Rumination as a Mental Habit
A study of habitual characteristics of depressive rumination in a non-clinical sample

Hildur Eva Ásmundardóttir
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Lokaverkefni til BS-gráðu í sálfraði
Leiðbeinandi: Ragnar Pétur Ólafsson

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Ritgerð þessi er lokaverkefni til BS gráðu í sálfræði og er óheimilt að afrita ritgerðina á nokkurn hátt nema með leyfi rétthafta.

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The aim of the study was to examine the habitual characteristics of rumination. Depressive rumination is repeated self-focused thoughts on one’s depressive symptoms and their implications, and is related to both onset and duration of depressive episodes. It has recently been proposed that rumination can be conceptualized as a mental habit, as it may have general characteristics of habitual behaviours, such as repetition, automaticity and being triggered by stable contexts. It was hypothesised that those who report more depressive symptoms have stronger rumination tendencies, and that greater habitual characteristics of negative thinking would be associated with stronger rumination tendencies. In total, 85 university students completed questionnaires of depression and anxiety symptoms, trait rumination tendency and habitual characteristics of negative thinking (BDI-II, BAI, HINT, RRS). They also completed a rumination induction task (mood measure and overgeneral thinking). The hypotheses were partially supported. Those who reported more depressive symptoms showed more rumination tendencies measured with questionnaires, and those who reported stronger tendency to habitual negative thinking were more prone to rumination measured with questionnaires. However, the rumination induction task did not affect participants’ mood, contrary to previous research. The results indicate that depressive rumination may be viewed as a form of a mental habit but this needs to be tested using experimental tasks in future studies.
Acknowledgements

This thesis was written under the guidance of Ragnar P. Ólafsson. We want to thank him for his invaluable assistance and excellent guidance. We also want to thank Ási Þórarson for proof reading and social support.
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Depression is a well-known mental disorder and has been widely researched. Cognitive theorists have speculated what cognitive factors are involved in the onset of depression, its duration and the frequency of relapses. Depressive rumination is a cognitive vulnerability factor, that has been defined as “behaviors and thoughts that focus one’s attention on one’s depressive symptoms and on the implications of these symptoms” (Nolen-Hoeksema, 1991, p. 569). People who ruminate tend to analyse over and over again feelings of distress and depressed mood, and their problems and concerns, making them more vulnerable for future depressive episodes (Watkins, 2008). The most prominent theory of rumination is the response styles theory (RST; Nolen-Hoeksema, 1991). The theory states that rumination is a response to distress that involves focusing on symptoms of distress passively and repetitively, as well as focusing on the potential causes and consequences of these symptoms.

Rumination disrupts effective problem solving and appears to do so by making the problems seem overwhelming to the dysphoric individual (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky et al., 1999). In addition, there seems to be an overall cognitive inflexibility among ruminators which manifests in a general shortage in the ability to switch to a helpful strategy from an unhelpful one when performing a task. This was noted in a study using the Wisconsin Card Sort Task, a standard measure of cognitive flexibility (Davis & Nolen-Hoeksema, 2000).

Joormann (2006) states that ruminators have trouble inhibiting negative information. This can make it hard for them to use positive or pleasant distractors to reverse their negative mood (Joormann, 2005) and may motivate ruminators to turn to unconstructive ways to cope with the depressive mood such as binge eating or drinking (Nolen-Hoeksema, Wisco & Lyubomirsky, 2008). Furthermore, research suggests that rumination is a transdiagnostic risk factor for various disorders such as anxiety, eating disorders, alcohol abuse and self-harm (Hilt, Cha, & Nolen-Hoeksema, 2008; Nolen-Hoeksema, 2000; Nolen-Hoeksema & Harrell, 2002; Nolen-Hoeksema, Stice, Wade & Bohon, 2007).

