

Changes in Mindfulness Facets and Psychological Flexibility Associated with Changes in Depressive Symptoms in a Brief Acceptance and Value Based Intervention: An Exploratory Study

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ABSTRACT

Increased knowledge of the type of skills training that is beneficial for producing long-term changes in depressive symptoms might help in the development of more effective brief interventions. This study aims to explore whether changes in mindfulness facets (KIMS) were differentially associated with changes in depressive symptoms (BDI) both immediately and 5 years after a brief 4-session intervention based on the psychological flexibility model. The data was a subpopulation of 33 participants who received a 4-session ACT-based treatment provided by student therapists. The measures were taken at pre-intervention, post-intervention and 5-year follow-up points in time. Acting with awareness and accepting without judgment as well as higher observing were associated with higher depressive symptoms at the pre-intervention. Changes in the levels of the accepting without judgment subscale during the treatment and paired combinations of different KIMS subscales were positively related to changes in depression. However, accepting without judgment seemed to be important as it was the only facet related to long-term changes in depression either on its own or paired with other facets. Emphasis on strengthening the ability to accept experiences in an accepting and nonjudgmental way should be taken into account when developing and administering brief ACT-based interventions.

Key words: Acceptance and Commitment Therapy, depressive symptoms, brief intervention, novice therapist, psychological flexibility, mindfulness.

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Novelty and Significance

What is already known about the topic?

- Psychological flexibility and mindfulness are interrelated concepts that both have been associated inversely with psychological distress such as depressive symptoms.
- Mere observing of experiences and present-centered being may present themselves as liabilities or strengths, and accepting nonjudgmentally has been associated with psychological well-being.

What this paper adds?

- Treatment changes in flexibility and mindfulness were associated with short-term improvements in depressive symptoms.
- Nonevaluative acceptance was associated either on its own or paired with other mindfulness subskills to long-term (5 years) improvements in depressive symptoms.
- Results suggested that emphasizing an open and accepting attitude toward aversive experiences were linked to improvements in time-limited interventions.

Brief psychological interventions for mood and anxiety problems and depressive symptoms are often implemented at the lower levels of health care systems, and such interventions have been studied with promising results (Cape, Whittington, Buszewicz, Wallace, & Underwood, 2010; Churchill *et alii*, 2001; Linde *et alii*, 2015; Nieuwsma *et alii*, 2012). However, the effects might not always be comparable to longer treatments (Cape *et alii*, 2010). Since brief interventions are time-limited, the content needs to be planned carefully and accordingly to support recovery and changes in well-being in

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a short time-frame. Constructs such as psychological flexibility and mindfulness have been receiving ample interest and both have been studied in relation to psychological health. Regarding both, research points to a positive relationship with well-being (Bond *et alii*, 2011; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Baer, Smith, & Allen, 2004; Levin *et alii*, 2014). Psychological flexibility is the key concept of Acceptance and Commitment Therapy (ACT; Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004; Hayes, Strosahl, & Wilson, 2011). ACT-based interventions promote the willingness to openly and mindfully embrace and approach private experiences, thoughts and feelings while either committing to change or persisting with behaviors according to one's own values (Hayes *et alii*, 2011). Psychological flexibility is commonly addressed as a single, global construct, but it can also be defined through interrelated elements combined into a two-fold process of 1) being consciously in the present moment and accepting of experiences while 2) taking into account the dynamic nature of behavioral change or acting persistently according to one's chosen values (Hayes *et alii*, 2004, 2006).

Psychological flexibility and mindfulness seem to share similar definitions, including being able to intentionally observe and describe the internal and external experiences as they happen, to take actions purposefully and with awareness, to take a nonjudgmental stance toward one's own thoughts and emotions, and both can also be seen as aiming to disengage from the domination of literal, evaluative language processes (Bilich, & Godsel, 2010; Brown & Ryan, 2003; Coffey, Hartman, & Fredrickson, 2010; Hayes *et alii*, 2011; Hayes & Wilson, 2003; Kabat-Zinn, 1990; Shapiro, Carlson, Astin, & Freedman, 2006). The mechanisms of change seem to be quite similar as both psychological flexibility and mindfulness involve the intentional recognition of one's own behaviors, thoughts and emotions, having a flexible attitude toward these and the ability to self-regulate them (Ciarrochi *et alii*, 2010; Shapiro *et alii*, 2006). Despite similarities, mindfulness and psychological flexibility are also understood as distinct, yet overlapping processes (Kashdan & Rottenberg, 2010). Concerning measures of psychological distress, an inverse relationship between depressive symptoms and both mindfulness (Hofmann, Sawyer, Witt, & Oh, 2010; Khoury *et alii*, 2013; Soysa & Wilcomb, 2015) and psychological flexibility (Hayes *et alii*, 2006; Kashdan & Rottenberg, 2010) has been suggested. There is evidence suggesting that both psychological flexibility and mindfulness may protect against the developing or worsening of psychopathological problems such as depressive symptoms (e.g., Christopher, Neuser, Michael, & Baitmangalkar, 2012; Bond *et alii*, 2011; Bryan, Ray-Sannerud, & Heron, 2015; Gilbert & Christopher, 2010; Woodruff *et alii*, 2014). However, it has been suggested that for a protective effect to take place, at least regarding mindfulness, a substantial amount of practice and sustenance might be required (Barnhofer, Duggan, & Griffith, 2011).

Mindfulness has been incorporated into various treatment protocols, and the emphasis on specific, formal mindfulness skills training varies between therapeutic orientations. For example, in mindfulness-based stress reduction (MBSR; Kabat-Zinn, 1990), mindfulness training is the foundation, compared to third-wave therapies such as ACT (Hayes *et alii*, 2011) and dialectical behavior therapy (DBT; Linehan *et alii*, 1999) where a mindful and aware stance toward experiences is incorporated into various aspects of therapy without an emphasis on mere formal practice.

