

# The role of positive psychology interventions in improving wellbeing and pathology in patients with borderline personality disorder

*A systematic literature review*

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## Abstract

*Background.* Borderline personality disorder (BPD) is a serious and prevalent disorder characterized by a persistent pattern of impulsivity, emotional dysregulation, interpersonal conflicts and an unstable identity. So far, treatment of the disorder was mainly focused on diminishing BPD pathology. Positive psychology complements and extends the problem-focused psychology, by focusing on strengths, wellbeing and quality of life. Consequently, remarkable growth in the development of positive psychology interventions (PPIs) has been recorded. PPIs have shown to enhance wellbeing in various clinical populations, yet the effectiveness in the population of BPD patients remained unclear. To fill the gap of research, *the present review systematically searched for (1) types of PPIs applied on BPD patients and (2) the effectiveness of PPIs regarding diminishment of BPD symptoms or enhancement of wellbeing in BPD patients.*

*Method.* A systematic search was conducted and included studies that targeted patients diagnosed with BPD, described a PPI, and performed at least post-intervention measures of outcomes in wellbeing or BPD symptoms. After screening, a limited number of eight studies remained, which contained seven different interventions (PPIs), including four (pilot) RCTs.

*Results.* Seven out of eight interventions were delivered as group-guided interventions with a duration of at least eight weeks. The majority of the studies investigated the effect of mindfulness. Results showed that mindfulness was effective in reducing BPD symptoms compared to control groups, ( $p = .001$ ,  $d = .90$ ), and improving BPD criteria: emotion regulation, ( $p = .012$ ,  $r = -0.7$ ), impulsivity, ( $p = .07$ ,  $d = .32$ ), and distress tolerance, ( $p = .001$ ,  $d = 1.10$ ). Moreover, mindfulness showed significant enhancement in wellbeing as well, ( $p = .017$ ). Also loving-kindness and compassion meditation (LKM/CM) significantly improved BPD symptoms, ( $p = .032$ ,  $d = .64$ ), and wellbeing, ( $p = .018$ ,  $d = -.74$ ). Further, in applying acceptance and commitment therapy (ACT), significant differences were observed at post-treatment for BPD symptoms, ( $p = .000$ ,  $d = .99$ ), and well being, ( $p = .002$ ,  $d = .89$ ).

*Conclusion.* The observations of this systematic review show that PPIs can contribute by improving wellbeing and giving support to its utility in treating symptoms of BPD. The findings show that mindfulness is the most prevalent PPI for BPD patients. Future research should also explore new concepts and approaches in line with positive psychology, delivery methods and optimal intensity. Further, high quality research with the use of larger samples to better determine the specific impact of relevant PPIs on BPD and follow-up assessments for evaluating the long-term effects are needed.

## **Introduction**

Borderline personality disorder was officially included in the DSM III in 1980 (American Psychiatric Association, 1980). Yet, what the disorder captured was not fully understood, its validity was mostly and rather precariously based on its clinical utility. In the next decade, sufficient clinically and scientifically wisdom had been accumulated. By the time the DSM-IV-TR was published, the scientific construction for understanding the genesis of borderline personality disorder, a way of describing its comorbidities and its spectrum relationships with other disorders shaped the development of the diagnosis ( Gunderson, 2009). Borderline personality disorder or BPD is defined as ‘a pervasive pattern of instability of interpersonal relationships, self-image and affects and marked impulsivity beginning by early adulthood and present in a variety of contexts’ (American Psychiatric Association, 2000, p.1250).

Individuals with BPD exhibit a broad range of behavioral and psychological problems. Many of them appear to have a significant fear of abandonment and rejection. They often fall into erratic and troublesome relationships, sometimes just after one meeting with another person. However, they are just as likely to fall out with that person if they read the person’s behavior as insensible or not caring. Even though they fall out with a person when their expectations for the relationship are not satisfied, they may also be riddled with fear or even panic about being abandoned and losing that relationship. This often leads to an emotional roller-coaster and may result in: (1) unstable and unpredictable changes in self-image and sense of self featured by altering personal aims, principles and career endeavors (2) feelings of shame (Rizvi & Linehan, 2005), and emptiness leading to episodes of depression (Lewinsohn, Rohde, Seeley, Klein & Gotlib, 2000), suicidal thoughts or even attempts (Davis Gunderson & Myers, 1999), (3) impulsive behavior that is often self-damaging such as substance abuse, spending, binge eating (Trull, Sher, Minks-Brown, Durbin & Burr, 2000), and (4) difficulty controlling anger, physical violence and inappropriate promiscuity. BPD has continuously been established as the most common disorder of all personality disorders (Zanarini, 2012). Women are considerably more likely to meet the criteria for BPD, and those who are diagnosed with BPD often report a dreary youth of (sexual) abuse, neglect, or separation (Lieb, Zanarini, Schmahl, Linehan & Bohus, 2004).

Moreover, BPD repeatedly involves high rates of comorbidity with: Axis-I disorders, mood disorders, anxiety disorders, substance use and post-traumatic stress disorder (Zanarini, Frankenburg, Hennen, Reich & Silk, 2004). Consequently, these data suggest that BPD

represents a behavioral style that sadly causes a lot of harm to the individual and surroundings. It is not only difficult for the individual living with this mental condition, it has also lead to widespread costs, including chronic unemployment, recurrent hospitalization and increased consumption of overall healthcare resources. Consequently, borderline personality disorder puts a heavy burden on its patients and on the society (Wupperman, Fickling, Klemanski, Berking & Whitman, 2013).

Although BPD is regularly seen by clinicians as one of the most challenging disorders to treat (Chafos & Economou, 2014), significant advances in the treatment of the disorder have been found. Systematic reviews suggest that psychotherapy is the preferred method of treatment for BPD (Stoffers, Voellm, Rücker, Timmer, Huband & Lieb, 2012). The following treatment methods are some of the most well-researched treatments in focusing on decreasing BPD symptoms in the past decades: *Cognitive therapy (CT)*, a method introduced by Beck (1979) focusing on correcting maladaptive cognitions has developed into *cognitive behavioural therapy (CBT)*. CBT can help identify and adjust core beliefs and/or behaviours that underlie inaccurate perceptions of themselves and others along with problems when interacting with others (Davey, 2008). Nonetheless, randomized controlled trials (RCTs) investigating the effectiveness of CBT for BPD deliver contradictory outcomes (Davidson, et al., 2006, Tyrer, et al., 2003). *Mentalization-based treatment (MBT)* was developed by Bateman and Fonagy in 1999. The object of treatment is increasing the mentalization capacity of patients with BPD. Individuals are taught to accurately examine their thoughts and beliefs and learn how to tolerate them, and to manage them adequately. In a RCT by Bateman & Fonagy (2009) MBT shows a decline in suicide attempts and hospitalization in individuals with BPD. The most vigorous evidence from clinical trials in treating BPD was found in *Dialectical Behavior Therapy (DBT)*. Various RCTs have shown the effectiveness of DBT in decreasing BPD symptoms (Ben-Porath et al., 2004).

