

Facilitating Emotional Processing: An Experimental Induction of Psychotherapeutically Relevant Affective States

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Abstract Psychotherapy research has shown that cognitive-affective meaning making is related to beneficial therapy outcomes. This study explores the underlying micro-processes by inducing specific cognitive-affective states and studying their immediate effects on emotional activation, the resolution of interpersonal grievances, and factors related to therapeutic progress, e.g., mastery experiences, clarification of meaning. Participants suffering from interpersonal grievances were randomly assigned to two conditions. A sentence completion task was employed to induce either the expression of emotional distress or cognitive-affective meaning making. Expressive writing was used to deepen processing. Findings of those participants adhering to the induction procedure ($n = 85$) showed no differences between conditions at baseline. During writing, participants in both conditions were equally emotionally activated. Directly after the writing task, participants in the meaning making condition

($n = 50$) reported less unresolved interpersonal grievances, and more mastery experiences, but, e.g., not more clarification, compared to those in the emotional expression condition ($n = 35$). Results suggest that engagement in specific states that promote meaning making of emotional experience facilitates emotional processing and is related to therapeutic benefit.

Keywords Emotion · Emotional processing · Disclosure · Experimental · Interpersonal · Expressive writing

Introduction

Across psychotherapeutic approaches, a vast body of research stresses the importance of patients' emotional processing for therapeutic change. The literature on cognitive-behavioral treatment of anxiety and fear exposure suggests that for emotional processing to be successful, the exposure to emotionally arousing stimuli or situations involves the integration of corrective information and thus the restructuring of cognition (e.g., Deacon and Abramowitz 2004; Foa and Kozak 1986; Rachman 1980; Samoilov and Goldfried 2000). In other therapeutic approaches, the claim for integrated emotional-cognitive information processing has been explicitly applied to a broader range of psychological problems, e.g., in Hayes and colleagues' exposure-based cognitive therapy for depression (Grosse Holtforth et al. 2012; Hayes et al. 2005), in emotion-focused treatments of depression, trauma and interpersonal problems (e.g., Greenberg and Safran 1987; Greenberg and Watson 2006; Paivio and Pascual-Leone 2010; Pos et al. 2003), or in psychodynamic/experiential interventions (Fosha 2001). Across these issues and approaches, it has been argued that therapeutically helpful emotional processing involves the

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integration of cognition and affect, i.e., emotional arousal and expression coupled with cognitive-reflective exploration or meaning making (for reviews, see Greenberg and Pascual-Leone 2006; Littrell 1998; Whelton 2004).

In this respect, theories about emotion in psychotherapy are based upon and in line with general emotion theories in at least two points: (1) Many contemporary emotion theories (e.g., Barrett 2006; Lazarus 2001; Plutchik 2000; Scherer 2001) incorporate both, an affective component often including or linked to the experience of arousal, as well as a cognitive component often conceptualized as an appraisal (e.g., Scherer 2001), or conceptualization (e.g., Barrett 2006, 2011) process. (2) Emotions, if experienced in a primary and adaptive way, convey in a fast and helpful way information that is important for survival and well-being (e.g., Frijda 1986; Lazarus 2001; Plutchik 2000). A more detailed linkage between basic emotion research and the conceptualization of emotional change in psychotherapy can be found in Greenberg (1993).

Some psychotherapy studies on emotional processing have related patients' emotional processing to therapy outcome while others have focused on emotional micro-processes as they occur within therapy sessions (e.g., Pascual-Leone and Greenberg 2007). Research on moment-by-moment steps in emotional processing suggests that going through a sequence of specific affective states may be one form of helpful emotional processing. In this context, Pascual-Leone and Greenberg (2007) developed a sequential model, which precisely describes such affective states implicated in emotional processing. The model illustrates on a micro-level how individuals with depression and unresolved interpersonal issues progress from early expressions of distress (EED; e.g., global distress, maladaptive fear/shame, rejecting anger) to states of advanced meaning making (AMM; e.g., assertive anger, adaptive hurt/grief, self-soothing/compassion). EED describes rather undifferentiated, painful states with high emotional arousal and low meaningfulness. In contrast, AMM involves advanced states where emotional experience and cognitive exploration of meaning are integrated. Importantly, these two groups of affective states are believed to differ with regard to their degree of meaning making, but not with regard to their broad emotional valence. The reason for this is that Pascual-Leone and Greenberg's model postulates that sad states occur among both EED (i.e., global distress, enduring pain/fear/shame) and AMM (specific sadness, hurt and grief). Likewise, angry states are integrated in the model among both EED (i.e., "rejecting anger") and AMM (i.e., "assertive anger").

To classify the identified model components, i.e., EED and AMM, an observational rating instrument was developed and validated (Classification of Affective-Meaning States, CAMS; Pascual-Leone and Greenberg 2005). This

measure provides precise criteria for each affective state in the model. Furthermore, it gives examples of patient statements that were shown to be prototypical for a particular state. Analysis of patients' expressed emotion during therapy sessions using the CAMS has shown that patients with good in-session outcomes entered more often into advanced states that integrated cognition and affect (AMM) than patients with poor in-session outcomes (Pascual-Leone 2009; Pascual-Leone and Greenberg 2007). In other words, engaging in specific, meaningful affective states was predictive of good in-session outcomes, which supports the notion that successful emotional processing involves the integration of cognition and affect.

Pascual-Leone and Greenberg's sequential model of emotional processing was used as the framework for a manualized treatment for complex relational trauma (Paivio and Pascual-Leone 2010), and has also been the focus of an emerging line of research on emotion in psychotherapy (Kramer et al. 2015a; Kramer et al. 2015b; McNally et al. 2014; Pascual-Leone 2009). Even so, because the original model relies on the observation of processes in the therapy of patients who were working through target issues, a direct, experimental investigation of the different kinds of emotion component states would be an important contribution.

