Cognitive vulnerabilities and childhood trauma:
Cognitive reactivity, rumination and childhood abuse

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HÁSKÓLI ÍSLANDS

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Lokaverkefni til MS-gráðu í klínískri sálfræði

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Abstract

Objective: Cognitive reactivity and rumination are established vulnerability factors for depression that have been found to be associated with a history of childhood trauma and abuse. Furthermore, childhood abuse is an established risk factor for depression. However, it is not known whether the relationship with the vulnerability factors is different depending on the type of abuse experienced; emotional, physical or sexual. The first aim of the study was to replicate previous studies and examine the relationship between the cognitive vulnerabilities and childhood abuse. Other aims were to examine whether this relationship is different based on type of abuse, and if the relationship between the vulnerability factors is different based on the type of abuse experienced.

Method: The sample consisted of 115 university students that completed a number of self-report measures, including on childhood trauma, rumination and cognitive reactivity, and two experimental tasks.

Results: Those with a history of childhood abuse reported significantly greater cognitive reactivity but not rumination, when measured with self-report. No significant group differences (trauma history and no trauma history) were found when cognitive reactivity and rumination were measured with experimental tasks. Only childhood sexual abuse appeared to be related to the brooding subtype of rumination and cognitive reactivity. A history of either sexual or physical abuse affected the relationship between brooding and cognitive reactivity. No significant results were found for emotional abuse.

Conclusions: The results indicate that having a history of childhood abuse makes one show greater cognitive reactivity compared with those with no such history. Only sexual abuse appears to increase cognitive reactivity and ruminative brooding tendencies. Furthermore, ruminative brooding seems to increase cognitive reactivity for those who have experienced either sexual or physical abuse. The experimental tasks appeared not to measure the cognitive vulnerabilities reliably. However, this is a rather small university sample which questions the generalizability of the results.

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Major depressive disorder (MDD) is among the most common mental disorders and is known to have a dramatic impact on people's lives. It is the leading cause of disability with over 300 million people affected worldwide (World Health Organization [WHO], 2017). The lifetime prevalence of depressive episode is estimated between 4 and 20% (Andrade et al., 2003; Chentsova-Dutton & Tsai, 2009). Women are about twice as likely to experience major depressive episodes (American Psychiatric Association [APA], 2013; Nolen-Hoeksema, 2001).

Depression is commonly regarded as a chronic condition. The risk for a recurrent episode is between 60 to 80% and increases with the number of previous episodes (APA, 2013; Judd, 1997; Monroe & Harkness, 2012), with an 18% increased risk of recurrence with each episode (Mueller et al., 1999). In light of its high prevalence, disease burden and chronicity, an important field for researchers is identifying risk and vulnerability factors, that predict and causally contribute to MDD onset and recurrence, and which might inform and increase the effectiveness of current preventive strategies. Previous research on the matter has identified cognitive reactivity (Segal et al., 2006; Teasdale, 1988) and rumination (Joorman, 2009; Nolen-Hoeksema, 2000) as important vulnerability factors for both onset and recurrence of depression. Childhood abuse has also been established as a significant risk factor (Chapman et al., 2004; Nelson, Klumparendt, Doebler, & Ehring, 2017) for the development of depression (for review see Alloy et al., 1999).

The focus of the current thesis is to explore the two apparent vulnerability factors for depression, rumination and cognitive reactivity, and examine their relationship with a well known risk factor, childhood abuse, namely emotional, physical and sexual abuse. It is important to get a better understanding of the relationship of different types of childhood abuse with the vulnerability factors for depression. It can help to indentify individuals in high risk of developing depression and further improve preventive strategies for depression.

Cognitive reactivity

Beck's cognitive theory (1967) hypothesizes that the negative cognitive schemas, characterized by dysfunctional attitudes, are a crucial aspect in the development, maintenance, and recurrence of depression (Scher, Ingram, & Segal, 2005). The negative schemas are said to develop from traumatic childhood experiences that are characterized by persistent negativity. Individuals who possess these negative schemas have a tendency to focus more on negative rather than positive events and are considered more vulnerable to depressive

episodes (Scher et al., 2005). When they encounter stressful life events later in life, these schemas, or dysfunctional attitudes, activate and lead to negative views about the self, the world, and the future, often referred to as the cognitive triad (Beck, 1967; Lau, Haigh, Christensen, Segal & Taube-Schiff, 2012; Robinson & Alloy, 2003).

According to the differential activation hypothesis (DAH; Teasdale, 1983; 1988), cognitive reactivity refers to the ease by which maladaptive cognitive processes are triggered by mild dysphoric mood. Teasdale (1988) states that Beck's theory (1967) focuses mainly on the onset of an episode of depression, but the DAH also attempts to account for the vulnerability to maintenance of depression. The DAH assumes that the negative schemas that are activated in depressed state make it more likely for depressed individuals to focus on those negative schemas and interpret their situation in negative ways and as uncontrollable (Nolen-Hoeksema, 1991; Teasdale, 1988). Furthermore, the DAH posits that during earlier episodes of depression, patterns of processing are established that form an association between depressed mood and negative thinking, such that dysphoric mood might re-activate depressogenic pattern of negative thinking associated with previous mood episodes (Lau, Segal, & Williams, 2004; Teasdale, 1988). This reciprocal relationship between cognition and depression may lead individuals to fall into a vicious cycle which can intensify and maintain depression (Lau et al., 2004; Nolen-Hoeksema, 1991; Teasdale, 1983). Studies on cognitive reactivity suggest that the presence of negative schemas alone is not sufficient to trigger depression, a stressful life event or dysphoric mood is also needed to activate them (Lo, Ho, & Hollon, 2008; for review see Scher et al., 2005). This conforms with Teasdale's (1988) hypothesis, that the negative schemas are latent and are activated by a negative change in mood.

Two different methods have traditionally been used to measure cognitive reactivity, a self-report measure, the Leiden Index of Depression Sensitivity-Revised (LEIDS-R; van der Does, 2002; van der Does & Williams, 2003), and an experimental mood induction task. In the experimental task the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978) is usually administered prior to and following a mood induction procedure (MIP), and the change in DAS score is used as an index for cognitive reactivity. This procedure has been used in prior studies (e.g., Gemar, Segal, Sagrati, & Kennedy, 2001; Segal et al., 1999; 2006). The two methods appear to correlate significantly (Figueroa et al., 2018; Figueroa et al., 2015; van der does, 2002).

According to numerous previous studies cognitive reactivity appears to be a vulnerability factor for relapse or recurrent depression (Figueroa et al., 2015; Kruijt et al., 2013; Segal et al., 1999; 2006). However, some studies using the experimental task have not found evidence of the predictive value of cognitive reactivity (Figueroa et al., 2015; Jarrett et al., 2012; Lethbridge & Allen, 2008; van Rijsbergen et al., 2013). The DAH predicts, that if tested while in induced dysphoric mood, there are cognitive differences between recovered-depressed and never-depressed individuals (Teasdale, 1988). In accordance with the DAH, studies comparing formerly depressed and never-depressed individuals, found that formerly depressed showed a greater increase in dysfunctional attitudes than never depressed individuals following a MIP, which indicates a greater cognitive reactivity (Gemar et al., 2001; Miranda, Gross, Persons, & Hahn, 1998; Miranda & Persons, 1988; Segal et al., 1999). However, some studies have not been able to differentiate between formerly and never depressed on cognitive reactivity measured with the experimental task (Dykman, 1997; van der Does, 2005). Based on the findings mentioned above, the reliability and validity of the method using a change in DAS score after a MIP to measure cognitive reactivity have recently been questioned (Figueroa et al., 2018). The LEIDS-R seems to be a more reliable and valid measure of cognitive reactivity (Figueroa et al., 2018; 2015).

Rumination

Another known vulnerability factor for depression is rumination. Findings from numerous studies have established rumination as a risk factor for depression onset (Nolen-Hoeksema, 2000; Robinson & Alloy, 2003; Spasojević & Alloy, 2001), severity (Nolen-Hoeksema & Morrow, 1991), and recurrence (Joorman, 2009; Nolen-Hoeksema, 1987). This seems to apply to both depressive symptoms and depressive disorders, but according to Nolen-Hoeksema (2000) rumination predicts both subclinical depressive symptoms and depressive disorders. According to Nolen-Hoeksema's (1991) response styles theory (RST), rumination has these diverse effects on depression by increasing negative thinking, hampering instrumental behaviour, impairing problem solving and corroding social support.

Rumination as defined by the RST consists of "repetitively focusing on the fact that one is depressed; on one's symptoms of depression; and the causes, meanings, and consequences of depressive symptoms" (Nolen-Hoeksema, 1991, p. 569). According to the RST this depressive rumination is a response to negative mood and depressive symptoms and the main factor of a ruminative response style is focusing on negative emotional state (Nolen-

Hoeksema, 1991). This ruminative response differs from problem solving or distracting procedures. Instead of actively engaging in something to alleviate the depressive symptoms or making plans of action, those who ruminate focus on their symptoms and their feelings without taking action (Lyubomirsky & Tkach, 2004; Nolen-Hoeksema, 1991; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Findings from previous studies on rumination (Nolen-Hoeksema & Morrow, 1993; Morrow & Nolen-Hoeksema, 1990) support the evidence that while distracting responses relieve depressed mood, rumination aggravates and maintains it (Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow, 1991). In Watkins's study (2009), rumination was comparable in formerly and currently depressed subjects which indicates that the tendency to ruminate appears to be relatively stable and not dependent on current mood or clinical status (Nolen-Hoeksema et al., 2008).

