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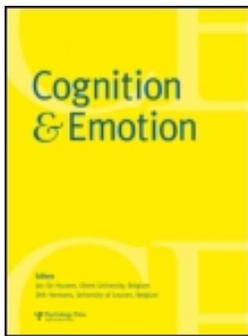
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Dealing efficiently with emotions: Acceptance-based coping with negative emotions requires fewer resources than suppression

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Previous studies have consistently shown that changing or avoiding emotions requires resources and therefore leads to impaired performance on a subsequent self-control task. The aim of the present study was to investigate the extent to which acceptance-based coping requires regulatory resources. Participants who accepted their emotions during exposure to a sad video performed better on a subsequent self-control task than participants who were instructed to suppress their emotions and a control group who received no instructions. These findings suggest that acceptance is an efficient strategy in terms of resources.

Keywords: Acceptance; Mindfulness; Emotion; Self-control; Ego depletion; Resources.

Coping with negative emotions is often accomplished by means of control-based strategies (Hayes, Follette, & Linehan, 2004). Control-based strategies, like suppression, aim to decrease the frequency and intensity of unwanted emotions. According to the limited strength model (Muraven, Tice, & Baumeister, 1998), applying these strategies requires resources. For instance, in a study by Baumeister, Bratslavsky, Muraven, and Tice (1998), it was found that participants who were instructed to suppress their emotions while watching an emotional video, performed significantly worse on a subsequent self-control task compared to participants who did not control

their emotions during the video. The model states that the energy used for an initial self-control attempt is no longer available for later attempts and therefore leads to decreased self-control performance. This phenomenon is labelled ego depletion and has been demonstrated in a wide range of studies (see Hagger, Wood, Stiff, & Chatzisarantis, 2010, for an overview).

A different way of dealing with emotions is by means of acceptance. In contrast to control-based strategies, the individual accepts and experiences the emotion fully, without attempting to alter, avoid or control it (Hayes, Strosahl, & Wilson, 1999). Acceptance entails an important

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component of acceptance-based interventions, such as acceptance and commitment therapy (Hayes et al., 1999). It involves a non-judgemental attitude toward emotions and requires willingness to stay in contact with the uncomfortable, often negative, feeling that accompanies the emotion, without reacting upon it (Bishop, 2002). Acceptance promotes the same regulated behaviour as suppression, however the emphasis is not on altering internal states, but rather on changing one's relationship to these states.

Resources

Emotion regulation has often been defined as the ability to *reduce* or *control* negative emotions (Thompson, 1994). If emotion regulation is defined in terms of the process of controlling emotions, then acceptance can not be labelled as emotion regulation, because emotions are tolerated, not controlled. However, it seems reasonable to assume that the process of applying acceptance may, to a certain extent, involve regulatory processes and thus require resources. First, acceptance of emotions entails the overriding of automatic responses or processes (Baumeister, Heatherton, & Tice, 1994). Previous studies have demonstrated that people automatically tend to approach positive and avoid negative stimuli (see Elliot, 2008, for a review). In order to accept an emotional experience, one needs to override the natural (hedonistic) tendency to avoid negative emotions. Second, acceptance requires regulation of attention. Acceptance of emotions draws on the ability to stay focused on the present emotional experience and recognise moments where attention shifts away from this experience (Wallace & Shapiro, 2006). Previous studies have shown that when individuals are required to focus their attention and avoid distraction, regulatory depletion effects are induced (e.g., Alberts, Martijn, Greb, Merckelbach, & De Vries, 2007). In sum, from this point of view, it can be predicted

that acceptance-based emotion regulation relies on self-control and should therefore lead to levels of resource depletion that are comparable to other forms of self-control strategies.

