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*J Health Psychol* published online 1 July 2013  
DOI: 10.1177/1359105313490774

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# Writing about life goals: Effects on rumination, mood and the cortisol awakening response

Journal of Health Psychology  
0(0) 1–10  
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DOI: 10.1177/1359105313490774  
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## Abstract

Rumination is a vulnerability factor for the onset and maintenance of emotional distress. This study examined whether writing about life goals is associated with a decrease in ruminative thinking and a reduced cortisol awakening response. 68 healthy participants either wrote about their personal life goals or a control topic. Writing about life goals was associated with a modest decrease in ruminative thinking and a reduced cortisol awakening response at the post-intervention assessment. Results provide initial evidence that writing about life goals can be a helpful aid in decreasing rumination and physiological stress reactivity.

## Keywords

cortisol awakening response, personal goals, positive writing, rumination, stress

## Theoretical background

Nolen-Hoeksema (1991) posits that rumination, as a perseverative, past-oriented, and passive way of negative thinking, puts individuals at risk of experiencing intensified and prolonged symptoms of emotional distress. In line with this theoretical assumption, the role of rumination in prolonging and intensifying depressed and anxious mood has received empirical support from experimental, cross-sectional, and longitudinal studies, both in clinical and nonclinical samples of adults, adolescents, and children (Nolen-Hoeksema et al., 2008). The tendency to engage in rumination in response to dysphoric mood or stress seems to be a vulnerability factor for the development of depressive and anxious symptomatology (Watkins, 2008) and is associated with somatic complaints and somatic disease

(Brosschot et al., 2006; Soo et al., 2009). Moreover, experimental studies provide evidence that rumination negatively biases thinking, impairs motivation, concentration, and interpersonal functioning, and interferes with instrumental activity and problem-solving (Nolen-Hoeksema et al., 2008). For this reason, it is important to develop and evaluate interventions aiming at the reduction of ruminative thinking (Teismann et al., 2012).

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In their Goal Progress Theory of rumination, Martin and Tesser (1996) propose that rumination is instigated by perceived discrepancies in goal progress. According to this theory, rumination is set off whenever individuals feel they are unable to attain valued personal goals. Rumination is said to continue either until the goal is reached or until the individual disengages from the goal and abandons it. Ending rumination becomes unlikely when people's goals are difficult to reach or are so ill-defined that attainment is unlikely, or the progress toward one's goal is in conflict with another goal. In line with such theoretical assumptions, studies show that commitment to an unattained goal is associated with higher levels of rumination (e.g. Gebhardt et al., 2010; Jones et al., 2009; Kraaij et al., 2010) and that unsuccessful goal pursuit is associated with an increase in ruminative thinking (Moberly and Watkins, 2010). Klappeck et al. (2012) found that patients who feel optimistic about reaching their goals and whose goals are intrinsically motivated suffer less from rumination. Although clarity about one's goals (as well as other goal characteristics) has been shown to be associated with positive health outcomes (Michalak et al., 2005), it is unclear whether helping individuals to gain clarity about their personal goals will actually reduce rumination.

In a variation of the expressive writing paradigm (Pennebaker, 2003), where individuals are asked to write about traumatic or emotionally upsetting life events over a course of a few days, King (2001) asked participants to write about future life goals, their most traumatic life event, both of these topics, or a nonemotional control topic for 20 minutes on four consecutive days. Writing about life goals appeared to be significantly less upsetting than writing about a trauma. Individuals who wrote about life goals were higher in subjective well-being after writing than participants in all other groups. In addition, compared with the writing control condition, both writing about life goals and writing about a trauma were associated with fewer health center visits due to illness. Yet,

only writing about life goals was associated with a significant decrease in health center visits. The benefit of writing about life goals on health center visits was recently replicated in other studies (Austenfeld et al., 2006; Austenfeld and Stanton, 2008; Harrist et al., 2007). Finally, writing about life goals has been shown to be associated with an immediate increase in positive mood (Austenfeld et al., 2006; King, 2001; Sheldon and Lyubomirsky, 2006). Sheldon and Lyubomirsky (2006) assume that writing about life goals is likely to "improve self-regulation because it allows an opportunity to learn about oneself, to illuminate and restructure one's priorities, and to gain better insight into one's motives and emotions" (p. 75). Furthermore, it may well be that writing about life goals aids a person to be more optimistic about attaining relevant goals and developing a sense of self-determination in goal-striving. In light of the Goal Progress Theory of rumination (Martin and Tesser, 1996), the question arises whether writing about personal life goals not only has an impact on current mood and health behavior but also serves to overcome ruminative thinking.

