Living to the Full

The Effectiveness of an Intervention Based on Acceptance and Commitment Therapy for the Psychological Treatment of Military Servicemen

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Master Thesis

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ABSTRACT

Background

Psychological issues among military servicemen are prevalent, with numbers reaching from 4% to even 44% of soldiers suffering from mental health issues. Acceptance and Commitment Therapy (ACT) has shown to be a promising treatment to increase mental health and decrease psychological symptoms. The present study examined the effect of an ACT-based group intervention for the psychological treatment of military servicemen with distress. Questions were examined whether attending the intervention leads to psychological benefits in terms of positive mental health, anxiety-related symptoms and negative self-thoughts, whether core processes of ACT, including mindfulness and acceptance increase in the course of the intervention and whether scores of mindfulness and acceptance predict outcomes of positive mental health.

Method

Servicemen (N = 56) suffering from depression or anxiety were invited to participate in the ACT-based intervention. A great part of the sample was male, still serving as active servicemen and the mean age was 39 years. Pre - and posttest measurements were conducted for positive mental health (MHC-SF), anxiety symptoms (HADS-A), negative self-thoughts (HINT), mindfulness (CAMS-R) and acceptance (AAQ-II).

Results

Attending the intervention led to a statistically significant increase in positive mental health (Cohen's d = - 1.02) and a decrease in anxiety-related symptoms (Cohen's d = 1.27) and negative self-thoughts (Cohen's d = 0.35). Moreover, the processes mindfulness and acceptance were both significantly improved. Regression analysis revealed a relation between mindfulness and positive mental health, but not between acceptance and positive mental health.

Conclusion

Findings suggest that the ACT-based intervention *Living to the Full* is effective for the treatment of servicemen suffering from psychological issues. However, future research is necessary to evaluate the effectiveness of the training, including a larger sample and a more refined methodological design.

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1. INTRODUCTION

To aid peacekeeping, fighting in combat zones and defending human rights are general responsibilities of a soldier's profession. This duty often comes at a cost in terms of psychological well-being and not infrequently servicemen suffer from symptoms of distress (Ramchand et al., 2010). Existing studies however indicate strongly diverging numbers regarding the prevalence of psychological disorders among servicemen, reaching from 4% screened positive for posttraumatic stress disorder (PTSD) and 4.4% for depression (Grieger et al., 2006) to 7.3% for PTSD symptoms (LeardMann, Smith, Smith, Wells, & Ryan, 2009), 11.6% (Vasterling et al., 2006) or even 44% of US servicemen seeking treatment reporting clinical symptoms of depression, PTSD or both (Lapierre, Schwegler, & LaBauve, 2007).

Although described prevalence estimates show high variability (for possible reasons, *see* Ramchand et al., 2010; Richardson, Frueh, & Acierno, 2010), different factors predicting the impact of deployment on mental health emerge within literature. Hoge et al. (2004) underline the importance of exposure to combat as a strong risk-factor for the development of PTSD (Hoge et al., 2004). Further research substantiates this conclusion (Hoge & Castro, 2006; Hoge, Terhakopian, Castro, Messer, & Engel, 2007; Kolkow, Spiral, Morse, & Grieger, 2007; Milliken, Auchterlonie, & Hoge, 2007; Smith et al., 2008). Other risk-factors include both low physical and mental capabilities immediately after serving and in the long run (Barrett et al., 2002; LeardMann et al., 2009). Feelings of not being sufficiently prepared for a mission, a lower rank or being unmarried, and not receiving a post-deployment debriefing in terms of psycho-education, likewise heighten the risk for the onset of psychological symptoms (Iversen et al., 2008). In contrast, both social support and higher resilience have shown to be essential protective factors (Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009; Polusny et al., 2011).

No matter which factors eventually influence the onset of psychological symptoms among soldiers, suffering from mental health problems has consequences in a wide range of

areas. Studies show negative effects on psychosocial aspects of life, including couple adjustment and parenting behavior (Gewirtz, Polusny, DeGarmo, Khaylis, & Erbes, 2010) as well as marital and relationship satisfaction (Goff, Crow, Reisbig, & Hamilton, 2007; Newby et al., 2005; Renshaw, Rodrigues, & Jones, 2008). Furthermore, physical symptoms (Hotopf et al., 2006; Jakupcak, Luterek, Hunt, Conybeare, & McFall, 2008) and alcohol abuse (Milliken et al., 2007) increase among servicemen showing fragile psychological health.

Considering the list of consequences, sufficient psychological support for soldiers is indispensable. Accordingly, refined interventions are necessary to provide appropriate psychological support for this special target group, to improve mental health for the individual and remove pressure from related parties. Common military interventions often are limited to psycho-educational debriefing sessions (Adler et al., 2008; Deahl et al., 2000) which, however, show limited effects (Mulligan, Fear, Jones, Wessely, & Greenberg, 2011).