In addition, we have seen an increase of integrating *mindfulness* into psychotherapy in recent years. The theory of mindfulness, which originates from Buddhist traditions, has gained extensive attention in Western psychology since it is believed to enhance psychological wellbeing (Chafos & Economou, 2014). Mindfulness can be defined as living consciously here and now, with attention, openness and without judgment (Kabat-Zinn, 2003). Mindfulness is one of the common themes of the so called ‘third wave’ of cognitive behavior therapies and includes *mindfulness-based cognitive therapy (MBCT)*, *dialectical behaviour therapy (DBT)* and *acceptance and commitment therapy (ACT)*, (Razzaque, 2013). MBCT has proven to be successful for patients at high risk of suicide (Barnhofer, Duggan,

Crane, Hepburn, Fennell & Williams, 2007) and psychiatric in-patients (York, 2007). Furthermore, mindfulness meditation is one of the core elements of DBT. This approach combines components of cognitive behavioral treatment (CBT) with mindfulness. It takes a client-centered view of accepting clients for who they are, but attempt to regulate the patient's ability to handle emotions and their dysfunctional ways of thinking about themselves and the world. As described by Lieb et al., (2004) DBT is the most well-researched treatment for BPD. Furthermore, ACT helps patients to cope with the obstacles they encounter (acceptance) and continue to move into a valued direction (commitment) in a way that builds larger patterns of effective behaviour (Hayes, 2004). The reduction of experiential avoidance (tendency to increase the intensity of negative events) is a fundamental goal of ACT (Razzaque, 2013). In addition, Chapman, Graz & Broan (2006) suggested that BPD symptom severity is related to experiential avoidance.

According to a recent meta-analysis current psychotherapeutic treatments have significant but small effect sizes on BPD pathology (Cristea, Gentili, Cotet, Palomba, Barbu & Cuijpers, 2017), and thus, the treatment of BPD can be much improved upon. An interesting and new venue of research would be positive psychology interventions (PPIs). Also, because of PPIs, in contrast to conventional methods, focus on quality of life and wellbeing that is severely impaired in these patients (Bolier, Haverman, Westerhof, Riper, Smit & Bohlmeijer, 2013). Seligman and Csikszentmihalyi (2000) pleaded for a radical change in psychology and introduced positive psychology: 'Positive psychology assumes that within the limitations that exist in every human being, the largest potential for flourishing or optimal functioning of individuals not lies in the analysis and minimizing deficiencies and problems, but in discovering, appreciating and developing opportunities, strengths and sources of meaning'. Positive psychology contributes by complementing a complaint-oriented approach with the aim of promoting well-being and enrichment of one's own strengths resulting in leading a meaningful life (Westerhof & Bohlmeijer, 2010).

One of the most influential theories within positive psychology, the broaden-and-build-theory argues that positive emotions lead to optimal functioning (Fredrickson, 2004). Positive emotions broaden one's attention, cognition and actions. For example, pleasure turns on creativity and interest invites investigating. Different positive emotions contribute to the broaden effect. Over time, this broadening effect of thought- and behavioral repertoire builds skills and prolonged physical, cognitive and social resources. This in turn leads to dealing with difficult situations in the future (Fredrickson, 2004). Research has shown that individuals experiencing more positive emotions are less self-centered, feel more connected to others and

have more resilience (Vaughn & Fredrickson, 2006). Positive emotions can be enhanced by for example, loving-kindness meditation (LKM). In a field experiment conducted by Fredrickson, Cohn, Coffey, Pek & Finkel (2008) 139 full-time working adults were randomly assigned to a LKM group or waitlist control group. Participants were asked to think of a person that they already saw as a warm person. Followed by increasing their focus and positive mind-set to themselves and enlarging it to a widening array of people. This resulted in direct positive emotions leading to long-term effects. In the end, a significant increase in daily positive emotions, sustainability, positive effects on resilience and functioning were recorded. This, in turn, predicted an increase of life satisfaction and a reduction of depressive symptoms.

Another interesting concept that is related to positive psychology and may operate as a psychological buffer against psychological stressors is self-compassion (Gilbert, 2010). Self-compassion is defined as being kind and understanding toward oneself and perceiving one's experiences as part of the larger human experience. In contrast, to being harshly self-critical and perceiving one's experiences as isolating (Neff, Kirkpatrick & Rude, 2007). There is a growing body of proof assuming that compassion-based interventions including compassion meditations (CM) and self-compassion are successful strategies to encourage mental wellbeing and to decrease clinical symptomatology in chronic personality disorders with self-critical thoughts (Lucre & Corten, 2013).

Teaching LKM and CM to individuals with BPD may be a coherent and complementary way to treat concepts like self-criticism and shame (Leaviss & Uttley, 2015). Since self-criticism and shame, are presumed to play a major role in the emotional dysregulation in individuals with BPD (Rüsch et al., 2007). BPD patients show maladaptive emotion regulation strategies like the attempt to suppress emotions with possible negative effects on mental health (Beblo et al., 2013). Therefore, mindfulness and self compassion could be very relevant for treatment of BPD pathology and enhancement of wellbeing in stimulating adequate emotion regulation strategies.

In sum, research in the field of positive psychology has emerged over the last decade and has provided evidence-based answers. Consequently, various interventions have been developed in line with positive psychology. PPIs attempt to improve positive feelings, behaviors or cognitions and have shown good results in healthy people and people with anxiety and mood disorders (Wood & Tarrrier, 2010). Moreover, PPI may offer a promising approach to enhance wellbeing (Sin & Lyubomirsky, 2009). Whereas PPIs have been studied intensively in mood disorders, little studying thus far have examined the use of PPIs in

personality disorder and more interestingly, in BPD. No systematic review of the effectiveness of PPIs in BPD has yet been published. To fill the gap of research, the present review aims to add to existing literature by systematically searching for:

1. What types of positive psychological interventions for BPD patients are present?
2. What is the effectiveness of positive psychological interventions in BPD patients?
  - a. Can positive psychological interventions improve BPD symptoms?
  - b. Can positive psychological interventions strengthen various components of wellbeing in BPD patients?

## **Method**

The study was prepared and conducted according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009).

### *Search strategy*

The electronic databases PsycINFO and Scopus were searched for relevant studies from 1998 (the start of the positive psychology movement) till May, 2017. For the concepts of ‘positive psychology’, ‘borderline personality disorder’ and ‘intervention’ a number of different search terms have been created (see Table 1). Subsequently, studies have been sought in combination with these three concepts in title, abstract or keywords using Boolean operators ‘AND’ and ‘OR’. Potentially eligible studies were screened on title in the first phase and on abstract in the second phase. Further investigation led to the third phase, an assessment of eligibility based on the full paper. In this phase, we examined these studies against the in- and exclusion criteria. Finally, of the included studies, the reference list was inspected to see if there were any new studies, also the studies that cited the included studies were inspected by the option ‘cited by’ in PsychINFO. This did not yield into new studies. The flowchart of the study selection process by PRISMA (2009) is presented in Figure 1.

Table 1 Search strategies

<b>Search strategy: Scopus</b>	
#1	TITLE-ABS-KEY (borderline personality disorder OR BPD OR borderline)
#2	TITLE-ABS-KEY (well-being OR happiness OR satisfaction OR positive psych* OR positive emotion* OR positive feeling* OR positive cognition OR positive behavior* OR compassion OR optimism OR resilience OR gratitude OR kindness OR self-compassion OR mindfulness)
#3	TITLE-ABS-KEY (positive psychology OR positive intervention OR positive therap* OR positive treatm* OR training OR program* OR exercise)
#4	#1 AND #2 AND #3 = 212 documents
<b>Search strategy: PsychINFO</b>	
#1	(borderline personality disorder OR BPD OR borderline)
#2	(well-being OR happiness OR satisfaction OR positive psych* OR positive emotion* OR positive feeling* OR positive cognition OR positive behavior* OR compassion OR optimism OR resilience OR gratitude OR kindness OR self-compassion OR mindfulness OR empathy OR engagement OR meditation OR growth)
#3	(positive psychology OR positive intervention OR positive therap* OR positive treatm* OR positive training OR positive program* OR positive exercise)
#4	#1 AND #2 AND #3 = 216 documents

*Criteria for considering studies for this review*

*Inclusion criteria.* For studies to be included in this review, a number of conditions had to be met. A study was included if it: (1) empirically tested the accessibility or effectiveness of a positive psychology intervention, therapy or training aimed at positive feelings, positive behavior, or positive cognitions (Sin & Lyubomirsky, 2009), (2) performed at least post-intervention measures of wellbeing or BPD symptoms, (3) was published between 1998 and 2017, (4) was written in English or Dutch, (5) included adult participants (18 years or older) diagnosed with BPD.