Psychological flexibility is often measured with the Acceptance and Action Questionnaire-2 (AAQ-2; Bond *et alii*, 2011), which is a single-factor instrument inspecting the whole of experiential avoidance and its counterpart, psychological flexibility. However, it does not enable a more specific inspection of the underlying processes that compose psychological flexibility. As the AAQ-2 is a holistic measure, other multidimensional measures used concurrently might provide more insight into whether some aspects of psychological flexibility should be emphasized when planning acceptance-based brief intervention protocols. One possibility for gaining more information on the significance and relationship of psychological flexibility in relation to psychological changes is to

investigate mindfulness and its subskills as a way to deconstruct some of the different elements that psychological flexibility might consist of. Baer *et alii* (2004) define mindfulness as consisting of 1) noticing both external and internal experiences, 2) naming or labeling those experiences using words, 3) taking purposeful action with a present-moment focus, and 4) embracing a non-evaluative and accepting mindset toward experiences and sensations. Similar concepts are found among ACT core processes promoting psychological flexibility, such as present-moment awareness, acceptance, mindful selection of values and commitment to act according to them (Hayes *et alii*, 2011).

Different facets of mindfulness seem to be linked differently to various psychopathological concepts. Concerning depressive symptoms and mood problems, describing or labeling feelings and thoughts has been found to be the least significant factor of all the mindfulness facets (Alleva, Roelofs, Voncken, Meevisen, & Alberts, 2014; Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011; Cash & Whittingham, 2010). In non-meditative samples, observing seems to be associated with maladaptive constructs and psychological distress, such as depressive symptoms, rather than with well-being as other mindfulness facets (Baer *et alii*, 2004; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Baer *et alii*, 2008; Barnes & Lynn, 2010). However, there are some mixed results regarding the associations between observing and higher levels of psychological distress (Barnhofer *et alii*, 2011; Bohlmeijer *et alii*, 2011). It has been noted that without the ability to notice and observe, mindfulness and present-moment acceptance are not achievable (Lilja, Lundh, Josefsson, & Falkenström, 2013); and the definitions of mindfulness include present-moment awareness which implies being able to observe the here-and-now (Baer *et alii*, 2004). In addition, studies with meditative samples show different results in terms of the observing facet suggesting that the importance of observing may lie in practice or perhaps in the ability to combine other skills with it to enhance non-reactivity to experiences and thus decreasing the possible maladaptiveness of mere observing (Baer *et alii*, 2008). Lower levels of depressive symptoms have been associated with nonjudgmental acceptance (Alleva *et alii*, 2014; Barnhofer *et alii*, 2011; Christopher *et alii*, 2012; Desrosiers, Klemanski, & Nolen-Hoeksema, 2013), as well as with acting with awareness (Bohlmeijer *et alii*, 2011; Christopher *et alii*, 2012; Desrosiers *et alii*, 2013). Most of the existing research investigating the associations between these facets is cross-sectional while longitudinal studies are rare (e.g., Barnes & Lynn, 2010; Barnhofer *et alii*, 2011). Several treatment studies have measured psychological flexibility using the AAQ-2 as a global construct and found that it plays a mediating role concerning outcomes (e.g., Ciarrochi *et alii*, 2010). A longitudinal study by Long and Hayes (2014) found that ACT-based process measures predicted depressive symptoms after controlling for pre-intervention depression. Psychological flexibility and present-centered awareness uniquely affected depressive symptoms, and the process of awareness was moderated by psychological flexibility. They suggested that the ability to be aware and present-centered may be either a liability or an asset contingent on whether or not one is open and accepting toward experiences. Regarding intervention studies, specific components of psychological flexibility impacting outcomes have also been examined, such as for chronic pain (McCracken & Gutiérrez Martínez, 2011) and depression (Forman, Herbert, Moitra, Yeomans, & Geller, 2007). Forman *et alii* (2007) found that nonjudgmental acceptance and mindful actions mediated the outcomes in the ACT treatment group. Regarding brief interventions (i.e., lasting less than ten sessions), especially those targeting mood problems, the examination of the components of psychological flexibility contributing to treatment effects is still scarce.

Brief psychological interventions are supported in the treatment of psychological distress (Cape *et alii*, 2010; Churchill *et alii*, 2001; Linde *et alii*, 2015; Nieuwsma *et alii*, 2012) and similar findings have been reported with ACT-based brief interventions for various distresses (e.g. Bach & Hayes, 2002; Lappalainen *et alii*, 2014; Markanday *et alii*, 2012; Petersen & Zettle, 2009). Additionally, our previously published papers

describe the short- and long-term treatment outcomes of a brief 4-session acceptance- and values-based intervention (Kohtala, Lappalainen, Savonen, Timo, & Tolvanen, 2015; Kohtala, Muotka, & Lappalainen, 2017). To increase the existing knowledge of what processes might be consequential and beneficial in time-limited acceptance-based interventions, our aim with the present study was to investigate the aspects and processes comprising psychological flexibility that might be linked to better treatment outcomes both short- and long-term through such brief forms of treatment. As an ACT-based intervention, we focused on the elements linked to being able to contact both the internal and external experiences in the present moment in a mindful and nonjudgmental way while persisting or changing one's behavior purposefully. These skills or processes are present in both mindfulness and psychological flexibility. The intervention was designed to produce a comprehensively more flexible stance toward experiences, encouraging taking actions toward valued living instead of emphasizing pure formal practice. The aim of the current study was to gain additional information on how different skills or set of mindfulness skills relate to changes in depressive symptoms and what aspects of mindfulness or psychological flexibility might be important to emphasize in and integrate into brief, time-limited acceptance- and value-based interventions.