In general, the question arises about the underlying mechanisms of the effects of writing on physical health: A variety of studies have found expressive writing about a traumatic event to be associated not only with fewer health center visits but also with increased immune functioning (Frattaroli, 2006). Lutgendorf and Ullrich (2002) speculate that these positive effects of expressive writing on immune functions and physical health might be mediated by a reduced cortisol level—an assumption understudied so far. Cortisol is a glucocorticoid that mediates the slower reacting second stress response elicited by the hypothalamus–pituitary–adrenal axis (HPAA). In humans, the HPAA system facilitates long lasting adaptation to stress through the release of cortisol. Beside circadian changes in cortisol levels, cortisol levels rise rapidly after awakening. The so-called cortisol awakening response (CAR) was first established by Pruessner et al. (1997) and is

associated with a 50–100 percent increase in cortisol, peaking about 30 minutes after awakening (Kudielka and Kirschbaum, 2003). The CAR is a neuroendocrine marker of adrenocortical status and is significantly related to various psychosocial factors, health, and physical conditions (Fries et al., 2009). The most robust finding is that work stress and general life stress are associated with an increased CAR (for a recent meta-analysis, see Chida and Steptoe, 2009): In one study, a reduction in financial strain was accompanied by a decrease in the CAR, indicating a parallel between changes in chronic stress and the magnitude of the CAR (Steptoe et al., 2005). Similarly, greater loneliness, sadness, or threat on a particular day predicted an increased CAR the following morning (Adam et al., 2006). In contrast, some positive psychological traits (e.g. optimism, well-being, high self-esteem, self-efficacy, and happiness) seem to be related to a reduced CAR (Endrighi et al., 2011; Steptoe et al., 2007). Based on these findings, this study examined whether writing about life goals is associated with positive changes in the CAR.

Taken together, this study examined to what extent writing about personal life goals positively impacts mood, rumination, and the CAR. In doing this, this study expands existing literature on the benefits of writing by focusing on its effects on central psychological and physiological factors of psychopathology understudied so far. We predicted that writing about life goals leads to a decrease in ruminative thinking and a decreased CAR, as well as to an increase in positive mood. After the intervention, participants who wrote about life goals should therefore exhibit lower rumination and CAR scores, as well as higher positive mood scores, than participants who wrote about a control topic.

## Methods

### Participants

The initial sample consisted of 68 participants, randomized to the experimental condition or to the control writing condition. Four participants

were excluded from the analysis due to missing data. Accordingly, the sample size in the following analyses consists of  $n = 64$  German adults (40 women and 22 men) whose age ranged from 18 to 49 years ( $M = 29.1$ , standard deviation (SD) = 8.42). Of the 64 participants, 31 participants (19 female) wrote about their future life goals and 33 participants (23 female) about a neutral control topic.

Participants were recruited from the Ruhr region in Germany. Potential participants were approached face-to-face or via announcements displayed at the university. Since age does not have a strong impact on the CAR (Pruessner et al., 1997) and neither education level nor age moderated the effect of writing in previous studies (Frattaroli, 2006), participants only had to be at least 18 years of age, and participation was not restricted to a student sample (cf. Wing et al., 2006). Due to their influence on the cortisol level, exclusion criteria included pregnancy and intake of psychoactive drugs, beta-blockers, estrogens, or glucocorticoids, as well as working night shifts. All participants provided full, informed, and written consent for research participation. Study participation was voluntary and there was no monetary compensation for study participation. The study protocol was approved by the local ethics committee of the Psychological Department of the Ruhr University Bochum (Germany).

### Measures

*Perseverative Thinking Questionnaire.* The Perseverative Thinking Questionnaire (PTQ; Ehring et al., 2011) is a 15-item self-report measure designed to assess process characteristics of ruminative thinking (e.g. repetitive, difficult to disengage from, unproductive, and capturing mental capacity). All items are answered on a 5-point scale ranging from 0 (never) to 4 (almost always). The PTQ total score has an excellent internal consistency: Cronbach's  $\alpha = .95$  (Ehring et al., 2011). Accordingly, internal consistency in the present sample was good:  $\alpha = .95$ .

