Psychological Flexibility and Functioning:

Three independent studies

Inaugural Dissertation

submitted in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

to the Department of Psychology

of the University of Basel

by

Hanna Paulina Wersebe

From Hamburg, Germany

Basel, 2017

UNI
BASEL

Approved by the Department of Psychology

At the request of

Prof. Dr. Andrew Gloster (Referee)

Prof. Dr. Roselind Lieb (Coreferee)

Basel, _____

Prof. Dr. Roselind Lieb (Dean)

UNI
BASEL

Declaration of Authorship

I, Hanna Wersebe (born December 28, 1983), hereby declare the following:

(i) My cumulative dissertation is based on three manuscripts, of which two are published and one is in preparation. I have contributed independently and substantially to this dissertation without any assistance from third parties not indicated.

(ii) I used only the resources indicated.

(iii) I cited all references.

Basel, November 2017

Hanna Wersebe

Acknowledgments

First and foremost, I would like to thank my supervisors, Professors Andrew Gloster and Roselind Lieb, for sharing their scientific expertise and precious support throughout the 4 years of this dissertation. I would like to thank Andrew Gloster for his advice and feedback, and for teaching me exacting research skills. Thank you for sharing your passion for acceptance and commitment therapy. Thank you very much to Roselind Lieb, for stimulating and challenging questions, for your feedback on earlier drafts of my manuscripts, and for always having an open door.

I would like to thank my dissertation committee for the straightforward process, Roselind Lieb and Andrew Gloster for writing a review of this dissertation, and Rolf-Dieter Stieglitz for serving as the head of the committee.

I want to thank Rolf-Dieter Stieglitz for offering me a position at the university psychiatry clinic, which enabled me not only to fund the last year of my PhD but also to gain valuable clinical experience. I am also grateful to my UPK colleagues for the stimulating and warm working environment and understanding.

Furthermore, I am grateful to all my colleagues of the Division of Clinical Psychology and Epidemiology; Division of Clinical Psychology and Psychiatry, and Division of Intervention Science for their support and for contributing to a friendly working environment. Andrea Meyer offered statistical consulting second to none. Thank you so much for your patience, help, and advice. I am also grateful to Catherine Coste, for her support on daily matters for 3 years of the project, for organizing little and big things on a daily basis, and for her caring nature. I would also like to express my gratitude to my coauthors for giving valuable feedback on the three manuscripts.

Warm thanks to the University of Basel antelope@university program and the 2016 cohort. I would like to thank Dr. Andrea Bauer and Patricia Zweifel for organizing the stimulating and helpful workshops, trainings, coachings, and expert exchange.

Importantly, I would like to express my genuine and warm gratitude to my friends and colleagues who gave me critical feedback on earlier versions of this dissertation or helped me in other ways: Hannes Bitto, Dr. Lavinia Flückiger, Dr. Cornelia Witthauer, Dr. Dirk Bandilla, Patrizia Hofer, Dr. Eva Unternährer—and Anita Todd for proofreading. I would like to thank my former colleagues and now dear friends Cornelia Witthauer and Lavinia Flückiger for their loyal support and discussions.

My friends in Switzerland and abroad aided and supported me in many ways. I am very grateful for their support and encouragement despite distance. Thanks to Dr. Karin Madlener for her spontaneous friendship and academic and pragmatic advice during coffee breaks and lunches. Big thanks to Dirk for his emotional and practical support during the last weeks of writing this dissertation.

Above all, words cannot express my gratitude to my family—my parents, grandparents, and my sister and her daughter. Thank you for always supporting me. In particular, I want thank my mom, for listening to my endless periods of frustration and worries over the last years, and for always being there for me.