Based on the above, we were particularly interested in investigating whether changes in the subcomponents of mindfulness skills during a very brief 4-session ACT intervention were associated with changes in depression symptoms during the intervention, and whether those changes predicted long-term changes in depressive symptoms. The present study investigated the following research questions: (1) which subcomponents of mindfulness had the strongest association with symptoms of depression at the beginning of the intervention, and (2) which subcomponents of mindfulness were associated with better short-term (pre to post) and long-term (pre to 5-year follow-up) changes in depressive symptoms.

METHOD

Participants and Procedure

The study population consisted of 33 participants who underwent a 4-session acceptance- and value-based intervention for self-reported depressive symptoms. The participant group examined here was part of a larger data set (see Kohtala *et alii*, 2015; Kohtala *et alii*, 2017). The present study focused on changes in psychological flexibility and mindfulness while examining their relation to depressive symptoms. The Research Ethics Committee of the University of Jyväskylä approved the study.

The recruitment of participants was conducted via a local newspaper advertisement announcing that a university research project seeks individuals feeling depressed and willing to participate in a brief treatment study where therapists are Master's degree level psychology students. Regarding the subsample used in the present study, Figure 1 shows the attrition of the participants. Several inclusion criteria were used: 1) subjective depressive symptoms or depressed mood (diagnosis not necessary); 2) no other concurrent psychological treatment; 3) no reported schizophrenia; 4) no reported alcoholism; 5) no reported severe sensory or brain injury; 6) no reported neurological disorder. During the contacting and screening phase, five participants decided to quit or were excluded based on the inclusion criteria leaving 36 participants to be randomized. Randomization was conducted according to gender, since a biased gender distribution was expected based on previously reported gender differences in both depression prevalence and help-seeking behaviors (Leach, Christensen, Mackinnon, Windsor, & Butterworth, 2008; Smith *et alii*, 2013). All in all, 33 participants were organized into two groups: 1) the ACT intervention group ($n= 16$), and 2) the waiting-list control group ($n= 17$;

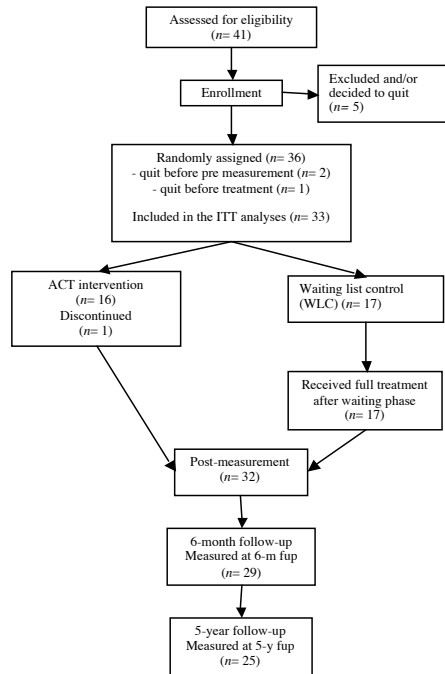


Figure 1. Attrition of the participants.

i.e., WLC group, which received treatment approximately five weeks later). The WLC group had an additional measurement after their waiting-phase before their intervention phase started, and this measurement served as their pre-intervention measurement in the analyses. In the present study, the two groups were combined as they both received the same brief intervention. One participant from the ACT group decided to quit the intervention and 32 participants attended the post-intervention measurement. Three more participants dropped out by the time of the 6-month follow-up measurement, leaving 29 participants (88%) attending that measurement. And a further four participants dropped out by the 5-year follow-up measurement: 76% of the participants who had started the intervention attended the 5-year follow-up measurement.

All 33 participants were Caucasian (27 females, 82%). Their mean age at the beginning of the research was 49.6 years ($SD= 12.0$; range= 17-71 years). The participants' background information is presented in Table 1. No statistically significant differences were found between the original ACT group and the later-treated WLC group.

Student therapists and ACT-based intervention

The therapists ($n= 12$) in this study were female Master's degree level psychology students at the University of Jyväskylä. Their mean age was 25.8 years ($SD= 6.86$; range= 22-47 years) and they had studied an average of 3.3 years ($SD= 1.0$; range= 1.5-5.5). The therapists had received approximately 10 hours of training on ACT principles and methods as part of their regular curriculum. An additional four hours were dedicated to ACT-specific intervention material and the presentation and construction of a functional analytic clinical case model (FACCM; Haynes & O'Brien, 2000) that was used to guide treatment decisions and goals alongside the analysis of participants' values.

Table 1. Background information for pre-measurement as a whole and by group.

Baseline characteristic		Pre-measurement (n= 33)	ACT group (n= 16)	WLC group (n= 17)
Female/Male		27/6 (82%/18%)	13/3 (81%/19%)	14/3 (82%/18%)
Employment	Work life	17 (52%)	9 (56%)	8 (47%)
	Outside of work life	7 (21%)	4 (25%)	3 (17.6%)
	Unemployed	5 (15%)	2 (13%)	3 (17.6%)
	Other	4 (12%)	1 (6%)	3 (17.6%)
Education	Basic education	3 (9%)	2 (12.5%)	1 (6%)
	Secondary degree	16 (49%)	7 (44%)	9 (53%)
	Higher education	12 (36%)	5 (31%)	7 (41%)
	Other	2 (6%)	2 (12.5%)	0 (0%)
Civil status	In a relationship	16 (49%)	8 (50%)	8 (47%)
	Unmarried	7 (21%)	3 (19%)	4 (24%)
	Divorced	10 (30%)	5 (31%)	5 (29%)
Mental health diagnosis*	No diagnosis	17 (52%)	9 (56%)	8 (47%)
	Depression	13 (39%)	6 (38%)	7 (41%)
	Depression and other	2 (6%)	0 (0%)	2 (12%)
	Other than depression	1 (3%)	1 (6%)	0 (0%)
History of psychotropic medication		21 (64%)	8 (50%)	13 (77%)
Psychotropic medication at the pre-measurement		5 (15%)	3 (19%)	2 (12%)

Notes: * = diagnosed by a general doctor or a psychiatrist.