Rumination does not seem to have a beneficial component as the aforementioned description clearly states. However, the ruminator does not necessarily see it that way. When people ruminate, they say that they are gaining insight into their problems and feelings and the meaning of them (Lyubomirsky & Nolen-Hoeksema, 1993). Nevertheless, it seems that rumination is connected to an ongoing processing of negative emotional material (McLaughlin, Borkovec & Sibrava, 2007). On this account, behavioural theorists have argued that rumination is a form of avoidance where depressed individuals preoccupy their attention and consequently avoid involving themselves in the aversive environment (Ferster, 1973).
Rumination is most often measured with the Rumination Response Scale, a self-report measure with two subscales: brooding and reflective pondering (RRS; Nolen-Hoeksema & Morrow, 1991). Reflective pondering “suggests a purposeful turning inward to engage in cognitive problem solving to alleviate one’s depressive symptoms” (Treynor, Gonzalez & Nolen-Hoeksema, 2003, p.256) while brooding is a more passive comparison of some unachieved standard to one’s current state of affair. Despite the fact that only the brooding component has been linked to future depression, both forms of rumination have been related to greater current symptoms of depression (Treynor et al., 2003).

Another way to measure rumination is by administering a rumination induction task in a controlled environment where participants are asked to focus on thoughts that are self-focused, emotion-focused and symptom-focused. In their research, Rimes and Watkins (2005) split the rumination induction task into an analytical focus and an experiential self-focus. Teasdale (1999) hypothesised that these two components are functionally distinct forms of self-attention. The analytical self-focus is described as thinking analytically about one’s symptoms and oneself and is thought to be maladaptive in depression. However, the experiential self-focus is described as focusing in the present moment, on the experience of one’s sensations, feelings and thoughts, and is thought to be adaptive in depression. In accordance with this hypothesis, Watkins and Teasdale (2004) found that analytical self-focus maintains overgeneral memory (e.g. “I never do anything right”) in depressed individuals, whilst experiential self-focus reduces it.

These measures have been used to identify the effects of rumination tendencies on the onset and duration of depressive episodes. It was originally suggested by Nolen-Hoeksema (1991) that rumination was more linked to the duration of depressive episodes than the onset and has been supported in several studies. For example, in a study by Nolen-Hoeksema and Morrow (1991), 137 students were examined following the Loma Prieta earthquake. Students who reported more depressive symptoms, and had more rumination tendencies showed prolonged symptoms at follow-up after seven weeks. Another study with a sample of 48 students, both depressed and non-depressed, showed that induced ruminative responses to depressed mood seemed to aggravate and prolong depressed moods. (Nolen-Hoeksema & Morrow, 1993). However, other research has suggested that rumination does not predict the duration of depressive episodes. Just and Alloy (1997) found that college students who ruminate in response to depressed mood were more likely to experience a depressive episode over the next 18 months. The rumination scores did not predict the duration of the episode in
already depressed students. There does not seem to be a consensus on whether rumination contributes to the onset or duration of a depressive episode.

Watkins and Nolen-Hoeksema (2014) recently proposed a theoretical framework of depressive rumination as a form of mental habit. This proposal is based on the view offered by the control theory of rumination (Martin & Tesser, 1996), in which rumination is seen as a state similar to cognitive response that arises due to a perceived discrepancy between one’s personal goals and the attainment of these goals. According to the control theory account, ruminative state is instigated by a negative discrepancy (ideal vs. actual) in goals important to the individual (Roberts, Watkins & Wills, 2013). When the discrepancy between performance and the goal is perceived as negative, it creates dissatisfaction (Bandura, 1989). This account assumes that thoughts are goal-directed, but these goals are not necessarily conscious or have a definitive end-point. The idea is that the individual will ruminate until the goal is either attained or abandoned (Martin & Tesser, 1996). Negative mood can cause individuals to set unrealistic goals that make it harder to resolve a goal discrepancy. Maladaptive beliefs about self-worth and dysfunctional attitudes will lead to goals that are harder to attain and a reluctance to abandon them. In that way, the individual is trapped in unconstructive repetitive thought, such as depressive rumination (Watkins, 2008). According to the theoretical framework of Watkins and Nolen-Hoeksema (2014), depressive rumination may be a form of a habitual response to negative mood originating in goal-discrepancy.