Recent developments within psychology emphasize the importance of *positive mental health*, defined as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (World Health Organization, 2004, p. 12). In this context, mental health features three components: emotional, psychological and social well-being. The *emotional* component of well-being is defined as experiencing positive feelings and satisfaction, while *psychological* well-being is seen as the level of individual functioning, comprising factors such as mastery, meaning, positive relations and autonomy (Bohlmeijer, Bolier, Westerhof, & Walburg, 2013, p. 20). Finally, *social* well-being is described as optimal performing in community life, including components such as social actualization, acceptance and contribution (Bohlmeijer et al., 2013, p. 261; Westerhof & Bohlmeijer, 2010, p. 50). A high level of positive mental health is defined as *flourishing* (Keyes, 2007). Within the framework of mental illness, positive mental health and psychopathology are related but separate factors, a relation outlined within the *two continua*

model (Westerhof & Keyes, 2010) and shown in several studies (Keyes, 2005; Keyes et al., 2008; Westerhof & Keyes, 2008, 2010). Accordingly, improving positive mental health leads to a decrease of psychopathology and vice versa (Westerhof & Keyes, 2010). Furthermore, low levels of positive mental health have shown to predict psychological issues in the long run (Keyes, Dhingra, & Simoes, 2010; Lamers, Westerhof, Glas, & Bohlmeijer, 2015; Wood & Joseph, 2010) as well as increase the risk of all-cause mortality (Keyes & Simoes, 2012). Thus, positive mental health serves as buffer and plays a preventive role in the context of mental illness (Bohlmeijer, Lamers, & Fledderus, 2015).

A therapy model that fits into the two continua model is *Acceptance and Commitment Therapy* (ACT), as it emphasizes both sides of the coin: promoting flourishing and decreasing psychopathology (Bohlmeijer et al., 2015). The general goal of ACT is to increase *psychological flexibility*, the ability to live according to personal values and to contact present (negative) experiences more fully as conscious human being (Hayes, 2004). Research shows a negative link between this vital ability and several forms of psychopathology (Masuda & Tully, 2012) as well as a positive association with treatment success (Fledderus, Bohlmeijer, Fox, Schreurs, & Spinhoven, 2013). In order to promote psychological flexibility, ACT tackles six core processes. The first two, a*cceptance* and *cognitive defusion* aim at viewing and interpreting negative thoughts and experiences from a distant point of view instead of staying stuck in cognitive exertion. In contrast, *experiential avoidance* (EA) is seen as an opposing process to acceptance and is described as the intentional escape from negative experiences, thoughts or events, even when this behavior leads to psychological inflexibility in the long term and prevents an individual from leading a meaningful life (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). EA is seen as main source for emotional and psychological issues (Biglan, Hayes, & Pistorello, 2008; Hayes et al., 2006). Moreover, the core processes of *values* and *committed action* include both awareness of personal priorities and the ability to follow intrinsic motivations and values, even in times of psychological stress (Hayes et al.,

2006). Eventually, the core processes *self as context* and *being present* are supposed to help the individual to become aware of personal experiences and get in touch with the present moment instead of remaining in thoughts about past and future, referring to the process of mindfulness (A-Tjak & de Groot, 2008; Westerhof & Bohlmeijer, 2010, p. 283). Mindfulness has been shown to be negatively associated with psychological symptoms (Hofmann, Sawyer, Witt, & Oh, 2010) and positively linked to greater emotion regulation and well-being (Carmody & Baer, 2008; Vujanovic, Bonn-Miller, Bernstein, McKee, & Zvolensky, 2010)

Several studies show the effectiveness of ACT in reducing psychological symptoms (Bohlmeijer, Fledderus, Rokx, & Pieterse, 2011; Kocovski, Fleming, Hawley, Huta, & Antony, 2013; Trompetter, Bohlmeijer, Veehof, & Schreurs, 2015) and also in particular for PTSD (Thompson, Luoma, & Lejeune, 2013; Woidneck, Morrison, & Twohig, 2014). Moreover, ACT has been shown to promote positive mental health and support flourishing (Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012; Fledderus, Oude Voshaar, ten Klooster, & Bohlmeijer, 2012).

However, applying ACT as psychological treatment for distressed soldiers has barely been researched yet. Research investigating the effect of an ACT-based parenting group for veterans with trauma-related symptoms shows an increase in psychological flexibility as well as enhanced parenting behavior among former soldiers attending the intervention (Casselman & Pemberton, 2015). Furthermore, Lang et al. (2012) developed a randomized controlled trial in order to evaluate ACT as treatment for distress and impairment in veterans, but the results are still expected. Vujanovic, Niles, Pietrefesa, Schmertz, and Potter (2013) further emphasize the importance to investigate mindfulness-based treatments as promising approaches in the context of military health care.

