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Running Head : Cognitive Errors in Borderline Personality Disorder

Biased Thinking assessed by External Observers in Borderline Personality Disorder

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Running Head: Biased Thinking in Borderline Personality Disorder

Biased Thinking assessed by External Observers in Borderline Personality Disorder

Abstract

Objectives: Biased thinking (to some extent overlapping with the concepts of cognitive distortions and cognitive errors) is a key-concept in cognitive therapy of Borderline Personality Disorder (BPD). Specific contents and cognitive processes related to BPD functioning are known. However, most studies are based on self-report measures which present a number of important limitations, in particular the difficulty in assessing non-conscious processes infused by affect. So far, no studies were conducted using valid observer-rated methodology addressing the question of biased thinking in BPD as it unfolds spontaneously in session.

Design: This is a controlled interview study comparing two matched groups, BPD patients and healthy controls.

Methods: A total of $N = 25$ clinical dynamic interviews with patients presenting with BPD were transcribed and rated using the Cognitive Errors Rating Scale (Drapeau, Perry, & Dunkley, 2008); their cognitive profiles were compared to those of $N = 25$ healthy controls who underwent the same procedure.

Results: Overall, results indicated that no between-group difference in the frequency of specific biases was found. However, heightened levels of negative cognitive biases, in particular over-generalizing and fortune-telling, were associated with BPD. Furthermore, negative over-generalizing was associated with the number of BPD symptoms.

Conclusions: These results have high levels of ecological validity and are promising for the refinement of cognitive theory of Borderline Personality Disorder. Clinical implications for assessment and intervention are discussed.

Key-Words: Biased Thinking; Cognitive Errors; Cognitive Distortions; Borderline Personality Disorder; Observer-Rated Methodology

BIASED THINKING ASSESSED BY EXTERNAL OBSERVERS IN BORDERLINE PERSONALITY DISORDER

Introduction

Biased thinking, in more specific works also referred to as cognitive distortions and sometimes cognitive errors, is important within the theoretical framework of cognitive therapy (Beck, 1963; Beck, 1976; Beck et al., 1990; J. Beck, 1995; Young, 1990; see also Arntz & van Genderen, 2009). The status of logic in biased thinking is discussed controversially. From the perspective of cognitive therapy, logical errors are associated with psychopathology and need to be treated beforehand (Beck et al., 1990; Young, 1990). However, from the perspective of research on heuristics (Gigerenzer & Brighton, 2011), it must be noted that under certain circumstances biased thinking may produce adaptive behavior. To some extent, cognitive biases are part of adaptive human functioning (see also Baron, 2008; Clark, Beck, & Alford, 1999; Gilbert, 1998). In order to remain as descriptive as possible in what follows, we choose the term of biased thinking, even if the notions of cognitive errors and cognitive distortions may be used as well, albeit always keeping in mind the afore-mentioned criticisms. The latter calls for specific process-based assessment of biased thinking.

Extensive research has been conducted on distorted thinking in mood disorders, such as major depression (Clark, Beck, & Alford, 1999). However, little is known for Personality Disorders (PD), in particular Borderline Personality Disorder (BPD; Arntz, 2005). Beck and colleagues (1990) postulated that the suffering of patients with PD is maintained by a set of specific cognitive errors, that are characterized by inaccuracy in interpreting the surrounding world or interpersonal relationships (Arntz, 1994; Barnow, Stopsack, Grabe, Meinke, Spitzer, Kronmüller, & Sieswerda, 2009). Biases in perception and assessment may result in shortcomings in interpretative functioning, which in turn may be indicative of underlying

schemas. For example, patients with BPD could have as many as nine (out of a complete list of 18 categorical formulations; according to Young, described in Beck et al., 1990) so-called early maladaptive schemas. Arntz (2004; see also Pretzer, 1990) assumed that three basic schemas may be found in patients with BPD: (1) „The world is/Others are dangerous and malevolent“, (2) „I am powerless and vulnerable“, and (3) „I am inherently bad and unacceptable“. In order to test these assumptions, research relevant for biased thinking associated with BPD have taken two partially overlapping perspectives: (a) focusing on the contents of the cognitive schemas and the representational structures of patients presenting with BPD, and (b) focusing on the processes of biased cognitive activity, by measuring any of the basic cognitive distortions, e.g., dichotomous thinking, as defined by Beck (1963; Pretzer, 1990).