The intervention was semi-structured and featured certain obligatory elements at the beginning. However, each session was planned under the supervision of an experienced ACT therapist (see below). Two leading guidelines directed the treatment protocol: 1) clarifying values and encouraging the client to commit to value-based actions, and 2) addressing and dealing with emotional, cognitive, social and behavioral barriers that might arise along with committed actions. ACT-consistent metaphors and experiential exercises were instructed to be used during every session, and homework assignments were constructed together with each client and linked to the topics covered during each session. Each session lasted 60 minutes on average, and the first two sessions were mainly dedicated to functional analysis and to the topic of values, including also a few experiential ACT exercises. The individual FACCM was outlined by the therapists, reviewed during the supervision and viewed along with the values-analysis homework together with each client. Subsequent sessions were more individualized in terms of content, exercises and metaphors in order to meet each client's goals and needs. Chosen values and commitment to actions based on those values played a central role in the intervention. The last session also included a summary of the treatment, a discussion on future directions and suggestions for useful and beneficial exercises, as well as acting as a forum for clients' insights supporting the continuous advancement toward valued and meaningful living. The intervention model is outlined in more detail in Table 2.

The therapists were instructed to use an Acceptance and Commitment Therapy manual (Lappalainen *et alii*, 2008) during the sessions. The manual includes the basic ACT principles and core processes, 32 metaphors, 18 exercises and some practical worksheets that can be used in therapy. Mandatory group supervision (approximately 2 hours) was held weekly during the treatment period and each subsequent intervention session was outlined with an experienced ACT therapist who acted as the supervisor (author RL). The total time for training and supervision was 23 hours.

Client measures

The Beck Depression Inventory (BDI) was used as the primary outcome measure. The BDI is a widely used self-report questionnaire with 21 items measuring the severity of depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The reliability of the instrument and the internal consistency have been found to be high (Beck *et alii*, 1961). The instrument has yielded an alpha coefficient of .92 for outpatient populations (Beck, Steer, & Brown, 1996). The original BDI was used instead of the more recent version (BDI-II) since the earlier version was readily available in Finnish when the research was being planned and designed.

Table 2. The structure and content of the brief ACT intervention.

Baseline characteristic	Session objectives	Examples of exercises and activities	Homework
1. Introduction and start of the analysis	Introduction to the brief intervention format (structure). Interview aiming at gathering information on the participant's current life situation, problems and prior attempts at solving them. Construction of a problem list for the functional analytic clinical case model (constructed after the session by the therapist). Orientation to values	Problem list form. <i>Tug-of-war or digging out of the hole</i> (metaphors; or some other regarding struggling with problems). <i>Skiing</i> (metaphor), <i>the funeral exercise/tombstone</i> (exercise). Breathing or some other present-moment exercise.	Functional analytic clinical case model (FACCM) diagram for the therapist to construct). Values worksheet
2. Clarification of values and treatment goals	Introduction of the FACCM formulation and possible corrections. Review of values homework, clarification of and reflection on values. Agreement on treatment aims based on the FACCM and values work. Choosing important values and identifying valued actions. Discussion on meaningful life and examination of possible obstacles to taking valued actions toward meaning life.	<i>The funeral exercise/tombstone</i> (exercise) if clarification of values seem problematic. Breathing or some other present-moment exercise.	Value-based action(s). Mindfulness/breathing exercise.
3. Taking actions and tackling obstacles	Review of participant's homework and discussion on experiences. Addressing participant specific issues and chosen treatment targets Identification of verbal and emotional obstacles and addressing ACT processes linked to those barriers Introduction of the idea of self-as-context	The use of participant appropriate exercises and metaphors identified and planned during supervision. <i>Passenger on a bus</i> (exercise). <i>Observer</i> (exercise). Breathing or some other present-moment exercise.	Value-based action(s). Mindfulness/breathing exercise.
4. Planning for the future	Review of participant's homework and discussion on experiences, barriers and problems. Discussion on control and acceptance. Review of the treatment and identification of important experiences, positive issues and clients resources. Creation of a post-treatment plan with valued actions	<i>Joe the Bum a.k.a. the unwanted visitor</i> (exercise). <i>Quicksand</i> (metaphor). Breathing or some other present-moment exercise. <i>What needs to be continued?</i> (discussion exercise).	Valued actions based on the plan created

The two process measures used were the Acceptance and Action Questionnaire-2 (AAQ-2, earlier version) and the Kentucky Inventory of Mindfulness Skills (KIMS). The AAQ-2 is a single-factor self-report inventory designed to measure psychological flexibility and experiential avoidance (depending on the scoring). The 10-item version used in this study also exists as a 7-item questionnaire following further psychometric analyses (Bond *et alii*, 2011). We used the 10-item version as it had been translated into Finnish. The 10- and 7-item versions correlate at $r = .96$, and the mean coefficient of the 7-item version has been reported to be 0.84 (Bond *et alii*, 2011). Items 2 to 5 and 7 to 9 were reverse-scored, meaning that higher scores on the AAQ-2 indicate more flexibility. The KIMS is a multidimensional self-report scale with 39 items measuring mindfulness skills (Baer *et alii*, 2004). The KIMS includes four subscales (observing, describing, acting with awareness, and accepting without judgment), and it uses a 5-point Likert-type scale with responses ranging from “never” or “very rarely true” to “always” or “almost always true”. Items include statements as follows: “I notice the smells and aromas of things” (observing); “It’s hard for me to find the words to describe what I’m thinking” (describing); “I drive on ‘automatic pilot’ without paying attention to what I’m doing” (acting with awareness); and “I criticize myself for having irrational or inappropriate emotions” (accepting without judgment). Even though the intervention was not mindfulness-based, and the AAQ-2 and the KIMS do not measure exactly the same constructs, the KIMS was used to widen the core conceptual construct of psychological flexibility. A more precise description of the KIMS subscale items can be found in Appendix. The KIMS was used instead of a more recent mindfulness self-report measure (The Five-Facet Mindfulness Questionnaire, FFMQ; Baer *et alii*, 2006) as it had already been translated into Finnish when the present study was being planned.