Two different methods have often been used to measure rumination, a self-report questionnaire, the Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991), and an experimental rumination task consisting of an analytical self-focused rumination induction (Watkins & Teasdale, 2001; 2004). Treynor, Gonzalez and Nolen-Hoeksema (2003) identified two subtypes of rumination measured by the RRS, brooding and reflective pondering. The brooding factor reflects a passive comparison of a current situation with some unachieved standard but the reflective pondering factor suggests an inward focus on engaging in cognitive problem solving to alleviate depressed mood (Treynor et al., 2003). Studies have found the brooding subtype to be more maladaptive and it appears to have a stronger relationship with depression than the reflective pondering subtype (Treynor et al., 2003; Watkins, 2009).

As has been acknowledge above, both rumination and cognitive reactivity have been established as cognitive vulnerability factors to depression (e.g., Moulds et al., 2008; Nolen-Hoeksema, 2000; Segal et al., 1999). Although these concepts are different they both describe how people react to depressed mood. In Nolen-Hoeksema's review of responses to depression (1991), she stated that rumination is not just a by-product of negative schemas and situations but an important independent predictor of depression. Moulds et al.'s study (2008) found a positive relation between RRS, measuring rumination, and all subscales of LEIDS-R, except the acceptance/coping scale. These positive correlations were independent of current depressive symptoms (Moulds et al., 2008). A relation has also been found between rumination and dysfunctional attitudes (Robinson & Alloy, 2003; Spasojević & Alloy, 2001).

In Spasojević and Alloy's study (2001) rumination, especially the brooding factor, mediated the relationship between dysfunctional attitudes and depression. Lo, Ho, and Hollon (2008) suggested that ruminative brooding could be an internal activating agent that triggers cognitive reactivity in depressed individuals. According to Moulds et al.'s study (2008), cognitive reactivity is a stronger predictor of depression than rumination, which suggests that the cognitive response to a depressed mood is more important than the ruminative process alone. It has also been suggested that when the negative schemas are activated in depression, one is more likley to focus inward on negative self-thoughts, or ruminate, but if these schemas are not activated one might be likely to cope in a more active manner with the depressive symptoms (Nolen-Hoeksema, 1991; Teasdale, 1988). Evidently these two cognitive vulnerabilities are higly connected and interact to create increased vulnerability to depression, however, the precise manner of their interaction remains to be found.

Childhood Trauma

A history of childhood trauma has been associated with both cognitive reactivity and rumination (e.g., Gibb, Alloy, & Abramson, 2003; Hovens, Giltay, van Hemert, & Penninx, 2016), and has also been associated with increased risk for depression in a number of studies (e.g., Chapman et al., 2004; Gibb, Butler & Beck, 2003; Hankin, 2006; Nelson, Klumparendt, Doebler & Ehring, 2017). Childhood abuse has been of special interest in relations to depression and cognitive styles. Emotional, physical, and sexual childhood abuse have all been associated with increased prevalence of depression, but there is evidence that the relationship with depression appears to be different based on the type of childhood abuse experience (Chapman et al., 2004; Hankin, 2006; Lindert et al., 2014; Nelson et al., 2017). Of the subtypes, childhood emotional abuse appears to be the most strongly associated with the presence of general cognitive vulnerabilities (Gibb, 2002; Gibb, Abramson & Alloy, 2004; Gibb et al., 2001) and the development of depression. Furthermore, emotional abuse has also been found to be a risk factor for early-onset, severe and treatment-resistant chronic depression and seems to moderate the relationship between dependent stress and depression (Chapman et al., 2004; Gibb et al., 2003b; Gibb, Chelmiski & Zimmerman, 2007; Hankin, 2006; Nelson et al., 2017; Padilla Paredes & Calvete, 2014; Shapero et al., 2014). Sexual abuse in contrast does not seem to associate as strongly with maladaptive cognitive styles and depression, and physical abuse appears to have the least association, if at all (Alloy &

Abramson, 1999; Chapman et al., 2004; Gibb, 2002; Gibb et al., 2007; Spasojević & Alloy, 2002).

As Rose and Abramson (1992) have pointed out, childhood emotional abuse, rather than physical or sexual abuse, may be more likely to contribute to negative cognitive styles because the negative attributions (e.g., "You're stupid") are supplied directly to the child by the abuser. According to Alloy and Abramsons (1999) Cognitive Vulnerability to Depression Project (CVD), participants who reported more childhood emotional maltreatment, but not sexual or physical, were at high cognitive risk for depression. In his review, Gibb (2002) found support for the relationship between a history of childhood emotional and sexual abuse, but not physical, and the presence of negative cognitive styles. Hankin (2006) found a similar pattern of results in his study. Furthermore, cognitive styles seem to mediate the relation between history of childhood maltreatment and MDE after 2.5-year follow-up (Gibb et al., 2001). These findings indicate that there appears to be a relationship between childhood abuse, especially emotional abuse, and negative cognitive styles, which increases the risk for depression.

Relationship between childhood trauma and cognitive vulnerabilities.
As has been acknowledged, childhood abuse has been found to contribute to negative cognitive styles. However, few studies have examined the relationship between childhood maltreatment and cognitive vulnerability to depression as defined in Beck's theory (1967), but as indicated in Beck's theory dysfunctional attitudes might mediate the relations between traumatic experiences and depression. Studies have supported the relationship between both childhood sexual and emotional abuse, and dysfunctional attitudes and depressive symptoms in adulthood (Gibb et al., 2004; 2003a; 2001). Only one study has researched childhood abuse in association with cognitive reactivity. In Hovens et al.'s study (2016), there was a relationship between emotional, physical, and sexual abuse, and cognitive reactivity. However, they only used two subscales of the LEIDS-R to measure cognitive reactivity, the rumination and the hoplessness/suicidality subscale, but these two subscales appear to have the strongest correlation out of the six subscales with RRS (Moulds et al., 2008). Clearly there is a need for further studies on this matter using the whole LEIDS-R, but this appears to be the only study on cognitive reactivity and childhood abuse.

The relationship between trauma and rumination has been of more empirical interest in previous studies. An association between childhood abuse, mostly sexual and emotional,

and rumination has repeatedly been found (Conway, Mendelson, Giannopoulos, Csank & Holm, 2004; Cutler & Nolen-Hoeksema, 1991; Raes & Hermans, 2008; Sarin & Nolen-Hoeksema, 2010; Spasojević & Alloy, 2002). Some studies have also found the mediating effect of rumination between childhood emotional and sexual abuse, and depressive symptoms, especially for the brooding subtype of rumination (Padilla Paredes & Calvete, 2014; Raes & Hermans, 2008; Spasojević & Alloy, 2002). Children who are abused often experience little or no control and might thus be likely to engage in depressive rumination in response to the abuse (Spasojević, Alloy, Abramson, Maccoon, & Robinson, 2004). In summary, previous research indicates that there is a relationship between childhood trauma and rumination. However, although dysfunctional attitudes appear to be associated with childhood trauma, little is known about the relationship between childhood trauma and cognitive reactivity. The results from the studies mentioned here imply that, out of the three types of abuse, emotional abuse appears to have the strongest association with the presence of cognitive vulnerabilites and the development of depression.

Aims of the present study

As has been acknowledged cognitive vulnerabilities, namely cognitive reactivity and rumination, and childhood trauma appear to have an effect on the presence of depressive symptoms and the development of depression (e.g., Chapman et al., 2004; Figueroa et al., 2015; Lau et al., 2004; Nelson et al., 2017; Segal et al., 1999). Research has also found a relationship between rumination and trauma and the mediating role of rumination between trauma and depression (e.g., Conway et al., 2004; Padilla Paredes & Calvete, 2014; Raes & Hermans, 2008; Spasojević & Alloy, 2002), but studies examining the relationship between trauma and cognitive reactivity are scarce. No previous studies seem to have explored both cognitive vulnerabiliy factors in conjunction with childhood abuse.

The present study explores the relationship between history of childhood trauma and rumination, and trauma and cognitive reactivity. It also explores the relationship of different types of trauma with the two vulnerability factors. Firstly, in accordance with previous research it is hypothesized that the tendency to ruminate is stronger for those who have experienced childhood trauma (e.g., Conway et al., 2004; Raes & Hermans, 2008), and it is also expected that they will show greater cognitive reactivity (Hovens et al., 2016). Because of limited research on childhood trauma in relation to cognitive reactivity, it is expected that the relationship will be stronger for rumination, especially the brooding subscale, than for

cognitive reactivity (e.g., Raes & Hermans, 2008; Spasojević & Alloy, 2002). Secondly, it is hypothesized that the relationship between trauma and cognitive vulnerability will be different depending on the types of childhood trauma experienced; emotional, physical or sexual abuse. It is expected that emotional abuse will have the strongest relationship with both rumination and cognitive reactivity, because of evidence from previous studies indicating that history of childhood emotional abuse is associated more strongly than other types of childhood abuse with depressive disorders (e.g., Chapman et al., 2004; Gibb et al., 2007; Nelson et al., 2017; Padilla Paredes & Calvete, 2014). Thirdly, it will be explored if the three different types of trauma will have a different effect on the relationship between rumination and cognitive reactivity. Thus, providing further information regarding the interplay of the two prominent cognitive vulnerability factors.