*Exclusion criteria.* Studies were excluded to this review if they were based on the effect of dialectical behavioral therapy (DBT). More specific, although mindfulness has a prominent role in DBT, it is not sufficient enough to categorize DBT as a PPI. For that reason, we excluded studies based on DBT during the searching process. However, studies



focusing merely on the core element ‘mindfulness’ and neglecting other elements of DBT were included to this review.

### *Data-extraction*

All data derived from the included studies were extracted by one researcher. See Tables 2 and 3 for the extracted and summarized data. The tables were divided into two separate tables and concern the intervention characteristics and study characteristics. The intervention characteristics included: goal and target group, name of PPI, component(s) of PPI, intensity and mode of delivery. The first characteristic, goal and target population, presents the purpose of the intervention and for whom it was intended. The intensity of the intervention shows the duration in weeks, number of sessions and minutes per session. The name of the PPI specifies what kind of PPI was applied. The component(s) of the PPI describe the specific elements of the PPI. Lastly, the mode of delivery indicates whether the intervention took place in a group or individual and if it was guided or not.

The study characteristics included: design, (*n*) participants per condition and the drop-out rates, measurements, outcome measures: (1) borderline personality disorder symptoms (BPDS) and (2) wellbeing (WB), and lastly the results. Design describes what kind of research method was applied and the rate of drop-out. (*n*) Participants per condition and drop-out specify the number of participants in each group and the drop-out rate. Measurements present the number of conducted measurements on which the intervention was evaluated. The outcomes measures show the effectiveness of the intervention on BPDS and WB. Finally, the results give a summarized conclusion of the outcomes.

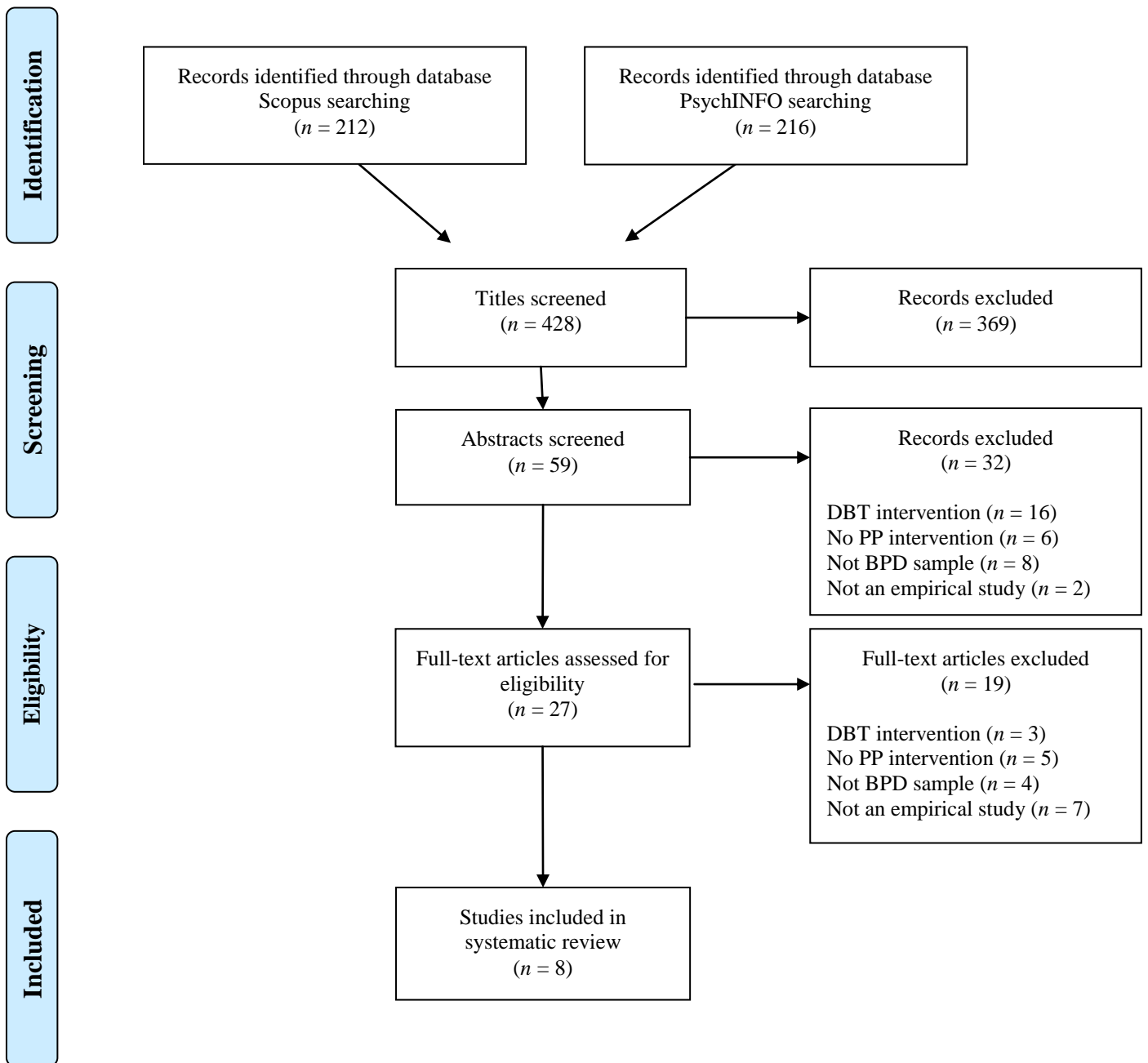


Figure 1 Flowchart of the study selection process by PRISMA (2009)

*Table 2 The intervention characteristics of the reviewed PPIs*

<b>Authors</b>	<b>Goal and target group</b>	<b>Name of PPI</b>	<b>PPI component(s)</b>	<b>Intensity</b>	<b>Mode of delivery</b>
1a. Elices et al. (2016)	Improving (1) BPD symptoms and (2) mindfulness-related capacities in patients diagnosed with BPD	Mindfulness Training (MT)	(1) Mindfulness practice (2) Skills training (‘what’ and ‘how’)	Duration:10 weeks Sessions: 10 Time:150 min per session	Group guidance
1b. Soler et al. (2016)	Improving various facets of impulsivity in patients diagnosed with BPD	Mindfulness Training (MT)	(1) Mindfulness practice (2) Skills training (‘what’ and ‘how’)	Duration:10 weeks Sessions: 10 Time:120 min per session	Group guidance
2. Feliu-Soler et al. (2014)	Improving (1) emotion regulation and (2) clinical symptomatology in patients diagnosed with BPD	Dialectical behavior therapy – Mindfulness only (DBT-M)	(1) Mindfulness practice	Duration:10 weeks Sessions: 10 Time:120 min per session	Group guidance
3. Feliu-Soler et al. (2017)	Improving (1) self-compassion (2) mindfulness and (3) BPD symptoms in patients diagnosed with BPD	Loving-kindness and compassion meditation (LKM/CM)	(1) Fostering(self-) compassion (2) Mindfulness practice (3) Skills training (‘what’ and ‘how’)	Duration:3 weeks Sessions:3 Time: Not specified	Group guidance