Habit is generally defined as behaviour performed repeatedly in stable context with a defining feature of automaticity (Aarts & Dijksterhuis, 2000). Habits are acquired gradually by learning associations between responses and cues in a particular context (Quinn, Pascoe, Wood & Neal, 2010). In the behaviourist tradition, habit was a simple stimulus-response association with an emphasis on behavioural frequency. Since then, it has been considered a response to a cue with an essential function of reaching a certain goal (Aarts & Dijksterhuis, 2000; Verplanken & Aarts, 1999; Verplanken, Friborg, Wang, Trafimow & Woolf 2007; Wood & Neal, 2007). In modern research, the idea is that habit has three central aspects: the behaviour is repetitive, automatic, and triggered by stable contexts (Orbell & Verplanken, 2010). Automaticity can be divided into four distinctive features which Bargh (1994) called “the four horsemen of automaticity”: “lack of awareness, mental efficiency, lack of control, and lack of conscious intent” (Verplanken et al. 2007, p. 526). However, behaviour does not need all four qualities to be considered automatic (Bargh, 1994).

Wood and Neal (2007) proposed a new empirically supported model in which habitual behaviour is a direct response to context cues without the intention of obtaining a goal.
Behaviour is goal-directed in the process of learning, but once behaviour becomes habitual, it is no longer goal-directed and is executed without intention. The habit is a remainder of an earlier goal pursuit (Wood & Neal, 2007). Therefore, there is a direct association between the context and the response. It is worth noting that the direct contextual control is an important factor in the resistance to change in habitual behaviour (Orbell & Verplanken, 2010). The cues which trigger a response may be a certain location, a certain response that precedes the behaviour, certain people or even an internal state or thought (e.g. negative mood) (Wood & Neal, 2007; Orbell & Verplanken, 2010).

Habit is therefore relevant to mental states. The idea of habit as a mental construct and not mere frequency of overt behaviour gives new meaning to the construct (Verplanken, 2006; Verplanken et al., 2007). It has been hypothesised that rumination is a form of mental habit because ruminative thoughts are often triggered without much awareness or conscious intent. Habits and control are at opposite ends of a continuum of cognitive controlled processes and mental habits can emerge when cognitive control is impaired. Furthermore, when attention is occupied by habitual thoughts, it is difficult to divert one’s thoughts to something else (Hertel, 2004; Verplanken & Wood, 2006). According to Hertel (2004) mental habits can affect mood and even predict future mood impairment.

The habit-goal framework of Watkins and Nolen-Hoeksema (2014) suggests that ruminative state becomes contingent on negative mood by repetition in a stable context. Thus, the negative mood becomes a direct context cue for an automatic response of rumination. When habitual rumination develops, the repetitive thought is not only contingent on negative mood but involves a passive focus on negative content (Watkins & Nolen-Hoeksema, 2014). Because the behavioural intent is no longer present in habits it is difficult to stop performing the behaviour even though the individual has new goals. If goals and habits are not in agreement, the goals have little influence. Once behaviour becomes habitual the outcome is less important. This may explain why the individual persists in performing the behaviour, even with negative consequences for the individual. Habitual depressive rumination is therefore resistant to change which may explain why it is hard for ruminators to break free from it and could explain why relapse is so frequent in depression (Hertel, 2004: Watkins & Nolen-Hoeksema, 2014).

This study attempts to explore habitual characteristics of depressive rumination. According to previous research (Flett, Madorsky, Hewitt & Heisel, 2002; Nolen-Hoeksema, Parker & Larson, 1994; Spasojevic & Alloy, 2001), depressed individuals are prone to rumination. Thus, it is hypothesised that those who report more depressive symptoms will
show more rumination tendencies than those reporting fewer symptoms, measured with both self-report and with rumination induction task. Furthermore, the main purpose of this study is to explore rumination as a mental habit as suggested by the habit-goal framework (Watkins & Nolen-Hoeksema, 2014). To our knowledge, this has not been empirically tested. Thus, it is hypothesised that those who report stronger tendencies to habitual behaviour will be more prone to rumination than those reporting weaker tendencies, measured with both self-report and with rumination induction task.
Method

Participants
Participants were 85 students, 53 female (62%) and 32 male (38%), enrolled at the University of Iceland. Age ranged from 19-50 years (M = 24, S = 4.9). Participants were sampled by convenience and received 1500 ISK for their participation. An email was sent to all students registered at the University of Iceland inviting them to participate in the study. Participants were also contacted through social media.

Measures

Background Questions
Participants were asked about their age, gender, level of education and marital status.