Method

Participants

Participants were 115 university students, at the age 19 to 56 with the mean age of 23.83 years. Females were 88 (76,5%). The educational level of most participants was that of secondary school (83,5%), B.Sc. or B.A. degree was 13,9% and 2,6% with a masters degree. Participants were recruited through e-mail invitations sent out to all registered students at the University of Iceland. Inclusion criteria were being a student at the university, between the age of 18 to 65, and having good command of both spoken and written Icelandic language. The sample is a convenience sample and participants were paid 4000 ISK for their participation in the study.

Measures

Demographic information on participants were gathered through a short questionnaire consisting of four questions about their age, gender, marital status and educational level.

Beck Depression Inventory: Second edition (BDI-II) is a 21 item self-report questionnaire used for measuring the presence and severity of depressive symptoms for the past two weeks (Beck, Steer & Brown, 1996). The items are rated on a 4-point scale, from 0 to 3 with total scores ranging from 0 to 63, with higher score indicating more severe depressive symptoms. BDI-II has good psyhcometric properties (e.g. Beck et al., 1996; Dozois, Dobson & Ahnberg, 1998; Sprinkle et al., 2002). The Icelandic version of BDI-II used in the present study was translated by Gísli Guðjónsson and Jón F. Sigurðsson and has shown both good internal and test-retest reliability (Arnarson, Ólason, Smári, & Sigurðsson, 2008; Davíðsdóttir, Þórsdóttir & Halldórsson., 2006).

The Childhood Traumatic Events Scale (CTES) is a self-report questionnaire used in the present study to assess the history and severity of traumatic events in childhood (before the age of 17; Pennebaker & Susman, 1988). The questionnaire consists of 6 items about traumatic events (events like significant loss of a loved one, physical abuse, sexual abuse, severe illness etc.). For each item of the scale the participants are asked to report whether they experienced the traumatic event and to rate it on a scale from 1 (not at all) to 7 (highly traumatic) depending on how traumatic the event was. If the traumatic event occurred before

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the age of 17 they are asked to write their approximate age at the time of the event. The CTES has shown good validity and reliability (Pennebaker & Susman, 1988). Ragnar P. Ólafsson translated the Icelandic version of the questionnaire, and along with Kristján Helgi Hjartarson, he added the seventh item to the Icelandic version of CTES to assess history and severity of emotional abuse in childhood (emotional abuse by a parent or another adult in the home). The psychometric properties of the Icelandic version are unknown.

Dysfunctional Attitudes Scale version A and B (DAS-A/B; Weissman & Beck, 1978) was administered during the experimental measure of cognitive reactivity as has been done in previous studies (Segal et al., 1999; 2006). The DAS is a self-report measure developed by Arlene N. Weissman and Aaron T. Beck (1978) from Becks (1967) cognitive theory of depression. The original DAS consisted of 100 items but two 40 item parallel versions have been developed (Weissman, 1979). However, there are doubts that these two forms are actually parallel (Figueroa et al., 2018; Oliver & Baumgart, 1985; Power et al., 1994). The scale is used to measure dysfunctional attitudes on a 7-point Likert scale from 1 (totally disagree) to 7 (totally agree) but ten items on both versions of the scale are reversed. The total score on each scale ranges from 40 to 280 with higher score indicating a tendency to have more dysfunctional attitudes. In the present study icelandic versions of the scales, DAS-A and DAS-B, were used. Ragnar P. Ólafsson, Sigfríður J. Guðmundsdóttir and Tanja D. Björnsdóttir translated the scales to Icelandic and the translation has been shown to have adequate psychometric properties (Guðmundsdóttir & Rögnvaldsdóttir, 2015).

Leiden Index of Depression Sensitivity-Revised (LEIDS-R) is a 34 item self-report questionnaire used to measure cognitive reactivity (van der Does, 2002; van der Does & Williams, 2003). The items are rated on a 5-point Likert scale from 0 (not at all) to 4 (very strongly), the total score ranging from 0 to 136 with higher score indicating greater cognitive reactivity. The LEIDS-R is divided into six subscales, acceptance/coping, aggression, control/perfectionism, hopelessness/suicidality, risk aversion, and rumination subscales (Figueroa et al., 2018). Participants are asked to answer the statements on the questionnaire indicating the degree to which the statements apply to them when experiencing mildly sad mood. The LEIDS-R has shown good psychometric properties in previous studies (Solis, Antypa, Conijn, Kelderman & van der Does, 2016). The Icelandic version of LEIDS-R was

translated by Ragnar P. Ólafsson and Sigrún Þ. Sveinsdóttir and has established good psychometric properties (Ellertsdóttir, 2015).

The Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991) is a self-report questionnaire that includes 22 items assessing ruminative responses to depressed mood that are self-focused, symptom-focused and focused on the consequences and causes of the mood (Treynor et al., 2003). Three subscales of the RRS were identified by Treynor et al. (2003), brooding, reflective pondering, and depression-related rumination. The brooding subtype is considered to be more maladaptive and appears to have a stronger relationship with depression than the reflective pondering subtype (Treynor et al., 2003; Watkins, 2009). The items are on a 4-point Likert scale from 1 (almost never) to 4 (almost always), total score ranging from 22 to 88, with higher scores indicating a stronger tendency to ruminate. The scale has shown acceptable psychometric properties (Nolen-Hoeksema et al., 1994; Treynor et al., 2003). An Icelandic translation of the RRS was used in this study. Jakob Smári translated the questionnaire and the Icelandic version has shown good psychometric properties (Pálsdóttir & Pálsdóttir, 2008).

Experimental tasks.

Mood induction.

The mood induction procedure (MIP) was used to elicit a mild and transient dysphoric mood. The procedure consisted of music combined with autobiographical recall. The music was the orchestral introduction by Prokofiev entitled "Russia under the Mongolian Yoke", first used by Clark and Teasdale (1985), and has since been used in numerous studies (e.g., Segal et al., 1999; Segal et al., 2006). The music was played for participants at half speed through headphones for 8 minutes. While listening to the music participants were instructed to recall a sad memory or event from their lives while simultaneously paying attention to the sadness in the music (e.g., Lau et al., 2012; Segal et al., 1999; Segal et al., 2006).

Experimental rumination task.

To assess participants ruminative tendencies participants first partook in the mood induction procedure followed by an analytical self-focused rumination task. The rumination task consisted of 28 items about physical sensations and current feelings, adapted from Nolen-Hoeksema & Morrow's (1993) rumination task (Watkins & Teasdale, 2001; 2004). Participants were asked to read the items slowly for 8 minutes and to focus on the causes,

meaning and the consequences of each symptom or sensation (Rimes & Watkins, 2005). The list of items used in the present study was translated to Icelandic by Hildur Eva Ásmundardóttir, Lára Sigurðardóttir, Sigríður Helgadóttir, and Ragnar P. Ólafsson. Both before and after the mood induction, and again after the analytical self-focused induction task, participants were asked to rate their current mood using a horizontal visual analogue scale (VAS) with 76 mm from the centre to each end point with different anchor descriptors, "sad" on the left and "happy" on the right end. Participants placed a mark on the horizontal line indicating their current mood. The change in the VAS scores before and after the MIP represents the effect of the mood induction. Similar horizontal scales have been used in previous studies for measurement on current mood during mood induction tasks (e.g., Segal et al., 1999; 2006). A self-rating scale on global negative self-judgements (worthless, unlovable, competent and acceptable, with the last two reversed) with a horizontal scale from 0 (not at all) to 100 (totally; Rimes & Watkins, 2005), was also administered, before and after the MIP and after the analytical self-focused induction task. As in Rimes and Watkins's study (2005) two subscales were formed out of the four negative judgement were worthlessness and incompetence form an autonomy-type judgement and unacceptability and unlovability form a sociotropy-type judgement. A negative change in self-rating on those global negative judgements after the rumination task represents a measure of rumination. Immediately upon finishing the task, particpants were asked to rate the proportion of time (from 0 to 100%) during the experimental task that they spent thinking about the causes, meaning and consequences of the sensations or symptoms, as well as the proportion of time spent focusing on themeselves (Rimes & Watkins, 2005).

Experimental measure of cognitive reactivity.

Cognitive reactivity was assessed using a well known experimental task (Segal et al., 1999). First, the MIP was used to elicit a mild dysphoric mood. Participants answered the two versions of DAS (A/B) in a counterbalanced order before and after the mood induction, but the magnitude of change in dysfunctional attitudes after the MIP represents the measure of cognitive reactivity. Horizontal visual analogue scales (VAS) were also used in this experimental task to measure the effects of the mood induction, with 76 mm from the centre to each end point with different anchor descriptors, "sad" on the left and "happy" on the right end. VAS was administered both before and after the mood induction, and finally after the particpants answered the latter dysfunctional attitudes scale (either DAS-A or DAS-B). The

VAS scales have been used in previous studies in mood induction experimental tasks (e.g. Gemar et al., 2001; Lau et al., 2012; Segal et al., 1999; Segal et al., 2006).