Alternatively, a key assumption of many self-regulation models is that successful self-control requires people to have a clear goal toward which they are striving (Carver & Scheier, 1981). In this view, controlling negative emotions can be defined as attempts to reduce the incongruence between a current negative state and an intended neutral or positive goal state. These attempts are a form of active control and have been proposed to deplete regulatory resources (Baumeister & Exline, 2000). In this respect, acceptance-based regulation is a fundamentally different process, since it does not involve the reduction of a discrepancy between a current state and a future goal state. Acceptance is a non-goal-oriented process (Shapiro & Schwartz, 1999), in which the person is willing to experience the current state, the emotional experience, and remains unattached to a goal or specific outcome.¹ Consequently, there is less need for active control of emotions (and thus fewer resources are required) as is the case with goal-oriented forms of regulation. From this point of view, it seems plausible to assume that acceptance of emotions may require fewer resources than goal directed self-control attempts such as suppression.

The present study

The current work used an experimental approach to explore the extent to which acceptance-based regulation requires regulatory resources. In order to do so, we used an ego-depletion paradigm (Baumeister et al 1998), in which self-control performance has been shown to decrease when people exert self-control repeatedly. Participants were first exposed to a sad video and were instructed to either suppress or accept their emotions while watching this video. Control participants did not receive any instructions.

¹Although it is possible to frame acceptance in terms of goals, namely (1) to take an accepting stance towards experienced emotions and (2) to approach this process in a non-judgemental manner, the present distinction refers to the future goal that one aims to reach by involving in a process, rather than these two present-oriented process goals.

Subsequently, performance on a self-control task was measured. Because an initial self-control attempt will drain resources and will therefore negatively impact performance on a subsequent self-control task, performance on this self-control task indicates the amount of resources used during exposure to the video. Because control-group participants were not given any instructions and thus were not required to exert self-control during the video, they were expected to outperform those in the suppression group. Moreover, if acceptance requires fewer resources compared to suppression, then self-control performance of participants in the acceptance condition should be superior compared to participants in the suppression condition. In contrast, if both acceptance and suppression deplete the resource equally, no differences in self-control performance between the groups should be observed.

An additional aim was to explore the impact of acceptance-based regulation and suppression on mood. Mood was assessed three times throughout the course of the experiment.

METHOD

Participants and design

Sixty-one undergraduates (7 men and 53 women, $M_{\text{age}} = 22.4$ years, $SD = 6.11$) of Maastricht University were randomly assigned to one of the three conditions: two experimental conditions in which type of emotion regulation instruction (acceptance vs. suppression) was varied and one control condition (no regulation instruction)—acceptance $n = 21$, suppression $n = 20$, control $n = 19$. The experiment was approved by the standing ethical committee of our faculty.

Materials and procedure

The experiment was presented as a series of unrelated tasks that tested participants' cognitive abilities. After signing a consent form, participants were randomly assigned to one of the three conditions. Then, they were asked to rate their mood on a single-item scale ranging from 1 = *very*

sad to 10 = *very happy* (Weick & Guinote, 2008). Next, they were informed that they would be viewing a short emotional video. Participants in the suppression and acceptance condition then received instructions for this video.

Instructions. Instructions were presented in the form of a five-minute audiotape and were largely adapted from Campbell-Sills, Barlow, Brown, and Hofmann (2006). Participants in the acceptance condition were instructed to focus all attention on the emotional experience, without trying to alter or avoid it. They were asked to accept emotions that would arise and stay in contact with the emotional experience from moment-to-moment. Participants in the suppression condition were encouraged to control both the experience and expression of emotions during the video. The number of words and duration was equal for both instructions. Following these instructions, both groups completed an instruction comprehension questionnaire (Campbell-Sills et al., 2006). This questionnaire consisted of four true/false questions and was used to assess whether participants were successfully able to distinguish between suppression and acceptance. Participants in the control condition did not receive any instructions and were just asked to watch the video (cf. Richards & Gross, 2000).

Video. Next, all participants watched an eight-minute excerpt from the movie *Gladiator*, in which the main character finds his wife and son murdered when he arrives home.