Similarly, other evidence for the helpfulness of integrated cognitive-affective processing comes mainly from observational studies that correlate emotional processing during the course of therapy with therapy outcome (e.g., Greenberg et al. 2007; Pascual-Leone 2009; Pascual-Leone and Greenberg 2007; Pos et al. 2003; Watson and Bedard 2006). These observations in natural psychotherapeutic settings have the advantage of high ecological and clinical validity, but do not allow one to draw sound causal conclusions about the precise relationship between the quality of emotional processing on a micro-level and outcome measures. The lack of experimental research in this area is not surprising. A stringent, systematic experimental manipulation of emotional processing is difficult to design and entails losses in ecological validity. For this reason, Pascual-Leone et al. (2012) have developed a novel approach to the examination of psychotherapeutically relevant emotional processing under experimentally controlled conditions by conducting a large experimental study using expressive writing as a paradigm. The present paper followed Pascual-Leone et al.'s design to directly examine the immediate impact of evoking specific therapeutically relevant affective states. To this end, the processing of naturally occurring negative feelings will be systematically manipulated in order to promote either engagement in specific, meaningful affective states (i.e., AMM) or in less processed affective states with low meaning making (i.e., EED).

A frequent type of naturally occurring and psychotherapeutically relevant negative feelings is the experience of bad feelings towards a close other by whom one feels hurt, neglected or betrayed. Unresolved negative feelings toward a significant other person are usually referred to as ‘unfinished business,’ and this is a specific and well-defined problem encountered in nonclinical contexts as well as in psychotherapy (Greenberg and Safran 1987). Several studies have investigated the process of resolving such long-standing interpersonal grievances in psychotherapy (Greenberg and Foerster 1996; Greenberg and Malcolm 2002; Paivio and Greenberg 1995) and in non-clinical samples (e.g., Chen et al. 2008; Liao et al. 2012; McCullough et al. 2006). The present study extends the research on emotional processing of interpersonally hurtful feelings by experimentally testing the impact of an induction of specific affective states on the resolution of long-standing interpersonal grievances as an affective-meaning problem.

One such possibility of experimentally investigating the emotional processing of naturally occurring stressful experiences is the expressive writing paradigm developed by Pennebaker and colleagues (Pennebaker and Beall 1986). From the perspective of psychotherapy, research employing this paradigm is an important complement of experimental research for the study of emotional processing because writing instructions can be experimentally varied and effects on writing and later outcome measures can easily be tracked (e.g., Broderick et al. 2004; Grisham et al. 2011; Guastella and Dadds 2006; McCullough et al. 2006; Nazarian and Smyth 2013; Pachankis and Goldfried 2010; Sloan et al. 2007). A vast body of research shows that writing about upsetting experiences is a powerful way of activating emotions and is associated with long-term changes in a wide range of physiological, psychological and behavioral outcome measures (e.g., Frattaroli 2006; Murray and Segal 1994; Pennebaker 1997; Pennebaker and Beall 1986; Smyth 1998). Expressive writing paradigms have been applied in a wide range of topics, and some of them targeted particularly types of the above-mentioned interpersonal grievances as for example interpersonal hurt and transgression (Liao et al. 2012; McCullough et al. 2006), or romantic relationship breakups (Lepore and Greenberg 2002; Primeau et al. 2013).

Several studies show that expressive writing involves the experience of painful emotions at the time of writing, as for example an immediate increase in negative mood or decrease in positive mood during each disclosure session (Murray and Segal 1994; Pennebaker and Beall 1986; Segal et al. 2009; Smyth 1998; Zakowski et al. 2011). Such activation of painful emotions is, according to Grawe and colleagues, one of four identified mechanisms of change in

psychotherapy and is usually referred to as ‘problem activation’ (Grawe 1997; Grawe et al. 1994; Orlinsky et al. 1994). Although there have been other conceptualizations of mechanisms of change (e.g., Kazdin 2007), and by now no agreement exists on the precise number of mechanisms of change in psychotherapy, Grawe’s framework allows for the identification of possibly influential factors when examining emotional processing: Different degrees of problem activation in expressive writing studies might be a confounding factor when comparing emotional writing groups to low-level control groups that write about neutral events (Lepore and Greenberg 2002; Liao et al. 2012). For a stringent experimental investigation it is thus necessary to control for the degree of problem activation, i.e., to test if participants are similarly emotionally activated and engaged across conditions. In the present study, it is assumed that problem activation occurs during both integrated cognitive-affective processing (AMM) and emotional expression involving less integration of cognition and affect (EED).

Beside problem activation, Grawe et al. (1994) identified the following mechanisms of change in psychotherapy: mastery experiences, clarification of meaning, and resource activation. Mastery experiences are the concrete experiences of learning to cope with a given problem or difficult situation. Clarification of meaning refers to making the motivational background and implicit meanings of problematic experiences explicit. Resource activation allows patients to experience themselves in therapy also in terms of their strength and positive potential (Grawe 1997). In naturalistic studies with psychotherapy clients in an outpatient clinic, post-session self-reports of clarification as well as mastery experiences were predictive of therapeutic change during the course, and at the end of psychotherapy, respectively (Grosse Holtforth et al. 2006; Tschacher et al. 2000). It seems plausible that these two mechanisms of change may also operate more markedly in integrated cognitive-affective processing (AMM) as compared to emotional expression involving less integration of cognition and affect (EED). However, the relation between the promotion of specific affective states and Grawe’s mechanisms of change has never been empirically investigated before.

The Present Study

The present study adopted an experimental design developed by Pascual-Leone et al. (2012) for the investigation of how the resolution of long-standing interpersonal grievances can be facilitated. In that study, the authors experimentally manipulated the type and sequence of emotional processing as described by the model of Pascual-Leone and Greenberg (2007). To this end, participants with

long-standing interpersonal grievances participated in three expressive writing sessions. The participants were assigned to different conditions in which they were directed toward either early expressions of distress (EED), advanced meaning making (AMM), a sequence of first EED and second AMM, or a control condition. The induction of the respective type of emotional processing (EED or AMM) was realized by a written sentence completion task (see also Pascual-Leone 2010). The sentence completion task consisted of patient statements that were prototypical of EED and AMM. It was followed by a standard written disclosure task to deepen the emerging emotional experience. This experimental induction of cognitive-affective states could be paralleled to therapists' in-session suggestions for the articulation of difficult emotional experiences. In contrast to the original study of Pascual-Leone et al. (2012) and to the original expressive writing paradigm (Pennebaker 1997; Pennebaker and Beall 1986), the present study employed a single writing session. Here, the aim was to investigate the immediate and proximal effects of the experimental induction and writing on a moment-to-moment level. While both experimental conditions of the present study were designed to emotionally engage the participant, they are believed to differ in the degree to which they promote the integration of cognition and affect. However, the actual impact of combining this emotion induction and expressive writing disclosure task as done in the present study, and their presumed differentiation, has never been empirically tested.