Other administered measures.

The present thesis is a part of a more comprehensive study and other measures of depression risk and vulnerability, in addition to those observed here, were administered. They are the following: *A habit learning experimental task*: the Fabulous Fruit Game (FFG). *Self-report measures*: Beck Anxiety Inventory (BAI; Beck & Steer, 1993), Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), Emotion Reactivity Scale (ERS; Nock, Wedig, Holmberg, & Hooley, 2008), Creature of Habit Scale (COHS; Ersche, Lim, Ward, Robbins, & Stochl, 2017), Snaith–Hamilton Pleasure Scale (SHAPS; Snaith, 1993), Habit-Index of Negative Thinking (HINT; Verplanken, Friborg, Wang, Trafimow, & Woolf, 2007), Positive and Negative Affect Scale (PANAS; Watson, Cark, & Tellegen, 1988), and finally a daily assessment focusing on momentary shifts in mood and cognition sampled through an app through 6 consecutive days, 10 times a day. These measures are not included in the current paper and will be reported in corresponding papers on the study.

Procedure

Following an approval from the National Bioethics Committee, and recruitment of participants, participants met with one of the researchers for a baseline assessment (90-120 minutes). Before giving informed consent participants were asked to read an information sheet about the research and their participation. Next, they filled out a questionnaire on demographic information. After that an experimental task of either cognitive reactivity or ruminaiton was administerd, with the second task administered later on in the session, in a counterbalanced order between participants. Eleven self-report measures were then administered in counterbalanced order, including BDI, LEIDS-R, CTES and RRS. Consequently, the second experimental task of, either congnitive reactivity or rumination, was administered. Following filling out the self-report measures the other experimental task was administered. Participants then partook in the Fabulous Fruit Game (FFG) experimental task. At the end of the baseline assessment the app for the daily assessment on shifts in mood and cognition was introduced and explained and participants asked to answer questions in the app 10 times a day for 6 consecutive days. Finally, the participants came for a secound visit for debriefing and getting paid 4000 ISK for their participation in the study.

Statistical analyses

All statistical analyses were carried out in the statistical program SPSS. Missing values were replaced with the mean item score for that particular variable. If there were more than 10% of the items missing from a particular measurement, those measures were not included in the statistical analysis. Bivariate correlations (Pearson) were performed to examine the relationship between self-report measures. Paired-sampled t-tests were used to examine the difference in scores on self-report measures before and after the mood induction and the rumination task. Independent-samples t-tests were used to examine group differences on self-report measures. Analyses of variance (ANOVA) were performed to examine the relationship between types of abuse and the vulnerability factors, and the relationship between the two vulnerability factors based on different types of abuse experienced. All analyses of variance were performed with the stepwise method and the best model fit was chosen based on the lowest Akaike Information Criterion (AIC) and the highest adjusted R square. A binary logistic regression was performed to explore the effects of the cognitive vulnerabilities on the likelihood of having a childhood trauma history. For all statistical tests an alpha level of .05 was used.

Results

Descriptive statistics, correlations and reliability

Table 1 presents the means, standard deviations, reliability estimates, and intercorrelations for the self-report measures of depression symptomatology and cognitive vulnerability factors. The mean score on the BDI-II indicates that in the current sample the mean level of depressive symptoms is in the mild range of depressive symptoms (Beck et al., 1996). All self-report measures of cognitive vulnerability and depressive symptoms were positively correlated, with the strongest correlation between LEIDS-R and RRS. Indicating a medium to strong association between the vulnerability factors.

Table 1

Means, standard deviations, intercorrelations, and reliability estimates for self-report measures of depression symptomatology and cognitive vulnerability factors.

	M (SD)	Cronbach's α	RRStotal	RRSbrooding	RRSreflect.	LEIDS-R
BDI-II	16.33 (10.88)	0.91	.64**	.52**	.26**	.57**
RRStotal	49.25 (11.81)	0.90	—	.80**	.68**	.69**
RRSbrooding	11.22 (3.44)	0.80		—	.40**	.65**
RRSreflect.	10.07 (3.45)	0.77			—	.36**
LEIDS-R	53.82 (17.79)	0.87				—

Note. BDI-II, Beck Depression Inventory: Second edition; RRStotal, Ruminative Response Scale total score; RRSbrooding, Brooding subscale of the RSS; RRSreflect., reflective pondering subscale of the RRS; LEIDS-R, Leiden Index of Depression Sensitivity-Revised. **$p < .001$.

Cognitive reactivity

The difference between VAS rating scores before and after the mood induction was significant, paired samples t-test; $t(113) = 9.21$, $p < .001$, which implies that the MIP was successful in inducing sad mood. The mean score on VAS is lower after the MIP compared to the mean baseline score, indicating lower mood. Descriptive statistics and difference scores for cognitive reactivity measures are displayed in table 2.

Table 2

Descriptive statistics and difference scores for self-report and experimental measures of cognitive reactivity.

	M (SD)	Difference score
Mood (VAS rating)		
Baseline	93.71 (31.47)	
Post MIP	69.33 (33.12)	24.38 (28.26)**
DAS		
Baseline	129.70 (31.28)	
Post MIP	130.74 (36.59)	-1.04 (18.54)
LEIDS-R	53.82 (17.79)	

Note. VAS, Visual Analogue Scale; MIP, mood induction procedure; DAS, Dysfunctional Attitudes Scale; LEIDS-R, Leiden Index of Depression Sensitivity-Revised. Difference score = mean and standard deviations for the difference between baseline and post MIP scores. * $p < .05$. **$p < .001$.

The difference between DAS scores before and after the MIP was not significant, paired samples t-test; $t(111) = -.59$, $p = .554$, which indicates that cognitive reactivity was not measured by the experimental task or that the mood induction was not successful in inducing a change in dysfunctional attitudes.

Correlations between LEIDS-R and change is DAS score.

No significant correlation was found between LEIDS-R and change in VAS scores before and after the mood induction nor LEIDS-R and change in DAS score before and after the mood induction. However there was a significant negative correlation between LEIDS-R and the mood measure before and after the mood induction ($r= -.33$ and $r= -26$ respectively), which indicates that those who show more cognitive reactivity appear to have a lower mood based on the mood measure, both before and after the MIP. A significant correlation was also found between LEIDS-R and pre and post DAS scores ($r= .53$ and $r= .51$ respectively), which indicates that those who show more cognitive reactivity seem to be more likely to have dysfunctional attitudes independent of changes in mood.

Rumination

The difference score for the VAS rating before and after the mood induction before the rumination task was significant, paired samples t-test; $t(114) = 9.77$, $p < .001$, which indicates that the MIP was successful in inducing sad mood for purpose of the rumination task. Table 3 presents the descriptive statistics and difference scores for rumination measures.

Table 3

Descriptive statistics and difference scores for self-report and experimental measures of rumination.

	M (SD)	Difference score
Mood (VAS rating)		
Baseline	94.86 (27.06)	
Post MIP	71.13 (31.62)	23.73 (26.05)**
Autonomy		
Pre	84.49 (61.47)	
Post	77.92 (66.98)	6.56 (31.61)*
Sociotropy		
Pre	77.13 (60.74)	
Post	75.07 (62.16)	2.06 (29.70)
RRStotal	49.25 (11.81)	
RRSbrooding	11.22 (3.44)	
RRSreflect.	10.07 (3.45)	

Note. VAS, Visual Analogue Scale; MIP, mood induction procedure; Autonomy and Sociotropy are the two subscales of overgeneral thinking; RRStotal, Ruminative Response Scale total score; RRSbrooding, brooding subscale of the RSS; RRSreflect., reflective pondering subscale of the RRS Difference score = mean and standard deviations for the difference between baseline and post MIP scores and pre and post the rumination task. * $p < .05$. **$p < .001$.

The difference score for autonomy-type judgements before and after the rumination task was significant, paired samples t-test; $t(114) = 2.23$, $p < .05$, however the difference was in a different direction than would be expected, but the negative judgements were rated more positively after the rumination task compared to before. The difference in sociotropy-type judgements scores was also in the opposite direction than would be expected, but was not significant, paired samples t-test; $t(114) = .74$, $p = .46$. This indicates that the rumination task was not successful in inducing the effects of rumination in the sample. However the difference score on both global negative judgements subscales between baseline and after the MIP, was significant for both subscales. Paired samples t-test for autonomy-type, $t(114) = -2.73$, $p < .05$, and for sociotropy-type, $t(114) = -3.65$, $p < .001$. These results indicate that the global negative judgements seemed to be more negatively rated after the MIP compared to baseline measures. The difference score between baseline and after the rumination task was significant for the sociotropy-type, paired samples t-test; $t(144) = -3.21$, $p < .05$, with sociotropy-type judgements rated more negatively after the rumination task compared to baseline measures. However there was not a significant difference for the autonomy-type, paired samples t-test; $t(114) = -.85$, $p = .40$.