The Ruminative Response Scale (RRS)
The Ruminative Response Scale (Treynor et al., 2003) consists of 22 items that assess one’s tendency to ruminate in response to depressed mood. The responses are either self-focused (e.g. think about how alone you feel), symptom-focused (e.g. think about how angry you are with yourself) or focused on the potential consequences and causes of their mood (e.g. go someplace alone to think about your feelings). Each item is rated on a four-point scale, ranging from “never or almost never” to “always or almost always”. The lowest possible score is therefore 22, indicating no tendency to ruminate. The highest score is 88, indicating high tendency to ruminate (Nolen-Hoeksema & Morrow, 1991). RRS has two subscales, the brooding factor and the reflective pondering factor, both consisting of five questions. The remaining 12 questions are depression related (Treynor et al., 2003). The list has demonstrated good internal consistency (α = .89) and correlates strongly (r = .62) with a measure of ruminative responses to depressed mood in a 30-day diary study (Nolen-Hoeksema & Morrow, 1991). The Icelandic version of RRS was translated by Jakob Smári and has comparable psychometric properties to the original version (Pálsdóttir & Pálsdóttir, 2008).

Habit-Index of Negative Thinking (HINT)
Habit-Index of Negative Thinking (Verplanken et al., 2007) is a 12 item self-report index adapted from the Self-Report Habit Index (Verplanken & Orbell, 2003). HINT measures the strength of habitual negative self-thinking, “whether negative self-thoughts occur often, are unintended, are initiated without awareness, are difficult to control, and are self-descriptive”
Response scales on a seven-point scale were used, ranging from “strongly disagree” to “strongly agree”, with higher scores indicating a stronger habit of negative thinking. Participants are asked to indicate how much they agree or disagree with statements regarding negative thinking about themselves, such as “I do frequently”, “I do automatically” and “that feels sort of natural to me”. In a study of 5,000 Norwegian citizens the HINT showed an effect in predicting changes in anxiety and depressive symptoms after 9 months, with a stronger effect for depression. The index has high internal reliability, $\alpha = .951$ and high test-retest reliability, ($r = .801, p < .001$) (Verplanken et al., 2007). Ragnar Pétur Ólafsson translated the questionnaire to Icelandic for the present study.

**Beck Depression Inventory: Second edition (BDI-II)**

The Beck Depression Inventory-II (Beck, Steer & Brown, 1996) is a 21-item self-report instrument for the level of depressive symptoms during the past two weeks. Each item is rated on a scale ranging from 0-3 with the highest summary score of 63, indicating severe depressive symptoms. BDI-II has high internal consistency ($\alpha = .93$ among college students) as well as adequate diagnostic validity (Dozois, Dobson & Ahnberg, 1998). The BDI-II was translated to Icelandic by Jón Friðrik Sigurðsson and Gísli Guðjónsson (Davíðsdóttir, Þórsdóttir, & Halldórsson, 2006) and good psychometric properties have been established (Arnarson, Ólason, Smári & Sigurðsson, 2008).

**Beck Anxiety Inventory (BAI)**

Beck Anxiety Inventory (Beck, Brown, Epstein & Steer, 1988) is 21-item self-report index rated on a four-point severity scale, indicating anxiety symptoms over the past week, with the highest summary score of 63. It was developed as an instrument that would reliably distinguish anxiety from depression while showing convergent validity. The BAI has high internal consistency ($\alpha = 0.92$) as well as adequate validity (Beck et al., 1988; Steer, Ranieri, Beck & Clark 1993). The BAI was translated to Icelandic by Jón Friðrik Sigurðsson and good psychometric properties have been established both in a clinical sample and a collegiate sample (Sæmundsson, 2009).

**Rumination Induction Task**

Rumination task. Participants worked through an analytical self-focused induction task (Watkins & Teasdale, 2001, 2004). This was a list of 28 items, adapted from Nolen Hoeksema & Morrow’s (1993) rumination task. Participants worked at their own pace for
eight minutes. The list consisted of sensations and symptoms (e.g. think about the experience of your present feelings lasting) with the instructions emphasising thinking about the meanings, consequences and causes of each symptom or sensation (Rimes & Watkins, 2005). The list of items was translated to Icelandic by Hildur Eva Ásmundardóttir, Lára Sigurðardóttir, Sigriður Helgadóttir and Ragnar Pétur Ólafsson for the present study.