Hypotheses

Emotional Activation Hypothesis

Emotional activation is considered a prerequisite for further emotional processing (Greenberg and Pascual-Leone 2006). This idea is also supported by several studies on expressive writing (e.g., Pennebaker 1997; Pennebaker and Beall 1986). Therefore, the first hypothesis focuses on the question of whether the induction of specific affective states and subsequent writing is immediately emotionally activating. To control for possible confounds to the experimental manipulation, it is analyzed whether participants are emotionally engaged to an equal extent in both conditions. In short, we predict that in both groups, negative affect will increase from baseline to immediately post writing whereas positive affect will show the opposite pattern. Since EED and AMM are not believed to differ in emotional valence and participants in both groups are instructed to write about a negative emotional experience, no differences between groups are expected with regard to the amount of negative or positive affect and the level of problem activation.

Differential Effect Hypothesis

Extending the findings that integrated cognitive-emotional processing of emotional disturbances correlates with beneficial outcomes, this second hypothesis focuses on the question of whether experimentally inducing AMM states actually leads directly to a measurably better resolution of long-standing interpersonal grievances. It is predicted that participants in the AMM-condition will report fewer unresolved interpersonal grievances, and that they will report more mastery experience, more clarification of meaning, and rate the writing as more useful as compared to participants in the EED-condition.

Methods

Participants

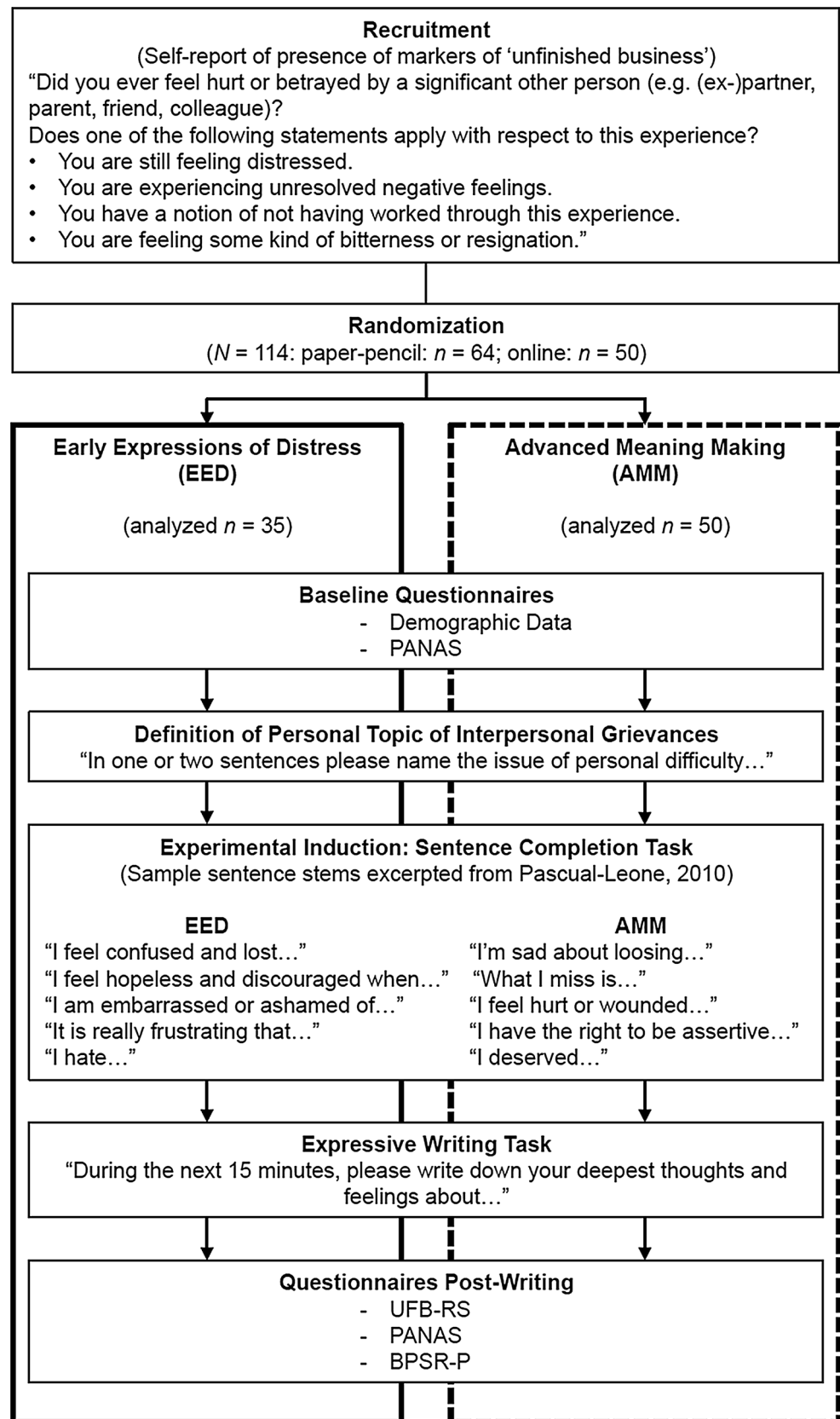
The sample consisted of 114 volunteers (94 women, 20 men) aged 19–73 years ($M = 27.7$, $SD = 9.8$) who reported long-standing interpersonal grievances. Participants were included if they were 18 or more years old, fluent in German, and if they met the criteria for the presence of 'unfinished business'. 'Unfinished business' was defined as: (a) the presence of lingering unresolved feelings such as hurt or betrayal, which were (b) related to a significant other person (c) currently experienced, and (d) problematic for the experiencing person (Greenberg and Foerster 1996). These criteria of 'unfinished business' were posed in an interrogative form in the recruitment announcements (e.g. 'Did you ever feel hurt or betrayed by a significant other person?'; see Fig. 1 for the recruitment via self-report of presence of markers of 'unfinished business'). Participants who answered yes to these questions and thus qualified themselves as suffering from such long-standing interpersonal grievances at baseline were invited to participate in the study. The majority (87.8 %) of the participants had at least the equivalent of a high school degree. Those participants who were psychology students at the university where the study was being conducted obtained course credit in exchange. Ethical approval for this study was obtained from the faculty's Ethics Committee.