Data analysis

The bivariate correlations were calculated using SPSS for Windows (version 22.0). Further analyses were performed using the Mplus program (version 7.0) (Muthén &

Muthén, 2012). All 33 participants were included in the intent-to-treat analysis examining changes over time. Hierarchical linear modeling (HLM) with full information maximum likelihood (FIML) estimation was used to examine changes in the process and outcome measures. This approach includes all available data and accounts for values missing at random (MAR). The FIML estimation was also used to analyze means, standard deviations (*SD*) and confidence intervals (CI). Linear regression analyses were performed using the FIML estimation, and the standardized beta coefficients are reported as correlations between the variables. To describe the effect of the treatment, effect sizes (Cohen's *d*) were calculated using the Mplus program for both the treatment period and the whole study period, as follows: the mean change from the pre- to post-intervention measurement (a 5-week period, on average) was divided by the pooled pre- and post-intervention measurements' *SD*, and the mean change from pre-intervention to 5-year follow-up measurement was divided by the combined pre-intervention- and 5-year follow-up measurements' *SD* (Feske & Chambless, 1995; Morris & DeShon, 2002). A within-group effect size of 0.5 is considered small, 0.8 medium, and 1.1 large (Roth & Fonagy, 1996; Öst, 2006).

Change scores (pre- to post-intervention measurement, pre-intervention to 5-year follow-up measurement) used to assess correlations were always calculated by subtracting the former (pre-intervention measurement) from the latter (post-intervention or 5-year follow-up measurement); thus, negative change scores in the BDI indicate decreases in depressive symptoms and are considered a positive outcome, whereas negative change scores in process measures indicate a decline, and are seen as a negative outcome.

RESULTS

The correlations between pre-intervention levels of process measures and depressive symptoms are shown in Table 3. The Pearson's bivariate correlations indicate that lower scores for psychological flexibility, the KIMS subscales acting with awareness and accepting without judgment, were significantly associated with higher scores for depressive symptoms at the beginning of the intervention. Interestingly, higher levels of observing were associated with higher scores for depressive symptoms. However, higher scores regarding accepting without judgment were related to lower scores for observing, suggesting an inverse relationship between these two KIMS subscales.

Changes in depressive symptoms, psychological flexibility and mindfulness skills were analyzed at pre-intervention, post-intervention, and 5-year follow-up measurement points. Table 4 presents the pre and post-intervention means, standard deviations (*SD*), 95% confidence intervals (CI), within-group effect sizes (Cohen's *d*) and the effect of the treatment (Wald test) with respect to depressive symptoms, aspects of mindfulness and psychological flexibility.

Table 3. Bivariate correlations (Pearson, $n=33$) between depression (BDI) and process measures (AAQ-2 and KIMS) pre scores.

Measurement	Pearson correlation coefficients					
	BDI	AAQ-2	KIMS	Observe	Describe	Acting with awareness
AAQ-2	-.65**	--				
KIMS	-.20	.48**	--			
Observe	.37*	-.20	.51**	--		
Describe	-.10	.25	.64**	.35*	--	
Acting with awareness	-.36*	.52**	.40**	-.29	-.08	--
Accept without judgment	-.49**	.54**	.30	-.48**	-.14	.45**

Notes: BDI= Beck Depression Inventory; AAQ-2= Acceptance and Action Questionnaire; KIMS= Kentucky Inventory of Mindfulness Skills and its subscales; * = $p < .05$; ** = $p < .01$; pre= pre-measurement.

Table 4. Mean scores, standard deviations, and 95% confidence intervals (CI) for outcome and process variables at pre and post (within-group effect sizes (ES) with 95% confidence intervals (CI) are also presented).

Measures	Pre (n= 33)	Post (n= 32)	5-years FU (n= 25)	ES (Cohen's d) and CI	
	M (SD) CI	M (SD) CI	M (SD) CI	Pre-Post	Pre-FU
BDI	22.61 (9.92) 19.22; 25.99	13.87 (9.54)** 10.58; 17.15	10.67 (7.28)^^^ 8.02; 13.33	0.89^# 0.55; 1.24	1.37^# 0.99; 1.75
AAQ-2	38.33 (11.07) 34.56; 42.11	44.39 (12.72)** 40.00; 48.78	50.54 (11.20)^^^ 46.48; 54.59	0.51^# 0.15; 0.87	1.10^# 0.78; 1.41
KIMS	116.88 (13.40) 112.31; 121.45	122.22 (19.39)* 115.55; 128.90	128.68 (16.64)^^^ 122.50; 134.86	0.32 0.04; 0.61	0.78^# 0.42; 1.14
Observe	37.21 (9.45) 33.99; 40.44	38.90 (9.56) 35.61; 42.20	38.00 (7.29) 35.41; 40.59	0.18 -0.11; 0.46	0.09 -0.30; 0.48
Describe	25.73 (6.70) 23.44; 28.01	26.91 (7.45) 24.36; 29.47	27.83 (6.15)^^^ 25.60; 30.06	0.17 -0.03; 0.36	0.33 0.07; 0.58
Acting with awareness	25.64 (5.69) 23.69; 27.58	27.09 (6.87) 24.73; 29.44	29.94 (6.71)^^^ 27.61; 32.28	0.23 -0.09; 0.56	0.69^# 0.45; 0.94
Accept without judgment	28.21 (7.10) 25.79; 30.64	29.34 (7.85) 26.64; 32.04	32.14 (5.88)^^^ 29.95; 34.34	0.15 -0.17; 0.47	0.60^# 0.27; 0.94

Notes: BDI= Beck Depression Inventory; AAQ-2= Acceptance and Action Questionnaire-2; FU: follow-up; KIMS= Kentucky Inventory of Mindfulness Skills and Subscales below; Pre= pre-intervention measurement; Post= post-intervention measurement; * = p <.05; ** = p <.01; ^ = p <.05, ^^ = p <.01; # = effect size small 0.5; ^# = effect size medium 0.8; ^## = effect size large 1.1.