Participants were split into two groups based on their rating on the proportion of time they spent thinking about the cause, meaning, and consequences of the sensations or

symptoms on the rumination task, ≤50% and >50%, to see if there was a difference on global negative judgements before and after the rumination task between the two groups. There was only a significant difference between the groups on the autonomy-type, independent samples t-test; $t(111) = -2.67$, $p < .05$. This indicates that those who showed more ruminative focus on the rumination task seemed to have a more negative view of themselves on the autonomy-type judgements after the task compared to those who showed less ruminative focus on the task. For the group with higher scores of ruminative self-focus, the sad mood also lasted longer. There was a significant difference between VAS mood ratings before and after the rumination task, independent samples t-test; $t(111) = 3.82$, $p < .001$, with the rumination group showing less decrease in sad mood compared to the group that showed less rumination tendencies.

Correlations between RRS and the rumination experimental task.

No significant correlation was found between RRS and the change in mood measured before and after the mood induction. Neither was there a significant correlation between RRS and the change in both subscales of global negative judgements before and after the rumination task. Same results were found for the group that showed more ruminative focus on the rumination task, no significant correlation between RRS and the change in mood, nor between RRS and the change in negative self-judgements. However a negative significant correlation was found between RRS, and both subscales, and the mood measures with r ranging from -.45 to -.24. This indicates that those who show more rumination tendencies seem to have a lower mood based on the mood measure, both before and after the MIP. A significant correlation was also found between RRS, and both subscales, and sociotropy-type and autonomy-type judgements after the rumination task. The correlation between RRStotal and both sociotropy-type and autonomy-type was $r = .51$. For the brooding subscale of RRS the correlation with the sociotropy-type was $r = .40$ and with the autonomy-type, $r = .41$. For the reflective pondering subscale the correlation with the autonomy-type was $r = .28$ but $r = .30$ with the sociotropy-type. This indicates that those who have a stronger tendency to ruminate seem to be more likley to have global negative judgements about themselves.

Childhood trauma and cognitive vulnerabilities

Since it was hypothesized that those with a history of childhood trauma would have a greater tendency to ruminate and show more cognitive reacitvity, particpants were split into two groups to explore this. As mentioned above, the focus in previous studies on the matter has mainly been on childhood emotional, physical, and sexual abuse in relation to cognitive vulnerabilites. Therefore, participants were split into a group with a history of childhood emotional, physical or sexual abuse, and a group with no such history. Descriptive statistics of LEIDS-R and RRS are displayed by group in table 4.

Table 4

Descriptive statistics for LEIDS-R and RRS split up in groups based on trauma history.

		M (SD)	N
LEIDS-R	Trauma history	58.71 (16.06)	49
	No trauma history	49.77 (18.22)	63
RRStotal	Trauma history	50.89 (11.73)	48
	No trauma history	47.76 (11.89)	63
RRSbrood.	Trauma history	11.42 (3.56)	48
	No trauma history	11.00 (3.38)	63
RRSreflect.	Trauma history	10.81 (3.44)	48
	No trauma history	9.52 (3.43)	63

Note. LEIDS-R, Leiden Index of Depression Sensitivity-Revised; RRStotal, Ruminative Response Scale total score; RRSbrooding, brooding subscale of the RSS; RRSreflect., reflective pondering subscale of the RRS.

There was a significant difference in means on LEIDS-R between the two groups, independent samples t-test; $t(110) = -2.71$, $p < .05$. This indicates that those who have experienced the types of childhood trauma of interest, seemed to show greater cognitive reactivity compared to those with no such trauma history. No significant difference was found between the two groups in the change in DAS scores after the cognitive reactivity experimental task, independent samples t-test; $t(108) = .66$, $p = .51$. Neither was there a significant difference in DAS baseline scores between the two groups, independent samples t-test; $t(109) = -.53$, $p = .56$.

      For rumination, measured with the RRS, there was no significant difference between the trauma and no trauma group, independent samples t-test; $t(109) = -1.38$, $p = .17$. No significant difference between the groups on both subscales of RRS was found, for brooding $t(109) = -.63$, $p = .53$, nor for reflective pondering $t(109) = -1.96$, $p = .05$ (independent

samples t-tests). These results indicate that those with a broadly defined history of childhood trauma do not have a stronger tendency to ruminate. Same results were found comparing the two groups on the experimental rumination task. No significant difference was found between the groups on difference scores (pre and post the rumination task) on both subscales of the global negative judgements, for the autonomy-type $t(111) = -.44$, $p = .66$, nor the sociotropy-type, $t(111) = -.48$, $p = .63$ (independent samples t-tests).

Effects of cognitive vulnerabilities on the likelihood of childhood abuse.

A logistic regression was performed to determine the effects of the RRS subscales, brooding and reflective pondering, and LEIDS-R scores on the likelihood that participants have a history of childhood abuse, while simultaneously controlling for BDI scores. The logistic regression model was statistically significant, $X^2(4) = 9.90$, $p < .05$. The model explained 11.6% (Nagelkerke R^2) of the variance in history of trauma and correctly classified 67.0% of cases. Out of those with a history of trauma, 47.9% were correctly classified and 82.0% of those with no trauma history were classified correctly as not having trauma history. An increase in LEIDS-R score was associated with the average 1.04 increased likelihood of exhibiting a history of trauma, $X^2(1) = 4.90$, $p < .05$ The effects of the RRS subscales on trauma history were however not significant, for brooding, $X^2(1) = 2.59$, $p = .11$, nor for reflective pondering, $X^2(1) = 2.27$, $p = .13$. This indicates that cognitive reactivity appears to increase the predictive value of history of childhood trauma. However, rumination does not seem to add to the predictive value of childhood trauma when the effects of cognitive reactivity are taken into account and BDI scores are controlled for.

Types of abuse and their relationship with cognitive vulnerabilities.

To explore the hypothesis that different types of childhood trauma have a different relationship with both rumination and cognitive reactivity, four multiple regression analyses with the stepwise method were conducted. The three types of trauma were independent variables in all four of the analyses and RRStotal, the brooding subscale of RRS, the reflective pondering subscale of RRS, and the LEIDS-R as the dependent variables, with BDI scores as a controlling variable. There were participants in the sample that had history of all three types of childhood abuse. Colinearity diagnostics tests were performed and that indicated that there were no issues with multicollinearity, with VIF values between 1 and 2 for all pair-wise comparisons of the variables.

The best model with RRStotal as a dependent variable excluded all types of trauma (emotional abuse: $p = .29$, physical abuse: $p = .42$ and sexual abuse: $p = .78$) when BDI scores were taken into account. The model was significant, $F(1,107) = 73.01$, $p < .001$ and explained 40% (adjusted R^2) of the variance in RSS scores. The best model for the reflective pondering subscale also excluded all types of trauma (emotional abuse: $p = .14$, physical abuse: $p = .33$ and sexual abuse: $p = .91$). The model was significant, $F(1,107) = 7.62$, $p < .05$, but only explained 5.8% of the variability in scores on the reflective pondering subscale. For the brooding subscale, the best model included sexual abuse but excluded both emotional ($p = .86$) and physical abuse ($p = .53$). The model was significant, $F(2,106) = 24.01$, $p < .001$ and explained 29.9% (adjusted R^2) of the variance in scores on the brooding subscale of RRS. When controlling for BDI scores, a history of sexual abuse added statistically to the prediction of brooding scores ($t(108) = 2.19$, $p < .05$), by significantly predicting a 1.50 average increase in scores on the brooding subscale. The best model for cognitive reactivity was statistically significant, $F(2,106) = 28.18$, $p < .001$, only including sexual abuse in the model (excluded both emotional ($p = .07$) and physical abuse ($p = .87$)). The model explained 33.5% (adjusted R^2) of the variability in scores on the LEIDS-R. When controlling for BDI scores, a history of sexual abuse added statistically to the prediction of LEIDS-R scores ($t(108) = 2.18$, $p < .05$), by significantly predicting a 7.39 average increase in scores on the LEIDS-R. Based on these results, out of the three types of trauma, only sexual abuse appears to be related to both brooding, the more maladaptive form of rumination, and cognitive reactivity.

The relationship between cognitive vulnerabilities based on type of abuse.
A linear regression analysis with the stepwise method was also conducted for each type of trauma to explore if the relationship between rumination and cognitive reactivity was different based on different type of abuse history. With LEIDS-R as the dependent and the two subscales of RRS, brooding and reflective pondering, as independent variables, and BDI scores as a controlling variable in each analysis. Cognitive reactivity was chosen as the dependent variable because of aforementioned studies suggesting that rumination is a relatively stable tendency (Watkins, 2009) and that ruminative brooding might be a trigger for cognitive reactivity (Lo et al., 2008).