Contents of biased thinking in BPD

Arntz's (1994) and Pretzer's (1990) assumptions were tested in a comparative study (Arntz, Dietzel, & Dreessen, 1999) including patients with BPD, patients with any Cluster C PD and a control group, by constructing a scale (Personality Disorder Belief Questionnaire; PDBQ) representing a set of 20 BPD-specific assumptions about the world and interaction partners. Results showed high specificity of the presumed BPD related assumptions in the patients with BPD, especially after controlling for the Cluster C diagnosis, with excellent internal consistency. The themes of these items include (Arntz et al., 1999, p. 555), among others, loneliness, emptiness, lack of personal control, abandonment, dependency on others, self-criticism, badness, mistrust, helplessness, powerlessness and self-punishment. From the perspective of Beck's list of cognitive errors in information-processing, several items may imply cognitive errors: „I will never get what I want“ may be underpinned by the process of fortune-telling or „I will always be alone“ may be rated on the process-level as over-generalizing (see for the items: Arntz et al., 1999). Only negatively valenced contents are

reported in the item-list. These BPD-related assumptions seem to be stable over experimental conditions, independent from manipulation of emotion-induction (Arntz et al., 1999). Similar themes were found in a study using a different questionnaire measuring dysfunctional beliefs in BPD (Butler, Brown, Beck, & Grisham, 2002), which also confirmed a BPD specificity in terms of cognitive themes. The world views of patients with BPD were examined by Giesen-Bloo and Arntz (2005). Results showed the presence of perceptions of the world as a malevolent and unlucky place, along with low self-worth. These themes were associated with BPD, but not with the presence of trauma in the anamnesis of the patient. Finally, a large-scale questionnaire study on $N = 643$ subjects, of whom many had a PD (with some BPD) diagnosis, showed a similar pattern, even though the cognitive themes, as measured by the PDBQ (Personality Disorder Belief Scale), predicted PD only sub-optimally (Arntz, Dreesen, Schouten, & Weertman, 2004). This last result may be interpreted as suggesting that PDs were not only determined by the *content* of the cognitive beliefs, but also by additional variables, such as the *processes* of biased thinking.

Processes of biased thinking in BPD

The process-perspective on biased thinking focuses on disturbances in information processing, *i.e.*, cognitive errors and overall cognitive negativity, rather than, as shown before, on the specific themes associated with BPD. Several studies have investigated dichotomous thinking, or all-or-nothing thinking, postulated to be a cognitive error in the information processing of patients with BPD when confronted with emotion-eliciting contents (Arntz, 1994; Layden, Newman, Freeman, & Byers Morse, 1993; Oshio, 2009). In two experimental studies (Veen & Arntz, 2000; Napolitano & McKay, 2007), dichotomous thinking was associated with BPD, when facing film clips implying BPD-specific themes (*i.e.*, abandonment, abuse), compared with patients presenting other PDs, versus healthy controls. Whereas Veen and Arntz (2000), who used a open response-format, found a clear specificity

in BPD for dichotomous thinking, this was not the case in the second study by Napolitano and McKay (2007), despite similar methodology. Moreover, dichotomous thinking was found not to be limited to one single dimension, usually named «good/bad», but the results suggested that BPD patients were able to make extreme judgments of the same person on various dimensions simultaneously, such as reliability/unreliability, loveability/unloveability and so forth. These studies are particularly relevant, as they do not only rely on self-report measures prone to methodological biases. However, the ecological validity of the experimental approach may be questioned, in particular the generalizing of the results to clinical, even more unstructured, settings.