<b>Authors</b>	<b>Goal and target group</b>	<b>Name of PPI</b>	<b>PPI component(s)</b>	<b>Intensity</b>	<b>Mode of delivery</b>
4. Morton et al. (2012)	Improving (1) ACT-related capacities and (2) BPD symptoms in patients diagnosed with BPD	Acceptance and commitment therapy (ACT)	(1) Mindfulness practice (2) ACT components: - defusion exercises - emotion skills training - values awareness exercises	Duration: 12 weeks Sessions: 12 Time: 120 min per session	Group guidance
5. Sache et al. (2011)	Improving (1) BPD symptoms and (2) mindfulness skills in patients diagnosed with BPD	Mindfulness-based cognitive therapy (MBCT)	(1) Mindfulness practice (2) Skills training	Duration: 8 weeks Sessions: 8 Time: 120 min per session	Group guidance
6. Sauer & Bear (2012)	Improving distress tolerance in patients diagnosed with BPD	Mindful self-focus	(1) Mindfulness practice (2) Encouraging mindful observation and awareness of ongoing experience	Duration: 1 day Sessions: 1 Time: 60 min per session	Individual non-guidance
7. Soler et al. (2012)	Improving (1) attentional processing and (2) BPD symptoms in patients diagnosed with BPD	Dialectical behavior therapy – Mindfulness only (DBT-M)	(1) Mindfulness practice aim: balancing emotion with reasoning (2) Skills training	Duration: 10 weeks Sessions: 8 Time: 120 min per session	Group guidance

Table 3 The study characteristics of the reviewed studies

Authors	Study design	(n) Participants per condition Drop-out	Measurements	Outcome measures BPD	Outcomes measures WB	Results
1a. Elices et al. (2016)	- Randomized Controlled Trial (RCT) - Two arm study	Mindfulness training: $n=32$ Interpersonal effectiveness skills training(IE): $n=32$ <u>Drop-out:</u> MT :40% IE:19%	Pre- and post-intervention $T_0= 64$ $T_1= 44$	Borderline Symptom List (BSL-32)	Five Facet Mindfulness Questionnaire (FFMQ) EQ	Intervention effect in both ITT and PP samples in BPD symptoms ( $p = .001$ , $d = .90$ ), and ( $p < .0001$ , $d = 1.32$ ), and decentering ( $p = .017$ , $d = .61$ ), and ( $p < .001$ , $d = 1.06$ ). Post hoc improvement in MT on two mindfulness facets: non-judging ( $p < .002$ ), and describing ( $p < .01$ )
1b. Soler et al. (2016)	- Pilot Randomized Controlled Trial (RCT) - Two arm study	Mindfulness training: $n=32$ IE training: $n=32$ <u>Drop-out:</u> MT :40% IE:19%	Pre- and post-intervention $T_0= 64$ $T_1= 44$	Barrat Impulsiveness Scale (BIS-II) CPT-II, GSIP, TCIP, SKIP TPT		Intervention effect on tolerance of delayed rewards ( $p = .003$ , $d = .95$ ), and subjective time perception ( $p = .034$ , $d = .66$ ). No intervention effect on trait impulsivity. But, MT improved significantly on impulsivity subscales ( $p < .004$ , $< .006$ , $< 0.7$ )
2. Feliu-Soler et al. (2014)	- Single-centre, non-randomized controlled trial - Two arm study	DBT-M: $n=18$ General Psychiatric Management (GPM): $n=17$ <u>No drop-out</u>	Pre- and post-intervention $T_0= 35$ $T_1= 35$	Self-Assessment Manikin (SAM), sCORT sAA HDRS BPRS	Experience Questionnaire (EQ)	Intervention effect in depression and psychopathology ( $F = 10.75$ , $p < .002$ and $F = 13.37$ , $p < .001$ ). No intervention effect on emotion response. But, daily mindfulness practice was significantly related to emotion response in DBT-M ( $p = .012$ and $p = .015$ )

<b>Authors</b>	<b>Study design</b> <b>Drop-out</b>	<b>(n) Participants</b> <b>per condition</b> <b>Drop-out</b>	<b>Measurements</b>	<b>Outcome</b> <b>measures</b> <b>BPD</b>	<b>Outcomes</b> <b>measures</b> <b>WB</b>	<b>Results</b>
3. Feliu-Soler et al. (2017)	- Pilot Randomized Control Trial (RCT)  - Two arm study	Loving-kindness compassion meditation (LKM/CM): <i>n</i> =16  TAU: <i>n</i> =16 <u>No drop-out</u>	Pre- and post- intervention T <sub>0</sub> = 32 T <sub>1</sub> = 32	Borderline Symptom List (BSL-32)	Philadelphia Mindfulness Scales (PHLMS) Self- compassion Scale (SCS)	Intervention effect in acceptance ( <i>F</i> = 1.38, <i>p</i> = .016). LKM/CM improved significantly in BPD symptoms ( <i>p</i> = .032, <i>d</i> = .64), self- criticism ( <i>p</i> = .022, <i>d</i> = .64), mindfulness ( <i>p</i> = .010, <i>d</i> = -.74), self-kindness ( <i>p</i> = .003, <i>d</i> = -.90), and acceptance ( <i>p</i> = .018, <i>d</i> = -.66). Control group: only self-criticism ( <i>p</i> = .031)
4. Morton et al. (2012)	- Pilot Randomized Control Trial (RCT)  - Two-arm study	Acceptance and commitment therapy (ACT) +TAU: <i>n</i> =32  TAU: <i>n</i> =32 <u>Dropout: only at</u> follow up: 48%	Pre- and post- intervention + follow-up T <sub>0</sub> = 41 T <sub>1</sub> = 41 T <sub>2</sub> = 10	Borderline Evaluation of Severity over Time (BEST) DASS, BHS ACS, DERS	AAQ (Acceptance and Action Questionnair e) FFMQ	ACT+TAU showed improvement in BPD symptoms ( <i>p</i> = .000, <i>d</i> = .99), psychological flexibility ( <i>p</i> = .000, <i>d</i> = .98), emotion regulation ( <i>p</i> = .002, <i>d</i> = .78), mindfulness ( <i>p</i> = .002, <i>d</i> = .79) and fear of emotions ( <i>p</i> = .001, <i>d</i> = .89). Follow-up: improvements maintained, except for fear of emotions
5. Sache et al. (2011)	- Repeated Measures Quasi- Experimental Study  - Two arm study	Treatment completers: <i>n</i> =16 Treatment non- completers: <i>n</i> =6 <u>Drop-out: 22%</u>	Pre- and post- intervention T <sub>0</sub> = 22, T <sub>1</sub> = 22, T <sub>2</sub> ( <i>post-hoc</i> )=16	State-Trait Anxiety Inventory (STAI) BDI-II, DES-II, SDQ-20, BIS-II, STROOP, TMT	Five Facet Mindfulness Questionnair e (FFMQ) AAQ	ITT analyses showed no intervention effects on clinical variables, but improvement was found on attentional control ( <i>p</i> = .03, <i>d</i> = .26) which is linked to mindfulness. TC improved significantly on mindfulness (RCI = 18.4)