**Current Mood Scale.** The Current Mood Scale (CMS; *Aktuelle Stimmungsskala*; Dalbert, 1992) is a modified German short version of the "Profile of Mood States" (POMS; McNair et al., 1971). It consists of 19 emotion adjectives with a 7-point Likert scale indicating the experience of each emotion at the present moment (e.g. exhausted, sad, and happy). Response options range from 1 = "not at all" to 7 = "very much." A total of 19 items are classified into the 5 subscales of sadness, hopelessness, tiredness, anger, and positive mood. The internal consistency (Cronbach's  $\alpha$ ) lies at .83 to .94 (Dalbert, 1992). An aggregated total score of positive affect was used in this study. The internal consistency of this subscale for the present sample was excellent:  $\alpha = .95$ .

**CAR.** CAR is a distinctive indicator of HPA function and dysfunction (Chida and Steptoe, 2009) and is easy to measure from saliva since it does not require laboratory conditions or administration of exogenous agents. Salivette sampling devices (Sarstedt, Nümbrecht, Germany) were used for saliva collection. Participants were asked to collect saliva on two consecutive workdays before and after the writing task, in sum 8 saliva samples, that is, immediately after awakening and before getting up (wake-up sample) and 30 minutes after awakening (+30-minutes sample). Participants were instructed not to brush their teeth and to refrain from eating, drinking, and smoking during the sampling procedure. The saliva samples were frozen until the experimental protocol was completed and were then returned to the laboratory. The CAR was assessed by the increase noted between the wake-up sample (baseline) and the +30-minutes sample. Change scores were calculated by subtracting the salivary cortisol concentrations of the wake-up sample from that of the +30-minutes sample. Since CAR scores are susceptible to diverse situational influences, it is common to use aggregated scores in order to increase the reliability of the CAR (e.g. Hellhammer et al., 2007; Wolf et al., 2005). In this study the scores of the two

consecutive workdays were averaged. As indicated by Spearman's Rho, the respective CAR scores were significantly correlated: day 1–day 2 CAR scores,  $r = .34$ ,  $p < .01$ ; day 3–day 4 CAR scores,  $r = .27$ ,  $p < .05$ . Cortisol levels were measured using a commercially available luminescence immune assay (IBL-Hamburg, Germany). Inter- and intra-assay coefficients of variation were below 10 percent, and the lower and upper detection limits were .015  $\mu\text{g}/\text{dL}$  (.41 nmol/L) and 4.0  $\mu\text{g}/\text{dL}$  (110.4 nmol/L), respectively.

### Procedure

Participants were randomly assigned to either the writing about life goals condition or a control condition. Assignment took place according to a predetermined, arbitrary sequence. In the *control condition*, participants were asked to write according to the following instructions (cf. King, 2001): Please write about your way to work in as much detail as possible (day 1). Today, write a detailed description of your kitchen (day 2). Today, write about how you clean the house. Be as detailed as possible (day 3). In the *experimental condition*, the following instructions were used (cf. Hayes et al., 1999; Willutzki and Koban, 2011): Imagine it's your 75th birthday; everything in your life has gone well. You've reached all your goals and all your dreams have come true. Now, please write down what should be told about you and your life retrospectively by your guests (day 1). Imagine we meet again in 5 years. Everything went well during this time. Where will we meet, what are you doing, what have you done in the past 5 years? Please write down what you've imagined (day 2). Imagine you've won 1 million Euros. Write down what you would do with the money (day 3). Similar to previous studies on the effects of writing about life goals, participants were instructed to envision a positive scenario of their life and the way they want themselves and their lives to be (cf. King, 2001; Sheldon and Lyubomirsky, 2006). Tasks like this are

common in psychotherapeutic treatments to help patients (1) gain clarity of their goals and values in life and (2) reconsider the importance of minor goals in their daily life (e.g. Hayes et al., 1999; Kanfer et al., 2011). All participants were asked to write for 20 minutes on three consecutive days. Participants were instructed to write alone in a private room—hence, they were not monitored during writing (cf. Wing et al., 2006).