The model for those who have experienced physical abuse was statistically significant, $F(1,18) = 10.75$, $p < .05$, with only the brooding subscale adding statistically to the prediction

of LEIDS-R score, ($t(19) = 2.21$, $p < .05$), by significantly predicting a 2.53 point average increase in scores on the LEIDS-R. The model explained 33.9% (adjusted R^2) of the variability in LEIDS-R. Similar results were found for those with a history of sexual abuse. The best model was statistically significant, $F(2,20) = 19.22$, $p < .001$, and explained 62.4% (adjusted R^2) of the variance on LEIDS-R. Only the brooding subscale of the RRS added statistically to the prediction of LEIDS-R score, ($t(22) = 3.41$, $p < .05$), significantly predicting a 2.34 point average increase on the LEIDS-R with every one point increase on the brooding subscale, when BDI scores were controlled for. For those who have experienced an emotional abuse, the best model was statistically significant, $F(1,23) = 50.77$, $p < .001$, explaining 67.5% (adjusted R^2) of the variance on LEIDS-R. However neither brooding nor reflective pondering added significantly to the prediction of LEIDS-R score when controlling for BDI scores and were therefore excluded from the best model. These results indicate that for those who have a history of either physical or sexual childhood abuse, an increase in scores on the brooding subscale adds to the predictive value of scores on LEIDS-R when controlling for BDI scores. However, the same can not be said for those who have experienced emotional abuse.

Discussion

The goal of the present study was to examine two apparent cognitive vulnerability factors for depression, cognitive reactivity and rumination, and their relationship with a history of childhood emotional, physical, and sexual abuse. Another goal was to explore if the relationship between the two vulnerability factors depend on the type of trauma experienced.

It was expected that those with a history of childhood trauma would show greater cognitive reactivity. In the present study the results were mixed. Cognitive reactivity was greater in the trauma group when measured with LEIDS-R self-report questionnaire but not with the experimental measure. However, this is in line with previous research that has not been able to measure a significant effect of cognitive reactivity using the experimental task (e.g., Jarrett et al., 2012; van der Does, 2005; van Rijsbergen et al., 2013). That appears to be the case in the present study, but the correlation between the two measures was very low and not significant. As has been pointed out, the two versions of DAS-A/B are not comepletly parallel and might thus not be interchangeable (Figueroa et al., 2018; Oliver & Baumgart, 1985; Power et al., 1994). Therefore the method of using mood induction and DAS assessments might not be a valid and reliable measurement of cognitive reactivity (Figueroa et al., 2018; 2015; van der Does, 2005). This might explain the present findings but that is only a speculation and any conclusions should be drawn with caution. However, there was not a significant difference on baseline DAS scores between the two groups, which is not consistent with previous findings (Gibb et al., 2004; 2003a; 2001). The results found when cognitive reactivity was measured with LEIDS-R are however in line with a previous study on the matter (Hovens et al., 2016), which indicates that if one has history of childhood abuse, one is more likely to show greater cognitive reactivity compared to one with no such experience, and thus might be more likely to develop depression. However, studies examining this relationship are scarce and further research is needed.

The results in the present study did not support the hypothesis that those with a history of childhood abuse show more rumination tendencies, neither measured with RRS nor the experimental task. The results with rumination with the self-report measure were unexpected when compared with previous studies (e.g., Conway et al., 2004; Raes & Hermans, 2008; Sarin & Nolen-Hoeksema, 2010), and are difficult to interpret. In the whole sample there was not a significant difference on the sociotropy-type subscale of the global negative judgements before and after the rumination task. There was a significant difference on the autonomy-type

subscale, but that difference was in an opposite direction to what was expected after the rumination task. There was no significant correlation between RRS and changes in the global negative judgements subscales which is not in line with Rimes and Watkins's study (2005). However, the difference on both subscales was significant between baseline and after the mood induction procedure. These results might indicate that the difference in the scores on the global negative judgements between baseline and after the MIP was saturated and that might explain why there was not a difference between the scores before and after the rumination task, and why the difference was in a different direction than would be expected. However, this is only a speculation and should be taken with caution. Another explanation might be that the measure of global negative judgements in the present study are items that were taken from a larger scale and their reliability and validity when used alone are unknown (Rimes & Watkins, 2005). There were weak to moderate significant correlations between RRS and both subscales of the global negative judgements after the rumination task, which suggests that those who ruminate appear to have a more negative global self-judgements. These results indicate that having a history of childhood abuse does not seem to increase the ruminative tendencies in adulthood. Corresponding with the previous results mentioned above, only cognitive reactivity (LEIDS-R) increased the predictive value of history of childhood trauma when BDI scores were controlled for.

When examining the different relationships of the types of abuse with the vulnerability factors, only sexual abuse significantly predicted an increase in scores on both LEIDS-R and the brooding subscale of RRS. No significant results were found for emotional abuse which was unexpected and did not support the hypothesis that emotional abuse would have the strongest association with the cognitive vulnerability factors. These results are not in accordance with previous studies suggesting that out of all the types, emotional abuse is the most relevant for the development of cognitive vulnerabilites and depression (e.g., Gibb et al., 2004; Gibb et al., 2007; Raes & Hermans, 2008). However, previous studies have found a relationship between childhood sexual abuse and rumination (Conway et al., 2004; Spasojević & Alloy, 2002), and cognitive reactivity (Hovens et al., 2006). These results indicate that having experienced sexual abuse in childhood, makes one show greater cognitive reactivity and ruminative tendencies of the brooding subtpype, which is considered more maladaptive than the reflective pondering subtype.

Only a history of either physical or sexual abuse affected the relationship between brooding and cognitive reactivity. This indicates that ruminative brooding, which is considered to be a relatively stable tendency, increases cognitive reactivity. This is in line with Lo et al.'s (2008) results, that brooding might be a trigger for cognitive reactivity. However, this relationship was only found for those with a history of either physical or sexual abuse in childhood. As brooding is considered the more maladaptive subtype of rumination with a stronger relationship with depression (Treynor et al., 2003), it was not unexpected that a relationship was found between childhood abuse and brooding (Raes & Hermans, 2008). Same can be said about the relationship between brooding and cognitive reactivity, but as has been mentioned the two vulnerability factors are connected (Moulds et al., 2008) and had a relatively high significant correlation in the present study. However it was expected that these results would be found for history of childhood emotional abuse, which was not the case.

Limitations

The present study has a few limitations. First, the study is a cross-sectional study and therefore it is not possible to determine causal relationship between the vulnerability factors and trauma. Second, the sample is a rather small non-clinical sample of university students, with the majority being females. These limitations might affect the results and also question the generalizability of the findings. The third limitation might be the self-report measure of childhood trauma, the CTES. It contains seven items assessing childhood trauma but in this study the focus was on three items on the self-report measure representing the three types of abuse. The question used to assess emotional abuse only accounts for emotional abuse from parents or an adult in the home before the age of 17. It does not include emotional abuse by peers, for example bullying, which is suggested to be an important part of emotional abuse when explored in relations to cognitive vulnerabilities for depression (Gibb et al., 2004; Padilla Paredes & Calvete, 2014). This might have affected the results in the study. Emotional abuse might have to be more clearly defined and comprise both parental and peer emotional abuse. It is also important to keep in mind that this type of self-report measure is of course based on subjective assessment, with participants retrospectively reporting on childhood trauma. The current state and mood of participants in the cross-sectional study might effect their recall of traumatic events in childhood.

Conclusions

A history of childhood abuse seems to affect cognitive reactivity, so that those who have experienced childhood abuse show more cognitive reactivity compared to those who have not. The present study did however not find that the tendency to ruminate is stronger for those with a history of childhood abuse. Only sexual abuse was found to be associated with both cognitive reactivity and brooding, adding to the predictive value of brooding and cognitive reactivity. Sexual and physical abuse affected the relationship between brooding and cognitive reactivity, with brooding adding to the predictive value of cognitive reactivity when depressive symptoms were controlled for. As has been pointed out, the two vulnerability factors are highly connected but these results provide a better understanding regarding childhood abuse and the interplay of the two vulnerabilities to depression. The major findings of the present study are those involving childhood sexual abuse but the results contradict results of previous studies indicating that emotional abuse might be more likely to contribute to negative cognitive styles and depression than physical or sexual abuse (e.g., Alloy & Abramson, 1999; Rose & Abramson, 1992). This appears to be among the first studies to explore both vulnerability factors and childhood trauma in the same study. Clearly, there is a need for further studies on childhood abuse and cognitive vulnerabilities to depression, especially cognitive reactivity. Future research should focus on longitudinal studies to be able to explore the causal relationship of the cognitive vulnerabilities and childhood abuse. Improved knowledge of the two vulnerability factors and their relationship with childhood abuse might help to increase the effectiveness of preventive strategies and theraputic interventions for depression.

References

Alloy, L. B., & Abramson, L. Y. (1999). The temple-wisconsin cognitive vulnerability to depression project: conceptual background, design, and methods. *Journal of Cognitive Psychotherapy*, *13*(3), 227-262.

Alloy, L. B., Abramson, L. Y., Whitehouse, W. G., Hogan, M. E., Tashman, N. A., Steinberg, D. L., . . . Donovan, P. (1999). Depressogenic cognitive styles: Predictive validity, information processing and personality characteristics, and developmental origins. *Behaviour Research and Therapy*, *37*, 503-531.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

Andrade, L., Caraveo-Anduaga, J. J., Berglund, P., Bijl, R. V., de Graaf, R., Vollebergh, W., . . . Wittchen, H. U. (2003). The epidemiology of major depressive episodes: Results from the International Consortium of Psychiatric Epidemiology (ICPE) surveys. *International Journal of Methods in Psychiatric Research*, *12*(1), 3-21.