Procedures

Recruitment

Participants were recruited via notice boards in our university's department of Psychology, announcements in university courses, by word of mouth, and brief descriptions of the study distributed via mailing lists. They were told that the aim of the study was to investigate the processing of unresolved long-standing grievances, and

Fig. 1 Study design and participant flow. *PANAS* = positive and negative affect schedule, *UFB-RS* = Unfinished Business Resolution Scale, *BPSR-P* = Bern post session report



briefed on the two different experimental conditions directly after having participated.

General Procedure

After obtaining informed consent, participants either completed paper–pencil measures ($n = 64$) or an online survey ($n = 50$) where the same measures were implemented using Unipark software (www.unipark.de). An overview over the study design and the participant flow is shown in Fig. 1. First, participants filled in a demographic data sheet and completed baseline measures of affect (see ‘Measures’ section). Then, they defined their personal topic of interpersonal hurt in one or two sentences. Next, they underwent an emotion induction procedure followed by an expressive writing task (see sections ‘Experimental Induction’ and ‘Expressive Writing’). After the writing task, participants completed the measure of affect again, and additional questionnaires about the resolution of interpersonal grievances and factors related to therapeutic progress, e.g. mastery experiences and clarification of meaning (see ‘Measures’ section). All instructions were given in written form.

Experimental Induction

Participants were randomly assigned to one of two experimental conditions. The experimental manipulation consisted of two different sentence completion tasks developed by Pascual-Leone (2010). In both conditions, participants were asked to complete 22 sentence stems with regard to their own personal topic of long-standing interpersonal grievances. These sentence stems were beginnings of patient statements shown to be prototypical of EED and AMM, respectively, according to the model of emotional processing by Pascual-Leone and Greenberg (2007). They were extracted from the corresponding rating procedure CAMS (Pascual-Leone and Greenberg 2005) and translated into German by the first and second authors, and translations were double-checked by a bilingual psychotherapist experienced in the field of emotion-focused psychotherapy. Participants were asked to complete as many sentences as possible of the 22 sentence stems, but were allowed to omit those sentences that absolutely did not convey their personal feelings. Sample sentence stems are presented in Fig. 1 and the complete instrument (i.e., Pascual-Leone 2010) is available upon request (apl@uwindsor.ca).

Expressive Writing

Similar to Pennebaker’s standard instructions in the basic writing paradigm (Pennebaker 1997), all participants re-

ceived identical writing instructions. Participants were asked to write about their individual topic of interpersonal grievances for 15 min. In short, they were encouraged to explore their deepest thoughts and feelings with respect to their long-standing interpersonal grievances, to write continuously, and not to worry about spelling, sentence structure, or grammar.

Measures

As part of a larger battery, the following questionnaires were employed to capture affect, resolution of long-standing interpersonal grievances and therapeutic mechanisms of change.

Affect, Measured at the Baseline-Assessment and the Assessment Post-Writing

At baseline, that is, before defining the personal theme, and post writing, participants were asked to fill in the Positive and Negative Affect Schedule (PANAS; Watson et al. 1988), a widely used self-report scale to assess changes in mood, in its German version (Krohne et al. 1996). It comprises two scales capturing ‘positive affect’ and ‘negative affect’; each consisting of 10 items that are rated on a 5-point Likert-scale. Higher levels of each scale indicate higher levels of emotion experienced at present. For this study, internal consistencies for these scales were high, with Cronbach’s α ranging from $\alpha = .87$ (negative affect post; with a 95 % confidence interval (CI) from .83 to .90) to $\alpha = .93$ (positive affect post; 95 % CI .90–.94).

Resolution of Long-Standing Interpersonal Grievances, Measured at the Assessment Post-Writing

The Unfinished Business Resolution Scale (UFB-RS) developed by Singh (1994) was administered after the expressive writing task. It assesses how clients feel in terms of their long-standing interpersonal grievances and has been used in several studies exploring the resolution of negative feelings through specific therapeutic interventions (Greenberg and Malcolm 2002; Greenberg et al. 2008; Paivio and Greenberg 1995). It comprises 11 items that are rated on a 5-point Likert-scale. The questionnaire was translated into German by the first and second authors, and translations were double-checked by a bilingual psychotherapist familiar with the psychotherapeutic construct of long-standing interpersonal grievances named ‘unfinished business’. The internal consistency in this study was $\alpha = .77$; 95 % CI .71–.83.

Mechanisms of Change and Experiences during Writing, Measured at the Assessment Post-Writing

An adapted version of the Bern Post Session Report 2000 (BPSR-P; Flückiger et al. 2010) was administered at the end of the session to assess a spectrum of psychotherapeutically relevant process variables. The BPSR-P was developed to measure the quality of psychotherapy by addressing central aspects of the therapeutic process from the patient's perspective, and it aims at capturing, amongst others, Grawe's mechanisms of change in psychotherapy (Grawe 1997; Grawe et al. 1994). In the current study, the following constructs were measured with two items each: (1) problem activation (e.g., "What I attended during writing churned me", $\alpha = .83$; 95 % CI .76–.89); (2) mastery experiences (e.g., "After writing, I feel better prepared for situations I could not handle before", $\alpha = .63$; 95 % CI .46–.74); (3) clarification of meaning (e.g., "I understand myself and my problems better after writing", $\alpha = .79$; 95 % CI .70–.86). Two further items were added to assess how useful the writing was perceived ("I believe that writing helped me", "Writing the text was somehow a beneficial experience", $\alpha = .87$; 95 % CI .81–.91). Each of these items was rated on a 7-point Likert-scale ranging from 'not at all' to 'yes, very much'.