Participants completed the PTQ (Ehring et al., 2011) and the CMS (Dalbert, 1992) before beginning the writing task (pre-treatment) and after three days of writing (post-treatment). The CMS (Dalbert, 1992) was assessed additionally immediately before and after each individual writing session. As described above, the CAR was assessed on the two consecutive workdays immediately preceding the writing task (pre-treatment) and on the two workdays following the writing task (post-treatment). A standard time schedule of the experiment was as follows: Participants collected the pre-treatment saliva samples on Wednesday and Thursday, completed the writing task from Friday to Sunday, and collected the post-treatment saliva samples on the following Monday and Tuesday. Saliva assessment instructions and the writing instruction packages were in separate envelopes, and written instructions guided participants as to which step to complete next.

### Statistical analyses

To identify differences between groups at post-treatment, one-way analyses of covariance (ANCOVAs) were used. Significant pre-treatment to post-treatment changes within the groups were analyzed by *t*-tests for dependent samples. In addition, within-group effect sizes were calculated according to Cohen's (1988) recommendations, using the means of post-minus pre-treatment scores and the pooled SD of the pre-treatment scores as the denominator. To determine the immediate effect of the writing topic on positive mood, ratings at the beginning and at the end of each writing session were compared using *t*-tests for dependent samples.

The overall  $\alpha$ -significance level was defined as  $p \leq .05$ . Due to directed hypothesis, hypothesis testing was conducted using one-tailed tests. There were no significant pre-treatment differences between the groups in any of the assessed characteristics: age ( $t(62) = -.63$ , not significant (NS)), gender distribution [ $\chi^2 = 0.5$ ,  $df = 1$ , NS], education level ( $t(62) = .48$ , NS), PTQ ( $F(1, 62) = .33$ , NS), CMS ( $F(1, 62) = 1.23$ , NS), and CAR ( $F(1, 62) = .01$ , NS).

## Results

### Effect of writing condition on ruminative thinking

Participants who wrote about life goals showed a significant decrease in ruminative thinking as measured by PTQ,  $t(28) = 3.10$ ,  $p < .01$ ,  $d = .32$ . The related means and standard error of means (SEM) are shown in Figure 1.

No changes were observed in the control condition,  $t(32) = .65$ , NS,  $d = .09$ . Yet, the control group and the experimental groups did not statistically differ in levels of rumination at the post-treatment assessment,  $F(2, 59) = 1.63$ , NS.

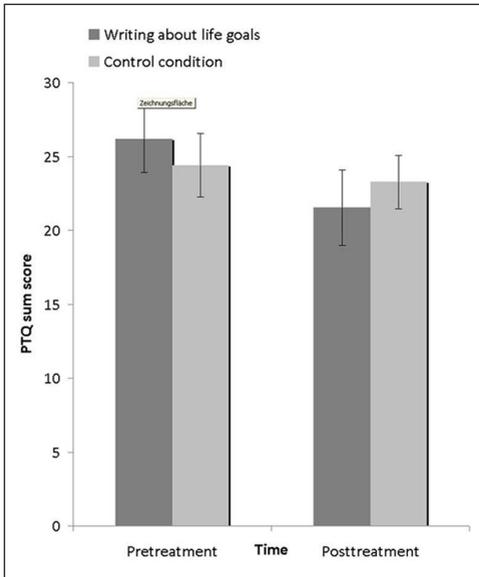
### Effect of writing condition on CAR

As shown in Figure 2, participants who wrote about life goals showed a nonsignificant decrease in the CAR on the two consecutive days after the writing task, based on the change in cortisol levels between awakening and 30 minutes later,  $t(30) = 1.56$ ,  $p < .06$ ,  $d = .29$ .

