



# Induced rumination dampens executive processes in dysphoric young adults

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## Abstract

Self-focused, analytical mental rumination constitutes a central process in depression. It has been hypothesized that such rumination depletes executive resources that are necessary for an efficient cognitive regulation of emotion and behavior. However, most of the research supporting this hypothesis is of correlational nature. The present study examined the effects of induced rumination versus distraction on executive capacities in dysphoric and nondysphoric college students. Executive functioning was measured with the Stroop task. Results indicate that induced rumination decreases inhibition capacities in dysphoric individuals only. The flexibility facet of executive functioning was not affected by induced rumination. However, dysphoric individuals demonstrated a fundamental impairment in this latter capacity, independent of rumination induction. The implications for the facets of executive functioning affected by depression and by rumination are discussed.

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## 1. Introduction

Mental rumination is thought to be a key process in the generation and maintenance of dysphoric mood (Nolen-Hoeksema & Morrow, 1991, 1993; Watkins & Baracaa, 2001). Nolen-Hoeksema (1991) has identified a form of rumination, consisting of focusing on dysphoric symptoms, their causes and consequences, as being especially detrimental for

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mood. Similarly, [Watkins and Teasdale \(2001\)](#) have demonstrated that analytical self-focused rumination (thinking of the causes and consequences of one's present state) has deleterious consequences for dysphoric individuals. In contrast, distraction has been found to have positive effects on mood in the aforementioned research.

In dysphoric individuals, the effects of self-focused analytical rumination are manifold. It increases negative mood ([Morrow & Nolen-Hoeksema, 1990](#); [Nolen-Hoeksema & Morrow, 1993](#)) and pessimistic thoughts ([Lyubomirsky, Caldwell & Nolen-Hoeksema, 1998](#)), it reduces effective problem solving ([Ward, Lyubomirsky, Sousa & Nolen-Hoeksema, 2003](#)), and it generates an overgeneral retrieval style of autobiographical memories ([Watkins & Teasdale, 2001](#)). Studies that have experimentally manipulated rumination generally found that these deleterious effects were observed only in dysphoric individuals. Thus, it seems that the depressogenic effect of rumination is only operant in people who are depressed or vulnerable to depression.

One hypothesis accounting for these observations is that self-focused analytical rumination depletes executive resources ([Davis & Nolen-Hoeksema, 2000](#); [Watkins & Baracaia, 2001](#)). The executive system is constituted by a set of processes that are called for when usual routines become inadequate and when a task requires controlled processes ([Van der Linden et al., 2002](#)). They comprise processes of attention allocation, of behavior planning, of flexible switch of strategies, and of inhibition of irrelevant behavior or information ([Damasio, 1995](#); [Duncan, 1986](#); [Shallice, 1982](#)). It has been documented that depressed individuals present a chronic deficit in executive resources ([Elliott, 1998](#); [Veiel, 1997](#)). Such impairment is likely to impact upon ruminative thinking. In particular, inhibitory and flexibility deficits would impair the person's ability, respectively, to suppress negative thoughts ([Joormann, 2004](#)) and to switch from the over-trained ruminative pattern to a new train of thoughts ([Hertel, 2004](#)). In addition, rumination in itself, as a form of automatic thinking, might deplete cognitive resources ([McNally, 1995](#)), as it requires sustained attention on a specific content. These combined deficits would favor the installation of a cognitive interlock in which over-trained negative thoughts feed back in one another ([Teasdale, Dritschel, Taylor, & Mezzich, 1995](#)). This cognitive interlocked loop would maintain rumination and a vicious circle would be initiated, depriving the depressed individuals of the possibility to adopt another perspective on their situation.

However, to date, there has been little experimental research on the effect of induced rumination on executive functions. One notable exception is the study by [Watkins and Brown \(2002\)](#) in which depressed patients and non-depressed controls were compared on a random number generation task, performed after either a rumination or a distraction induction. Compared with the distraction induction, the rumination induction produced a significant increase in stereotyped counting responses (thought to reflect a failure of inhibitory executive control) in depressed patients but not in controls. However, after distraction, no difference was found between the two groups. The authors concluded that executive functioning might not be fundamentally impaired in depressed patients, as often assumed in the literature, but that the rumination induction seemed to interfere with concurrent executive processing. This interpretation thus suggests that depressive rumination is not a consequence of an executive deficit, but rather that the executive impairment observed in depressed individual might result from their ruminative tendencies.

[Watkins and Brown's \(2002\)](#) results are however limited by the task they used to assess executive functions. Indeed, the random number generation task yields only one general

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