*Mood measure.* Visual analog scale (VAS) was used to rate participants’ current mood. The scale measured 76 mm from centre to each end-point, with “sad” on the left end and “happy” located on the right end. Arrows pointing from the centre indicate the strength of mood. Similar scales have been used in previous studies of mood-related cognitions in depression (e.g. Segal, Kennedy, Gemar, Pedersen & Buis, 2006).

*Overgeneral thinking.* Self-rating scales were used to assess global negative judgements about the self. The scales consisted of the following aspects: “worthless”, “unlovable”, “competent” and “acceptable” scored from “not at all” to “totally” with the final two reversed. The negative self-devaluation scale of the Depressed States Checklist was used as a frame of reference for the aspects (Teasdale & Cox, 2001). Based on the study by Rimes and Watkins (2005) unacceptability and unlovability form a sociotropy-type judgement but worthlessness and incompetence form an autonomy-type judgement.

**Procedure**

The National Bioethics committee approved the study. Participants met the researchers once at the University of Iceland in a room provided by the Department of Psychology. They began with reading a description of the study before they gave their written consent. The research was twofold. First, the participants were asked to fill out the questionnaires. In addition, they filled out DERS, ERS, LEIDS and TES (before and after 17 years of age), which will not be used in the present study. After that, the rumination induction task was introduced. The participants filled out the questionnaire about overgeneral thinking as well as the mood measure, then read and thought about the 28-item rumination task for eight minutes. After the task, they filled out the questionnaire about overgeneral thinking again, as well as the mood measure and the manipulation check. However, the manipulation check was not used in this study. Finally, they received compensation for participation.
**Statistical Analysis**

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, 23). First correlations and reliability estimates were computed for all measures. A mixed ANOVA with repeated measures was conducted with BDI-II scores as the independent variable. Scores were split into two groups, non-dysphoric (0-13) and dysphoric (13+). Dependent variables were the mood measure and overgeneral thinking. For further analysis, a linear regression using the stepwise method was conducted, with BDI-II scores as the dependent variable and RRS scores and HINT scores as predictors.
Results

Descriptive statistics and reliability
Reliability estimates were computed for all measures in the study along with means and standard deviation. Internal consistency (Cronbach’s alpha) was adequate for all questionnaire measures (see table 1).

Table 1. Descriptive statistics and internal consistency.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRS</td>
<td>41.19</td>
<td>10.84</td>
<td>.91</td>
</tr>
<tr>
<td>Brooding</td>
<td>9.18</td>
<td>3.02</td>
<td>.75</td>
</tr>
<tr>
<td>Refl. pondering</td>
<td>8.40</td>
<td>2.84</td>
<td>.73</td>
</tr>
<tr>
<td>BDI-II</td>
<td>12.15</td>
<td>9.10</td>
<td>.91</td>
</tr>
<tr>
<td>HINT</td>
<td>42.67</td>
<td>18.86</td>
<td>.95</td>
</tr>
<tr>
<td>Overg. think. (pre)</td>
<td>16.93</td>
<td>14.25</td>
<td>.79</td>
</tr>
<tr>
<td>Overg. think. (post)</td>
<td>16.94</td>
<td>15.08</td>
<td>.77</td>
</tr>
<tr>
<td>Mood (pre)</td>
<td>105.31</td>
<td>28.99</td>
<td></td>
</tr>
<tr>
<td>Mood (post)</td>
<td>103.81</td>
<td>31.40</td>
<td></td>
</tr>
</tbody>
</table>

Note: RRS = The Rumination Response Scale (brooding and reflective pondering are subscales), BDI-II = The Beck Depression Inventory (2nd edition), HINT = Habit Index of Negative Thinking, Overg. think. = overgeneral thinking (pre and post rumination task), Mood = mood measure (pre and post rumination task).

Correlations between self-report questionnaires
Correlations between all questionnaires were significant, with RRS and BDI-II strongly correlated as expected (see table 2). HINT was positively correlated with both RRS and BDI-II, indicating that greater habitual characteristics of rumination were associated with greater rumination tendencies and depressive symptoms. At the subscale level, this relationship was stronger for depressive brooding than reflective pondering.
Table 2. Correlations between questionnaires in the study.