Changes from pre-intervention to 5-year follow-up measurement were significant regarding psychological flexibility (AAQ-2: estimate= 12.11, p= .000), depressive symptoms (BDI: estimate= -11.79, p= .000), general mindfulness skills (KIMS: estimate= 11.58, p= .000), and several mindfulness subscales (KIMS describing: estimate= 2.23, p= .00; KIMS acting with awareness: estimate= 4.14, p= .000; KIMS accepting without judgment: estimate= 3.91, p= .000). The pre to post changes in the mindfulness subscales were not statistically significant, whereas changes in depressive symptoms, psychological flexibility and general mindfulness skills were significant. The effect sizes (Cohen's d) from the pre- to post-intervention indicate a medium effect for depressive symptoms (BDI: d= -0.89) and a small effect for psychological flexibility (AAQ-2: d= 0.51). For the whole study period (from the pre-intervention to 5-year follow-up measurement), a large effect was found regarding depressive symptoms (BDI: d= -1.37) and psychological flexibility (AAQ-2: d= 1.10) while a close-to-medium effect was detected for general mindfulness skills (KIMS: d= 0.78) and a small effect was found for the subscales acting with awareness (d= 0.69) and accepting without judgment (d= 0.60).

The relationships between the changes in the process measures during the treatment (pre- to post-intervention) and the changes in depressive symptoms both during the treatment (pre- to post-intervention) and across the whole study period (pre-intervention to 5-year follow-up measurement) are seen in Table 5. The pre to post change correlations indicate that the change in depressive symptoms was related to changes in psychological flexibility (AAQ-2), general mindfulness skills (KIMS), and the accepting without judgment subscale.

Changes in depressive symptoms across the whole study period (pre to 5-year follow-up) were significantly associated with changes in accepting without judgment during the intervention (pre to post). However, changes from pre to post in three other KIMS subscales were not related to changes in depression across the whole study period.

Table 5. Bivariate correlations (Pearson, n= 33) between depression (BDI) change scores (from pre to post, and to 5-years FU) and process measures (AAQ-2, KIMS) change scores (from pre to post).

Measurement	Pearson correlation coefficients						
	BDI Pre-Post	BDI Pre-FU	AAQ-2 Pre-FU	KIMS Pre-Post	Observe Pre-Post	Describe Pre-Post	Acting with awareness Pre-Post
BDI pre-FU	.75**	--	--	--	--	--	--
AAQ-2 Pre-Post	-.51**	-.32	--	--	--	--	--
KIMS Pre-Post	-.51**	-.38	.42*	--	--	--	--
Observe Pre-Post	-.23	.05	.05	.65**	--	--	--
Describe Pre-Post	-.26	-.27	.36*	.35	-.07	--	--
Acting with awareness Pre-Post	-.30	-.15	.42*	.56**	.17	.03	--
Accept without judgment Pre-Post	-.39*	-.52**	.29	.64**	.04	.23	.17

Notes: BDI= Beck Depression Inventory; AAQ-2= Acceptance and Action Questionnaire; FU: 5-year follow-up; KIMS= Kentucky Inventory of Mindfulness Skills and its subscales; Pre= pre-intervention measurement; Post= post-intervention measurement; * = p <.05, ** = p <.01.

Since previous research suggests that different components of mindfulness seem to be linked differently to various psychopathological concepts (see Introduction), we further examined the combinations of different KIMS subscales and whether they were related to changes in depressive symptoms. A further examination was conducted using a linear regression model testing pairs of subscales to see whether some of those combinations were related to positive changes in depressive symptoms both during the treatment phase and from the beginning of the study to the 5-year follow-up measurement (see Table 6). The investigation of the subscale pairs showed significant associations with pre- to post-intervention changes in depressive symptoms, even though when examined individually only the accepting without judgment subscale had produced significant results. Thus, while pre to post changes in other subscales (observing, describing, and acting with awareness) were not significantly related to pre to post changes in depressive symptoms (Table 5), significant associations were observed when the those KIMS subscales were paired with each other or with the accepting without judgment subscale (Table 6). However, when examining the pre to post changes in these combinations with regard to long-term changes (pre-intervention to 5-year follow-up measurement) in depressive symptoms, merely the combinations involving the accepting without judgment subscale produced significant results.

Table 6. Combination correlations (MPlus, $n = 33$) between depression (BDI) change scores (pre to post and pre to FU) and aspects of mindfulness skills (KIMS) change scores (pre to post).

Measures	Pearson correlation coefficients					
	Observe+ Acting with Awareness	Observe+Accept without Judgment	Observe+ Describe	Describe+ Acting with Awareness	Describe+Accept without Judgment	Acting with Awareness+Accept without Judgment
BDI pre-post	-.34 **	-.42**	-.33*	-.39**	-.43**	-.45**
BDI pre-FU	-.04	-.30*	-.08	-.26	-.54**	-.45**

Notes: BDI= Beck Depression Inventory; FU= 5-year follow-up; KIMS= Kentucky Inventory of Mindfulness Skills and its subscales; Pre= pre-measurement; Post= post-intervention measurement; * = $p < .05$; ** = $p < .01$.