Authors	Study design	(n) Participants per condition Drop-out	Measurements	Outcome measures BPD	Outcomes measures WB	Results
6. Sauer & Bear. (2012)	- Behavioral Experimental Study - Two arm study	Mindful self-focus: $n=20$ Ruminative self-focus: $n=20$ <u>No drop-out</u>	$T_0$ . Baseline (40) $T_1$ . Post anger induction (40) $T_2$ . Post self-focus (40) $T_3$ . Post distress tolerance (40)	Positive and Negative Affect Schedule-Expanded Version (PANAS-X), (PASAT-C)		Intervention effect on distress tolerance ( $p = .001$ , $d = 1.10$ ), and on feelings of anger ( $F = 15.76$ , $p < .01$ ). The reduction in anger following MSF was significantly greater than the reduction in anger following RSF. Further, participants in MSF were less angry than RSF ( $p = .01$ , $d = .81$ )
7. Soler et al. (2012)	- Single-centre, non-randomized controlled trial - Two arm study	DBT-M + GPM: $n=40$ GPM : $n=19$ <u>Drop-out</u> : 1.7%	Pre- and post-intervention $T_0= 60$ $T_1= 59$	Continuous Performance Test (CPT-II), POMS, HRSD, BPRS	Five Facet Mindfulness Questionnaire (FFMQ), EQ	Intervention effects on attention ( $F = 3.3$ , $p = .02$ ). DBT-M +GPM group improved in impulsivity: fewer commissions ( $p = .009$ ), slower responses ( $p = .02$ ), lower scores on impulsivity index ( $p = .04$ ). Time of mindfulness correlated with depressive symptoms ( $r = -.67$ , $p < .001$ ), and reactivity to inner experiences ( $r = 0.56$ , $p = .008$ ).

*Note.* AAQ = Acceptance and Action Questionnaire, ACS = Affective Control Scale, BDI-II = Beck Depression Inventory, BEST = Borderline Evaluation of Severity over Time, BHS = Beck Hopelessness Scale, BIS-II = Barrat Impulsiveness Scale, BPRS = Brief Psychiatric Rating Scale, BSL-32 = Borderline Symptom List, CPT-II = Continuous Performance Test-II, DASS = Depression Anxiety Stress Scale, DERS = Difficulties in Emotion Regulation Scale, DES-II = Dissociative Experience Scale, EQ = Experience Questionnaire, FFMQ = Five Facet Mindfulness Questionnaire, FSCRS = Forms of Self-Criticism/Self-Attacking and Self-Reassuring Scale, GSIP = GoStop Impulsivity Paradigm, HDRS = Hamilton Depression Rating Scale, PANAS-X = Positive and Negative Affect Schedule-Expanded Version, PASAT-C = Paced Auditory Serial Addition Task, PHLMS = Philadelphia Mindfulness Scale, POMS = Profile of Mood States, sAA = salivary alpha-amylase, SAM = Self-Assessment Manikin questionnaire, sCORT = salivary cortisol, SCS = Self-Compassion Scale, SDQ-20 = Somatoform Dissociation Questionnaire, SKIP = Single Key Impulsivity Paradigm, STAI = State-Trait Anxiety Inventory, TCIP = Two Choice Impulsivity Paradigm, TMT = Trail Making Test, TPT = Time Paradigm Test.

## Results

### *Search results*

In the study selection, a total of 426 studies were screened on title. After removal of unsuited studies, 59 studies were screened on abstract. In this phase, 32 studies were excluded for the following reasons: it did not measure the accessibility or effectiveness of an intervention by post-intervention measurement; it described a DBT intervention or another intervention not in line with the theoretical tradition of positive psychology; or it did not consist of an adult BPD sample. In the last phase, 27 full-text studies were assessed for eligibility. Another 18 studies were removed for the following reasons: it did not measure the accessibility or effectiveness of an intervention by post-intervention measurement; it described a DBT intervention or another intervention not in line with the theoretical tradition of positive psychology; or it did not consist of an adult BPD sample. Finally, the remaining eight studies were included to the review. Figure 1 shows the study flow chart, including reasons for exclusion.

### *Characteristics of the interventions*

The characteristics of the interventions are displayed in Table 2. Each study was numbered for the purpose of making references in the following text easier to read. Although the study by Soler et al., (2016) investigated another construct, they reported secondary analyses from the same data and same intervention investigated in the study by Elices et al. (2016). Therefore, both studies received the same number with an added a or b (1ab).

*Goal and target population.* All interventions were aimed at improvement of BPD symptoms or other BPD-related constructs and most of the studies were aimed at improvement of wellbeing as well. The target populations of this review were individuals diagnosed with borderline personality disorder (BPD). The categorical diagnostic system requires at least five criteria for a BPD diagnosis (American Psychiatric Association, 2000). The presence of five or more criteria of BPD for those accepted into a study was supported by clinical interviews. More specific, in all studies, the participants were screened for BPD symptoms with use of the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II) or the Diagnostic Interview for Borderline Revised (DIB-R). Seven out of eight studies included participants meeting the required criteria and were diagnosed with BPD (1ab;2;3;5;6;7). One study (4) included participants meeting four or more criteria for BPD. However, the average number of BPD criteria was 6.0 for the intervention group and



6.5 for the control group. Therefore, the study was included in the systematic review. Within all studies, most of the participants consisted of female participants, ranging from 86 up to 93.75 percent. The age of the participants varied between 18-59 years.

*Positive psychological interventions (PPIs).* All PPIs were developed in line with the theoretical tradition of positive psychology, meaning a psychological intervention aimed at enhancing positive emotions, positive cognitions or positive behavior. Seven PPIs were applied in eight studies. Although most of the PPIs were focusing in particular on the effect of mindfulness in BPD patients (1ab;2;5;6;8), the format and background of the mindfulness interventions varied. For example, Mindfulness Training (MT) was applied in two studies (1ab). Two other studies applied 'Core Mindfulness Skills', which originates from Dialectical Behavior Therapy (DBT) (2;7). Furthermore, Mindfulness-based Cognitive Therapy (MBCT) is a variation in the concept of mindfulness and was applied in one study (5) and lastly Mindful self-focused attention was applied in one study (6). Other types of PPIs investigated in studies and included to this review are Loving-kindness- and (Self) Compassion Meditation (LKM/CM) (3) and Acceptance and Commitment Therapy (ACT) (4).

*Intensity and mode of delivery.* The intensity in the eight interventions varied concerning duration as well as contact time in minutes. The duration of the interventions varied from 1 day up to 12 weeks. Six interventions had a duration of more than eight weeks (1ab;2;4;5;7), one intervention had a duration of three weeks (3) and one had a duration of one day (6). The contact time in minutes per session of the intervention varied from 60 up to 150 minutes. Six interventions had a duration of 120 minutes or more per session (1ab;2;4;5;8;) and one intervention had a duration of 60 minutes (6). For one study the duration in minutes per session was not specified (3).

With regard to the mode of delivery, seven out of eight interventions were delivered as a group guided intervention (1ab;2;3;4;5;8). The interventions were guided by psychotherapists (1ab;2;8), psychiatrists (2) and clinical psychologists (3;6). Two studies mentioned 'experienced practitioners', however they did not give more clarification about their profession (4;5). One study consisted of an individual non-guided session (6).

### *Characteristics and quality of the studies*

The characteristics of the studies are displayed in Table 3.