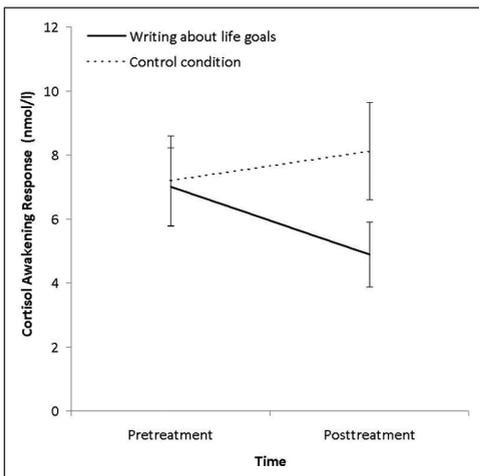
No change was observed for the control condition,  $t(32) = -.51$ , NS,  $d = .12$ . At the post-treatment assessment, participants who wrote about life goals showed a significantly lower CAR than participants who wrote about the control topic,  $F(2, 61) = 3.10$ ,  $p < .05$ .

### Effect of writing condition on positive mood

Within the 3 days of writing, participants who wrote about life goals showed an immediate increase in positive mood scores after the first,



**Figure 1.** Means and standard error of means (SEM) of the PTQ scores of both conditions before (pre-treatment) and after (post-treatment) writing. The higher the score the higher the tendency to ruminative thinking.  
PTQ: Perseverative Thinking Questionnaire.



**Figure 2.** Means and standard error of means (SEM) of the average cortisol awakening response (y-axis) as measured by the differences in cortisol levels immediately after awakening and 30 minutes later on two consecutive days before (pre-treatment) and after (post-treatment) writing.

$t(29) = -2.22, p < .05, d = 1.97$ , and the third writing tasks,  $t(29) = -2.43, p < .05, d = 1.39$ . No changes in positive mood were found after the second writing task,  $t(30) = -1.15, NS, d = -0.12$ , and no changes in mood were observed after any writing task in the control condition (day 1:  $t(32) = 0.0, NS, d = 0$ ; day 2:  $t(30) = 1.02, NS, d = 0.07$ ; day 3:  $t(32) = 1.53, NS, d = 0.15$ ). The related means and SEM are shown in Table 1. From pre-treatment to post-treatment, changes in positive mood were observed neither in the experimental,  $t(27) = .61, NS, d = .09$ , nor in the control condition,  $t(32) = 1.30, NS, d = .24$ , indicating that the immediate positive effects of writing about goals did not endure. Accordingly, the control group and the experimental groups did not statistically differ in positive mood at the post-treatment assessment,  $F(2, 59) = .01, NS$ .

## Discussion

The findings reported here provide preliminary evidence that writing about future life goals is helpful in reducing ruminative thinking and physiological stress reactivity. Specifically, writing about life goals was associated with a modest decrease in ruminative thinking. Furthermore, results revealed that compared to the control condition, writing about life goals was associated with a reduced CAR at the post-intervention assessment. However, although writing about life goals had no lasting effect on positive mood, an immediate enhancement of positive mood was observable on 2 of the 3 days of writing.

To our knowledge, this is the first study showing that ruminative thinking can be reduced through writing about life goals. Expressive writing about a traumatic event has been shown to be effective in reducing rumination (Gortner et al., 2006). Yet, this positive effect was only found for persons high in habitual thought suppression. Furthermore, a recent study was unable to find a beneficial influence of expressive writing on rumination (Maestas and Rude, 2012). It therefore might be that

**Table 1.** Means (*M*) and standard error of means (SEM) of positive mood.

	Experimental group ( <i>M</i> (SEM))	Control group ( <i>M</i> (SEM))
Positive mood score (CMS)		
Pre-treatment	23.14 (1.53)	25.52 (1.50)
Post-treatment	22.47 (1.30)	23.45 (1.53)
Positive mood score on the writing days (CMS)		
Writing day 1 pre-treatment	21.83 (1.28)	22.58 (1.29)
Writing day 1 post-treatment	24.45 (1.37)	22.58 (1.43)
Writing day 2 pre-treatment	20.87 (1.27)	22.79 (1.42)
Writing day 2 post-treatment	21.81 (1.40)	21.97 (1.49)
Writing day 3 pre-treatment	21.87 (1.55)	22.73 (1.56)
Writing day 3 post-treatment	24.00 (1.51)	21.55 (1.75)

CMS: Current Mood Scale.