<table>
<thead>
<tr>
<th></th>
<th>RRS</th>
<th>Brooding</th>
<th>Refl. pond.</th>
<th>BDI-II</th>
<th>HINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRS</td>
<td>.86**</td>
<td>.74**</td>
<td>.71**</td>
<td>.56**</td>
<td></td>
</tr>
<tr>
<td>Brooding</td>
<td>.59**</td>
<td>.63**</td>
<td>.56**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refl. pond.</td>
<td>.30**</td>
<td>.29**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDI-II</td>
<td></td>
<td></td>
<td>.60**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HINT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: ** = p < .01. RRS = The Rumination Response Scale (brooding and reflective pondering are subscales), BDI-II = The Beck Depression Inventory (2nd edition), HINT = Habit Index of Negative Thinking.*

Changes in mood measure and overgeneral thinking

There was no significant change in participants’ mood after the rumination induction task. Since it was expected that those scoring high on BDI-II would also report more sadness on the mood measure and more negative overgeneral thinking, this was explored further. A mixed ANOVA with repeated measures was conducted with BDI-II scores split into two groups, non-dysphoric (0–13) and dysphoric (13>). The difference between groups was significant, both on the mood measure, $F(1,83) = 10.77, p < .01$, and overgeneral thinking, $F_{autonomy}(1,83) = 8.89, p < .01; F_{sociotropy}(1,83) = 14.56, p < .01$. Dysphoric individuals reported more sadness than non-dysphoric, both before and after the task, and showed more negative overgeneral thinking (see table 3). However, the change in mood and overgeneral thinking during the task was not significant. This suggests that the rumination induction task was not affecting mood nor overgeneral thinking, and that the difference between dysphoric and non-dysphoric individuals was pre-existing and not induced by the task.
Table 3. Descriptive statistics for the rumination induction task with participants split up in non-dysphoric and dysphoric groups.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mood (pre)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-dysphoric</td>
<td>112.07</td>
<td>27.69</td>
<td>55</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>97.94</td>
<td>27.60</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>105.31</td>
<td>28.99</td>
<td>85</td>
</tr>
<tr>
<td><strong>Mood (post)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-dysphoric</td>
<td>110.75</td>
<td>27.47</td>
<td>55</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>91.09</td>
<td>34.52</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>103.81</td>
<td>31.40</td>
<td>85</td>
</tr>
<tr>
<td><strong>Overg. think. (pre)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-dysphoric</td>
<td>12.92</td>
<td>10.29</td>
<td>55</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>24.27</td>
<td>17.45</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>16.93</td>
<td>14.25</td>
<td>85</td>
</tr>
<tr>
<td><strong>Overg. think. (post)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-dysphoric</td>
<td>13.08</td>
<td>11.67</td>
<td>55</td>
</tr>
<tr>
<td>Dysphoric</td>
<td>24.02</td>
<td>18.04</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>16.94</td>
<td>15.08</td>
<td>85</td>
</tr>
</tbody>
</table>

*Note:* Mood = mood measure (pre and post rumination task), Overg. think. = overgeneral thinking (pre and post rumination task)

**Correlations between RRS and rumination induction task**

No significant correlation was found between the RRS and change in the mood measure during the task nor between RRS and change in overgeneral thinking during the task. The data was further analysed by computing correlations separately between RRS and the mood measure before and after the task. The same was done for overgeneral thinking. There was no significant correlation between RRS and the mood measure, both pre and post, except the brooding factor had a significant correlation with the post mood measure ($r = -.24$). However, there was significant correlation between RRS and overgeneral thinking ($r$ ranging from .36 to .45) indicating that those who tend to ruminate are more likely to think negatively about themselves on the task.
Correlations between HINT, BDI-II and rumination induction task

Table 4. Correlations between HINT, BDI-II and mood measure, autonomy-type judgement, and sociotropy-type judgement.