Results

Preliminary Data Analysis

Prior to analysis, the variables of interest were examined for accuracy of data entry, missing values, and fit between distributions and the assumptions of parametric analysis. The variables were inspected separately for each condition (EED, AMM).

Only two data points in the self-report questionnaires were missing. One single missing item score in the PA-scale of the PANAS was replaced by the individual average of the remaining scores of the PA-scale. The same procedure was applied to the one single missing item score in the NA-scale of the PANAS.

With one exception (see below), the dependent variables did not meet the assumptions for parametric statistical tests. Thus, nonparametric tests were conducted to explore the effects of condition on the respective variables, and the effect size r was estimated wherever appropriate. For the PANAS (used to measure positive and negative affect at baseline as well as post writing), the most important assumptions were met, while others were violated (non-normality of data distribution in one subgroup, coming along with unequal group sizes). As there is no global non-parametric counterpart of factorial ANOVA with repeated

measures, we decided to conduct—in addition to the non-parametric test on the PANAS values—an additional separate parametric two-way ANOVA to explore the effects of condition and time on positive and negative affect. All statistical procedures were conducted using the 'Statistical Package for the Social Sciences', version 20.0 ("SPSS", 2001).

Adherence to the Induction Procedure

There were a substantial variability in the number of completed sentences, ranging from 0 to 22, and a significant positive correlation between the number of completed sentences and the level of problem activation, $r_s = .35$, $p < .001$, $df = 112$. As participants autonomously completed the emotionally evocative sentence stems, there was a necessity for an extra manipulation check: One cannot assume that all participants were inducted into a condition or adequately followed the experimental instructions. To ensure that only data of those participants who adhered to the emotion induction and who were emotionally engaged entered in further analyses, only participants who completed more than 50 % of the sentences were included ($N = 85$), yielding groups of $n = 35$ in the EED-condition and $n = 50$ in the AMM-condition. A cut-off of 50 % was chosen on the basis of face validity with the aim of only including participants who had adequately followed the instructions and who had spontaneously complied with the experimental emotion induction. Mann–Whitney tests indicated that the included and excluded participants did not differ significantly in age, education, marital status, previous experience with psychotherapy, type of long-standing interpersonal grievances (see below), or in baseline levels of affect (all $p > .05$). There was a significant association between gender and whether or not participants had completed more than 50 % of the sentences, $\chi^2(1) = 4.89$, $p = .045$, indicating that slightly more women than men completed more than half of the sentences, and this was therefore also related to the exclusion of some male participants.

Sample Characteristics

Sociodemographic sample characteristics for the final EED-condition ($n = 35$) and AMM-condition ($n = 50$) are reported in Table 1. Separate Mann–Whitney and Chi-Square tests were conducted to ensure that there were no between-group differences on the self-report questionnaires completed at baseline. The two groups did not differ with respect to gender, age, education, marital status and percentage of participants reporting previous experience with psychotherapy (all $p > .05$).

Table 1 Sample characteristics

	Early expressions of distress	Advanced meaning making
Total sample size	35	50
Gender (female)	32 (91.4 %)	42 (84.0 %)
Age in years <i>M</i> (<i>SD</i>)	27.3 (9.2)	27.4 (10.2)
Highest level of education		
Apprenticeship	2 (5.7 %)	5 (10.0 %)
High School	20 (57.1 %)	18 (36.0 %)
University	13 (37.1 %)	25 (50.0 %)
Other		2 (4.0 %)
Marital status		
Single	17 (48.6 %)	24 (48.0 %)
Common-law	17 (48.6 %)	24 (48.0 %)
Separated or divorced	1 (2.9 %)	1 (2.0 %)
Widowed		1 (2.0 %)
<i>n</i> who had previous therapy	15 (42.9 %)	21 (42.0 %)
Type of long-standing interpersonal grievances		
Romantic relationships	18 (51.4 %)	22 (44.0 %)
Family	13 (37.1 %)	12 (24.0 %)
Friends	3 (8.6 %)	12 (24.0 %)
Work/study		2 (4.0 %)
Other	1 (2.9 %)	2 (4.0 %)

The interpersonally hurtful events reported by participants were coded into five categories: romantic relationships, family, friends, work/study and other. The most frequently reported category of long-standing interpersonal grievances was romantic relationships, followed by family and friends. There was no significant association between condition and category of long-standing interpersonal grievances, $\chi^2(4) = 5.70$, $p = .225$.

Separate Mann–Whitney and Chi-Square tests were conducted to evaluate if the method of data collection (paper–pencil vs. online) was consistently related to differences in sociodemographic characteristics. No differences between paper–pencil and online collected data were found concerning age, gender, marital status, previous experience with psychotherapy, and category of long-standing interpersonal grievances (all $p > .05$). Differences were found concerning the highest level of education, $\chi^2(3) = 9.80$, $p = .013$, reflecting the fact that in the paper–pencil group, there was a larger proportion of participants currently pursuing their university studies whereas in the online collected data group, there was a larger proportion of participants having already completed their university degrees.

Analyses Regarding Emotional Activation

Scores on the PANAS and the sub-scale ‘problem activation’ of the BPSR-P are presented in Fig. 2. Concerning affect at baseline, Mann–Whitney tests of condition (EED, AMM) as independent variable and self-ratings of negative

and positive affect as measured by the PANAS at baseline as dependent variables indicated no significant difference between conditions *before* inducing specific affective states (positive affect at baseline: $Mdn_{EED} = 26.0$; $Mdn_{AMM} = 30.0$; $U = 706.0$; $z = -1.51$; $p_{(2-tailed)} = .132$; $r = -.16$; negative affect at baseline: $Mdn_{EED} = 16.0$; $Mdn_{AMM} = 14.5$; $U = 798.5$; $z = -.69$; $p_{(2-tailed)} = .497$; $r = -.07$). Similarly, when affect was examined using the PANAS post-writing, Mann–Whitney tests for positive and negative affect did not indicate any differences between conditions (positive affect post writing: $U = 776.0$; $z = -.89$; $p_{(2-tailed)} = .189$; $r = -.10$; negative affect post writing: $U = 827.0$; $z = -.43$; $p_{(2-tailed)} = .335$; $r = -.05$).

