Working memory capacity can be improved by expressive writing: A randomized experiment in a Japanese sample

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This study examined the influence of expressive writing on working memory capacity (WMC), a component of executive function. Japanese undergraduates (N = 104) were individually tested across six separate experimental sessions (baseline, three writing, and two follow-up sessions at 1 and 5 weeks). Participants were randomly assigned to write about a traumatic experience, their best possible future selves (BPS), or a trivial topic for 20 minutes. WMC tests were completed at baseline and follow-ups. Results indicate that expressive writing about traumatic experience can improve WMC at 5 weeks after writing, but that writing about BPS or trivial topics has no effect on WMC.

The link between emotion regulation and executive function (EF) may be most evident during the modulation of emotion processes, such as those that occur during emotion regulation (Zelazo & Cunningham, 2007). Expressive writing, a type of intentional emotion regulation process, may activate EF, which is commonly measured by working memory tasks (Cowan, 2005). The current understanding of the links between expressive writing and EF, however, is somewhat incomplete.

Although evidence suggests that expressive writing can improve working memory capacity (WMC), a number of questions about the effect of writing about positive concepts remain. Klein and Boals (2001) found that writing about a traumatic experience can increase WMC several weeks after the intervention, but that writing about positive topics has little effect. Other research, however, demonstrated beneficial results from writing about positive topics, such as one’s best possible future self (BPS; King, 2001).

Furthermore, most previous studies in this area have been conducted in English-speaking and individualistic cultures (Frattaroli, 2006). Only a handful of studies have been conducted to investigate expressive writing among individuals from...
non-English-speaking and collectivistic cultures, such as the Basque region and Japan (i.e. Paez, Velasco, & Gonzalez, 1999; Yogo, 2003).

In light of these limitations, the present study aimed to examine if writing about traumatic experience, best possible future self, or trivial topics can influence WMC with the intention of exploring expressive writing’s potential for improving executive function (EF). Additionally, it explores the beneficial effects of expressive writing for people from a non-English-speaking and collectivist culture.

**Method**

In this study, 104 Japanese undergraduates (74 women, 30 men; age range: 18–19) from Doshisha University participated. The participants were tested individually in six separate experimental sessions during the course of 9 weeks. At baseline, all participants gave informed consent and completed the first WMC test, which consisted of an arithmetic operation-word memory span task (Turner & Engle, 1989). At each writing session, participants were randomly assigned to one of the three groups: trauma writing group ($N = 35$); BPS writing group ($N = 33$); and trivial writing group ($N = 36$), and instructed to write for 20 minutes. The participants completed current negative mood ratings, using ‘depression/anxiety’ (10-item) and ‘hostility’ (10-item) subscales of the Multiple Mental States (Terasaki, Kishimoto, & Koga, 1992), and current physical symptoms, reporting on eight common symptoms (on a scale from 1 (not at all) to 4 (extremely); Pennebaker, 1982), before and after each writing session. Both trauma and trivial topics writing groups were given the original expressive writing instructions (see Pennebaker, Colder, & Sharp, 1990). The BPS writing group was asked to write about the realization of all of their life dreams (King, 2001). The second WMC test was completed 1 week after the third writing session, and the third WMC test was completed 5 weeks after the conclusion of writing.

**Results and discussion**

Eighty-three participants completed the study: trauma writing group ($N = 28$); BPS writing group ($N = 27$); and trivial writing group ($N = 36$). Twenty-one participants dropped the study. Using an Analysis of Variance (ANOVA), we found that after each writing session the BPS group reported decreased ‘depression/anxiety’ [$F(1, 99) = 30.09, \ p < .01$] and ‘physical symptoms’ [$F(1, 99) = 6.41, \ p < .05$], whereas the trauma writing group reported increased ‘hostility’ [$F(1, 99) = 30.79, \ p < .01$] and ‘physical symptoms’ [$F(1, 99) = 10.81, \ p < .01$]. These results suggest that the manipulation of writing groups was successful. WMC scores for each participant was transformed into percentages and were averaged by experimental group and by session (see Table 1). Between-within repeated measures ANOVA showed a significant group by time interaction on WMC scores [$F(4, 222) = 2.44, \ p < .05$]. Contrasts indicate that the trauma writing group had higher WMC scores than the other writing groups at 5 weeks after writing.

The findings of this study demonstrate that expressive writing can improve WMC at 5 weeks after writing, but that writing about both BPS and trivial topics has no effect on WMC. These results are consistent with Klein and Boals’ (2001) findings, but extend them to a non-English-speaking and collectivist sample. Although the mechanism is...
ill-defined, writing about traumatic experience appears to improve EF. Mitchell and Phillips (2007) suggest that mild manipulations of negative mood appear to have little effect on cognitive control processes, whereas positive mood impairs aspects of updating, planning, and switching. According to their notions, it can be speculated that writing about negative emotional experience might not impair EF, whereas writing about positive things, such as BPS, would do so (although such explanations are harder to reconcile with the control group results). Future studies should continue to clarify the relationship between EF and expressive writing, and the procedural (e.g. writing instructions) and cultural (e.g. collectivism/individualism) factors that moderate such effects.

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References


Table 1. Mean working memory scores by writing condition at each assessment period

<table>
<thead>
<tr>
<th>Group</th>
<th>Baseline</th>
<th>Follow-up</th>
<th>Follow-up</th>
</tr>
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<tbody>
<tr>
<td>Trauma writing</td>
<td>67 (16)</td>
<td>68 (11)</td>
<td>73 (13)</td>
</tr>
<tr>
<td>BPS writing</td>
<td>67 (13)</td>
<td>67 (13)</td>
<td>69 (13)</td>
</tr>
<tr>
<td>Trivial writing</td>
<td>65 (11)</td>
<td>69 (13)</td>
<td>70 (12)</td>
</tr>
</tbody>
</table>

Note. Standard deviations are in parentheses.
a One week before the first writing session.
b One week after the third writing session.
c Five week after the third writing session.


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