<table>
<thead>
<tr>
<th></th>
<th>Mood</th>
<th>Worthlessness/incompetency</th>
<th>Unlovability/unacceptibility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre task</td>
<td>Post task</td>
<td>Pre task</td>
</tr>
<tr>
<td>HINT</td>
<td>-.17ns</td>
<td>-.24*</td>
<td>.54**</td>
</tr>
<tr>
<td>BDI-II</td>
<td>-.24*</td>
<td>-.27*</td>
<td>.46**</td>
</tr>
</tbody>
</table>

Note: ns = non significant, ** = p < .01, * = p < .05. BDI-II = The Beck Depression Inventory (2nd edition), HINT = Habit Index of Negative Thinking, Mood = mood measure (pre and post rumination task), Worthlessness/incompetency = autonomy-type judgement (pre and post rumination check), unlovability/unacceptibility = sociotropy-type judgement (pre and post rumination task).

No significant correlation was found between HINT, BDI-II and change in the mood measure and in overgeneral thinking during the rumination induction task. Seeing that there was a significant correlation between the pre and post measures and RRS, when analysed separately, there was good reason to explore the correlation between the separate measures and HINT as well as BDI-II (see table 4). Significant correlation was found in almost all conditions, indicating that those who score higher on both BDI-II and HINT report more sadness and have a more negative way of thinking.

The additional contribution of habitual negative thinking to depressive symptoms

Linear regression analysis was conducted in order to examine the additional contribution of habitual negative thinking to depressive symptoms. The stepwise method was used and gave two possible models. The first model, proposing that RRS was the only factor contributing to variance in depressive symptoms, was significant, F(1,83) = 84.40, p < .01. The analysis revealed that depressive rumination, β = .60, t(83) = 9.19, p < .01, is a significant predictor of depressive symptoms. The model explains 50% of the variability of depressive symptoms, R² = .50. The second model, including both HINT and RRS as contributing factors, was also significant, F(2, 82) = 52.84, p < .01. The analysis revealed that both depressive rumination, β = .46, t(83) = 6.18, p < .01, and habitual negative thinking, β = .14, t(83) = 3.33, p < .01, were significant predictors of depressive symptoms. This model explains 56% of the variability of depressive symptoms, R² = .56, indicating that the variance in depressive symptoms is better
explained by both rumination and habitual negative thinking than only rumination. Another model using the subscales of RRS and HINT revealed that the brooding factor and HINT explains more of the variance of depressive symptoms than reflective pondering and HINT. However, the model with HINT and total scores of RRS seemed to explain the variance of depressive symptoms the best.

_Correlations between anxiety and rumination and habitual negative thinking_

Further analysis of the data revealed strong correlation between BAI and RRS ($r = .64$) suggesting that rumination might be a transdiagnostic factor. However, correlation between BAI and HINT was considerably less ($r = .38$) than between BAI and RRS, indicating that habitual negative thinking more intimately related to symptoms of depression than anxiety.
Discussion

Results support the hypothesis that those who report more depressive symptoms show more rumination tendencies, as measured with questionnaires. This is consistent with previous research, indicating that depressive rumination is a vulnerability factor for depression (Nolen-Hoeksema, 1991; Watkins, 2008). Further analysis showed that the brooding subscale had stronger correlation with depressive symptoms than reflective pondering. This is also in agreement with previous studies (Treynor et al., 2003) and shows that brooding might be a contributing factor in greater current depressive symptoms.

The hypothesis that those who report stronger tendency to habitual negative thinking will be more prone to rumination measured with questionnaires was also supported, and is consistent with the habit-goal framework introduced by Watkins and Nolen-Hoeksema (2014). This could indicate that habit plays an important role in rumination, which is worthy of further research. A stronger correlation was observed between habitual negative thinking and brooding than with reflective pondering. Since brooding is more associated with depression over time than reflective pondering, it is interesting to see that it is more strongly correlated with habitual tendencies. In other words, those who have a habitual tendency for negative thinking and focus on negative aspects of self-reflection, might be more likely to experience more depression over time.

The hypotheses that those who report more depressive symptoms and more habitual negative thinking will be more prone to ruminate, as measured with a rumination induction task, were not supported.