As only little is known about the effectiveness of ACT as psychological treatment for servicemen, this study seeks to shed light on this issue by investigating the effectiveness of the ACT-based intervention ‘Voluit Leven’ (*Living to the Full*) for the treatment of Dutch

servicemen (Bohlmeijer & Hulsbergen, 2008). *Living to the Full* combines elements of both ACT and mindfulness-meditation and has shown to be effective among a sample of adults with mild to moderate depressive symptoms (Bohlmeijer et al., 2011; Fledderus, Bohlmeijer, Smit, & Westerhof, 2010), as self-help version in combination with email support (Fledderus, Bohlmeijer, et al., 2012) and as internet-delivered self-help intervention for depression (Pots et al., 2015) and chronic pain (Trompetter et al., 2015).

Since the effectiveness of *Living to the Full* has not been evaluated yet for the psychological treatment of soldiers, the present study aims to give further insights into the general effectiveness of this intervention. Furthermore, new prospects for treatment in the context of military health care might be generated, concentrating on the improvement of positive mental health and prevention of psychological issues. This study will also feature the component of a Dutch military sample and, with this, the corresponding opportunity to evaluate the effect of ACT-based interventions for servicemen in a different cultural context.

In conclusion, the overall concern of this study is to investigate whether participation in the ACT-based intervention leads to psychological benefits for soldiers in outcomes of positive mental health, anxiety-related symptoms and negative self-thoughts. Furthermore, the question is considered whether attending the intervention leads to an improvement in core processes of ACT, including mindfulness and acceptance. Finally, it is investigated to what extent acceptance and mindfulness predict positive mental health. Following research questions are formulated:

(1) Does participation in the ACT-based intervention lead to psychological benefits in outcomes of mental health, anxiety-related symptoms and negative thinking?

(2) Does participation in the ACT-based intervention lead to an improvement in core processes of ACT including mindfulness and acceptance?

(3) Does mindfulness predict positive mental health?

(4) Does acceptance predict positive mental health?

2. METHOD

2.1 Design & Procedure

In order to examine the effectiveness of *Living to the Full,* a quantitative study is conducted using a pretest-posttest design, with the pretest (T0) conducted maximum one week before the first session of the group program and the posttest (T1) performed one week after the last session. Registration for the intervention was initiated by military psychologists who invited eligible individuals, undergoing psychological treatment, to attend the program. Implementation took place at four different Dutch military health care centers in Utrecht, Amsterdam, Zwolle and 's Hertogenbosch. The realization of the program was the same at all four locations.

Prior to the intervention, an information event for eligible participants at all four locations was given including general information about the intervention and what to expect from the program and from the participants. Afterwards, an individual interview with each registered participant was performed to obtain a better understanding of individual problems, expectations and motivation. The data was collected from February 2011 until October 2013.

An important prerequisite for participation was the general indication of an axis-I or axis-II issue emerging from individual sessions prior to the intervention. In addition, several exclusion criteria were formulated and participants were filtered accordingly. Participants who were in an early phase of treatment for depression or PTSD and who showed indications of panic disorder were excluded. Classified drug dependence at the moment of sampling was an exclusion criteria as well as a lack of interest, motivation or time to complete the intervention adequately.

2.2 Participants

Participants of this study (N = 56) were gathered via systematic sampling at four different military health care centers. The original sample size was reduced to 43, since some

participants not completed the full test battery or were missing the posttest measurements. It is unknown in which military sector the participants were active during data collection, but the group counselors indicated that a major part serves for the armed forces, as this represents the greatest section of military personnel. At the time of data collection, all participants were still serving as military servicemen. A high percentage of the participants was working full-time while only a small portion was working part-time or was not working at all. Mean age of the participant sample was 39.41 years (SD = 9.206) and 73.2% of the sample was male. Educational level varies from 1.8% low education, 58.9% moderate education and 40.2% high educated participants. All participants included in this sample were Dutch nationals. Table 1 summarizes the above named data.

Table 1

Demographical Data of the Participant Sample (n = 56)

Variable		n (%)
Gender	Male	41 (73.2)
	Female	15 (26.8)
Educational Level	Low	1 (1.8)
	Moderate	33 (58.9)
	High	22 (40.2)
Nationality	Dutch	56 (100)
Age (mean. sd)		39.41 (9.206)

2.3 Measures

Participants were asked to specify demographical data, including age, gender and educational level. In addition, a primary psychological outcome measure of mental health was used and secondary psychological outcome measures assessing anxiety-related symptoms and the extent of negative self-thoughts. Furthermore, process measures assessing mindfulness and acceptance are included.