Table of Contents

Abbreviations

ACT	Acceptance and commitment therapy
APA	American Psychiatric Association
CBT	Cognitive behavioral therapy
DSM-IV	*Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*
DSM-5	*Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*
FU	Follow-up
LGM	Latent growth model
LMM	Linear mixed model
MDD	Major depressive disorder
MHC-SF	Mental Health Continuum Short Form
OESQ	Open and Engagement State Questionnaire
PAS	Panic and Agoraphobia Scale
PD/A	Panic disorder with or without agoraphobia
PF	Psychological flexibility
PSS	Perceived Stress Scale
SCID	Structured Clinical Interview for *DSM- IV* Axis I Disorders
SP	Social phobia
VLQ	Valued Living Questionnaire
WHO	World Health Organization
WHODAS	World Health Organization Disability Assessment Schedule

Abstract in English

Background: Mental disorders and stress have implications for individuals' functioning, well-being, and symptom burden. One treatment that aims to facilitate functioning and well-being is acceptance and commitment therapy (ACT), which works by increasing psychological flexibility (PF) and valued behaviors. Still, little is known about specific changes in ACT processes (i.e., in PF and valued behaviors) and their association with functioning. This dissertation investigates the association of ACT processes with functioning. Also, it evaluates the links between symptom burden, ACT processes, and functioning.

Methods: Data from three independent studies were used: (1) n = 91 individuals with elevated levels of stress, (2) N = 41 patients with treatment-resistant panic disorder with or without agoraphobia, and (3) N= 118 individuals with major depressive disorder, N = 47 with social phobia. Participants reported on functioning, PF, valued behaviors, stress, and well-being.

Results: Changes in ACT processes were positively associated with changes in functioning during the interventions, but not after. Additionally, symptom burden was associated with ACT processes and functioning. Depending on their baseline levels, participants showed differential trajectories in valued action. Comorbidity between anxiety and depressive disorders was associated with lower well-being.

Discussion: The associations detected provide empirical support for the relationship between ACT processes and functioning. Findings further indicate that symptom burden is associated with valued behaviors and functioning.

Abstract in German

Hintergrund: Psychische Störungen und Stress haben Implikationen auf das Funktionsniveau, Wohlbefinden und die Symptombelastung von Individuen. Eine Intervention mit dem Ziel der Steigerung des Funktionsniveaus und Wohlbefindens ist die Akzeptanz- und Commitment Therapie (ACT). Diese arbeitet durch Erhöhung der Psychologischen Flexibilität (PF) und des wertgeleiteten Verhaltens. Derzeit ist wenig bekannt zu spezifischen ACT Prozessen (in Hinblick auf PF und weitergeleitetes Verhalten) in Verbindung mit dem Funktionsniveau. Diese Dissertation untersucht die Assoziation von ACT Prozessen mit dem Funktionsniveau. Darüber hinaus untersucht sie die Verbindung von Symptombeeinträchtigung, ACT Prozessen und dem Funktionsniveau.

Methode: Daten von drei verschiedenen Studien wurden verwendet: 1) *n*= 91 Individuen mit erhöhtem Stresslevel, 2) *N*=41 therapieresistente Patienten mit/ohne Agoraphobie, 3) *N*=118 Individuen mit Major Depression und *N*=47 mit Sozialer Phobie. Teilnehmer gaben Auskunft zum Funktionsniveau, zur Psychologischen Flexibilität, zum wertegeleiteten Verhalten, Stress und Wohlbefinden.

Resultate: Veränderungen in ACT Prozessen waren positiv mit Veränderungen im Funktionsniveau während der Intervention assoziiert, jedoch nicht nach der Intervention. Darüber hinaus war die Symptombeeinträchtigung assoziiert mit ACT Prozessen und dem Funktionsniveau. Abhängig von Anfangswerten in Symptomatologie zeigten Patienten unterschiedliche Veränderungsverläufe im wertegeleiteten Handeln. Komorbidität zwischen Angststörung und Depression war mit niedrigerem Wohlbefinden assoziiert.

