence while the magnitude of the condition increases, the subjects complains decreases and the spouses reports increase (Reisberg et al., 2010; Reisberg & Gauthier, 2008). The Brief Cognitive Rating Scale (BCRS) is often used in studies that use GDS as well, and the BCRS is used in clinical interviews to acknowledge the presence of subjective impairments in various areas and also estimates the objective deficits in each domain. These domains are as follows: concentration and calculation, recent memory, remote memory, orientation and functioning ability (Reisberg et al., 2010). Reisberg research found that subjects whose complaints are in the domain of concentration, calculation and
functional deficit, are much more likely to decline than those who complain in other domains (Reisberg et al., 2010).

The Mini-Mental State Examination (MMSE) is a mental status assessment, designed as a screening tool for dementia to access a patient cognitive status. The MMSE is used in various researches on SCD, MCI and further dementia. The examination tests orientation, registration, attention and calculation, recall, language, and visuospatial construction (Wood et al., 2006). A very interesting result in one of the SCD researches showed that the prevalence of SCD increased progressively with lower MMSE scores, therefore Balash concluded that it is very important to include MMSE scores when researchers are working with SCI patients considering that MMSE scores correlate well with SCD diagnosis (Balash et al., 2013).

Reisberg (2010) also found out that education has an impact on cognitive decline, where people with lower education were more likely than those with higher education to develop SCD, MCI and further dementia and at a faster rate. However, although it is apparent that less educated people are at a higher risk of developing dementia later in life, they are not in the highest risk group. It seems that people who are highly educated and have memory complaints are those who are at the biggest risk of developing some form of dementia. Studies have shown that educational level is the strongest factor associated with better scientific understanding (Herculano-Houzel, 2002). Highly educated people are more likely to have more intellectual ability, could know much more about dementia and the brain functions than less educated people, therefore just the slightest change in their cognition might throw them off and make them more anxious about their possible decline. There might be some overthinking, and thoughts about the worst case scenario regarding their cognitive decline, and since people who are anxious about their symptoms are
twice as likely to develop dementia, those results will definitely make highly educated people more anxious (Jessen et al., 2010; van Oijen et al., 2007).

There are some sex differences when it comes to the development of dementia and it seems that women are at a higher risk after the age of 85 to develop SCD and further dementia, but when people turn 90 years and older, the men start to decline more than the women. However, some studies show no significant difference. Women become older than men on average, so therefore they are more prone to developing SCD and possibly dementia (Chen et al., 2009).

This study uses a questionnaire by Gifford (2015) that has shown to be a reliable screening tool to identify individuals with SCD. The questionnaire consists of a variety of questions that are characterized by different SCD domains, for instance global memory functioning, temporal comparisons and more specific items that affect the daily life tasks for the individual. Global memory function questions were for example “Do you think you have problems with your memory?” and “On a whole, do you think that you have problems remembering things that you want to do or say?” and those questions have been linked to poorer cognitive performance and smaller medial temporal lobe volumes. Temporal comparison questions is where time is used as a benchmark and those questions were “Do you think that your memory is worse than 5 years ago?” and “Do you have complaints about your memory in the last 2 years?”, these questions can show us the cognitive change index. Other questions like “How often is the following a problem for you: Personal dates (e.g., birthdays) and “How often is the following a problem for you: Phone numbers you use frequently” are daily activity questions that have been used in SCD analyses and are said to be related to amyloid positivity (Gifford et al., 2015).
In this study, the total score from the 20-item bank was used to get the total SMC score and the aim of the study was to see if there was any cognitive pattern for both old and young participants on the SMC scale. Based on the literature, three hypotheses were tested; (1) as found in Reisberg (2010) study that people with lower education are prone to a higher SMC score than people with higher education, (2) hypothesis is that females score on average higher than males on the SMC scale, (3) hypothesize is that older people score on average higher than younger people on the SMC scale, therefore subjective memory complaints increase with age.

**Method**

*Participants and Procedure*

Two-hundred and sixty-one volunteers (M = 46.86) above eighteen years of age completed the study. All participants were Icelandic but not all of them lived in Iceland. A total of 95.73% of the participants lived in Iceland, and the rest lived in Denmark, Sweden, Norway, the United States, Ireland, Netherlands, Belgium and Switzerland. Majority of participants were females (M = 49.31) and they were also on average older than male participants (M = 42.78). Regarding relationship status, married and people in relationships, living with their partners were in overwhelming majority in the study. Table 1 shows participants’ background characteristics.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Percent %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>44.0/44.0/12.0 (M = 46.86)</td>
</tr>
<tr>
<td>Sex</td>
<td>34.5/65.1/.4</td>
</tr>
<tr>
<td>Education</td>
<td>50.4/49.6</td>
</tr>
<tr>
<td>Relationship status</td>
<td>15.6/6.2/71.4/3.3/3.6</td>
</tr>
</tbody>
</table>
Note – Age: young age group (18-45 years)/middle age group (46-66)/old age group (66+). Sex: males/females/other. Education: low education (elementary school, secondary school diploma and junior college without secondary school diploma)/high education (bachelor’s degree, master’s degree and doctor’s degree). Relationship status: single/in a relationship but not living with partner/married or in a relationship and living with partner/divorced/widower or widow.