Mental Health Continuum Short Form (MHC-SF)

The MHC-SF (Lamers, Glas, Westerhof, & Bohlmeijer, 2012) assesses the outcome of positive mental health on three dimensions: psychological, emotional and social well-being. Containing 14 items, the questions are answered on a 6-point Likert scale with participants describing the frequency of feelings and experiences during the last week (1 = *never*, 6 = *every day*), with total scores ranging from 14 to 84 and higher scores indicating higher positive mental health. The internal consistency of the MHC-SF in a Dutch population was validated as acceptable (Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011) for the scale of psychological well-being (α = .73) and as good for emotional well-being (α = .85) and social well-being (α = .82). Reliability analyses on total scores of the MHC-SF revealed good to excellent internal consistency for the present study (T0, α = .89; T1, α = .91) as well as for the subscales of psychological (T0, α = .83; T1, α = .89) and emotional well-being (T0, α = 0.88; T1, α = 0.90), while the subscale of social well-being showed acceptable respectively questionable internal consistency (T0, α = 0.69; T1, α = 0.58).

Hospital Anxiety and Depression Scale (HADS-A)

In order to assess psychological symptoms of anxiety, the anxiety scale of the HADS (Zigmond & Snaith, 1983) is used. In total, the HADS contains 14 items, while the anxiety scale HADS-A consists of 7 statements measuring the strength of anxiety symptoms among participants. The items are answered on a scale ranging from 0 (*very weak*) to 3 (*very strong*) with a total score of minimum 0 and maximum 21, while a higher score is equivalent to a higher extent of anxiety symptoms. Research (Whelan-Goodinson, Ponsford, & Schönberger, 2009) revealed good reliability for the anxiety scale (α = .88), while for the present data set an acceptable internal consistency for this subscale was found (T0, α = .77; T1, α = .77).

Habit Index of Negative Thinking (HINT)

Containing 12 items, the HINT (Verplanken, Friborg, Wang, Trafimow, & Woolf, 2007) measures the habit to think negatively about oneself. On different scales, the HINT assesses whether negative self-thoughts occur often, are intended, difficult to control, initiated without awareness and self-descriptive. In terms of scoring, different statements are answered on a 7-point Likert scale (0 = *totally disagree*, 6 = *totally agree)*, with the total score ranging from 0 to 72, being computed as sum of all items. Accordingly, a higher score indicates a stronger tendency to think negatively about oneself. The Dutch version used during data collection showed excellent internal consistency (α = .94) in an evaluation study by Verplanken et al. (2007) as well as in the present study (T0, α = .93; T1, α = .96).

Cognitive & Affective Mindfulness Scale-Revised (CAMS-R)

The self-report measure CAMS-R (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007) assesses the degree of mindfulness during general daily occurrences on four different domains: attention, present focus, awareness and acceptance. In total, the CAMS-R consists of 12 items and questions are answered on a 4-point Likert scale (1 = *rarely / not at all*, 4 = *almost always*), with the overall score ranging from 12 to 48 and a corresponding higher score indicating a greater degree of mindfulness. The CAMS-R has shown acceptable internal consistency in two different samples of college students (α = .74 and α = .78) and also convergent and discriminant validity (Feldman et al., 2007). In the present study, good internal consistency was found for total scores (T0, α = .81; T1, α = .88) and the subscale of *attention* (T0, α = 0.82; T1, α = 0.82), while the subscale *present focus* revealed questionable internal consistency (T0, α = 0.64; T1, α = 0.63), *awareness* questionable to acceptable reliability (T0, α = 0.67*;* T1, α = .76*)* and *acceptance* questionable (T0, α = 0.53) respectively acceptable reliability (T1, α = 0.78).

Acceptance & Action Questionnaire (AAQ-II)

Consisting of 10 items, the AAQ-II (Bond et al., 2011) assesses the extent of acceptance versus EA. Participants answer several statements on a 7-point Likert scale (1 = *never true*, 7 = *always true*) with the total score ranging from 10 to 70 points. Subsequently, a higher score on the AAQ-II indicates a greater degree of acceptance and a lower degree of EA. The Dutch version used in this study (Fledderus, Oude Voshaar, et al., 2012; Jacobs, Kleen, Groot, & A-Tjak, 2008) shows good internal consistency (α = .88). Discriminant validity is found to be good as well as the finding that the AAQ-II predicts a range of outcomes, including work absence and mental health (Bond et al., 2011). In line with former results, good internal consistency (T0, α = .87; T1, α = .93*)* was found for this study.