Diskussion: Die gefundenen Assoziationen unterstützen empirisch den Zusammenhang zwischen ACT Prozessen und dem Funktionsniveau. Die Ergebnisse weisen außerdem darauf hin, dass die Symptombeeinträchtigung mit wertgeleitetem Verhalten und dem Funktionsniveau assoziiert sind.

Introduction

Mental disorders and symptoms of stress are associated with social and financial burdens worldwide (Batelaan et al., 2007; Kalia, 2002; Smit et al., 2006; Wittchen, Nelson, & Lachner, 1998). Thirty percent of the American population (American Psychiatric Association [APA], 2007) and 20% of the working population in Switzerland (Bundesamt für Statistik, 2012) have reported having stress on a daily basis. In addition, approximately every third person worldwide experiences a mental health problem at some point in his or her life (Kessler et al., 2009). Among the most prevalent mental disorders are anxiety and depressive disorders (Kessler, Chiu, Demler, & Walters, 2005). In Europe, the 12-month prevalence rate is about 14% for anxiety, with 61.5 million individuals affected, and 6.9% for depression, with 30.3 million affected (Wittchen et al., 2011).

In terms of implications for functioning, research has shown that individuals with anxiety and depression face disruptions and impairments in daily life (Adams, Balbuena, Meng, & Asmundson, 2016; Erwin, Heimberg, Juster, & Mindlin, 2002). That is, symptoms of a mental disorder disrupt family life and home responsibilities, social life and activities, and life at school or at work (Fehm, Pelissolo, Furmark, & Wittchen, 2005; Simon et al., 2000; Stein & Kean, 2000). At the same time, individuals' well-being is compromised (Rapaport, Clary, Fayyad, & Endicott, 2005).

Difficulties are even more pronounced in individuals with more than one disorder at the same time, as several community studies (Jacobi et al., 2004; Kessler, Stang, Wittchen, Stein, & Walters, 1999; F. Lamers et al., 2011) have demonstrated. This so-called comorbidity is related to higher symptom burden (Jacobi et al., 2004; Wittchen et al., 2011) and increased impairment in comparison to having a single mental disorder (Kessler, DuPont, Berglund, & Wittchen, 1999). Because treatment strategies could be different in individuals with comorbidity in comparison to a single disorder (Lieb, Meinlschmidt, & Araya, 2007),

knowledge of the association between comorbidity and functioning could inform treatment and thus contribute to the reduction of the burden.

One intervention that is thought to fit well with cultivating functioning and well-being is acceptance and commitment therapy (ACT), a behavior therapy that aims at increasing psychological flexibility (PF) by means of behavior changes aligned with personal values (S. C. Hayes et al., 2006). In ACT, patients learn to live in line with their values, a process referred to as valued behaviors (Dahl, 2015; S.C. Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

A line of evidence suggests that PF and valued behaviors, two ACT processes, increase during treatment, and these increases are connected to improved functioning (Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012; Fledderus, Bohlmeijer, Smit, & Westerhof, 2010; Vowles & McCracken, 2008). Some studies have examined changes in PF and functioning, focusing on changes during the intervention (i.e., preintervention to postintervention; e.g. Brinkborg, Michanek, Hesser, & Berglund, 2011) or from preintervention to follow-up (FU; McCracken & Gutiérrez-Martínez, 2011; Scott, Yu, & McCracken, 2016; Vowles & McCracken, 2008) but not on changes only after the intervention, that is, from postintervention to FU. Yet, changes that occur between posintervention and FU are a crucial indicator of the success and maintenance of treatment gains after the intervention. Thus, to further complement existing knowledge on the association of changes in PF and functioning, it is necessary to include the time period of postintervention to FU in the analyses.

Another point of interest is the association between valued behaviors and baseline factors. One such baseline factor could be the symptom burden. Although intervention studies have shown that valued behaviors increase during treatment, it is not yet known if such changes are associated with symptom burden at baseline. Investigating the role of symptom

burden could help in determining trajectories in treatment (Cuijpers, van Lier, van Straten, & Donker, 2005).