This study uses a questionnaire that was developed by Gifford (2015) and has showed to be a reliable screening tool for identifying individuals with SCD. The questionnaire consists of a variety of questions that are characterized by different SCD domains, for example global memory functioning, temporal comparisons and more specific items that affect the individual’s daily life task. The questionnaire also includes four background questions about age, sex, education level and relationship status. The questionnaire was translated to Icelandic by the author of this study. The translation was conducted in several steps. Firstly, the list was translated by the author using an English-Icelandic dictionary and reviewed by the supervisor of this study María Kristín Jónsdóttir. Secondly, the list was improved according to the instructor’s modifications and reviewed again. Thirdly, the list was further improved by examining the top nine items on the list which were translated by María Guðnadóttir (2018). Fourthly, before completing the translation, a few other people were asked to review the questions on the questionnaire to ensure there were no errors in the translation.

The questions were transferred to the website www.questionpro.com and a convenient questionnaire was made. The link to the questionnaire was distributed to the public on www.facebook.com by the author of this study on April 8th. To get as many participants a snowball sampling was used where friends and family of the author answered the questionnaire and distributed it amongst people in their lives. It took the participants on average 3 minutes to
answer all the items on the questionnaire. The data was gathered on April 17th and the results
were exported to IBM SPSS Statistics software package used for statistical analysis.

\textit{Assessment of Subjective Memory Complaints}

Every participant was assessed with the SMC scale where they answered 20 individual
items concerning difficulties in daily life memory tasks, with total scores ranging from 0 (no
complaint) to 26 (maximum complaint score). Originally the questionnaire contained 57
questions that were likely to capture SCD, however Gifford et al. shortened the list of SCD items
by using post hoc simulations from CAT modeling. In this study, the SCD 20-item bank and top
eight selected SCD items were used. Item nine “Do you feel you are forgetting where things
were placed?” was removed from the questionnaire due to issues within the web-survey.

\textit{Statistical Analysis}

Every question was recoded to find the total score from the SMC scale of 0-26. Questions with
yes and no answers were recoded where no had the value of 0 and yes had the value of 1.
Questions with always, sometimes and never answers were recoded where never had the value of
0, sometimes had the value of 1 and always had the value of 2. Only one question “On a whole,
do you think that your memory is good or poor?” had the answers good and poor where good
was recoded as 0 and poor was recoded as 1. Every question related to memory difficulties was
recoded into one variable to get a total SMC score. There were seven age bands in the
questionnaire, but they were recoded into three age groups with young age group (44\%), middle
age group (44\%) and old age group (12\%). People aged 18-45 were considered young, people
aged 46-65 were sorted in the middle age group and old people were people of 66 years of age
and older. In the questionnaire the education was split between six bands and were later recoded
into two education groups. The first education group was recoded as low education (50.4\%).
which was Elementary School, Secondary School diploma and Junior College without Secondary School diploma. The second education group was high education (49.6%) which were people who finished Bachelor’s degree, Master’s degree and/or Doctor’s degree. One-way Anova was used to see if there was any sex difference in the SMC scale. Independent T-test was used to see if there were any differences between the sexes in the results and independent T-test was also used to see if people with higher or lower education performed better on the SMC scale.

**Results**

Two-hundred and sixty-one subjects aged 18 years and older were included in the study. The subjective memory complaints were calculated in the total sample where the results show that the mean score was 8.47 (SD = 4.28) out of a possible 26. There was not a single participant who did not have any subjective cognitive complaint and four participants had the highest score of 21 out of a total 26. The most common SMC score was between 4-9, where 59.8% of participants in the sample scored in that range.

Table 2.