2.4 Intervention

Living to the Full interventions (Bohlmeijer & Hulsbergen, 2008) aim to include all components of a successful ACT-treatment. Therefore, eight weekly group sessions, each lasting two hours, were being held, strictly in line with a pre-set protocol. A ninth session was held two months after the eighth meeting in order to reflect on the treatment process and to assist participants to continue applying the learned lessons. Every week participants were instructed to carry out homework following on from their last session. Individual feedback on homework was provided subsequently in order to improve the treatment process and to guarantee an accurate implementation of the program. Professionally trained clinical psychologists were in charge of the sessions and in order to make sure the appointed personnel was convinced of the intervention, a requirement to hold the sessions was to possess general interest in concepts of both ACT and mindfulness. Although every session had a particular focus, short mindfulness meditations were included during each session throughout the entire program.

The intervention is based on the six core processes of ACT (Hayes et al., 2006) described earlier: acceptance, cognitive defusion, values, committed action, self as context and being present. During session 1, basic concepts of ACT and mindfulness were introduced and participants were motivated to think about what they want in life, which also meant to develop first ideas of personal values. Session 2 and 3 focused on avoiding and control strategies, which includes exploring advantages and disadvantages of these strategies, especially in the long term. To come in touch with present experiences, without avoiding or trying to control them was the center of session 4, 5 and 6 and cognitive defusion and to experience oneself as context were exercised. The final two sessions concentrated on becoming aware of personal values and learn to act according to these values.

2.5 Statistical Analyses

All statistical analyses were conducted with the Statistical Package for Social Sciences (SPSS) version 23 and a two-tailed *p*-value of < 0.05 as the cutoff for statistical significance is used. First of all, it was tested whether the present data set shows normal distribution. For this, the Shapiro-Wilk test was used, since the sample size is smaller than 2000. The null hypothesis of this normality test implies that the sample reveals normal distribution and the alternative hypothesis states that the sample shows no normal distribution. Normal distribution was found for total scores on the MHC-SF (T0, p = .156; T1, p = .426), HADS-A (T0, p = .571; T1, p = .164), HINT (T0, p = .115; T1, p = .170) and CAMS-R (T0, p = .208; T1, p = .535) for both pretest and posttest results. Regarding the AAQ-II, normal distribution was concluded for pretest scores (p = .410) but not for results on the posttest (p = .023).

Furthermore, effect sizes (Cohen's *d*) were determined for scores on the MHC-SF, HADS-A, HINT and CAMS-R. In this context, $d = 0.2$ was considered as small, $d = 0.5$ as medium and $d = 0.8$ as large effect (Cohen, 1992). In addition, the non-parametric effect-size PS_{dep} (number of positive difference scores divided by the total number of matched pairs) was

determined for scores on the AAQ-II as the Shapiro-Wilk test revealed no normal distribution for total scores on this scale.

In order to answer the question whether attending the intervention leads to significant psychological benefits for participants, a row of paired samples t-tests was conducted comparing pretest and posttest scores of positive mental health, anxiety-related symptoms and negative self-thoughts. Total scores on the MHC-SF, HADS-A and HINT were computed and it was investigated whether a significant change between means of pretest and posttest can be concluded. Additionally, it was researched whether a significant change can be concluded for the subscales of the MHC-SF: emotional, psychological and social well-being.

To investigate whether the intervention leads to significant improvements regarding core process of ACT, a paired samples t-test was conducted comparing pretest and posttest scores of mindfulness. For this purpose, total scores of the CAMS-R were calculated and condition means of pretest and posttest were compared. Since the Shapiro-Wilk test revealed no normal distribution for scores on the AAQ-II, the non-parametric Wilcoxon signed-rank test was applied to compare pretest and posttest condition means for the process of acceptance.

A linear regression analysis was carried out to determine the relationship between acceptance respectively mindfulness and positive mental health. For this, change scores (T1 – T0) were computed for scores of positive mental health as measured by the MHC-SF. Furthermore, change scores (T1 – T0) of mindfulness respectively acceptance assessed by the CAMS-R and AAQ-II were calculated. Afterwards, a linear regression model was used with the computed change scores of positive mental health as dependent variable and change scores of mindfulness respectively acceptance as independent variables.