To summarize, it is important to gain more detailed insight into the association between ACT processes and functioning on the one hand and on the role of symptom burden in ACT processes and functioning on the other. This may provide a better understanding of treatment processes and might ultimately lead to treatment refinement.

Therefore, my objective in this dissertation is to examine (1) the association between ACT processes and functioning and (2) the association between symptom burden and ACT processes and functioning. This dissertation includes three manuscripts (see Appendices A–C). Concerning the first objective, in Manuscripts 1 and 2, my coauthors and I analyzed the association between changes in PF and valued behaviors and changes in functioning: In Manuscript 1 we focused on the relationship between changes in PF and changes in functioning, expressed with stress and well-being. In Manuscript 2 we addressed the association between changes in valued behaviors and changes in functioning. With respect to the second objective, in Manuscripts 2 and 3, we addressed the role of symptom burden: In Manuscript 2 we examined symptom burden in relation to changes in valued behaviors over the course of the intervention. In Manuscript 3 we addressed the role of comorbidity in well-being.

This dissertation is organized as follows: In the section on theoretical background I introduce the theoretical concepts that are relevant to the manuscripts. This is followed by a section outlining the overall research questions of this dissertation and the specific research questions of the three manuscripts. The methods section describes the methodology and the results section summarizes the major results. Last, in the discussion I consider the implications, strengths, and limitations of this research and provide an outlook for the future.

Theoretical Background

Functioning

For the purpose of this dissertation, the term functioning refers to an overall construct covering functioning in a narrower sense, plus well-being and stress, as described in more detail in the following.

Functioning. Functioning in a narrower sense describes a person's body system, body structures, and activities and participation (Stucki, 2005; World Health Organization, 2002). Body system and structures refer to physiologic functions and anatomic parts; activities and participation refer to task executions in general life situations. Furthermore, contextual factors are taken into account. For instance, a person with a mental disorder may face a lack of support systems (i.e. barriers) or the presence thereof (i.e. facilitators).

Well-being. Well-being can be subdivided into emotional, psychological, and social well-being (Keyes, 2005). Emotional well-being involves the presence of positive affect and happiness, as well as a positive evaluation of life satisfaction. Psychological well-being includes components such as self-acceptance, environmental mastery, and positive relations with others. Social well-being refers to components such as social contribution, social integration, and social acceptance. Emotional, psychological, and social well-being make up the definition of positive mental health (Keyes, 2005). Positive mental health or well-being constitutes one part of the two-continua model of mental health that states that positive mental health is related to, but different from, mental illness (Keyes, 2005). According to the model, psychopathology and positive mental health can coexist and reflect two related continua. The model implies that an individual experiencing symptoms of psychopathology has a higher chance of experiencing low well-being, such as fewer positive emotions. Several studies have evaluated implications of this two-continua model and findings have consistently supported the model and shown that well-being is linked to better physical health, less health care usage, and improved work performance (Keyes & Grzywacz, 2005; Lamers, Westerhof, Glas, &

Bohlmeijer, 2015; Lyons, Huebner, & Hills, 2013). Recent studies have established an association of well-being and psychopathology in that higher well-being is linked to reduced mental illness (Keyes, Dhingra, & Simoes, 2010) and lower well-being is linked to increases in psychopathology (Grant, Guille, & Sen, 2013; Wood & Joseph, 2010). For instance, changes in well-being were associated with the prevalence and incidence of major depressive disorder, panic disorder, and generalized anxiety disorder 10 years later (Keyes et al., 2010) and individuals with low levels of well-being had a substantially higher likelihood of being depressed 10 years later (Wood & Joseph, 2010).

Stress. Stress can be defined as a two-way process involving stressors in the environment and the response of an individual to these stressors (Lazarus, 1974). Two factors are related to the response to stress: the threat potential of the stressor and the assessment of resources required to cope with the stressor. For an individual to assess resources, the stressor is categorized as being neutral, positive, or negative (Lazarus, 1974, 1992). Then, resources are appraised in terms of feelings related to coping with the stressor. A crucial aspect of the definition is that not only the stressful event and the quality thereof determine the response to the stressor but the personal and contextual factors as well.