Measurement phase. After this video, participants were again asked to rate their mood. In addition, participants in the acceptance and suppression conditions were asked to indicate to what degree they were able to apply the instructions during the video on a 10-point scale, ranging from 1 = *not at all* to 10 = *very much*. Next, participants engaged in the self-control task, the Stop Signal Task (SST; Logan, 1994). This task was developed to measure response inhibition. In this task, a participant must respond as fast as possible to a go signal (in this case, the letter "O" or "X") by

pressing the corresponding key on the keyboard. However, when a stop signal appears (a 100 ms 1,000 Hz tone), the response must be inhibited (25% of the trials). The delay of the stop signal is initially set at 250 ms after the presentation of the go signal, and then dependent on the response from the participant adjusted dynamically. If participants successfully inhibit the response, the stop delay is increased by 50 ms. Consequently, it becomes harder to inhibit the next trial. If participants fail to inhibit the response, the stop delay is decreased by 50 ms, thereby making it easier to inhibit the next trial. The SST is designed to enable participants to inhibit 50% of the stop trials. The stop signal reaction time (SSRT) is calculated by subtracting the stop delay from the reaction time. A higher SSRT indicates poorer response inhibition. Previous research has found that ego-depleted participants are less successful at stopping themselves from responding after hearing the tone compared to participants having more resources at their disposals (Muraven, Rosman, & Gagné, 2007; Muraven, Shmueli, & Burkley, 2006). The task lasted for approximately eight minutes.

Finally, participants indicated their mood once more and were asked to write down what they thought the experiment was about. Participants were debriefed and thanked.

RESULTS

Stop Signal Task

One-way analysis of variance (ANOVA) with Condition as independent variable and SSRT as dependent variable revealed a significant effect, $F(2, 57) = 3.40, p < .05, \eta^2 = .11$. Pairwise comparisons showed that participants in the acceptance condition had a significant lower SSRT score compared to participants in the suppression condition, $F(1, 39) = 5.06, p < .05, \eta^2 = .12$, 95% CIs (208.29, 225.86), and (222.12, 240.13), respectively. In other words, participants who accepted their emotions were better able to control their impulses compared to participants who suppressed their emotions during the video.

Likewise, a significant difference was found between the acceptance and control condition, $F(1, 38) = 4.73, p < .05, \eta^2 = .11$. Participants who accepted their emotions outperformed control participants who did not receive regulation instructions, 95% CI (222.17, 240.65). In contrast with our hypothesis, no significant difference in SST performance was observed between the control condition and the suppression condition, $F(1, 37) = 0.002, p = .97, \eta^2 < .01$. Mean SSRT scores are summarised in Table 1.

Mood

A repeated-measures ANOVA of mood with Time as within factor (3 levels: before onset of the experimental procedure; directly after the video; and after completing the stop signal task) and Condition as between factor was used to assess differences in mood between groups on the three measurements. This analysis revealed a significant main effect of Condition, $F(2, 57) = 16.63, p < .001, \eta^2 = .15$. Moreover, a significant interaction effect of condition and time was found, $F(2, 57) = 4.12, p < .05, \eta^2 = .13$. In order to further explore this interaction effect, within-group comparisons were conducted using single degree of freedom contrasts.

For participants in the suppression condition, no difference in mood between the first measurement and the second measurement was observed, $F(1, 19) < 0.01, p = .99, \eta^2 < .01$ ($M = 7.2, SD = 1.2$; $M = 7.2, SD = 1.4$, respectively); 95% CIs (6.7, 7.8), and (6.6, 7.9), respectively. However, a significant decline in mood was observed after the second measurement, $F(1, 19) = 7.26, p < .05, \eta^2 = .28$ ($M_{\text{third measurement}} = 6.6, SD = 1.3$); 95%

Table 1. *Self-control performance*

	Condition		
	Acceptance	Suppression	Control
SSRT	217.07 (21.22) ¹	231.41 (18.64) ²	231.13 (20.35) ²

Note: Numbers represent mean Stop Signal Reaction Times (SSRT). Standard deviations are given in parentheses. Means with a different superscript differ significantly at $p < .05$.