3. RESULTS

3.1 Effect of the Intervention on Psychological Outcome Measures

A significant difference was found for total scores on the MHC-SF between results on the pretest (M = 28.06, SD = 10.98) and posttest (M = 38.64, SD = 12.15); t (43) = -6.71, $p < 0.001$. Thus, a significant increase of total scores of positive mental health as effect of the intervention can be concluded. The effect size Cohen's *d* was found to be high with *d* = - 1.02 for total scores on the MHC-SF. Significant scores between posttest and pretest scores were found for all three subscales of the MHC-SF, including *psychological well-being* (*T0*; M = 13.28, SD = 5.84, *T1*; M = 18.37, SD = 5.98); t (43) = - 6.08, $p < 0.001$ and *emotional well-being* (*T0*; M = 6.86, SD = 3.20, *T1*; M = 9.24, SD = 3.24); t (43) = - 5.71, $p < 0.001$ and *social well-being* (*T0*; M = 7.81, SD = 4.12, *T1;* M = 11.15, SD = 4.34); t (43) = -4.83, $p < 0.001$.

Considering scores of the HADS-A a significant difference between pretest (M = 11.63, SD = 4.70) and posttest (M = 7.01, SD = 3.83) was found; t (43) = 8.35, $p < 0.001$, indicating a significant decrease of anxiety-related symptoms due to the intervention. In terms of effect size, *d* = 1.27 was found for scores on the HADS-A indicating a high effect of the intervention on anxiety-related symptoms.

Results regarding the HINT reveal a significant difference between pretest (M = 37.70, SD = 15.70) and posttest (M = 31.98, SD = 17.05); t (43) = 2.27, p = 0.029, suggesting a significant decrease of negative self-thoughts as a consequence of the intervention. Cohen's *d* effect size was found to be medium for scores on the HINT with *d* = 0.35. Table 2 summarizes the above named results.

Table 2

Paired Sample T-tests Comparing Pretest and Posttest Measurements Total Scores on the MHC-SF, HADS-A and HINT

	T0		T1			
	M	SD	M	SD	t	Sig.
MHC-SF	28.06	10.98	38.64	12.15	- 6.71***	.000
Emotional	6.86	3.20	9.24	3.24	-5.71***	.000
Psychological	13.28	5.84	18.37	5.98	- 6.08***	.000
Social	7.81	4.12	11.15	4.34	-4.83***	.000
HADS-A	11.63	4.70	7.01	3.83	8.35***	.000
HINT	37.70	15.70	31.98	17.05	2.27*	.029

***p <.001. *p <.05. N = 43

Note. M = Mean. SD = Standard Deviation

3.2 Effect of the Intervention on the ACT-Process of Mindfulness

Differences for the CAMS-R between pretest (M = 27.16, SD = 8.50) and posttest (M = 39.30, SD = 9.28) were found to be significant; t (43) = -8.21, p < 0.001, indicating an increase of mindfulness among participants due to the intervention. Cohen's *d* effect size for the total scores of the CAMS-R was found to be *d* = 1.25.

Regarding the subscales, a significant difference between pretest and posttest for the four subscales was found, including *attention* (*T0*; M = 6.94, SD = 3.25, *T1*; M = 9.67, SD = 3.12); t (43) = - 8.21, p < 0.001 and the subscale *present focus* (*T0*; M = 6.94, SD = 3.25, *T1*; M = 9.65, SD = 2.67); t (43) = - 5.94, p < 0.001 as well as for the subscale of *awareness* (*T0*; M = 7.07, SD =2.84, *T1*; M = 10.07, SD = 2.70); t (43) = - 6.25, p < 0.001 and finally for the subscale of *acceptance* (*T0*; M = 6.14, SD = 2.74, *T1*; M = 9.91, SD = 2.94); t (43) = -7.27, p < 0.001. Table 3 summarizes the findings regarding the CAMS-R.

Table 3

Paired Sample T-tests between Pretest and Posttest Measurements for Scores on the CAMS-R

	T0		T1			
	M	SD	M	SD	t	Sig.
CAMS-R	27.16	8.50	39.30	9.28	- 8.21***	.000
Attention	6.94	3.25	9.67	3.12	- 5.84***	.000
Focus	7.00	2.83	9.65	2.67	- 5.94***	.000
Awareness	7.07	2.84	10.07	2.70	- 6.25***	.000
Acceptance	6.14	2.74	9.91	2.94	- 7.27***	.000

***p <.001. N = 43

Note. M = Mean. SD = Standard Deviation

3.3 Effect of the Intervention on the ACT-Process of Acceptance

A significant difference for scores on the AAQ-II between pretest (M = 35.49, SD = 9.71) and posttest (M =42.86, SD = 10.04) was found; z (43) = -4.072, p < 0.001. This suggests a significant increase of acceptance and decrease of experiential avoidance as an effect of the intervention. PS_{dep} effect size was found to be 0.79. Table 4 summarizes the results regarding scores on the AAQ-II.