Cognitive biases towards negativity were shown in several additional studies. Barnow, Stopsack, Grabe, Meinke, Spitzer, Kronmüller, and Sieswerda (2009) have shown that patients with BPD tend to judge others more negatively and aggressively (in addition to less positively), when compared to controls. This difference was also significant when comparing the judgments of BPD patients with those of depressed individuals. Similar findings were reported by Arntz and Veen (2001) on a sample of $N = 16$ patients with BPD, compared to Cluster C PDs and healthy controls. These results are consistent with the ones reported by Kurtz and Morey (1998). More generally, negatively valenced thoughts have a more important functional impact on symptom level and are more prone to change over the course of therapy, compared to positively valenced errors (Schwartz, 1986). Further empirical findings on the role and function of positive cognitive errors in severe psychiatric disorders may be found in Kramer and Drapeau (2009) and Kramer, Bodenmann and Drapeau (2009). Finally, we should mention several other studies realized from different conceptual viewpoints (e.g., psychodynamic, Westen, Lohr, Silk, Gold, & Kerber, 2010, and interpersonal, e.g., Ghiassi, Dimaggio, & Brüne, 2010) which put forward specific socio-cognitive dysfunctions in patients presenting with BPD partially overlapping with the afore-

mentioned. From the research perspective on heuristics cited above, Dimaggio et al. (2008) hypothesized several specific heuristics to be associated with BPD, for instance „better safe than sorry“ meaning that the reasoning is characterized by the overestimation of an anticipated danger leading to not choosing to take that limited risk („safe“), while at the same time discarding the possibility of negative consequences (*i.e.*, impossibility of goal-attainment) in case of not choosing to take that limited risk. This strategy might explain paranoid states on BPD. Another heuristic of relevance for BPD might be the self-enhancement strategies, also associated with narcissistic functioning (Dimaggio et al., 2008). Finally, limited anticipation of satisfaction, recurrent interpersonal reassurance seeking and limited joy in case of gains are some other cited heuristics associated with BPD (Leahy, 2002). So far, these assumptions on maladaptive heuristics related to BPD have not been tested empirically.

It needs to be acknowledged that cognitive processes are not fully accessible to an individual's awareness: most of them are implicit or automatic cognitive processes (Johnson-Laird, Mancini, & Gangemi, 2006), in particular from the perspective of the criticisms addressed at cognitive theory: heuristics may be understood as unconscious strategies, infused by affective and socio-emotional components (e.g., Bower, 1981; Domes, Cziesschnek, Weidler, Berger, Fast, & Herpertz, 2008; Downey, Berenson, Rafaeli, Coifman, & Leventhal, 2011; Minzenberg, Poole, & Vinogradov, 2006) which has implications for assessment strategies, in particular, the questionable use of self-report questionnaire to tap into cognitive processes. Biases of social desirability, or acquiescence and self-deception need to be acknowledged. Glass and Arnkoff (1997) pointed out that item endorsement in a self-report questionnaire may represent, in addition to the measured construct, conceptually unrelated constructs, such as the personal relevance of the item to the subject, the subject's motivation to respond or the degree of awareness of a process. This problem may result in uneven prime

specificity associated with each item of the questionnaire. This set of criticisms also apply to the scales measuring cognitive distortions using a questionnaire-approach (Najavits, Gotthardt, Weiss, & Epstein, 2004; Oshio, 2009; Renneberg, Schmidt-Rathjens, Hippin, Backenstrauss, & Fydrich, 2005). D'Iuso, Blake, Fitzpatrick, and Drapeau (2009) underlined that a self-report assesses the representation a person has of his/her own processes, and fails to assess the processes themselves, as they may occur in a spontaneous speech production (see also Nisbett & Wilson, 1977).