To assess the changes in affect as measured by the PANAS from baseline to post writing, Wilcoxon tests with positive and negative affect as dependent variables were conducted. Separate Wilcoxon tests for both conditions showed that there was a significant reduction from baseline to post writing in positive affect in the AMM-condition ($Mdn_{pre} = 30.0$; $Mdn_{post} = 26.0$; $T = 272.0$; $z = -3.25$; $p_{(1-tailed)} < .001$; $r = -.32$) as well as in the EED-condition ($Mdn_{pre} = 26.0$; $Mdn_{post} = 24.0$; $T = 145.0$; $z = -2.22$; $p_{(1-tailed)} = .013$; $r = -.27$). There was a significant increment in negative affect in the AMM-condition ($Mdn_{pre} = 14.5$; $Mdn_{post} = 19.0$; $T = 321.0$; $z = -2.04$; $p_{(1-tailed)} = .021$; $r = -.20$) as well as in the EED-condition ($Mdn_{pre} = 16.0$; $Mdn_{post} = 19.0$; $T = 143.0$; $z = -2.06$; $p_{(1-tailed)} = .019$; $r = -.25$). An additional 2 (time: baseline, post writing) \times 2 (condition: EED, AMM)

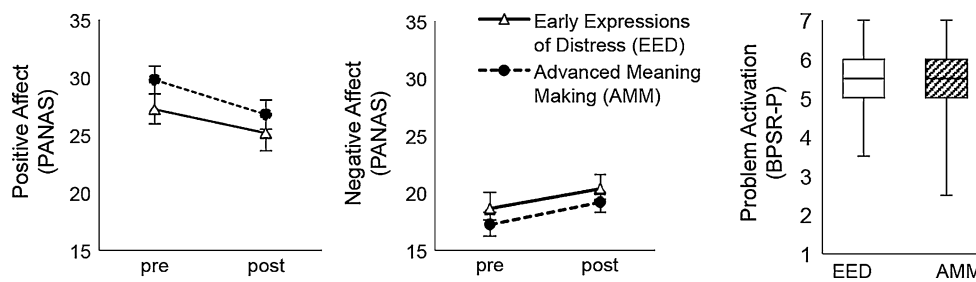


Fig. 2 Results concerning the emotional activation hypothesis. *Left and middle:* Mean scores on positive and negative affect at pre- and post-writing for the EED group (solid line) and AMM group (dashed line). Error bars represent standard errors. *Right:* Scores on problem

activation assessed post-writing for the EED group (white) in comparison to the AMM group (shaded). Boxplots represent medians and quartiles with whiskers from minimum to maximum of the data

ANOVA confirmed a significant main effect of time for positive affect, $F(1, 83) = 17.85$; $p < .001$; $\eta^2 = .18$, and negative affect, $F(1, 83) = 7.21$; $p = .009$; $\eta^2 = .08$. There was no main effect of condition [positive affect: $F(1, 83) = 1.28$; $p = .261$; $\eta^2 = .02$; negative affect: $F(1, 83) = .80$; $p = .373$; $\eta^2 = .01$] and no significant time by condition interaction [positive affect: $F(1, 83) = .63$; $p = .430$; $\eta^2 = .01$; negative affect: $F(1, 83) = .03$; $p = .859$; $\eta^2 = .00$], indicating that the changes in positive and negative affect were not different depending on the condition.

A Mann–Whitney test with condition as independent variable and self-ratings of problem activation during writing as dependent variable did not indicate any difference between conditions concerning the emotional engagement during writing ($Mdn_{AMM} = 5.5$; $Mdn_{EED} = 5.5$; $U = 861.5$; $z = -.127$; $p_{(2-tailed)} = .901$; $r = 0.01$).

Analyses Regarding Resolution of Long-standing Interpersonal Grievances, Mastery Experience, Clarification, Perceived Usefulness

Scores on the UFB-RS and on the sub-scales of the BPSR-P are presented in Fig. 3. Separate Mann–Whitney tests were performed to evaluate the differences between the AMM-condition and EED-condition on the resolution of the presenting concern. A significant difference concerning the resolution of the long-standing interpersonal grievances as measured with the UFB-RS was found: After the writing task, participants in the AMM-condition reported less long-standing interpersonal grievances than those in the EED-condition ($Mdn_{AMM} = 38.5$; $Mdn_{EED} = 42.0$; $U = 664.5$; $z = -1.89$; $p_{(1-tailed)} = .03$; $r = -.20$). Furthermore, participants in the AMM-condition reported more mastery experience than those in the EED-condition ($Mdn_{AMM} = 4.5$; $Mdn_{EED} = 3.0$; $U = 571.5$; $z = -2.73$; $p_{(1-tailed)} = .003$; $r = -.30$).

No significant differences between the EED- and AMM-condition were found concerning participants' ratings of

clarification ($Mdn_{AMM} = 4.5$; $Mdn_{EED} = 4.0$; $U = 712.5$; $z = -1.46$; $p_{(1-tailed)} = .073$; $r = -.16$), or usefulness of writing ($Mdn_{AMM} = 5.0$; $Mdn_{EED} = 5.0$; $U = 852.5$; $z = -.20$; $p_{(1-tailed)} = .421$; $r = -.02$).

Discussion

This study borrowed from an initial design by Pascual-Leone et al. (2012) to present a novel approach for the investigation of psychotherapeutically relevant emotional processing under experimentally controlled conditions. The aim of the study was to demonstrate the differential impact of the induction of specific affective states. Participants with long-standing interpersonal grievances were randomly assigned to two conditions inducing either states of AMM or early expressions of distress (EED). In both conditions, the induction method promoted emotional activation, and seemed to have differential effects on mastery experiences and the resolution of long-standing interpersonal grievances.