*Design en randomization.* All studies included in this review were two-arm studies consisting of two groups and conducted pre- and post-intervention measurements. Four out of eight studies conducted a (pilot) randomized controlled trial (RCT) (1ab;3;4). Further, data

from non-randomized studies (2;8) and (quasi)-experimental studies (5;6) were included too, since data available from RCTs was limited. In sum, five out of eight studies allocated participants randomly (1ab;3;4;6). Two by means of the online Research Randomizer (1ab). The other three studies did not clarify the process of randomization. Seven out of eight studies compared an intervention group (PPI) to a control group (1ab;2;3;4;6;7). One study compared treatment completers of a PPI with treatment non-completers of the same PPI (5). Two studies applied treatment as usual (TAU) in the control groups (3;4), the other studies applied another treatment in the control groups. None of the studies used a wait list control group.

*Sample size and dropout.* In order to generalize statements to the target population it is important that the studies consisted of high sample sizes. According to a checklist for quality assessment of interventions applied by Henselmans, De Haes and Smets (2012) a study must contain at least 35 participants per condition to generalize the findings to the target population. None of the included studies consisted of this number of participants. Two studies with the highest sample sizes consisted of 32 participants per group (1ab). The other studies varied from 6 up to 21 participants per group. Consequently, this review consisted of studies with limited sample sizes. A possible explanation for this fact could be the included pilot studies with modest sample sizes. Furthermore, three out of eight studies had no dropout (2;3;6). Two studies had a dropout rate under 22 percent (5;8) and two studies up to 41 percent with attrition bias (1ab). Lastly, one study had merely a dropout in the follow-up measurement three months after the intervention (4).

*Measurements.* All studies conducted pre- and post-intervention measurements, of which two studies conducted more measurements in time (4;6). More specific, one study conducted a follow-up measurement of the intervention group three months after the intervention (4). However, the follow-up measurement had a drop-out of 48%. With regard to high quality, the study did not meet the criterion of the maximum of 30% loss of participants (Henselmans et al., 2012). The other study performed a behavioral conducted assessment at four points in the study and had no drop-out (6).

*Questionnaires.* In order to measure the outcomes, different questionnaires were deployed. Half of the studies in this review measured intervention effectiveness entirely by means of self-reported measurements (1a;3;4;6). Since self-reported measurements provide us with purely subjective information, they are often considered less reliable. However, the Borderline Symptom List (BSL-32) for example, has shown good psychometric properties, like high internal consistency and good test-retest reliability (Elices et al., 2016) (1a;3). In addition, the Five Facet Mindfulness Questionnaire (FFMQ) has shown adequate

psychometric properties as well (Morton, Snowden, Gopold & Guymer, 2012) (1a;4;8). The other half of the studies made use of a combination of both self-reported measurements as well as objective measurements (1b;2;5;8). Objective measurements used in the studies were for instance, biological responses like cortisol (sCORT) (2) or computerized neuropsychological attention tests (CPT-II) (1b;8).

*Analysis.* Two studies increased their quality assessment by conducting an intention-to-treat (ITT) and per-protocol (PP) analysis (1a;5). More specific, an ITT analysis included all enrolled participants, regardless of whether they completed the intervention or not. PP analysis comprised only participants who completed at least 80 percent of the intervention (completers), and for whom, all data points (pre- and post-intervention) were available.

To conclude, the methodological quality of the studies varied. Taking into account the study design, randomization, sample sizes and various measurements, one study by Elices et al., (2016) qualified as a high quality study. For the reasons that, (1) they conducted a randomized controlled trial (RCT), (2) they involved 32 participants per group, and (3) they conducted both PP and ITT analyses.

### *Outcomes measures and results*

The studies varied in types of outcomes in evaluating the effectiveness of the interventions. The outcome measures can be discussed in either outcomes on BPD symptoms and criteria or outcomes on wellbeing and other positive psychological-related capacities. Most studies investigated both types of outcomes (1a;2;3;4;5;7). In the following text, outcomes of the studies are discussed separately, in two main categories.

*Effects on BPD symptoms.* The effectiveness of the interventions measuring outcomes on BPD symptoms were evaluated with a variety of outcomes. The outcome measures can be discussed in terms of on the one hand BPD symptoms or criteria that emerged from the studies (such as emotion regulation, impulsivity and distress tolerance), and on the other hand, relevant clinical outcomes (such as depression, anxiety, stress). Since these are frequent comorbid symptoms in BPD patients.

The overall outcome of the PPIs included in this review, showed significant results (some even with high effect sizes) in improving BPD symptoms and criteria. In the following text these results will be elaborated. To start with the high quality study (1a), both ITT ( $p = .001$ ,  $d = .90$ ), and PP analyses, ( $p < .0001$ ,  $d = 1.32$ ), showed the effectiveness of mindfulness training in reducing BPD symptoms, compared to the control group (IE training), in which BPD symptoms were not significantly improved.

Although study 2 indicated that mindfulness was not able to improve *emotion regulation* in BPD patients, a strong correlation between mean duration of daily mindfulness practice and emotion regulation was found in the mindfulness group, ( $r = -0.7, p = .012$ ). This could suggest a relationship between mindfulness practice and emotion regulation.

Study 7 showed that the mindfulness group improved on measures of *attention and impulsivity*: slower responses, ( $p = .02$ ), fewer commission errors (= better accuracy in inhibiting responses to no-targets), ( $p = .009$ ), and lower scores on impulsivity, ( $p = .04$ ), compared to the control group (GPM) who worsened significantly in inattention, ( $p = .007$ ), and impulsivity, ( $p = .01$ ). Consequently, these findings indicate that mindfulness enhances attention and impulsivity variables.

Interestingly, study 1b showed significant intervention effects on increase tolerance for delay rewards, ( $p = .003, d = .95$ ) and on time paradigm ( $p = .034, d = .66$ ). Meaning that participants in the mindfulness group improved their ability to delay gratification, compared to participants in the control group (IE training). Decreases on *impulsivity* subscales were found in the mindfulness group, (acting without forethought:  $p = .03$ , attentional impulsiveness:  $p = .04$ , non-planning impulsiveness:  $p < .001$ ), whereas no significant pre-post differences were found in the control group (IE training). By contrast, the mindfulness group did not yield any significant differences in terms of self-reported impulsivity.

The mindful self-focus group in study 6 showed significant changes, ( $F = 14.81, p = .001$ ), with a large effect size, ( $d = 1.10$ ), in *distress tolerance* compared to the control group (ruminative self-focus). In addition, the reduction in feelings of anger following mindful self-focus was significantly greater, ( $F = 15.76, p < .01$ ), compared to the control group. Further, participants following mindful self-focus were significantly less angry than participants following ruminative self-focus, ( $F = 6.67, p < .01$ ), with a large effect size, ( $d = .81$ ).

Interestingly, it was not just mindfulness that showed improvements in BPD symptoms, loving-kindness and compassion meditation (LKM/CM) showed also a significant pre-post change, ( $p = .032, d = .64$ ), in study 3. This was also true for the effectiveness of acceptance and commitment therapy (ACT), in BPD symptoms, in study 4. The ACT-group improved largely and significantly on the primary outcome: overall BPD symptoms, ( $p = .000, d = .99$ ), compared to the control group (TAU), who showed no significant change.

With regard to the secondary clinical outcomes, study 2 showed significant and large improvement in clinical symptomatology in the mindfulness intervention group compared to the control group (GPM). Intervention effects were found in depressive symptoms, ( $F = 10.75, p < .002$ ), and psychopathology symptoms, ( $F = 13.37, p < .001$ ). In study 7, the

average minutes of daily mindfulness practice were significantly related with clinical improvements in depressive symptoms, ( $r = -0.67, p < .001$ ), psychopathology symptoms, ( $r = -0.61, p = .001$ ), and mood states, ( $r = -0.53, p < .01$ ). In study 5, ITT analysis showed no significant changes in any of the clinical variables, however a significant reliable change in MBCT treatment completers, compared to non-completers was found on depressive symptomatology, (RCI = 6.6; mean improvement = 7.0). Lastly, in study 4, the ACT-group improved significantly with a large effect size on hopelessness, ( $p = .006, d = 1.02$ ).