Arnarson, Þ. Ö., Ólason, D. Þ., Smári, J., & Sigurðsson, J. F. (2008). The Beck depression inventory second edition (BDI-II): Psychometric properties in Icelandic student and patient population. *Nordic Journal of Psychiatry*, *62*, 360-365.

Beck, A. T. (1967). *Depression: Causes and treatment*. Philadelphia: University of Pennsylvania Press.

Beck, A. T., & Steer, R. A. (1993). *Manual for the Beck Anxiety Inventory*. San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory manual* (2nd ed.). San Antonio. TX: Psychological Corporation.

Chapman, D. P., Whitfield, C. L., Felitti, V. J., Dube, S. R., Edwards, V. J., & Anda, R. F. (2004). Adverse childhood experiences and the risk of depressive disorders in adulthood. *Journal of Affective Disorders*, *82*(2), 217-225.

Chentsova-Dutton, Y. E., & Tsai, J. L. (2009). Understanding Depression across Cultures. In I. H. Gotlib og C. L. Hammen (Eds.), *Handbook of Depression* (p. 363-379). New York: Guilford Press.

Clark, D. M., & Teasdale, J. D. (1985). Constraints on the effects of mood on memory. *Journal of Personality and Social Psychology*, *48*, 1595-1608

Conway, M., Mendelson, M., Giannopoulos, C., Csank, P. A., & Holm, S. L. (2004). Childhood and adult sexual abuse, rumination on sadness, and dysphoria. *Child Abuse & Neglect, 28*(4), 393-410.

Cutler, S. E., & Nolen-Hoeksema, S. (1991). Accounting for sex differences in depression through female victimization: childhood sexual abuse. *Sex Roles*, *24*, 425-438.

Davíðsdóttir S. D., Þórsdóttir G. I., & Halldórsson, B. (2006). Mat á árangri hugrænnar atferlismeðferðar í hóp við félagsfælni. *Sálfræðiritið*, *10*, 9-21.

Dozois, D. J., Dobson, K. S., & Ahnberg, J. L. (1998). A psychometric evaluation of the Beck Depression Inventory–II. *Psychological Assessment*, *10*, 83-89.

Dykman, B. M. (1997). A test of whether negative emotional priming facilitates access to latent dysfunctional attitudes. *Cognition and Emotion*, *11*, 197–222.

Ellertsdóttir, G. H. (2015). Þáttagreining á LEIDS sjálfsmatslista við hugnæmi í depurð. Unpublished BS dissertation. Faculty of Psychology, University of Iceland, Reykjavík.

Ersche, K. D., Lim, T. V., Ward, L. H., Robbins, T. W., & Stochl, J. (2017). Creature of Habit: A self-report measure of habitual routines and automatic tendencies in everyday life. *Personality and Individual Differences*, *116*, 73-85.

Figueroa, C. A., Mocking, R. J. T., Mahmoud, G. A., Koeter, M. W., Bockting, C. L., van der Does, W., . . . Schene, A. H. (2018). The measurement of cognitive reactivity to sad mood in patients remitted from major depressive disorder. *British Journal of Clinical Psychology*, *57*, 1-15.

Figueroa, C. A., Ruhé, H. G., Koeter, M. W., Spinhoven, P., van der Does, W., Bockting, C. L., & Schene, A. H. (2015). Cognitive reactivity versus dysfunctional cognitions and the prediction of relapse in recurrent major depressive disorder. *The Journal of Clinical Psychiatry*, *76*, 1306-1312.

Gemar, M. C., Segal, Z. V., Sagrati, S., & Kennedy, S. J. (2001). Mood-induced changes on the Implicit Association Test in recovered depressed patients. *Journal of Abnormal Psychology*, *110*(2), 282-289.

Gibb, B. E. (2002). Childhood maltreatment and negative cognitive styles: a quantitative and qualitative review. *Clinical Psychology Review*, *22*, 223-246.

Gibb, B. E., Abramson, L. Y., & Alloy, L. B. (2004). Emotional maltreatment from parents, verbal peer victimization, and cognitive vulnerability to depression. *Cognitive Therapy and Research*, *28*(1), 1-21.

Gibb, B. E, Alloy, L. B., & Abramson, L. Y. (2003a). Global reports of childhood maltreatment versus recall of specific maltreatment experiences: relationships with dysfunctional attitudes and depressive symptoms. *Cognition & Emotion*, *17*, 903-915.

Gibb, B. E., Alloy, L. B., Abramson, L. Y., Rose, D. T., Whitehouse, W. G., Donovan, P., . . . Tierney, S. (2001). History of childhood maltreatment, negative cognitive styles, and episodes of depression in adulthood. *Cognitive Therapy and Research*, *25*, 425-446.

Gibb, B. E., Butler, A. C., & Beck, J. S. (2003b). Childhood abuse, depression, and anxiety in adult psychiatric outpatients. *Depression and Anxiety*, *17*, 226-228.

Gibb, B. E., Chelmiski, I., & Zimmerman, M. (2007). Childhood emotional, physical, and sexual abuse, and diagnoses of depressive and anxiety disorders in adult psychiatric outpatients. *Depression and Anxiety*, *24*, 256–263.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, *26*, 41-54.

Guðmundsdóttir, G.B. & Rögnvaldsdóttir, K.E. (2015). Próffræðilegir eiginleikar DAS-A og DAS-B í íslenskri þýðingu: Spurningalistar um ógagnleg viðhorf í þunglyndi [Psychometric properties of the Icelandic version of the DAS A and B to measures dysfunctional attitudes in depression]. Unpublished BS dissertation. Faculty of Psychology, University of Iceland, Reykjavík.

Hankin, B. L. (2006). Childhood maltreatment and psychopathology: prospective tests of attachment, cognitive vulnerability, and stress as mediating processes. *Cognitive Therapy and Research*, *29*, 645-671.

Hovens, J. G. F. M., Giltay, E. J., van Hemert, A. M., & Penninx, B. W. J. H. (2016). Childhood maltreatment and the course of depressive and anxiety disorders: The contribution of personality characteristics. *Depression and Anxiety*, *33*(1), 27-34.

Jarrett, R. B., Minhajuddin, A., Borman, P. D., Dunlap, L., Segal, Z. V., Kidner, C. L., . . . Thase, M. E. (2012). Cognitive reactivity, dysfunctional attitudes, and depressive relapse and recurrence in cognitive therapy responders. *Behaviour Research and Therapy*, *50*(5), 280-286.

Joormann, J. (2009). Cognitive Aspects of Depression. In I. H. Gotlib & C. L. Hammen (Eds.), *Handbook of Depression* (p. 298-315). New York: Guilford Press.

Judd, L. L. (1997). The Clinical Course of Unipolar Major Depressive Disorders. *Arch Gen Psychiatry, 54*, 989–991.

Kruijt, A. W., Antypa, N., Booij, L., de Jong, P. J., Glashouwer, K., Penninx, B. W., & van der Does, W. (2013). Cognitive reactivity, implicit associations, and the incidence of depression: A two-year prospective study. *PLoS One*, *8*(7), e70245.

Lau, M. A., Haigh, E. A. P., Christensen, B. K., Segal, Z. V., & Taube-Schiff, M. (2012). Evaluating the mood state dependence of automatic thoughts and dysfunctional attitudes in remitted versus never-depressed individuals. *Journal of Cognitive Psychotherapy*, *26*, 381-389

Lau, M. A., Segal, Z. V., & Williams, J. M. G. (2004). Teasdale's differential activation hypothesis: implications for mechanisms of depressive relapse and suicidal behaviour. *Behaviour Research and Therapy*, *42*, 1001-1017.

Lethbridge, R., & Allen, N. B. (2008). Mood induced cognitive and emotional reactivity, life stress, and the prediction of depressive relapse. *Behaviour Research and Therapy*, *46*, 1142-1150.

Lindert, J., von Ehrenstein, O. S., Grashow, R., Gal, G., Braehler, E., & Weisskopf, M. G. (2014). Sexual and physical abuse in childhood is associated with depression and anxiety over the life course: systematic review and meta-analysis. *International Journal of Public Health*, *59*, 359-372.

Lo, C. S. L., Ho, S. M. Y., & Hollon, S. D. (2008). The effects of rumination and negative cognitive styles on depression: a mediation analysis. *Behaviour Research and Therapy*, *46*, 487-495.

Lyubomirsky, S., & Tkach, C. (2004). The consequences of dyshporic rumination. In C. Papageorgiou og A. Wells (Eds.), *Depressive rumination: Nature, theory and treatment* (p. 21-41). West Sussex: John Wiley and Sons.

Miranda, J., Gross, J. J., Persons, J. B., & Hahn, J. (1998). Mood matters: Negative mood induction activates dysfunctional attitudes in women vulnerable to depression. *Cognitive Therapy and Research*, *22*, 363-376.

Miranda, J., & Persons, J. B. (1988). Dysfunctional attitudes are mood-state dependent. *Journal of Abnormal Psychology*, *97*(1), 76-79.

Monroe, S. M., & Harkness, K. L. (2012). Is depression a chronic mental illness? *Psychological Medicine, 42,* 899-902.