Emotional Activation Hypothesis

Since emotional activation is often considered a prerequisite to further emotional processing, the first analyses addressed the question of whether inducing specific affective states and writing employed in this study were emotionally activating. Moreover, it was explored if the emotional activation was similar in both conditions, setting similar preconditions for further emotional processing in both experimental conditions and avoiding possible confounds to the interpretation of differential effects. As hypothesized, an immediate increase from baseline to post-writing in negative affect and an immediate decrease from baseline to post-writing in positive affect were observed in both conditions. Likewise, self-reports in problem activation (i.e., the degree to which participants were emotionally

activated) indicated that participants were emotionally engaged to a similar degree in both conditions.

The effect of decrease in positive affect during writing was moderate in magnitude (for a survey of effect sizes, see, e.g., Rosnow and Rosenthal 2003), and the increment in negative effect yielded small to moderate effect sizes. These findings are in line with other studies reporting an immediate increase of distress after expressive writing tasks (Murray and Segal 1994; Nazarian and Smyth 2013; Pennebaker and Beall 1986; Segal et al. 2009). Also, these findings are congruent with a meta-analysis reporting a moderate effect size for baseline to post-writing distress in the experimental group compared to control participants (Smyth 1998).

It is well conceivable that participants experience distress in the short-term, as they are instructed to maintain focus on negative thoughts and feelings during the writing task. The evoking and exploring of negative feelings can also be seen as one of the first treatment steps in psychotherapy (e.g., Greenberg and Malcolm 2002; Pascual-Leone and Greenberg 2007) and has been identified as a mechanism of change across psychotherapeutic orientations (Grawe 1994). The importance of emotional activation for further emotional processing has also yielded support from neuroscience studies stressing the impact of emotional arousal on subsequent information processing (for a review, see, e.g., Dolan 2002).

The null results at baseline indicated that participants in both conditions did not differ in their positive or negative affect before participating in the study. Furthermore, the degree of problem activation was also similar in both conditions, so that differential effects in other outcome measures cannot be attributed to group differences in baseline affect or emotional engagement. Rather than inadvertently fostering emotional engagement in one and not the other condition, the current design kept emotional engagement similar across both groups, allowing one to investigate the differential effects of specific types of affective states.

Differential Effect Hypothesis

The second hypothesis stated that participants in the AMM condition would immediately report fewer unresolved long-standing interpersonal grievances. Moreover, it was hypothesized that the AMM group would report more mastery experience, more clarification, and rate the writing to be more useful as compared to participants in which early expressions of distress were induced. As predicted, participants in the AMM group reported significantly fewer long-standing interpersonal grievances and also more mastery experiences. However, no significant differential effects were found for clarification and usefulness of writing.

The observation that inducing AMM likely promotes the resolution of long-standing interpersonal grievances and the experience of problem mastery is consistent with previous correlative findings that stress the importance of the integration of cognition and affect for psychotherapeutic benefit (e.g., Greenberg and Pascual-Leone 2006; Pos et al. 2003; Whelton 2004). While these studies and reviews focus on purely clinical populations, the present study examined a student and community sample suffering from a potentially clinical meaningful interpersonal problem. Although nearly half of the participants in each group reported having sought previous psychotherapy, the generalization of the results to a clinical population might be limited. Within the present sample, the results seemed to be valid for both individuals with and without prior experience with psychotherapy. Supplementary post hoc analyses of the present sample did not reveal any differences in the dependent variables between participants having previous experience with psychotherapy and participants without such experience.

The present finding that the induction of AMM likely has some beneficial effects is in line with studies reporting favorable effects of integrated cognitive-affective processing in expressive writing tasks in non-clinical populations (e.g., Nazarian and Smyth 2013; Ullrich and

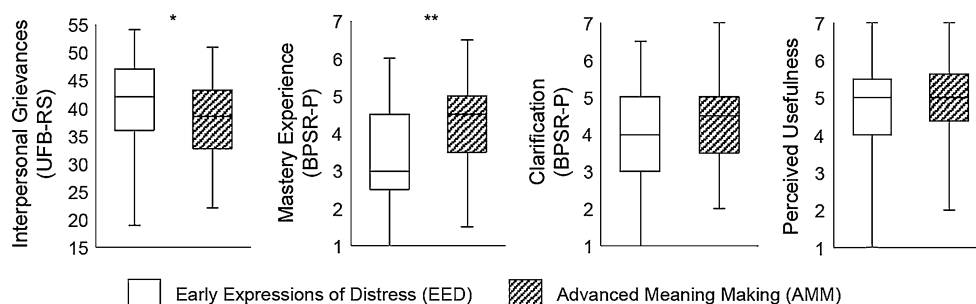


Fig. 3 Results concerning the differential effect hypothesis. Scores on the resolution of interpersonal grievances, mastery experiences, clarification, and perceived usefulness at the assessment after the

writing for the EED group (white) in comparison to the AMM group (shaded). Boxplots represent medians and quartiles with whiskers from minimum to maximum of the data. * $p < .05$; ** $p < .01$

Lutgendorf 2002). Furthermore, the results show that small to medium effects in the resolution of interpersonal grievances and medium effects in mastery experience can likely be achieved by a relatively short and economic intervention, i.e., a sentence completion task and subsequent writing. These effects were found by comparing two high-level experimental groups, both of which underwent an experimental induction task, and were emotionally engaged. It is thus well conceivable that the beneficial effects of the AMM induction might be even more pronounced when compared to a low-level control group without emotion induction or less emotional engagement. Both experimental groups were instructed to work on interpersonally hurtful events that seemed to be qualitatively comparable, as no between-group differences in the type of interpersonal grievances were found at baseline. However, one might argue that a quantitative between-group difference in the interpersonal grievances might have already existed at baseline. While this possibility cannot be completely ruled out (see also ‘[Limitations](#)’ section), the randomization of participants aimed at creating groups that were comparable with respect to confounding factors and the resolution of interpersonal grievances at baseline.