*Effects on wellbeing.* Six out of eight studies showed that BPD participants indeed showed improvement in wellbeing or other positive psychological-related capacities (1a;2;3;4;5;7). Different outcomes were observed in investigating the effectiveness of the interventions measuring wellbeing or related facets. For example, decentering ability, attention, mindfulness skills, acceptance, compassion facets and psychological flexibility.

For mindfulness skills, the high quality study (1a) showed a significant increase in *decentering* in the mindfulness group: ITT, ( $p < .001, t(31) = -5.57$ ), and PP, ( $p < .0001, t(18) = -9.85$ ). Decentering is a key mindfulness skill, and the ability to observe one's thoughts and emotions as temporary events of the mind. In addition, post hoc analyses showed an improvement in the mindfulness group on two mindfulness facets as well: non-judging, ( $p < .002, t(18) = -3.53$ ), and describing (giving words to internal experiences), ( $p < .01, t(18) = -2.72$ ). In contrast, the control group (IE training), did not showed any improvement in regard to mindfulness facets.

Study 2 found no significant effect of condition on *decentering ability*. Nevertheless, an effect of mindfulness practice can be suggested. For the reason that a strong association of average in minutes of mindfulness training together with improvement in emotion regulation was found, ( $r = -0.7, p = .012$ ). Thus, more mindfulness could lead to better outcomes in emotion regulation and clinical symptomatology and thus improved wellbeing.

According to study 7, mindfulness seemed to improve *attentional processing*. Intervention effects were found through objectively detectable scores from a computerized neuro-psychological test (CPT-II), ( $p = .02, F(4,52) = 3.3$ ), and on the composite scores of inattention, ( $p = .014, F(1,55) = 6.4$ ), and impulsivity, ( $p = .003, F(1,57) = 9.3$ ), as well. By increasing control of attention, participants can achieve a 'wise' integration of emotional and rational thinking which is an essential goal of mindfulness in BPD patients (Lynch et al. 2006). Further, amount of mindfulness correlated significantly with reactivity to inner experiences (mindfulness facet), ( $r = 0.56, p = .008$ ).

The ITT analysis of study 5 showed no significant effect of MBCT on *mindfulness*, yet in 56% of the treatment completers, improvement in mindfulness was found, (RCI = 18.4; observed change = 26). Participants, who improved, did not differ in BPD severity. Further, ITT analysis showed significant changes on measures of *attentional control*, ( $Z = -1.89, p = .03$  and  $Z = -1.93, p = .026$ ), with small to medium effect sizes, ( $d = .26$  and  $d = .36$ ).

To conclude, the overall outcome of mindfulness interventions showed significant amelioration of wellbeing in BPD participants. Although mindfulness showed promising results, the other PPIs included in this review showed interesting results as well. In the following paragraph, a more in-depth view is given on the effectiveness of loving kindness and (self) compassion meditation (LKM/CM) and acceptance and commitment therapy (ACT) on wellbeing outcomes in BPD participants.

Besides studies focusing on mindfulness, interesting and significant improvements of LKM/CM in wellbeing were found too (3). Although both groups in the study showed similar improvements in present-moment awareness, a significant improvement in the LKM/CM group regarding *acceptance* was found, ( $p = .018, d = -.66$ ), whereas scores in the control group (mindfulness training), did not change significantly. Moreover, the LKM/CM group showed significant pre-post changes with moderate-to-large effect sizes in *compassion* facets: self-criticism, ( $p = .022, d = .64$ ), self-kindness, ( $p = .003, d = -.90$ ) and acceptance, ( $p = .018, d = -.66$ ). Significant changes were also found for mindfulness, ( $p = .010, d = -.74$ ). In contrast, only significant pre-post changes in self-criticism were observed for the control group, ( $p = .031, d = .59$ ).

In viewing the changes of ACT process variables in study 4, a significant improvement with a large effect size in *psychological flexibility* was observed in the ACT group, ( $p < .01, d = .98$ ). In addition, significant improvement in the ACT group on ACT-process variables such as mindfulness, ( $p = .028, d = .79$ ), and fear of emotions, ( $p < .002, d = .89$ ), were found as well. In contrast, the control group (TAU), showed no significant change in any of the ACT process variables. Three months after the end of treatment, a follow-up measure of the ACT group showed that all significant improvements were maintained, apart from the reduction in fear of emotion. However, these results must be viewed with some caution, since the follow-up group consisted of merely 10 participants.

In sum, all studies included in this review, presented some significant effects on decreasing BPD symptoms or BPD criteria, with effect sizes ranging from small to high. With regard to the secondary clinical outcomes, four studies showed significant improvements (2;4;5;7), too. Viewing the outcomes of wellbeing, six out of eight studies showed

amelioration on wellbeing in BPD participants (1a;2;3;4;5;7). Most of these studies applied mindfulness as PPI (1ab;2;5;7) and presented promising results. The remaining two studies applied LKM/CM (3) and ACT (4) as PPI and revealed some significant results as well. However, it is difficult to make statements about these last two PPIs, since they are the only studies investigating this type of PPI in a BPD sample. See Tables 2 and 3 for detailed information regarding the various outcome measures and results.

## **Discussion**

To our knowledge, this is the first attempt at reviewing the variety and effectiveness of PPIs in BPD patients. The specific goals of this systematic literature review were to find out (1) what types of PPIs for BPD patients are present and accessible and (2) the effectiveness of PPIs in diminishing BPD symptoms or enhancing wellbeing in BPD patients. Eight studies were included to this review. The intervention characteristics (i.e. goal and target group, type of PPI and PPI components, intensity and mode of delivery) were examined. As well as, the study characteristics (design, sample, dropout, measurements, outcomes and results).

### *Types of PPIs for BPD patients*

From this literature review, it appears that there are only a limited number of studies investigating PPIs among BPD patients. Despite the flexible and non-rigid in- and exclusion criteria that were maintained in the screening process of this research. Hence, the choice for including pilot studies as well. In addition, there seems to be little spread in the types of PPIs accessible at the moment. The findings show that mindfulness is the most prevalent PPI for BPD patients. Overall, six out of eight interventions were based on mindfulness theories and methods. Although most of the PPIs were focusing in particular on the effect of mindfulness in BPD patients, the format and background of the mindfulness interventions varied. For example, mindfulness training, mindfulness-based cognitive therapy or mindful self-focused attention were applied in PPIs. Apart from mindfulness, two other PPIs for BPD patients were found too –loving kindness and compassion meditation (LKM/CM) and acceptance and commitment therapy (ACT)– as they also aimed to foster positive feelings, thoughts, behaviors, and cognitions (Sin & Lyubomirsky, 2009). Interesting results were found and will be discussed in the next section, regarding the effectiveness of the PPIs.