CI (6.0, 7.2). In other words, suppression during the video did not have an immediate influence on participants' mood but resulted in a decrease in positive mood after time passed. A different pattern was observed for the acceptance condition. Participants who accepted their emotions reported a significantly lower mood on the second measurement ($M=6.1$, $SD=2.1$); 95% CI (5.2, 7.1) compared to the first measurement ($M=6.9$, $SD=2.0$); 95% CI (6.0, 7.8), $F(1, 20) = 7.36$, $p < .05$, $\eta^2 = .27$. Interestingly, however, a significant improvement in mood was observed after the second measurement, $F(1, 20) = 8.09$, $p < .05$, $\eta^2 = .29$ ($M_{\text{third measurement}} = 6.7$, $SD = 1.8$); 95% CI (5.9, 7.6). Finally, analysing the first and second mood scale of participants in the control condition revealed a significant drop in mood after the first measurement as well, $F(1, 18) = 10.98$, $p < .01$, $\eta^2 = .38$ ($M = 7.4$, $SD = 1.1$; $M = 6.4$, $SD = 1.6$, respectively); 95% CIs (6.9, 7.9), and (5.6, 7.1), respectively. In contrast to the acceptance condition, no difference in mood was observed between the second and third measurement, indicating that the drop in mood after the video did not restore again, $F(1, 18) = 0.02$, $p = .88$, $\eta^2 < .01$ ($M_{\text{third measurement}} = 6.3$, $SD = 1.1$); 95% CI (5.8, 6.9); see Figure 1.

In order to test the possible influence of mood changes on performance on the SST, we regressed mood 2 scores on mood 1 scores, and

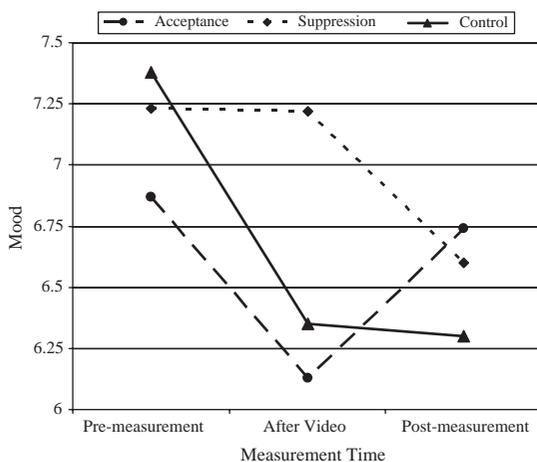


Figure 1. The course of mood during the experiment.

entered the residuals from this computation as a covariate in the ANCOVA with condition as independent variable and SSRT as dependent variable. Again, a significant effect of Condition was found, $F(2, 56) = 3.44$, $p < .05$, $\eta^2 = .11$, whereas the covariate failed to reach significance, $F(1, 56) = 0.07$, $p = .80$, $\eta^2 < .01$. These results indicate that the differences in SST performance cannot be attributed to differences in mood.

Manipulation checks

As far as can be inferred from the description of the study given in their own words in the final questionnaire, none of the participants realised the true purpose of the experiment. Analysis of the mean scores on the instruction comprehension questionnaire revealed that participants in both the acceptance and suppression conditions understood the instructions (range = 90–100% correct on the instruction comprehension questionnaire). In addition, the suppression and acceptance conditions indicated that they perceived themselves equally successful in applying the instructions, $F(1, 39) < 0.05$, $p = .93$, $\eta^2 < .01$.

