

Individuals with depressive tendencies experience difficulty in forgetting negative material: two mechanisms revealed by ERP data in the directed forgetting paradigm

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Running title: Forgetting negative material in depression

Additional results

Behavioral data

Recognition rate

The interaction of instruction by emotion was significant ($F(1,58) = 8.65, p = 0.005, \eta_p^2 = 0.130$). Compared with the instruction of forgetting neutral words ($74.6 \pm 1.0\%$), the instruction of forgetting negative words resulted a larger recognition rate ($78.4 \pm 1.0\%$; $F(1,58) = 19.2, p < 0.001$). However, this emotion difference did not achieve significant level when participants were instructed to remember previously presented words ($F(1,58) < 1$; negative = $82.9 \pm 1.3\%$, neutral = $83.2 \pm 1.6\%$).

Reaction time

The interaction of instruction by emotion was significant ($F(1,58) = 7.10, p = 0.010, \eta_p^2 = 0.109$). Compared with the condition of remembering neutral words (751 ± 14.8 ms), the condition of remembering negative words was associated with a shorter RT (725 ± 12.1 ms) ($F(1,58) = 7.39, p = 0.009$). However, the emotion difference did not achieve significant level when participants were instructed to forget previously presented words ($F(1,58) < 1$; negative = 739 ± 16.6 ms, neutral = 731 ± 18.6 ms).

ERPs

Cue-occipital P1

The interaction of emotion by group was significant ($F(1,58) = 5.96, p = 0.018, \eta_p^2 = 0.093$). Compared with subjects without depressive tendencies (0.76 ± 0.20 μ V), subjects with depressive tendencies had larger P1 amplitudes (1.55 ± 0.20 μ V) in negative-word trials ($F(1,58) = 7.75, p = 0.007$). However, this group difference did not achieve significant level in neutral-word trials ($F(1,58) < 1$; nondepressed = 0.63 ± 0.20 μ V, depressed = 0.70 ± 0.20 μ V).

Cue-frontal N2

The interaction of emotion by group was significant ($F(1,58) = 4.73, p = 0.034, \eta_p^2 = 0.075$). Compared with subjects without depressive tendencies (3.41 ± 0.24 μ V), subjects with depressive tendencies had larger negative-going N2 amplitudes (2.53 ± 0.24 μ V) in negative-word trials ($F(1,58) = 7.00, p = 0.010$). However, this group difference did not achieve significant level in neutral-word trials ($F(1,58) < 1$; nondepressed = 3.55 ± 0.22 μ V, depressed = 3.27 ± 0.22 μ V).

The interaction of instruction by emotion was significant ($F(1,58) = 9.61, p = 0.003, \eta_p^2 = 0.142$). Compared with the instruction of forgetting previous neutral words (3.05 ± 0.21 μ V), the instruction of forgetting previous negative words evoked larger negative-going N2 amplitudes (2.15 ± 0.19 μ V; $F(1,58) = 18.8, p < 0.001$). However, this emotion difference did not achieve significant level when participants were instructed to remember previously presented words ($F(1,58) < 1$; negative = 3.79 ± 0.20 μ V, neutral = 3.78 ± 0.19 μ V).

Cue-parietal P3

The interaction of instruction by emotion was significant ($F(1,58) = 23.7, p < 0.001, \eta_p^2 = 0.290$). Compared with the instruction of remembering neutral words ($5.16 \pm 0.26 \mu\text{V}$), the instruction of remembering negative words evoked larger P3 amplitudes ($6.77 \pm 0.24 \mu\text{V}; F(1,58) = 43.1, p < 0.001$). However, this emotion difference did not achieve significant level when participants were instructed to forget previously presented words ($F(1,58) < 1$; negative = $3.22 \pm 0.22 \mu\text{V}$, neutral = $3.16 \pm 0.27 \mu\text{V}$).