Symptom Burden

Symptom burden can be described as the impact of symptoms on an individual (Cleeland, 2007). In the case of more than one disorder at a time (comorbidity; Wittchen, 1996b), symptoms from the disorders involved contribute to an overall symptom burden, yet not necessarily to the same extent. In this dissertation, the term symptom burden refers to an overall construct that consists of level of symptoms and comorbidity.

Level of symptoms. The level of symptoms is one of the most crucial criteria to quantify disorders. For instance, in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (*DSM-5*) criteria for depressive disorders, “severity is based on the number of criterion symptoms [and] the severity of those symptoms” (APA, 2013). These

criteria belong to the episode specifiers and provide clinicians and researchers with the ability to classify episodes as mild, moderate, or severe. As such, the number and/or level of symptoms a person experiences dictates the severity of the depressive or any other mental disorder.

Comorbidity. Comorbidity in clinical and epidemiological research is defined as "the presence of more than one disorder in a person in a defined period of time" (Wittchen & Essau, 1993, p.7). Disorders can occur at the same time or at different time intervals, such as within 12 months or over the life-span (Brown & Barlow, 1992; Lieb, Schreier, & Müller, 2003). Both clinical (Fava et al., 2008) and cohort (Kessler et al., 2003; F. Lamers et al., 2011) studies have shown high comorbidity rates between depressive and anxiety disorders.

Acceptance and Commitment Therapy and Psychological Flexibility

ACT is a cognitive behavioral therapy (CBT) with the central goal of increasing PF (Arch, Craske, & Angeles, 2008; S. C. Hayes et al., 2006). PF is the ability to adapt to a variety of different situational demands when doing so is useful for living a meaningful life (S. C. Hayes et al., 2006). PF consists of two core aspects: (1) mindfulness and acceptance processes and (2) commitment and behavior change processes (Fletcher & Hayes, 2005). These core processes play a role in various problems and disorders, for instance, weight problems (Forman, Butryn, Manasse, & Bradley, 2015; Gregg, Lillis, & Schmidt, 2015), depression (Zettle, 2015), and anxiety disorders (Landy, Schneider, & Arch, 2015), as PF aims to promote generic skills and is inherently transdiagnostic (e.g. Dindo, Liew, & Arch, 2017). A growing body of literature has indicated that PF can be promoted successfully, and the theoretical underpinnings of this research are reviewed in a separate paragraph below.

Valued action as a component of PF. Values can be defined as directions in life that guide one's behavior (Wilson, Sandoz, Kitchens, & Roberts, 2010). Value work is an integral part of ACT to foster PF. Clinically, patients are encouraged to clarify the *importance* of a number of life domains (e.g., family, intimate relationships, education, recreation, work, etc.;

Dahl, 2015). The degree to which a person lives in accordance with her or his values is defined as *valued action*, one of the components of the PF model (S.C. Hayes et al., 2006). Working with values in a therapeutic setting often reveals that patients do not live in line with their stated values. This can yield a discrepancy between the importance of patients' life domains and how closely their actions accord with their values (valued action), which is referred to as the *valued living discrepancy* (the discrepancy between *importance* and *valued action*). Research has indicated that patients engage in less valued action compared to healthy counterparts (Michelson, Lee, Orsillo, & Roemer, 2011). In the present dissertation, *importance, valued action,* and *valued living discrepancy* are summarized as valued behaviors and are, together with the overall construct of PF, treated as ACT processes.