The aim of the present study was to apply a valid observer-rated system of cognitive errors from the process-perspective to standardized clinical interviews eliciting relevant schemas conducted with patients presenting Borderline Personality Disorder and to compare their cognitive error profiles with the ones of matched healthy controls. This methodology reponds to the criticism addressed to the questionnaire-approach and ensures high levels of ecological validity. Our hypotheses were as follows: (1) More cognitive errors (overall score) are produced by patients with BPD in the in-session spontaneous verbal report, compared to non-clinical controls; (2) More specifically, more negatively valenced errors are produced by patients with BPD in the in-session spontaneous verbal report, compared to non-clinical controls; (3) There is a correlation between the frequencies of cognitive errors and symptoms in BPD patients.

Method

Sample

A total of 25 outpatients presenting with Borderline Personality Disorder (BPD) were included in the study. A total of 15 (60%) were female; the patients had a mean age of 31.1 years ($SD = 10.4$; ranging from 19 to 55). All patients were french-speaking and had a DSM-IV (APA, 1994) diagnosis of Borderline Personality Disorder, as diagnosed by the treating clinician using the Structured Clinical Interview for DSM-IV (SCID-II; First, Spitzer,

Williams, & Gibbons, 2004). Mean number of BPD criteria met was 6.96 (SD = 1.43; ranging between 5 and 9). Other axis II –diagnoses included paranoid PD (1 patient) and narcissistic PD (1 patient); on average, the patients had 1.08 diagnoses on axis II. Reliability of axis II diagnoses was satisfactory ($\kappa = .76$); these analyses were performed on independent ratings done by a trained researcher of video-taped SCID-II interviews on randomly chosen 20% (5) of all cases; inter-rater reliability was performed taking into account all items of the SCID-II. Some of the patients (10; 40%) presented co-morbid disorders, such as major depression (4 patients; 16%), agoraphobia (1 patient), dysthymia (1 patient), bulimia (1 patient), anorexia (1 patient), panic disorder (1 patient), alcohol abuse (1 patient), somatoform disorder (1 patient), schizoaffective disorder (1 patient); on average, the patients had 0.42 diagnoses on axis I. Axis I-diagnoses were obtained using the MINI (Lecrubier et al., 1997), on which no reliability checks were performed. Their socio-demographic level was assessed by means of the total number of years of education. On average, the patients had 13.2 years of education in any field (SD = 1.3; range from 10 to 17). The rather low levels of co-morbidity was probably due to the highly specialized center in which the study took place; as a principle, only patients with predominant axis-II disorder were accepted for treatment, which resulted in particular in relatively low levels of depression. Treatment encompassed weekly psychiatric treatment according to Gunderson and Links (2008; see also Kramer, Berger, Kolly, Marquet, Preisig, de Roten, Despland, & Caspar, 2011).

A strictly matched control group was recruited; matching criteria were gender, socio-demographic level and age, as these have an influence on cognitive functioning (Labouvie-Vief, Hakim-Larson, & Hobart, 1987; Whitty, 2003). A total of $N = 25$ individuals from a french-speaking community sample participated in the study. Out of these, 15 (60%) were female; the controls had a mean age of 33.7 (SD = 7.9 ; range from 23 to 50) and a mean number of years of education of 12.9 (SD = 1.2; range from 11 to 17). Thus, no difference

was found with regard to the matching criteria (for age: $t(1, 48) = -1.06$; $p = .30$; for socio-demographic level: $t(1, 48) = -1.44$; $p = .39$). Neither life-time inpatient treatment in psychiatry, nor current pharmacological nor behavioral intervention is known for these participants. General symptomatology was in the normal range for all control participants (using the SCL-90-R; see below), according to the clinical cut-offs ($M = .47$; $SD = .23$; ranging from .18 to .89). All participants gave written informed consent. The study was approved by the Research Ethics Board of the specific institutions.