*Participants sorted by their SMC score*

<table>
<thead>
<tr>
<th>SMC score</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>15</td>
<td>5.7</td>
</tr>
<tr>
<td>4-6</td>
<td>93</td>
<td>35.7</td>
</tr>
<tr>
<td>7-9</td>
<td>63</td>
<td>24.1</td>
</tr>
<tr>
<td>10-12</td>
<td>40</td>
<td>15.3</td>
</tr>
<tr>
<td>13-15</td>
<td>28</td>
<td>10.7</td>
</tr>
<tr>
<td>16-18</td>
<td>16</td>
<td>6.1</td>
</tr>
<tr>
<td>19-21</td>
<td>6</td>
<td>2.3</td>
</tr>
<tr>
<td>22-26</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Using the SMC scale as seen in table 3, it was found that the most frequently reported complaint was that their memory is worse now than it was five years ago where the majority or 51.3% of the total sample said that their memory is worse now than five years ago, Also the least reported complaint was if participants are unable to recall names of good friends where only 6.2% of the total sample were affected by that cognitive problem. Cronbach’s Alpha was used for internal consistency $\alpha = 0.82$ which is considered very acceptable.

**Age**

The oldest group had the total mean score of 9.26 (SD = 2.09), middle group had 8.03 (SD = 4.04) and the youngest had 8.76 (SD = 4.79), however there was no difference between the groups F(2,257) = 1.295; $p = 0.276$. Also, there was a variance difference between the age groups F(2,257) = 9.419; $p < .001$.

**Education**

According to the Levene’s Test there was a significant difference between the variance of the groups F(1,259) = 6.909; $p = .009$ The results suggest that higher educated people perform better on the SMC scale where the mean for less educated people (N = 127) was 8.80 (SD = 4.69) and the mean score for the higher education group (N = 134) was 8.157 (SD = 3.84) but according to the independent t-test there was not a significant difference between the groups $t(243.50) = 1.200; p = .231$. 
Table 3. *Results of the SMC scale*

<table>
<thead>
<tr>
<th>Item</th>
<th>Subscore Range</th>
<th>Participant's answers/subscore, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-1</td>
<td>0 = 60.9; 1 = 39.1</td>
</tr>
<tr>
<td>2</td>
<td>0-1</td>
<td>0 = 79.0; 1 = 21.0</td>
</tr>
<tr>
<td>3</td>
<td>0-1</td>
<td>0 = 51.6; 1 = 48.4</td>
</tr>
<tr>
<td>4</td>
<td>0-2</td>
<td>0 = 30.4; 1 = 64.5; 2 = 5.1</td>
</tr>
<tr>
<td>5</td>
<td>0-2</td>
<td>0 = 42.2; 1 = 50.2; 2 = 7.6</td>
</tr>
<tr>
<td>6</td>
<td>0-1</td>
<td>0 = 75.3; 1 = 24.7</td>
</tr>
<tr>
<td>7</td>
<td>0-2</td>
<td>0 = 15.6; 1 = 78.9; 2 = 5.5</td>
</tr>
<tr>
<td>8</td>
<td>0-1</td>
<td>0 = 48.7; 1 = 51.3</td>
</tr>
<tr>
<td>9</td>
<td>0-2</td>
<td>0 = 17.5; 1 = 76.4; 2 = 6.2</td>
</tr>
<tr>
<td>10</td>
<td>0-1</td>
<td>0 = 57.2; 1 = 42.8</td>
</tr>
<tr>
<td>11</td>
<td>0-1</td>
<td>0 = 79.6; 1 = 20.4</td>
</tr>
<tr>
<td>12</td>
<td>0-1</td>
<td>0 = 86.1; 1 = 13.9</td>
</tr>
<tr>
<td>13</td>
<td>0-1</td>
<td>0 = 85.8; 1 = 14.2</td>
</tr>
<tr>
<td>14</td>
<td>0-1</td>
<td>0 = 84.0; 1 = 16.0</td>
</tr>
<tr>
<td>15</td>
<td>0-1</td>
<td>0 = 66.7; 1 = 33.3</td>
</tr>
<tr>
<td>16</td>
<td>0-1</td>
<td>0 = 75.7; 1 = 24.3</td>
</tr>
<tr>
<td>17</td>
<td>0-1</td>
<td>0 = 93.8; 1 = 6.2</td>
</tr>
<tr>
<td>18</td>
<td>0-1</td>
<td>0 = 72.9; 1 = 27.1</td>
</tr>
<tr>
<td>19</td>
<td>0-2</td>
<td>0 = 13.1; 1 = 85.8; 2 = 1.1</td>
</tr>
<tr>
<td>20</td>
<td>0-2</td>
<td>0 = 30.5; 1 = 68.7; 2 = .7</td>
</tr>
<tr>
<td>Total</td>
<td>0-26</td>
<td></td>
</tr>
</tbody>
</table>
Scoring of items 1, 2, 3, 6, 8 and 10-18: 0 = no; 1 = yes.
Scoring of items 4, 5, 7, 9, 19 and 20: 0 = never; 1 = sometimes; 2 = always.
Scoring of item 18: 0 = good; 1 = poor.

**Sex**

Females scored higher on average than males on the SMC scale which can be seen in table 4. However, that does not mean that women are in fact more impaired by daily life cognitive complaints.