It was expected that the task would influence the participants’ mood and show a clear difference between the mood of dysphoric and non-dysphoric individuals. However, it seemed that the rumination task itself did not affect participants’ mood nor overgeneral thinking, as there was no cognitive change during the task. Dysphoric individuals reported more sadness than non-dysphoric individuals, both before and after the task, and showed more negative overgeneral thinking. The difference between dysphoric and non-dysphoric individuals was most likely pre-existing and not induced by the task. Previous research showing that the rumination induction task affects people’s mood has used clinical samples where participants were currently depressed (Rimes & Watkins, 2005). This could explain why the task did not affect mood in this study, as it was a non-clinical sample of university students and there was no way of knowing whether they had a history of depression, were depressed or only showing depressive symptoms. Since no previous research was found using a non-clinical sample, it is
difficult to conclude whether the task could affect mood in non-depressed individuals. Perhaps it would have been necessary to induce sad mood before administering the rumination induction task, as it could be more likely that people ruminate when in a negative mood. This is an idea presented in the habit-goal framework, in which negative mood is considered a cue for habitual rumination (Watkins & Nolen-Hoeksema, 2014).

In the study by Rimes and Watkins (2005), self-reported rumination correlated positively with changes in mood and overgeneral thinking during the rumination induction task. Since the task did not seem to be affecting mood in this study, it came as no surprise that RRS and its subscales were not related to cognitive changes during the task. This could indicate a measurement error. However, when looking at the mood measure and overgeneral thinking before and after the task (instead of focusing on the change) different results emerged. There seemed to be some correlation between overgeneral thinking and trait rumination, but limited evidence was found for correlation between the mood measure and trait rumination. This provides evidence that this form of overgeneral thinking can be influenced by rumination and is consistent with previous research that shows that ruminators tend to have more negative self-judgements (Rimes & Watkins, 2005).

This gives good reason to explore the hypotheses regarding the rumination induction task from another viewpoint. It was decided to see if there was correlation between habitual negative thinking and the rumination induction task, as well as depressive symptoms, focusing on the task as a separate pre and post measure. Despite doing so, the mood measure had weaker correlation with depressive symptoms than expected, but overgeneral thinking had strong correlation with depressive symptoms and habitual negative thinking. It strengthens the idea that those who show more negative overgeneral thinking also show more depressive symptoms. More interestingly, the association between overgeneral thinking and habitual negative thinking indicates that rumination has habitual characteristics, as overgeneral thinking plays a big part in rumination (Teasdale, 1999).

The habit-goal framework is a new theoretical framework of rumination that needs to be tested. The results of this study suggest that this framework may add to existing theories of rumination, as habitual negative thinking combined with trait rumination, explains more of the variation of depressive symptoms than trait rumination by itself. It also raises an additional question. The habit-goal framework proposes that rumination is a mental habit (Watkins & Nolen-Hoeksema, 2014) which makes rumination more resistant to change. Previous research has been trying to identify how rumination functions in depression, in regards to its onset, duration and relapse. Therefore, seeing rumination as mental habit might
explain why relapse is so frequent in depression. This might have important implications regarding treatment.

Interestingly, despite the fact that trait rumination has equally strong correlations with depressive symptoms and anxiety, habitual negative thinking had a considerably stronger correlation to depressive symptoms. This is consistent with the notion that rumination is a transdiagnostic factor (Nolen-Hoeksema, 2000), while suggesting that habitual characteristics of rumination are more related to depression than anxiety.

Even though this study provides some empirical support to the habit-goal framework, it has its limitations. As mentioned earlier, the rumination induction task was not affecting mood as expected. The sample was also a homogenous convenience sample consisting only of university students. Thus, the sample is not representative of the general population. For further research, it would be interesting to study a clinical sample in order to see if depressed mood is a key factor in setting rumination in motion.

To our knowledge this theoretical framework has not been tested empirically before. It states that rumination can be seen as a mental habit, making it resistant to change. It hypothesises that traditional cognitive behavioural therapy does not necessarily deal with the underlying habitual rumination, leaving patients vulnerable to relapse (Watkins & Nolen-Hoeksema, 2014). Since the results of this study support the framework, there is reason to research it more for further empirical support. Assuming that the framework is correct, there would be cause to re-evaluate current treatments for depression and to take into consideration that rumination could be a mental habit when choosing the appropriate treatment.
References