Instruments

Cognitive Errors Rating System (CERS; Drapeau, Perry, & Dunkley, 2008; French translation and validation by Kramer & Drapeau, 2011). The CERS is an observer-rating system assessing cognitive errors in interview transcripts. It evaluates 15 different cognitive errors, based on J. Beck (1995) and A. T. Beck (1963): (1) Fortune-telling, (2) Labeling, (3) Over-generalizing, (4) All-or-nothing, (5) Discounting the positive/negative, (6) Emotional reasoning, (7) Magnification/minimization of positive/negative, (8) Mental filter, (9) Should and must, (10) Tunnel vision, (11) Jumping to conclusions, (12) Mind-reading, (13) Personalization, (14) Inappropriate blaming of self, and (15) Inappropriate blaming of others. All errors are broken down according to their valence: positive and negative. According to Lefebvre (1981), they can be classified in four higher-order categories: fortune-telling (error 1), overgeneralizing (errors 2 and 3), selective abstraction (errors 4 through 11), personalization (errors 12 through 15). For all computations, relative frequencies are used, by weighting the absolute frequency of each error by the number of words emitted by the patient (excluding therapist interventions and patient's hesitations) yielding a score for each error per 1000 words. Empirical validation data have been presented in several studies, accounting for sufficient internal and external validity (D'Iuso, Blake, Fitzpatrick, & Drapeau, 2009) for the original English version and for the French version used in this study (Kramer, Bodenmann,

& Drapeau, 2009; Kramer & Drapeau, 2011; Kramer, de Roten, & Drapeau, 2011). A manual (Drapeau, Perry, & Dunkley, 2008) guides the rater, in order to assure high quality ratings. For instance, in order to be able to identify a CE on a specific transcript excerpt, the manual prescribes the necessity of external evidence which must be found elsewhere in the same session, e.g., over-generalizing at one point in the transcript must be accompanied by information – to be found elsewhere in the transcript - about the presumed external evidence related to the content of the over-generalizing statement. For the current study, reliability coefficients on 20% of the ratings are established among trained raters and yield satisfactory results in terms of intra-class correlation coefficients (ICC(2, 1); Shrout & Fleiss, 1979) varying between .72 and .92 (M = .83; SD = .07). These coefficients are established on error category as the unit of analysis (15 categories); in order to save power, for the presentation of the results, only the four higher-order categories, broken down into both valences, are taken into account.

Outcome Questionnaire-45.2 (OQ-45.; Lambert, et al., 1996). This self-report questionnaire encompasses 45 items addressing three main domains of distress: level of symptoms, interpersonal relations and social role. A general sum score was computed which was used in this study. A Likert-type scale is used to assess the items, from 0 (never) to 4 (almost all the times). Validation coefficients of the original English version are satisfactory, in particular for internal consistency and sensitivity to change over psychotherapeutic treatment (Vermeersch, Lambert, & Burlingame, 2000). A French validation study (for the version used in this study) was carried out by Emond, Savard, Lalande, Boisvert, Boutin, and Simard (2004) and yielded satisfactory results. Cronbach's alpha for this sample was .95. Only the BPD patients filled out this questionnaire.

Symptom Check List (SCL-90-R; Derogatis, 1994). This questionnaire includes 90 items addressing various somatic and psychological signs of distress. These items are scored

using a Likert-type scale from 0 (not at all) to 4 (very much). Although the instrument is composed of 10 subscales, our study used only the Global Severity Index (GSI, score ranging from 0 to 4), which is a mean rated over all symptoms. Clinical cut-off score is 0.80. The French validation study was carried out by Pariente and Guelfi (1990) and yielded satisfactory coefficients. Cronbach's alpha for this sample was .98. Only the controls filled out this questionnaire.