writing about life goals turns out to be a helpful alternative to reduce ruminative thoughts. Yet, further studies are needed. Especially since the mechanism underlying the effect of positive writing on rumination is not clear. Nevertheless, it may well be that persons who actively focus on life goals gain awareness and clarity about their goals, restructure priorities, and/or gain confidence in approaching their goals. Disengagement from goals, reduction of goal conflicts, as well as clearer definition of goals and values might be further benefits of writing about life goals. In terms of the Goal Progress Theory of rumination (Martin and Tesser, 1996), all of these processes should be associated with a reduction in ruminative thinking processes. However, this study does not provide evidence whether changes in the perception and definition of goals take place while writing. Moreover, it remains unclear whether writing about approach or avoidance goals as well as attainable or unattainable goals made a difference. Therefore, future studies should include a content analysis of the written essays. In the final analysis, the effect on ruminative thinking was rather modest and no group differences could be found. Nevertheless, it should be kept in mind that the intervention included only three sessions consisting of a total of just 60 minutes.

The positive relationship between the writing task and a reduced CAR is particularly

interesting against the background of this minimal intervention (Fries et al., 2009)—although the effect was rather small in size. It might be that becoming clearer about one's life goals helps consider daily stressors less significant or threatening and is thereby associated with reduced cortisol secretion. It might also be that the association between writing about life goals and the reduced CAR is attributable to an increase in optimism, well-being, and/or self-efficacy—factors known to be associated with a reduced CAR (cf. Steptoe et al., 2007). Future studies should address these possible mechanisms of change. Furthermore, the question is left open whether writing about life goals as well as the decline in rumination and the CAR translate into a positive influence on physical health. Although some studies point to such an association (Brosschot et al., 2006; King, 2001), solid research is still lacking in this area.

Finally, writing about life goals was associated with a strong immediate enhancement of positive mood (cf. King, 2001; Harrist et al., 2007). Yet, a lasting enhancement of positive mood could not be detected. Sheldon and Lyubomirsky (2006) found that the degree of long-term positive mood was dependent on the extent to which participants continued writing about their life goals. It may well be that a longer writing period in this study would have been associated with sustained improvements in positive mood. On the contrary, the question

arises on how long one can meaningfully deal with the clarification of goals.

This study has some limitations, which need to be acknowledged. First, it would have been informative to include a “writing about trauma” condition, which would have allowed a direct comparison of the effect of writing on life goals with the standard task in expressive writing. Second, the study was conducted with a convenience sample of German adults. It may be that individuals from different backgrounds and of different ages would respond differently to a writing intervention. Yet, previous writing studies rarely found participant variables, such as age, gender, education level, and ethnical background, to be associated with the success of the intervention (Frattaroli, 2006). With regard to the generalizability of the results, it therefore seemed justified to use a convenience sample. Third, it would have been beneficial to assess not only the CAR but also cortisol concentrations at other time-points throughout the day (cortisol day profile) in order to obtain a more complete picture of the HPA activity of the participants. Fourth, in this study, writing instructions differed from those used in previous studies. We decided to use instructions made up by members of our own working group, which have been shown to be beneficial in working with patients suffering from various disorders (Willutzki and Koban, 2011). Still, one could question whether the instruction “Imagine you’ve won 1 million Euros” is adequate to instigate involvement with personal goals. Yet, the instruction may well touch personal values of a subject. Another limitation was the insufficient power to detect small- to medium-sized effects, although the sample size was comparable to that used in most writing experiments (e.g. Frattaroli, 2006). Taken together, the results of this study have to be interpreted with caution and are in need of a replication.

Nonetheless, the results add to the growing body of literature showing that writing about topics that are neither negative in tone nor deal with traumatic experiences can be beneficial (King, 2001; Sheldon and Lyubomirsky, 2006; Wing et al., 2006). Furthermore, writing about

life goals seems to be a simple way to target ruminative thinking. It would be of great interest to determine whether these effects apply to different populations, especially patients suffering from psychopathology. Moreover, future studies should examine whether there are different indications for writing about life goals than traditional expressive writing about traumatic events: Who benefits under which circumstances from writing about which topic? As the deliberate dealing with personal goals is a central feature of various psychotherapeutic treatment forms (e.g. Hayes et al., 1999), it eventually might be that writing about personal goals can be integrated in a beneficial manner as a treatment component in more comprehensive psychotherapeutic treatment programs (cf. Graf et al., 2008).

### Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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