The AMM condition was not significantly more effective at promoting clarification than the EED condition, but on a descriptive level, tendencies in the expected direction could be found. However, this small magnitude of effect is surprising, as the induction of AMM aimed at fostering meaning making. This result may be attributable to the fact that our experimental induction was implicit and that the participants did not explicitly perceive possible clarification effects whereas the questionnaire explicitly asked if the writing helped the participants to understand themselves and their emotional upheaval. As an alternative explanation, the items employed in the present study to assess clarification may not have captured the clarification of meaning per se, but rather the elucidation of the crux of the personal problem in question, which could be achieved in both conditions.

When asked to explicitly rate the usefulness of the writing task, participants in both conditions valued the sentence completion and writing as equally useful (the medians in both conditions being above the midpoint of the scale). It is possible that writing per se is a subjectively helpful experience, which is in line with some of the research on expressive writing (e.g., Frattaroli 2006; Murray and Segal 1994; Pennebaker 1997; Pennebaker and Beall 1986; Smyth 1998). It may also be possible that the items with which the usefulness of the writing experience was captured were not valid or discriminating enough to demonstrate differences between conditions.

Limitations

The present study did not have a control condition without emotion induction, which can be considered as a limitation. Given the lack of such a control condition, only conclusions about the relative effects of the induction of EED and AMM can be drawn. To investigate the effects of the induction of EED and AMM compared to no induction and writing alone, future studies might include a control group without the emotion induction procedure, i.e., without sentence completion task. This would allow exploring if the induction of AMM was beneficial not only compared to EED but also compared to writing alone, and if the induction of EED was just less helpful than AMM or even harmful when compared to a neutral control condition. Moreover, it could be interesting to disentangle the effects of the emotion induction, i.e., sentence completion, and the deepening of the emerging experience, i.e., written disclosure. For this purpose, other worthwhile experimental conditions would be an emotion induction alone, or an emotion induction with a neutral writing control.

Furthermore, the present analyses were exclusively based on self-report measures, so the common criticism of self-report measures may apply. For instance, self-report measures cannot capture constructs or processes that participants are unwilling or unable to report. The explicit self-report measures in the present study might therefore not have assessed thoughts and feelings that were outside the participants’ awareness. We attempted to curtail influence of participants’ implicit expectations or social desirability by keeping participants blind to the condition they were allocated to. Nevertheless, future studies might include psychophysiological measures to explore further differential effects of inducing either EED or AMM. Prospective analyses should also take the written texts resulting from the expressive writing task into account. Indeed, text analyses of those essays collected during the current study are planned and will be reported elsewhere.

A further limitation was the lack of control regarding the number of completed sentence stems. Our results here indicated a remarkable variability between individuals and a significant relationship between the number of completed sentences and problem activation. This co-variability with problem activation cannot be causally attributed to the number of completed sentences, as we did not experimentally vary the number of sentences to be completed. The reported results were obtained for those participants who adhered to the emotion induction procedure and were emotionally engaged and therefore may not be further generalizable. Although the exclusion of participants who completed 50 % or less of the sentence stems did not lead to differences between the two resulting experimental groups concerning several baseline variables,

more participants in the EED condition were excluded. One possible interpretation might be that the promotion of EED may encounter more resistance than the promotion of AMM, and that participants therefore adhered less to the completion task.

Another limitation is that the UFB-RS, which served as a quantitative measure of how resolved the long-standing interpersonal grievances were, was only employed in the assessment post-writing. Although participants were randomly assigned to the two experimental conditions and no baseline-differences concerning the type of interpersonal grievances were found, the possibility that some quantitative between-group differences had already existed at baseline cannot be ruled out. Future studies should include the UFB-RS in assessments at pre- and post-intervention.

Finally, by inducing either EED or AMM, the present study design did not pay explicit attention to the sequential character of Pascual-Leone and Greenberg's (2007) model, which we based our study on. Future studies should take into account sequential developments in emotional processing by systematically varying different sequences of emotional processing steps. One interesting approach to the study of sequences in emotional processing has been adopted by Guastella and Dadds (2009) who investigated the effect of varying emotion processing instructions over several subsequent writing sessions. In contrast to the present study, they did not focus on affective states on a moment-to-moment-level, but rather on long-term benefits of guiding participants towards integrated cognitive-affective processing across several writing sessions.

Conclusions and Implications for Psychotherapy

The present study builds on previous work that suggests that emotional activation is a necessary but not sufficient condition for therapeutic progress (e.g., Greenberg and Pascual-Leone 2006). The results of the present experimental induction paradigm showed that participants in both conditions were emotionally activated and that these conditions did not differ in the broad emotional valence. In contrast, differential effects indicated that those participants in the AMM condition benefitted more than those in which early expressions of distress were induced. In addition to existing task analyses and observational studies, these experimental results suggest that very specific differences in affective states, i.e. the degree of meaning making as proposed by the sequential model by Pascual-Leone and Greenberg (2007), are causally linked to differences in outcome variables that could be associated with therapeutic progress. The results therefore are an experimental extension of the research stimulated by this model and support the notion that successful emotional processing involves the integration of cognition and affect.

Based on these results and on Pascual-Leone and Greenberg's (2007) model of emotional processing, an implication for the psychotherapeutic setting might be that fostering patients' engagement in very specific affective states that involve the integration of cognition and affect is one way of promoting helpful emotional processing. Within psychotherapy sessions, it seems important to observe the precise moment-by-moment mechanisms of emotional processing and to guide patients to affective states that allow not only emotional activation, but also meaning making of difficult emotional experiences.

With regard to the psychotherapeutic setting, these results might underscore the potential of simple, economic and short interventions, i.e. the completion of sentence stems and subsequent writing, in the promotion of such specific affective states. The differential effects we found might support the importance of certain therapeutic interventions for guiding patients towards states of cognitive-affective integration implicated in helpful emotional processing. Such interventions may encompass encouraging "I" language in clients, helping to put feelings into words, and providing suggestions for the articulation of meaningful emotional experience.

Conflict of Interest Kristina B. Rohde, Maria Stein, Antonio Pascual-Leone, Franz Caspar declare that they have no conflict of interest.

Informed Consent All procedures were in accordance with the ethical standards of the responsible committee. Informed consent was obtained from all the participants.

Animal Rights No animal studies were carried out by the authors for this manuscript.

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