Procedure

All patients and controls were asked to participate in a dynamic interview (DI; Perry, Fowler, & Semeniuk, 2005) lasting 50 minutes. As shown by Perry, Fowler, and Semeniuk (2005), high-quality dynamic interviews were associated with Interviewer's and Overall Dynamic Interview Adequacy (I-DIA and O-DIA). On a technical level, focus of the DI was the «patient's life in general» and five tasks of the interviewer composed the I-DIA: (1) Setting the interview frame: work-enhancing strategies; (2) Offering support: questions, support strategies, associations; (3) Affect exploration: questions, reflections, clarifications, defense interpretations; (4) Trial interpretations: defense and transference interpretations; (5) Formulating a synthesis. DI as a research tool has been developed from clinical practice of psychodynamic psychotherapy; thus, the context of DI is comparable to the context of an intake psychotherapy interview which was the case in our study: all patients came to the outpatient clinic with a request for psychotherapy for problems related to BPD. The techniques involved in the DI, in particular affect exploration, interpretations and formulation of synthesis, were prone to activate relevant schemas, as they had a fairly confronting value for the patient. Thus, this interview format, due to its schema-activating techniques, was relevant for assessment of spontaneous cognitive processes and ensured high levels of ecological validity (Kramer, Bodenmann, & Drapeau, 2009; D'Iuso et al., 2009). Validity coefficients of the DI with a healthy control group and for assessment of cognitive errors were

provided by Kramer and Drapeau (in press). The DIs were conducted by trained clinicians who had over 3 years of clinical experience and had specific initial training in DI.

The patients were given the questionnaires at the end of the interview and were asked to fill them in right after the session.

The control group was recruited by means of advertisement at two local institutions: (1) School of Social Studies ($n = 16$); (2) Association promoting Community Activities and Service ($n = 9$). Matching criteria were transparently issued at the outset of the control group recruitment. Therefore, only nine participants had to be refused participation due to the failure to meet the matching criteria. Only the control participants were given a financial compensation (the equivalent of USD 20). Due to our focus on the process-level using the CERS, we assumed comparability between the different interview contexts.

All interviews were tape-recorded and transcribed by Master's-level psychology students, according to the method defined by Mergenthaler and Stigler (1997).

Interviews were rated based on the transcripts. All ratings were done by four Master's-Level students in psychology; reliability of these ratings was established with trained raters on a randomly chosen 20% of all interviews (for the results see under Instruments).

Data Analytic Strategy

In preliminary analyses, we tested the comparability on the process-level of the two interview contexts (patients and healthy controls), by using between-group comparison (ANOVA) of number of words emitted by the individual. Univariate and multivariate statistics were performed to test our first hypothesis. Pearson's correlations were carried out in order to test the relationship between errors, BPD-criteria and symptoms.

Results

Preliminary analyses comparing the mean number of words yielded a between-group difference: the BPD patients produced on average 4470 words ($SD = 1056$) during the

dynamic interview setting, which was less than the controls who produced on average 7766 words ($SD = 2514$) in the same setting. This difference in number of words was significant ($F(1, 49) = 36.52; p < .001$). As independent clinical anchor, Kramer, Bodenmann, and Drapeau (2009) have found in a comparable interview study on bipolar disorder the mean production of 5037 (4418 respectively) words for patients presenting with clinical depression. Given the significant between-group difference in our data, along with the comparable means with other clinical populations, it was meaningful to pursue all remaining statistical analyses only on relative frequencies of CEs, weighted by the number of words produced per 1000.

Univariate analyses yielded no significant between-group effect for the number of errors, even if a medium effect size of $d = .50$ was observed (see table 1). However, a between-group difference was found for the total of negative cognitive errors; patients produced more of these, compared to controls ($p = .03$), whereas no effect was found for the total positive errors ($p = .41$).

Multivariate statistics (MANOVA) on all the eight categories of errors (the four clusters broken down into positive vs negative valence) yielded an overall multivariate effect ($p = .01$; see table 1). More specifically, two clusters with negative valence showed significant differences: BPD patients produced more negative fortune-telling and over-generalizing, compared to controls. On the other hand, BPD patients produced less positive over-generalizing than controls. No other significant differences were found.

Finally, Pearson's correlation analyses showed no significant correlation between the level of general symptoms (sum score of OQ-45) and the weighted frequencies of cognitive errors (see table 2). In order to test if the level of general symptoms had an influence on the between-group differences, as tested above, we conducted ANCOVA controlling for the sum score of OQ-45; as expected, results from these analyses were comparable to the ones reported in table 1. However, the number of BPD criteria met, as assessed using the SCID-II,

correlated with one category of weighted frequencies of CE: negative over-generalizing ($r = .41$; see table 2).