Table 4

Wilcoxon Signed-Rank Test Comparing Pretest and Posttest Scores on the AAQ-II

	T0			T1				
	Median	Min.	Max.	Median	Min.	Max.	z	Sig.
AAQ-II	34.50	17.00	55.00	44.00	12.00	58.00	- 4.07***	.000

***p <.001. N = 43

Note. Min. = Minimum. Max. = Maximum.

3.4 Relationship between Mindfulness and Positive Mental Health

A simple linear regression model was applied in order to estimate the extent to which mindfulness scores predict scores of positive mental health. A significant regression equation was found (F(1, 41) = 18.05, p < .000) revealing a linear relationship between the variables of

mindfulness and positive mental health. Furthermore, a R^2 of .306 was found, showing that 30.6% of the variance in positive mental health can be predicted by mindfulness, which is seen as moderate effect. The unstandardized slope (β = .605) and standardized slope (β = .553) were both significantly different from 0; t (41) = 4.25, p < 0.001 with one point increase in mindfulness leading approximately to a half point increase in positive mental health. The intercept (B = 3.51) was found to be not significantly different from 0; t (41) = 1.593, p = .119. Table 5 summarizes the above described results.

Table 5

Effect of Mindfulness on Positive Mental Health

		Positive mental Health	
Variable	Model 1 B	B	95% CI
Constant	3.51	2.20	[-0.94, 7.96]
Mindfulness	.605**	.553**	[0.32, 0.89]
R^2	.306		
F	18.05***		
Δ R^2		.289	

***p <.001. **p <.01. N = 42

3.5 Relationship between Acceptance and Positive Mental Health

In order to determine to which extent scores of acceptance predict scores of positive mental health a second simple linear regression was calculated. No linear relationship between the variable of acceptance and positive mental health was found (F(1, 41) = 2.87, p = .098). A R^2 of 0.065 was found, indicating that acceptance accounted for 6.5% of variance in positive mental health, which can be considered as low effect. The unstandardized slope (β = .272) and standardized slope (β = .160) were both not significantly different from 0; t (41) = 1.693, p = .098, while the intercept (B = 8.85) was found to be significantly different from 0; t (41) = 4.479, p < 0.001. Table 6 summarizes these results.

Table 6

Effect of Mindfulness on Positive Mental Health

		Positive mental Health	
Variable	Model 1 B	B	95% CI
Constant	8.85***	1.98	[4.86, 12.84]
Acceptance	.272	.160	[-0.052, 0.596]
R^2	.065		
F	2.87		
ΔR^2		.043	

***p <.001. N = 42

4. DISCUSSION

This study set out to evaluate the effectiveness of the ACT-based group intervention *Living to the Full* (Bohlmeijer & Hulsbergen, 2008) for the psychological treatment of military servicemen. In general, the findings highlight the effectiveness of the intervention, indicating psychological benefits in terms of positive mental health, anxiety-related symptoms and negative self-thoughts. It can furthermore be noted that core processes of ACT, including mindfulness and acceptance increased in the course of the training and a relationship between the process of mindfulness and positive mental health was found, with mindfulness scores predicting positive mental health outcomes. Contrary to this finding, no relation between the process of acceptance and positive mental health was found.

Some of the findings regarding psychological outcome measures merit particular attention. Prior studies appear to be in line with the finding that attending the intervention leads to psychological benefits, showing the effect of *Living to the Full* in reducing psychological distress (Bohlmeijer et al., 2011; Fledderus et al., 2013; Fledderus, Bohlmeijer, et al., 2012). Further consideration of the effect sizes makes clear that the impact of the intervention was especially high on outcomes of anxious symptomatology (Cohen's d = 1.27) and comparatively low on outcomes of negative self-thoughts (Cohen's d = 0.35). From a theoretical point of view, this discrepancy can be interpreted as reflection of the overall aspiration of ACT, which can be described as decreasing psychological symptoms without directly disputing negative cognitions itself or changing their content.

The strong effect of the group program on outcomes of positive mental health (Cohen's d = -1.02) underlines the potential of *Living to the Full* to promote flourishing, and concurs with results of previous research, which revealed a noticeable increase of positive mental health as effect of the intervention (Bohlmeijer et al., 2015; Fledderus, Bohlmeijer, et al., 2012; Fledderus et al., 2010). Transferring above named findings to the two-continua model (Westerhof & Keyes, 2010), stating that an increase in mental health leads to a

decrease in psychopathology and vice versa, allows the conclusion that both dimensions of the model were affected in the course of the intervention: positive mental health increased while symptoms of psychopathology decreased. The potential to alleviate psychological distress by promoting positive mental health underlines the importance of this key component, with previous research supporting this idea by assigning positive mental health a crucial role for impending the occurrence of psychological symptomatology (Keyes et al., 2010; Lamers et al., 2015; Wood & Joseph, 2010). Following up on this, Biglan et al. (2008) present several implications for practice, emphasizing the potential of ACT for preventive interventions (Biglan et al., 2008). Keeping the preventive potential of positive mental health in mind, psychological training aimed to promote flourishing might not just avoid mental illness and personal suffering for the individual but also reduce costs and workload in the (military) health care sector in the long run, since more complex and resource-consuming disorders might be avoided.