Morrow, J., & Nolen-Hoeksema, S. (1990). Effects of responses to depression on the remediation of depressive affect. *Journal of Personality and Social Psychology*, *58*, 519-527.

Moulds, M. L., Kandris, E., Williams, A. D., Lang, T., Yap, C., & Hoffmeister, K. (2008). An investigation of the relationship between cognitive reactivity and rumination. *Behavior Therapy*, *39*, 65-71.

Mueller, T. I., Leon, A. C., Keller, M. B., Solomon, D. A., Endicott, J., Coryell, W., . . . Maser, J. D. (1999). Recurrence after recovery from major depressive disorder during 15 years of observational follow-up. *American Journal of Psychiatry*, *156*, 1000-1006.

Nelson, J., Klumparendt, A., Doebler, P., & Ehring, T. (2017). Childhood maltreatment and characteristics of adult depression: meta-analysis. *The British Journal of Psychiatry*, *210*(2), 96-104.

Nock, M. K., Wedig, M. M., Holmberg, E. B., & Hooley, J. M. (2008). The emotion reactivity scale: development, evaluation, and relation to self-injurious thoughts and behaviors. *Behavior therapy*, *39*, 107-116.

Nolen-Hoeksema, S. (1987). Sex differences in unipolar depression: evidence and theory. *Psychological Bulletin*, *101*(2), 259-258.

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, *100*, 569-582.

Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, *109*, 504-511.

Nolen-Hoeksema, S. (2001). Gender differences in depression. *Current Directions in Psychological Science*, *10*, 173-176.

Nolen-Hoeksema, S. (2004). The response styles theory. In C. Papageorgiou og A. Wells (Eds.), *Depressive rumination: Nature, theory and treatment* (p. 107-124). West Sussex: John Wiley and Sons.

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology*, *61*(1), 115-121.

Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and emotion*, *7*, 561-570.

Nolen-Hoeksema, S., Parker, L. E., & Larson, J. (1994). Ruminative coping with depressed mood following loss. *Journal of Personality and Social Psychology*, *67*(1), 92-104.

Nolen-Hoeksema, S., Wisco, B. E, & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science*, *3*, 400-424.

Oliver, J. M., & Baumgart, E. P. (1985). The dysfunctional attitude scale: Psychometrics properties and relation to depression in an unselected adult population. *Cognitive Therapy and Research, 9,* 161-167.

Padilla Paredes, P., & Calvete, E. (2014). Cognitive vulnerabilities as mediators between emotional abuse and depressive symptoms. *Journal of Abnormal Child Psychology*, *42*, 743-753.

Pálsdóttir K. & Pálsdóttir S. (2008). Mat á próffræðilegum eiginleikum Ruminative Response Scale: Samanburður á íslenskri og bandarísri útgáfu listans [Evaluation of the psychometric properties of the Ruminative Response Scale: Comparing the Icelandic and English versions]. Unpublished BA dissertation. Faculty of Psychology, University of Iceland, Reykjavík.

Pennebaker, J. W., & Susman, J. R. (1988). Disclosure of traumas and psychosomatic processes. *Social Science & Medicine*, *26*, 327-332.

Power, M. J., Katz, R., McGuffin, P., Duggan, C. F., Lam, D., & Beck, A. T. (1994). The dysfunctional attitude scale (DAS): a comparison of forms A and B and proposals for a new subscaled version. *Journal of Research in Personality*, *28*, 263-276.

Rimes, K. A., & Watkins, E. (2005). The effects of self-focused rumination on global negative self-judgements in depression. *Behaviour Research and Therapy*, *43*, 1673-1681.

Raes, F., & Hermans, D. (2008). On the mediating role of subtypes of rumination in the relationship between childhood emotional abuse and depressed mood: Brooding versus reflection. *Depression and Anxiety*, *25*, 1067-1070.

Robinson, M. S., & Alloy, L. B. (2003). Negative cognitive styles and stress-reactive rumination interact to predict depression: A prospective study. *Cognitive Therapy and Research*, *27*, 275-291.

Rose, D. T., & Abramson, L. Y. (1992). Developmental predictors of depressive cognitive style: Research and theory. In D. Cicchetti & S. Toth (Eds.), *Rochester symposium of developmental psychopathology* (Vol. IV, p. 323–349). Rochester, NY: University of Rochester Press.

Sarin, S., & Nolen-Hoeksema, S. (2010). The dangers of dwelling: An examination of the relationship between rumination and consumptive coping in survivors of childhood sexual abuse. *Cognition and Emotion*, *24*(1), 71-85.

Scher, C. D., Ingram, R. E., & Segal, Z. V. (2005). Cognitive reactivity and vulnerability: Empirical evaluation of construct activation and cognitive diatheses in unipolar depression. *Clinical Psychology Review*, *25*, 487-510.

Segal, Z. V., Gemar, M., & Williams, S. (1999). Differential cognitive response to a mood challenge following successful cognitive therapy or pharmacotherapy for unipolar depression. *Journal of Abnormal Psychology*, *108*(1), 3-10.

Segal, Z. V., Kennedy, S., Gemar, M., Hood, K., Pedersen, R., & Buis, T. (2006). Cognitive reactivity to sad mood provocation and the prediction of depressive relapse. *Archives of General Psychiatry*, *63*, 749-755.

Shapero, B. G., Black, S. K., Liu, R. T., Klugman, J., Bender, R. E., Abramson, L. Y., & Alloy, L. B. (2014). Stressful life events and depression symptoms: the effect of childhood emotional abuse on stress reactivity. *Journal of Clinical Psychology*, *70*(3), 209-223.

Snaith, P. (1993). Anhedonia: a neglected symptom of psychopathology. *Psychological Medicine*, *23*, 957-966.

Solis, E., Antypa, N., Conijn, J. M., Kelderman, H., & van der Does, W. (2016). Psychometric Properties of the Leiden Index of Depression Sensitivity (LEIDS). *Psychological Assessment*, *29*, 158-171.

Spasojević, J., & Alloy, L. B. (2001). Rumination as a common mechanism relating depressive risk factors to depression. *Emotion*, *1*, 25-37.

Spasojević, J., & Alloy, L. B. (2002). Who becomes a depressive ruminator? Developmental antecedents of ruminative response style. *Journal of Cognitive Psychotherapy*, *16*, 405-419.

Spasojević, J., Alloy, L. B., Abramson, L. Y., Maccoon, D., & Robinson, M. S. (2004). Reactive rumination: outcomes, mechanisms, and developmental antecedents. *Depressive Rumination: Nature, theory and treatment.* In C. Papageorgiou and A. Wells, (p. 43-58). West Sussex: John Wiley and Sons.

Sprinkle, S. D., Lurie, D., Insko, S. L., Atkinson, G., Jones, G. L., Logan, A. R., & Bissada, N. N. (2002). Criterion validity, severity cut scores, and test-retest reliability of the Beck Depression Inventory-II in a university counseling center sample. *Journal of Counseling Psychology*, *49*, 381-385.

Teasdale, J. D. (1983). Negative thinking in depression: Cause, effect, or reciprocal relationship? *Advances in Behaviour and Research Therapy*, *5*, 3-25.

Teasdale, J. D. (1988). Cognitive vulnerability to persistent depression. *Cognition & Emotion*, *2*(3), 247-274.

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, *27*, 247-259.

van der Does, W. (2002). Cognitive reactivity to sad mood: structure and validity of a new measure. *Behaviour Research and Therapy, 40*, 105-120.

van der Does, W., & Williams, J. M. G. (2003). Leiden index of depression sensitivity-revised (LEIDS-R). Leiden University.

van Rijsbergen, G. D., Bockting, C. L. H., Burger, H., Spinhoven, P., Koeter, M. W. J., Ruhe, H. G., . . . Schene, A. H. (2013). Mood reactivity rather than cognitive reactivity is predictive of depressive relapse: A randomized study with 5.5-year follow-up. *Journal of Consulting and Clinical Psychology*, *81*, 508-517.

Verplanken, B., Friborg, O., Wang, C. E., Trafimow, D., & Woolf, K. (2007). Mental habits: metacognitive reflection on negative self-thinking. *Journal of Personality and Social Psychology*, *92*, 526-541.

Watkins, E. R. (2009). Depressive rumination and co-morbidity: evidence for brooding as a transdiagnostic process. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 27*(3), 160-175.

Watkins, E., & Teasdale, J.D. (2001). Rumination and overgeneral memory in depression: effects of self-focus and analytic thinking. *Journal of Abnormal Psychology*, *110*, 353-357.

Watkins, E., & Teasdale, J. D. (2004). Adaptive and maladaptive self-focus in depression. *Journal of Affective Disorders*, *82*, 1-8.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063-1070.

Weissman, A. N. (1979). The Dysfunctional Attitude Scale: A validation study. *Dissertation Abstracts International, 40,* 1389B-1390B. (University Microfilms No. 79-19, 533).

Weissman, A. N. & Beck, A. T. (1978). *Development and validation of the Dysfunctional Attitudes Scale: a preliminary investigation*. In: Proceedings of the meeting of the American Educational Research Association. Toronto, ON.

World Health Organization. (2017). *Depression* (Fact sheet No. 369). Retrieved from http://www.who.int/mediacentre/factsheets/fs369/en/