DISCUSSION

The main objective of the present study was to investigate whether changes in the subcomponents of mindfulness skills during a very brief 4-session ACT intervention were associated with changes in depression symptoms during that intervention, and also whether those changes predicted long-term changes in depressive symptoms. Our preliminary results suggested that different facets seen as parts of psychological flexibility and mindfulness might behave differently compared to one another during a brief intervention, and the changes in them during treatment may have a different impact on long-term changes in depressive symptoms.

As previous research has suggested (Alleva *et alii*, 2014; Barnes & Lynn, 2010; Barnhofer *et alii*, 2011; Bohlmeijer *et alii*, 2011; Christopher *et alii*, 2012), in our study, accepting without judgment was associated with depressive symptoms on many levels: pre-intervention scores correlated with each other (higher levels of depressive symptoms at the beginning of the treatment were related to lower levels of accepting without judgment) and changes in accepting without judgment during the treatment were associated with changes in depressive symptoms from both pre- to post-intervention and pre-intervention to 5-year follow-up measurement. No other changes in mindfulness facets showed associations with short- or long-term treatment changes *regarding* to participants' depression symptomatology. At the time of the pre-intervention measurement, acting with awareness had a negative association to depressive symptoms (higher levels of depressive symptoms were related to lower levels of acting with awareness), and describing was unrelated to depression, also in line with earlier research (Alleva *et alii*, 2014; Barnhofer *et alii*, 2011; Bohlmeijer *et alii*, 2011; Cash & Whittingham, 2010; Carmody & Baer, 2008; Christopher *et alii*, 2012).

As expected, the observing facet was positively related to depressive symptoms at the pre-intervention measurement time: higher levels of observing at the beginning of the treatment were related to higher pre-treatment levels of depressive symptoms. Observing also seemed to change the least, and higher levels of observing have been associated either directly or indirectly with lower well-being in cross-sectional studies (Alleva *et alii*, 2014; Barnes & Lynn, 2010; Christopher *et alii*, 2012). Worth noticing is that the overall level of depressive symptoms significantly decreased in spite of the observing feature maintaining its level. It might be that other important skills or skill sets, such as acting with awareness and accepting without judgment, had been integrated into the process of becoming more aware of inner and outer experiences.

When the KIMS' subscale changes were combined in pairs, there were significant associations regarding all pairs in relation to the pre- to post-intervention changes in depression. As noted earlier, individual subscale changes were significantly associated with changes in depressive symptoms only in regard to the accepting without judgment subscale, not regarding observing, describing or acting with awareness. When the subscale combinations were examined in relation to the whole study period, merely those combinations including the accepting without judgment subscale were statistically significant. Adding another subscale did not seem to strengthen the association when investigating the long-term changes in depressive symptoms. It appears that changes in accepting without judgment carried the most importance when it comes to the longevity of the treatment effect of a brief acceptance- and value-based intervention. These results show the importance of taking a non-evaluative and accepting stance even toward painful private events, supporting the theory behind acceptance- and value-based interventions (Hayes *et alii*, 2011), as well as confirming earlier research (Alleva *et alii*, 2014; Barnhofer *et alii*, 2011; Christopher *et alii*, 2012; Desrosiers *et alii*, 2013).

Our study has several limitations. Firstly, the fairly small sample size, the not diagnosed population and the biased gender distribution may have affected the results and thus limit their generalizability regarding *only* treatment-motivated females reporting mild to moderate symptoms of depression. Secondly, during the 5-year follow-up period, six participants (24% of the 25 participants) reported having had additional psychological treatment, four (16%) had used psychotropic medication during the follow-up and two (8%) were on medication by the time of the 5-year follow-up measurement. When comparing those participants having had additional psychological treatment to those not having had any, there were significant differences in both the pre- and post-intervention measurement results regarding acting with awareness [$t(23)= 2.30, p= .031$ and $t(23)= 2.50, p= .020$], respectively, in both cases with higher levels in those participants not having had any additional treatment outside our intervention. At the 5-year follow-up measurement, significant differences were detected in terms of psychological flexibility [$t(23)= 2.74, p= .012$] and acting with awareness [$t(23)= 3.18, p= .004$], also in both cases with higher levels in those participants not having had any additional treatment. These findings, combined with other results from the present study, are indicative of the importance of developing a non-evaluative, open attitude and mindful behavior as these seem to be significant factors leading better outcomes in brief acceptance- and value-based interventions, as well as better for one's overall well-being in general as suggested by earlier research (Alleva *et alii*, 2014; Barnhofer *et alii*, 2011; Barnes & Lynn, 2010; Bohlmeijer *et alii*, 2011; Christopher *et alii*, 2012; Desrosiers *et alii*, 2013). However, more research with larger samples, improved methodologies and research designs is called for. Further related limitations, such as concerning this type of intervention and long follow-ups, are discussed in previous papers that used the same data (Kohtala *et alii*, 2015; Kohtala *et alii*, 2017).

Thirdly, no statistically significant changes were detected during the brief 4-session intervention with respect to the KIMS subscales. It might be that the 4-session ACT intervention was not able to produce measurable changes large enough to be statistically

significant for specific aspects of flexible, mindful and nonjudgmental behavior within such a short time frame for all individuals. The individual variation in KIMS subscales was large, indicating that some individuals experienced more changes than others. However, significant pre to post changes were found in the single-factor measure of psychological flexibility (AAQ-2) as well as in the total score of the multidimensional mindfulness measure (KIMS).

Lastly, since psychological flexibility has been defined as a two-fold process as presented earlier (Hayes *et alii*, 2004, 2006), the measures available in the present study (AAQ-2, KIMS) may have captured only the first part consisting of present-moment awareness and having an accepting attitude toward experiences. Hence, the second part concerning the behavioral aspects and valued choices might be missing in our measurement, even though those dynamic behavioral aspects were crucial elements of the brief treatment model used. Thus, the associations found in the present study only address the aspect of having an accepting and aware attitude, possibly missing other integral elements important to changes in depressive symptoms. Also, it should be noted that our study applied a very brief intervention model delivered by novice therapists without extensive training or experience in psychotherapy.