Certain findings regarding the core processes, mindfulness and acceptance, also deserve further exploration. In terms of mindfulness, the effect of the intervention was certainly high (Cohen's d = 1.25), confirming previous deductions by Fledderus, Bohlmeijer, et al. (2012) who investigated the effect of *Living to the Full* among a sample of Dutch participants with mild to moderate symptomatology, and also concluded moderate to high effect sizes for different facets of mindfulness (Cohen's d = 0.52 – 0.91). These findings suggest the capability of the intervention to promote mindfulness in general as well as for military servicemen. Additionally, regression analysis in the present study suggests a relationship between mindfulness and positive mental health. Carmody and Baer (2008) suggest a similar importance of mindfulness, revealing it to be associated with improvement in psychological functioning. Taking into account these insights of the role of mindfulness, the practical value of mindfulness-based interventions becomes obvious. Based on this, offering mindfulness trainings to each individual and making it a part of military servicemen's

skill repertoire may lead to positive effects on psychological health and potentially to a decrease of mental distress. In this context, mindfulness is especially useful as it is easy to acquire, to practice and can be applied at home as well as during deployments.

Focusing on the process outcome of acceptance an improvement due to the intervention can be concluded, which is in line with previous research, showing the effect of *Living to the Full* on acceptance, and underlining the mediating role of acceptance for the effect of the intervention (Bohlmeijer et al., 2011). However, taking this into account, it appears perplexing that regression analysis revealed no relationship between acceptance and positive mental health in the present study. Speculating on this finding, a possible explanation might be that the process of acceptance does not exert direct influence on positive mental health. Instead, *Living to the Full* might promote the process of acceptance by improving the ability to recognize negative experiences without blundering into cognitive exertion, which afterwards reduces the tendency to exercise experiential avoidance. This again might create psychological and mental freedom to lead an engaged life, which ultimately increases positive mental health. Although this line of thought presumes a complex interaction of core processes and is purely speculative, it fits into the theoretical framework of ACT, stating that engaged living is the main step towards a meaningful life and the process of acceptance rather embodies a means to an end on the way to positive mental health, as it supports to break away from cognitive entanglement and paves the way towards value-based behavior and committed action (Hayes, 2004; Hayes et al., 2006).

Taking into account weaker components of the study, several limitations arise, particularly from a methodological point of view. First of all, the small sample size should be noted, potentially upsetting the generalizability of the present findings. Secondly, a control group was missing and with this the opportunity to compare the effect of the intervention to a treatment as usual or non-treatment group. This makes it difficult to evaluate the pure effect of the intervention, as other factors possibly affecting positive mental health were not

considered. Thirdly, no follow-up measurement was applied in the course of the research, making it impossible to evaluate the effects of the intervention in the long term. Fourthly, solely process measures of mindfulness and acceptance were included, while the processes of committed action and values were not assessed, making it impossible to obtain a complete picture regarding working mechanisms.

Based on the context of the findings and on above named limitations a number of recommendations and opportunities for future research can be noted. So far, the current research is the first study evaluating the effectiveness of an ACT-based group intervention for the psychological treatment of servicemen, revealing promising results and giving new prospects for military health care. However, future research should focus on an evaluation of the intervention in a wider and more generalizable sample to potentially confirm the findings presented in this study and create a statistically more solid foundation. Furthermore, future research should include more measurement points, for example each week after every session, to estimate changes in core processes more precisely. In this way, it could be observed which process gets affected at which point of the training, which allows a more diversified view on which processes eventually influence positive mental health and via which pathways. Another possibility for future research includes the development of a specific measurement, assessing risk criteria for those servicemen being at risk to develop psychological issues. This would support the systematic screening and early detection of high-risk individuals and the intervention could be offered in advance to those servicemen in order to prevent mental issues in the long run. Finally, *Living to the Full* could be offered as online-intervention for servicemen, as previous research shows promising findings regarding the treatment of psychological symptoms in the context of internet delivered psychological help (Pots et al., 2015; Trompetter et al., 2015).

Altogether, it can be concluded that this study, despite several limitations, presents promising findings for the psychological treatment of servicemen and gives new insights into

military health care. The present study can be seen as pilot study, while future research is necessary to evaluate the effectiveness of the intervention for the treatment of military servicemen within a larger sample and using a methodologically more refined design.

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