DISCUSSION

The current study showed that participants who accepted their emotions during a sad video outperformed both participants who suppressed their emotions and control-group participants on a subsequent self-control task. This finding implies that applying acceptance-based coping is more efficient in terms of resource usage and relies less on self-control compared to suppression. Unexpectedly, participants who did not receive regulation instructions performed equally badly on the self-control task compared to those in the suppression condition. This finding suggests that control-group participants exerted control over their emotions during the video, possibly because they preferred to avoid expression of emotions in the presence of an experimenter. Although a similar pattern was observed in previous research (see for instance Martijn, Tenbült, Merckelbach,

Dreezens, & De Vries, 2002), no definite conclusions can be drawn on the cause of this finding.

The observed differences in resource usage between acceptance and suppression may be attributed to a differential monitor process. In acceptance, the function of the monitor process is to detect when attention shifts away from the experience in the present moment. In contrast, in goal-oriented forms of self-regulation such as suppression, the function of the monitor process is to provide information on the discrepancy between the current state and the to-be-reached goal state. When the monitor phase continuously provides information on the discrepancy between current and desired future state, a person can become caught in a vicious circle. Not being capable of successfully reducing a discrepancy can result in a disproportional amount of attention to this discrepancy (Segal, Williams, & Teasdale, 2002) and can lead to frustration (Boekaerts, 1999). Consequently, additional self-control (and thus resources) is needed to regulate this frustration. Acceptance-based coping is not primarily concerned with the discrepancy between current and future state, making the above described problem less likely to occur.

Differences in the course of mood between the three conditions were observed. More specifically, suppression did not cause a change of mood directly after the video, which can be interpreted as a sign of successful suppression. However, suppression resulted in a significant decrease in mood at the end of the experimental procedure, which may indicate a rebound effect (Wegner, 1994). In contrast, acceptance caused participants to experience a significantly decreased mood directly after the video. Interestingly, mood was restored again at the last measurement, suggesting that the initial decrease was not permanent. Finally, participants who received no instructions showed a drop in mood after exposure to the video, but did not report a recovered mood state at the end of the experiment. The fact that this pattern is different compared to both experimental conditions may indicate that a different strategy than acceptance and suppression was used.

Good self-control abilities have been found to contribute to overall quality of life (Tangney, Baumeister, & Boone, 2004). These findings may give rise to the idea that there exists a linear relationship between the ability to exert active control over one's behaviour and positive outcomes. However, the fact that a person has good self-control skills does not necessarily provide insight into the strategies that he or she employs in order to display self-regulated behaviour. Suppression, for instance, can be defined as a form of self-control. In a clinical context, however, deliberate suppression of internal states is conceptualised as experiential avoidance (Hayes et al., 1999) and has been linked with a great diversity of negative outcomes (see Hayes, Wilson, Gifford, Follette, & Strosahl, 1996, for a review). It seems important, then, to distinguish between self-control as the *process* of active control (i.e., controlling or modifying internal states) and self-control as a marker of human agency (i.e., the ability to behave in congruency with one's intentions). Acceptance draws strongly on the latter definition, departing from the assumption that accepting and staying in contact with internal states can decrease identification with these states. Disidentification can help to reduce the extent to which these states guide behaviour in a way that is incongruent with one's intentions, and may therefore increase self-control.

Limitations

Although the present findings are promising, some limitations remain. First, the current study used a relatively brief instruction to induce acceptance of emotions. In clinical practice, however, acceptance of emotions often requires a considerable amount of time and effort. Second, because most participants were women and all participants were undergraduates, generalisability of the results may be limited. Third, we did not check whether participants had been previously exposed to the sad scene presented in the experiment. Previous exposure to the scene may affect its impact on mood. Lastly, mood was measured using a single-item mood measure. Although single-item mood measures have been used by

previous researchers (Weick & Guinote, 2008), multi-affect assessment has been preferred by some researchers because of its possibility of capturing both the general negative and positive affect factors underlying mood.

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