According to the Levene’s Test there was no significant difference between the variance of the groups F(1,257) = 3.170; \( p = .076 \).

According to the Independent t-test there was a significant difference between the groups means \( t(257) = 2.756; \ p = .006 \).

**Table 4.**
**Total SMC score for Males and Females**

<table>
<thead>
<tr>
<th>Total Score</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>89</td>
<td>7.44</td>
<td>.41</td>
</tr>
<tr>
<td>Female</td>
<td>170</td>
<td>8.95</td>
<td>.33</td>
</tr>
</tbody>
</table>

Note – SMC score scales from 0-26.

**Discussion**

The first hypothesis suggested that people with lower education are prone to a higher SMC score than people with higher education. The results from this study support this hypothesis, since participants in the low education sample scored higher on the SMC scale than participants in the high education sample. As stated above, Reisberg (2010) also found out in his study that education has an impact on cognitive decline, where people with lower education were
more likely than those who were well educated to develop SCD, MCI and further dementia and at a faster rate. It is apparent that less educated people are at a higher risk of developing SCD and further dementia, however they are not in the highest risk group. According to Van Oijen et al. (2007) people who are at the highest risk of developing some form of dementia are highly educated people with memory complaints. Those highly educated people are in general more intelligent and know more about how dementia and the brain works (Herculano-Houzel, 2002) than people with low education, so just the slightest change in their cognition might throw them off and cause stress and anxiety about their cognitive decline. Jessen et al. (2010) came to the conclusion that people who are anxious about their cognitive decline are twice as likely to develop further dementia. It would be incredibly beneficial to do more studies on how education, SCD and anxiety correlate with each other.

The second hypothesis suggested that females score on average higher than males on the SMC scale. The results supports this hypothesis since females scored higher than males on the SMC scale, however past studies have shown that SCD and further dementia correlates with increasing age (Lindeboom & Weinstein, 2004). Therefore, it must be mentioned that the females in this study were on average older than the males. Past studies have shown that females are at a higher risk than males to develop SCD and possibly further dementia. However, it must be stated that females generally live longer than males on average, hence there are more females with dementia than males (Chen et al., 2009). A possible future study would be useful where there are exact same number of females and males in every age group, and the same mean age for both sexes. This would give a much better result regarding age and SCD in all age groups.

The third hypothesis suggest that SMC increase with age. According to Reisberg and Gauthier (2008) the SCD prevalence is quite high amongst people who visit memory clinics and
according to them it is associated with aging. It was expected that this hypothesis would be supported due to immense amount of previous studies suggesting that SMC increases with age. However, the results from this study were very interesting as the youngest age group performed worse than the middle age group on the SMC scale. It was evident if we look at previous studies that the oldest age group would have the highest SMC score, but it was surprising to see the middle age group with the lowest score. These results need further examination since younger people give different reasons for their own memory problems. According to Ginó et al. (2010) younger people saw their memory problems as being reversible and more manageable and caused by stressful life events, while older people saw their memory problems as less reversible and less manageable and caused by ageing. Future research should focus on the differences in how young and old people interpret their memory problems.

The biggest strength of this study was the translated SMC questionnaire. The Cronbach’s Alpha was considered very acceptable, which implies that the translation was executed well. The questionnaire was also quite short, and it did not take participants a long time to answer every question. Another strength of this study is that SCD is not a well-known stage in the development of dementia and this study can be used to get a better understanding of this condition. Lastly, the ratio between participants educational background (lower vs. higher education) was quite equal, which can be considered a good strength of the study.

Looking at the limitations of this study, the first one is that the gender ratio was not good at all, with females being the majority. It would increase the quality of the results to have the same gender ratio. The second limitation is the sample size. There were only 275 participants who completed the web-survey, and much more participants are necessary to get a better statistical analysis. The third limitation would be that participants were also asked to answer a
question about their relationship status but results from that question were not analyzed and used in the study. The fourth limitation is that one question “Do you feel you are forgetting where things were placed?” on the Gifford 21-item SMC bank was lost in the process, and therefore not used in the study.

For future research, it would be clever to use the same SMC questionnaire including item nine but in a controlled environment with an interviewer. Participants would be recruited by the researcher to get an almost perfect sample of participants regarding age, sex, education and relationship status ratio. Hopefully, more studies will be done in the future on the importance of SCD to educate our society on this first stage of the development of dementia.

Since dementia is one of the leading causes of disability and death in the elderly population (Tangen et al., 2014) these cognitive complaints should not be taken lightly, and not just in the elderly population. Therefore, the author of this study hopes that the current results have shined some light on the not so well known subjective cognitive decline and complaints that are an important predictor of dementia.
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