Regardless of the limitations of the present study, we believe our findings to have implications for both clinical and research communities. By examining the various aspects of psychological flexibility beyond cross-sectional studies and investigating whether changes in those aspects are differentially related to changes in depressive symptoms and other well-being factors during time-limited treatment, we were able to bring more insight to what elements and processes might be important to the effectiveness of brief, time-limited acceptance and value-based interventions. As our results indicate, mere noticing and labeling of experiences was not associated to changes in depressive symptoms, yet when those aspects were combined with a non-evaluative attitude toward those experiences the association became significant. Similar observations and results regarding the relationship between observing and lower levels of mental health (Baer *et alii*, 2006; Baer *et alii*, 2008), as well as the observation of differential patterns of relationships between facets of mindfulness and mental health factors (e.g., Desrosiers *et alii*, 2013), have been found using a newer self-report measure for mindfulness aspects, the Five-Facet Mindfulness Questionnaire (FFMQ; Baer *et alii*, 2006).

As the results of our study suggest, certain aspects of mindful and acceptance, such as being able to observe and describe experiences and act with intention and awareness, might not be sufficient as separate “skills”; the emphasis on one facet might not be sufficient in producing and maintaining well-being and an open, flexible stance toward experiences over time. Observing has been associated with psychological distress and depressive symptoms (Baer *et alii*, 2004; Baer *et alii*, 2006; Baer *et alii*, 2008; Barnes & Lynn, 2010). However, the ability to notice and observe is also considered to be a pivotal aspect in various definitions of what is required to develop an accepting and mindful attitude and stance toward experiences (Lilja *et alii*, 2013), and should thus not be ignored but rather combined and strengthened with other skills.

As noted with regard to limitations, the importance of and changes in behavioral components and valued actions related to treatment outcomes in brief interventions for depressive symptoms should be addressed in future studies using more sophisticated designs. Also, other measures dissecting the concept of psychological flexibility, such as the Cognitive Fusion Questionnaire (CFQ) (Gillanders *et alii*, 2014) and the Valued Living Questionnaire (VLQ) (Wilson, Sandoz, Kitchens, & Roberts, 2010) could be used.

Our results imply that clinicians using acceptance-based interventions aiming for more behavioral and psychological flexibility should emphasize the development of a nonjudgmental and accepting attitude, which seems to be an important element in both achieving and maintaining lower levels of depressive symptoms. As some interventions may emphasize a more formal approach to developing mindful and present-centered

attention, clinicians should also be aware of not putting too much emphasis on observing and describing experiences without balancing these with acceptance skills. Similar findings have been discussed regarding longitudinal and cross-sectional mindfulness research (e.g., Barnes & Lynn, 2010; Brown, Bravo, Roos, & Pearson, 2015). The aim of the treatment model examined in our study was not to teach the participants mindfulness per se as in formal mindfulness-based interventions (e.g., MBSR; Kabat-Zinn, 1990), but rather to engage them in a more mindful and present-centered orientation toward their experiences and accepting the experiences without evaluations or judgment. Simplified, the aim was to help individuals gain more psychological flexibility. The existing literature drawing from both mindfulness and psychological flexibility research also promotes the importance of such ways of relating to the present moment, thoughts and emotions, underlining the potential effectiveness of our treatment approach.

APPENDIX

Kentucky Inventory of Mindfulness Skills (KIMS) by Ruth A. Baer, Ph.D., University of Kentucky
Subscales and related statements

Observe

- I notice changes in my body, such as whether my breathing slows down or speeds up.
- I pay attention to whether my muscles are tense or relaxed.
- When I'm walking, I deliberately notice the sensations of my body moving.
- When I take a shower or bath, I stay alert to the sensations of water on my body.
- I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
- I pay attention to sensations, such as the wind in my hair or sun on my face.
- I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- I notice the smells and aromas of things.
- I intentionally stay aware of my feelings.
- I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
- I pay attention to how my emotions affect my thoughts and behavior.
- I notice when my moods begin to change.

Describe

- I'm good at finding the words to describe my feelings.
- I can easily put my beliefs, opinions, and expectations into words.
- I'm good at thinking of words to express my perceptions, such as how things taste, smell, or sound.
- It's hard for me to find the words to describe what I'm thinking.
- I have trouble thinking of the right words to express how I feel about things.
- When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
- Even when I'm feeling terribly upset, I can find a way to put it into words.
- My natural tendency is to put my experiences into words.

Acting with awareness

- When I do things, my mind wanders off and I'm easily distracted.
- When I'm doing something, I'm only focused on what I'm doing, nothing else.
- I drive on "automatic pilot" without paying attention to what I'm doing.
- When I'm reading, I focus all my attention on what I'm reading.
- When I do things, I get totally wrapped up in them and don't think about anything else.
- I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
- When I'm doing chores, such as cleaning or laundry, I tend to daydream or think of other things.
- I tend to do several things at once rather than focusing on one thing at a time.
- When I'm working on something, part of my mind is occupied with other topics, such as what I'll be doing later, or things I'd rather be doing.
- I get completely absorbed in what I'm doing, so that all my attention is focused on it.

Accepting without judgment

- I criticize myself for having irrational or inappropriate emotions.
- I tend to evaluate whether my perceptions are right or wrong.
- I tell myself that I shouldn't be feeling the way I'm feeling.
- I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
- I make judgments about whether my thoughts are good or bad.
- I tend to make judgments about how worthwhile or worthless my experiences are.
- I tell myself that I shouldn't be thinking the way I'm thinking.
- I think some of my emotions are bad or inappropriate and I shouldn't feel them.
- I disapprove of myself when I have irrational ideas.

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