Discussion

Our hypotheses were partially supported by the results. The first hypothesis postulating higher levels of cognitive biases, as measured on the process-level of the spontaneous in-session speech production, associated with BPD, compared to healthy controls was not confirmed by the results; similar frequencies of CEs were found. This result may surprise, but is in line with research associated with the heuristics paradigm, in the form of unjustified optimism in the healthy controls (Baron, 2008; Gigerenzer & Brighton, 1990). Thus, we may note that the absence of the main effect may reflect what Gigerenzer and Brighton (2011, p. 3) summarized as, regarding healthy persons, “people violate a law of logic, probability, or some other standard of rationality” (see also Tversky & Kahneman, 1974). The second hypothesis was partially supported: more negative cognitive errors, in particular fortune-telling and over-generalizing, were found to be associated with BPD, compared to healthy controls, along with lower levels of positive over-generalizing in BPD. Negative over-generalizing was also linked with BPD symptomatology (see hypothesis 3). Cognitive biases towards negativity on the process-level was reported to be linked with BPD (Arntz & Veen, 2001; Barnow et al., 2009; Kurtz, & Morey, 1998). Based on our results, this bias may now be specified in terms of specific categories of cognitive biases, *i.e.*, negative over-generalizing and fortune-telling. It is interesting to note that the selective abstraction category which encompasses among others dichotomous thinking, discussed as a BPD specificity (Napolitano & McKay, 2007; Veen & Arntz, 2000), did not present an effect in our study. Even if the interview technique assures individualized schema-activation, this particular process was not elicited more often than in controls. The structure of the CE instrument, the low power of the present study and possible Type II statistical errors might

account for the absence of effect of dichotomous thinking. Our findings put a different category at center stage of the BPD functioning on the process-level: over-generalizing. An example of negative over-generalizing may be a patient saying: “My entire life is a mess”, or “My father always ignored me” where the patient makes abusive generalizations (using typically words such as “entire”, “always”, “never” referring to generalizing) based on a fact that presumably only occurred very rarely (the latter point implies that the CE-rating must take into account the contextual information of the entire transcript, for comparison with the assumed “reality” which constitutes an advantage of the observer-rater perspective; see under Instruments). We underline that the purity of our sample, in particular the low level of comorbid depression, allows the exclusion of confounding with depressive phenomenology, clinically associated with over-generalizing. The more often the patients used this cognitive error, the more BPD symptoms they presented: thus, negative over-generalizing may be discussed as specific vulnerability factor in the maintenance of BPD symptoms. Positive over-generalizing, *e.g.*, a patient saying “My entire childhood was a honey-moon” or “My boyfriend is always there when I need him”, a cognitive process which may at times serve tendencies of denial (Kramer & Drapeau, 2009) was less produced by BPD patients, compared to controls. Again, positive cognitive errors may certainly have an impact on the level of symptoms on the long run, but on the short-term, they are capable of producing in the subject a positive emotion, *e.g.*, pride, contentment, enthusiasm in the case of our second example, which may serve as a protective shield towards the overall distressing experience. The therapeutic role of positive emotions associated with pleasurable activities is discussed by Linehan, Bohus, and Lynch (2007) and more generally within Dialectical-Behavior Therapy (Linehan, 1993).

According to Kendall and Hollon (1981; see also Schwartz, 1986), negative cognitive errors are more likely to change as a result of cognitive psychotherapy, compared with