With regard to the intensity of the PPIs, there seems to be little spread in the duration of the interventions. Most types of PPIs had a relative long duration varying from 10 till twelve weeks. These results support the idea of Sin & Lyubomirsky (2009) who suggested that longer interventions produce greater gains in wellbeing. Moreover, with the exception of one PPI, all PPIs were delivered as a group-guided intervention. However, a study by Bolier et al., (2013) showed that individual-guided PPIs are more effective than group-guided PPIs. For future research it is recommended to investigate the effects of individual-guided PPIs in BPD patients. Moreover, many studies were focused on the effectiveness of the PPIs in BPD patients. However, little is known about the acceptability and tolerability of PPIs for BPD patients or whether PPIs are appealing for BPD patients or not. Or which characteristic of a PPI could be a potential marker for long-term intervention adherence. Research showed that participants who showed a rapid increase in positive emotional reactivity after starting the intervention were more likely to continue meditating one year later (Cohn & Fredrickson, 2010). It could be interesting for future research to find similar patterns and valuable markers for adherence and thereby help BPD patients to connect with a PPI and improve their long-term wellbeing.

In sum, the PPIs in this review appeared to be mostly based on mindfulness theories and methods. However, other positive psychology concepts, like self-compassion seem to be promising and highly suitable for treating BPD symptoms and improving wellbeing as well. Lucre & Corten (2013) assumed that compassion-based interventions are successful strategies to enhance wellbeing and to decrease clinical symptomatology in chronic personality disorders with self-critical thoughts. In addition, Leaviss & Uttley (2015) suggested that self-compassion meditation may be a complementary way to treat concepts like self-criticism and shame, which are presumed to play a major role in the emotional dysregulation in individuals with BPD (Rusch et al. 2007). Yet, it appears that self-compassion is rarely implemented in the PPIs found for BPD patients. Therefore, PPIs based on self-compassion designed for BPD patients are highly recommended for future research.

#### *Effectiveness of PPIs for BPD patients*

In the following text, general implications are given regarding the effectiveness of BPD symptoms, wellbeing and other positive psychological-related capacities that emerged from the studies. Although the studies retrieved for this review highlight the novelty of PPIs for BPD patients, the overall outcomes are promising.



Firstly, it appears that PPIs have a significant effect on improving BPD symptoms. This is a surprising finding, since the improvement of wellbeing would in itself be a motivating outcome. Especially, mindfulness showed significant improvements of BPD symptoms. Mindfulness seemed to smooth the progress of decreasing internally-driven behaviors as BPD patients were less affected by different mood states and urges and had more attentional control. This is particularly important since difficulty in controlling anger, physical violence and impulsive behavior are often reported in BPD patients (Trull et al., 2000). This result also demonstrates clinical relevance since some maladaptive behaviors of BPD patients, such as substance abuse and self-injury, are particularly related to impulsivity and the incapability of delay gratification (Coffey, Gudleski, Saladin & Brady 2003). Therefore, mindfulness can act as a valuable therapeutic strategy for BPD patients in leading them to reach a 'wise' balance of thinking and a decrease of BPD symptoms and maladaptive behaviors.

Besides mindfulness, significant and large improvements were found for BPD symptoms in two other studies applying ACT and LKM/CM techniques. However, it is important to note that these results derived from merely two pilot studies with small sample sizes, one investigating ACT and the other investigating LKM/CM. For this reason, it is hard to make any statements since these studies are unique and cannot be compared to similar studies investigating similar PPIs. The findings should therefore be interpreted with caution. Despite the novelty of these PPIs, improvement of acceptance and self-criticism were shown and may have led to less negative thoughts, feelings and behaviors in BPD patients. This is in line with the study by Selby & Joiner (2009), who suggested that improvements in self-criticism, acceptance and mindfulness are stimulators for a healthier method of cognitive processing and can therefore diminish emotional escalations. However, more research is considered necessary to elucidate whether, as suggested by Gilbert (2010), decreases in self-criticism and increases in self-kindness also diminish the risk of self-injury and suicidal behavior in BPD patients.

Secondly, significant effects of PPIs on wellbeing compared to treatment-as-usual or other control conditions were observed as well. Interesting results were found in enhancement of acceptance of the present-moment experience, psychological flexibility, self-kindness, self-criticism and mindfulness and may have led to enhancement of wellbeing. These findings are consistent with the results obtained by Shapira & Mongrain (2010), which found that increases in wellbeing and happiness may be reached by fostering self-kindness and self-compassion. As previously mentioned, some of these results derived from pilot studies with

small sample sizes. Therefore, the results should be interpreted with caution. Similarly, these types of PPIs may not be suitable for all BPD patients, given that for some, too difficult emotions may arise when experimenting with techniques to encourage positive emotions. Future studies with larger samples of BPD patients in all clinical settings may help to clarify these findings.

In sum, the present literature review shows the effectiveness of different types of PPIs accessible at the moment. Convincing results were found for both decreasing of BPD symptoms as for increasing wellbeing. As well as for secondary clinical outcomes such as depression and anxiety. Mindfulness seems to be the most prevalent PPI for BPD patients at the moment and showed promising results. However, LKM/CM and ACT showed, despite their limitations, interesting results as well. Therefore, the present review adds to existing literature by giving an overview of the PPIs existing at the moment and their effectiveness in BPD patients. Moreover, it provides indication for the complementary role of PPIs to the complaint-oriented approach with the aim of promoting well-being in treating BPD patients.

### *Limitations*

Although the findings of this systematic review are encouraging with regard to the effectiveness of PPIs in reducing BPD symptoms and increasing wellbeing, they must be interpreted with caution. One important limitation is that the review consisted of a limited number of eight studies, with relatively small sample sizes. This limits the interpretation of the differences between groups. Second, the review lacked of a second rater for screening the studies and for determining eligibility. Hence, the absence of the inter-rater reliability. Third, the present study did not conduct a meta-analysis because of the limited number of studies. Fourth, despite the effortful systematic approach, it is still possible relevant studies were not included to this review. For the reason that not all studies were freely accessible and could not be included to the review. Therefore, potentially relevant studies could remain undisputed. Nevertheless, this is the first systematic review in this field that provides an overview of the accessibility and effectiveness of PPIs in BPD patients.

### *Guidelines for future research*

Although the field of positive psychology is blossoming with applications and interventions, more scientific studies are needed to establish the value of PPIs as treatment regimes. Especially for the population of BPD patients. In this review, the quality of the included studies was low to medium. More high quality research is needed to determine the

effectiveness of PPIs on relevant outcomes in samples of BPD patients. Even though, the majority of the studies were focused on mindfulness, the universality of positive psychology means that it may lend itself to effective other types of PPIs for BPD patients, as well. For example, interventions based on enhancing self-compassion, positive emotions, resilience and growth, strengths and empathy. Questions remain concerning essential and active ingredients for effective PPIs (e.g. length of duration, mode of delivery), as well as the effectiveness of PPIs independent and as part of a broader treatment package for BPD. Furthermore, still little is known regarding the experiences, acceptability and tolerability of the PPIs for BPD patients. Do BPD patients find the PPIs pleasant, enjoyable or valuable? Or do they rather prefer treatment as usual? These questions motivate future research, which needs to ensure the use of larger samples to better determine the specific impact of relevant PPIs on BPD and follow-up assessments for evaluating the long-term effects.

## **Conclusion**

In sum, a relative small number of PPIs were found that focused on improving BPD symptoms or wellbeing in a sample of BPD patients. The findings suggest in particular, that mindfulness appears to be the most prevalent PPI for BPD patients. However, future research should also explore new concepts and approaches in line with positive psychology, delivery methods and optimal intensity in developing PPIs for BPD patients. Fortunately, ACT and Buddhism-derived practices like LKM/CM offer a possible complementary approach, yet replications with larger sample sizes could be of much relevance. To this end, the observations of this systematic review contribute to the literature of PPIs on enhancing wellbeing and give support to its utility in treating symptoms of BPD. The future of positive psychology is bright, it will expand and improvement of the quality of human life will be reached.

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