positive cognitive errors. Therefore, several clinical implications may ensue from the results found (see also Alden & Osti, 1989). Cognitive processes occur spontaneously in-session, consistent with the methodology used in the present study which underlines the particular clinical relevance of the results. The observation that negative over-generalizing is over-used in the in-session cognitive processes in BPD patients may be useful for clinical assessment and intervention. Cognitive therapists working with these patients may be more attentive to these processes and use these errors as hints to the underlying cognitive or affective schemas (Sachse et al., 2009; Young et al., 2003). Based on the example given („My father always ignored me“), the therapist may hypothesize the basic need of being important for the patient's father was not met (Sachse et al., 2009) and the feeling of being ignored takes precedence over, in this example, the presumed fact that the father was also at times attentive and empathic towards the subject. Clarification of these schema-aspects related to this cognitive bias should be done on an idiosyncratic level, as well as the implementation of cognitive or affective restructuring techniques, *e.g.*, by using socratic dialogue, imagery techniques (Young et al., 2003) or various forms of two-chair dialogues (*e.g.*, Arntz, 2009; Greenberg, 2002; Sachse, Püschel, Fasbender, & Breil, 2008; Warwar, Links, Greenberg, & Bergmans, 2008). The latter Gestalt techniques are consistent with the notion of, described earlier, affect-infusion (Bower, 1981) where the aim of psychotherapy is the promotion of shifts in states of mind which ultimately will change biased thinking.

We need to acknowledge several limitations of the present study. The number of observations is relatively small, resulting in limited power, and several research avenues open up based on the present pilot study. The difference found with regard to the number of words produced, which seem to be associated with psychopathology in two studies using the same methodology (the present one and Kramer, Bodenmann and Drapeau, 2009), calls for further investigation aiming at the understanding of this phenomenon: are patients more distressed

and therefore less talkative, or are healthy controls less mistrusting and produce therefore more words? The BPD sample presents low co-morbidity, both on axis I and II, which is consistent with the specialized center for BPD where the patients were recruited; however, we need to take great care when generalizing these results to samples with higher co-morbidity. Similarly, a relative high number of men (40%), rather unusual in studies on BPD, invite readers to be cautious when comparing our results with the literature. Matching with the number of years of education (instead of the intelligence itself) may have been a biased operationalization of cognitive capacities, in particular for this patient population for whom we may therefore have underestimated their cognitive capacities. Finally, no clinical control group was included (see Veen & Arntz, 2000; Napolitano & McKay, 2007) which should be a follow-up study answering the question of CE specificity of BPD, from the perspective of the external observers.

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Table 1

Cognitive Errors in Borderline Personality Disorder ($N = 25$)

Cognitive Errors	Patients		Controls		$F(1, 49)$	ES
	M	SD	M	SD		
Cognitive errors	2.40	1.32	1.79	1.10	3.12	.50
Positive	.58	.57	.75	.63	1.01	.28
Negative	1.81	1.30	1.03	.76	6.64*	.73
Positive cognitive errors						
Fortune-Telling	.01	.04	.03	.07	1.53	.35
Over-Generalizing	.06	.13	.16	.23	4.06*	.54
Selective Abstraction	.49	.47	.56	.46	.22	.15
Personalization	.03	.08	.01	.04	.98	.32
Negative cognitive errors						
Fortune-Telling	.21	.22	.03	.06	14.51**	1.12
Over-Generalizing	.52	.59	.25	.21	4.86*	.61
Selective Abstraction	.88	.51	.66	.70	1.59	.36
Personalization	.21	.38	.10	.14	1.78	.38

Note. MANOVA: $F(8; 41) = 2.82; p = .01$; ES : Effect size. All CE scores are weighted relative frequencies per 1000 words; Effect size (Cohen's d)

* $p < .05$; ** $p < .01$

Table 2

Pearson's correlations between symptom level (OQ-45), number of BPD criteria met and Cognitive Errors ($N = 25$)

CE	OQ-45	BPD
Number of words	-.10	-.11
Cognitive errors	.02	.31
Positive	-.39	-.14
Negative	.15	.33
Positive cognitive errors		
Fortune-Telling	-.25	.01
Over-Generalizing	-.21	.13
Selective Abstraction	-.33	-.13
Personalization	-.29	-.26
Negative cognitive errors		
Fortune-Telling	.17	.18
Over-Generalizing	.22	.41*
Selective Abstraction	.09	.18
Personalization	.19	.26

Note. All CE scores are weighted relative frequencies per 1000 words.

* $p < .05$