Changes in PF. Numerous intervention studies have consistently demonstrated that PF can be promoted (e.g., Fledderus, Bohlmeijer, Fox, Schreurs, & Spinhoven, 2013; Fledderus et al., 2012) through different modes of ACT interventions, such as face-to-face therapy (e.g. Gloster et al., 2015), Web-based therapy (Lappalainen, Langrial, Oinas-Kukkonen, Tolvanen, & Lappalainen, 2015; Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016; Trompetter, Bohlmeijer, Lamers, & Schreurs, 2016), or self-help books (Fledderus et al., 2013). Recent work reported that PF changes equally positively in "stuck" populations, such as treatment-resistant patients (Clarke, Kingston, Wilson, Bolderston, & Remington, 2012; Gloster et al., 2015) and patients with chronic pain (McCracken & Velleman, 2010; Vowles & McCracken, 2010). Alike, research has established increases in PF in individuals with elevated levels of stress (Brinkborg et al., 2011; Hofer et al., 2017).

Changes in valued behaviors. Intervention studies with patients with chronic pain (McCracken & Gutiérrez-Martínez, 2011; Vowles & McCracken, 2008) and generalized anxiety disorder reported changes in valued action over the course of the intervention (Hayes, Orsillo, & Roemer, 2010; Michelson et al., 2011). In contrast, an FU intervention study reported the maintenance of valued living discrepancy between a 3-month FU and a 3-year

FU (Vowles, McCracken, & O'Brien, 2011). To date, no data have been reported on changes in the facet importance.

Level of symptoms and changes in valued behaviors. Although research has demonstrated that valued behaviors change, to my knowledge it has not yet been determined whether such changes are linked to baseline factors such as levels of symptoms. Intervention studies investigating patterns of changes in symptomatology have shown that depending on their baseline symptom level, patients followed different trajectories in symptom change (Cuijpers et al., 2005; Lutz et al., 2014). These studies focused on the same variables, for example, initial level of symptoms in depression and decrease in depression due to treatment. To date, little attention has been paid to the initial level of symptoms (i.e., at baseline) and its relationship to changes in other variables, for instance, valued behaviors. Identifying the association between level of symptoms at baseline and changes in valued behaviors would be useful, as research has indicated that valued behaviors promote well-being and buffer against stress (e.g., Dahl, 2015). Such an investigation could provide a clearer picture of how valued behaviors might be promoted, with potential implications for the design of interventions.

Comorbidity and well-being. Research has shown that comorbidity between mental disorders, particularly anxiety and depression, is very common (Adams et al., 2016; F. Lamers et al., 2011; Ohayon & Schatzberg, 2010) and is associated with slower recovery (Brown, Schulberg, Madonia, Shear, & Houck, 1996), greater impairment (Erwin et al., 2002; Ohayon & Schatzberg, 2010), and increased health care utilization (Hämäläinen, Isometsä, Sihvo, Prikola, & Kiviruusu, 2012; McLaughlin, Khandker, Kruzikas, & Tummala, 2006). It has been established that anxiety–depression comorbidity is linked to lower quality of life (Rapaport et al., 2005; Saarni et al., 2007; Zhou et al., 2017), a related albeit broader construct in comparison to well-being (Pinto, Fumincelli, Mazzo, Caldeira, & Martins, 2017). Yet evidence remains unclear and no study has shed light on the role of well-being in anxiety–

depression comorbidity. Work in this area could improve current interventions and halt individuals' progression into potentially diminished well-being.

PF and Functioning

Intervention studies have established associations between PF and functioning in different populations. Research in patients with chronic pain has shown positive links between functioning and PF (e.g., Scott, Hann, & McCracken, 2016; Vowles & McCracken, 2010; Vowles et al., 2011). Some of these studies in patients with chronic pain (e.g. McCracken et al., 2015; Vowles et al., 2011) and in social workers with elevated stress levels (Brinkborg et al., 2011) examined changes in PF during treatment (i.e., preintervention to postintervention) in relation to changes in functioning during the same time period. Findings consistently revealed meaningful associations. Other intervention studies examined changes in PF in relation to changes in functioning over the entire course of the study (i.e., preintervention to FU; e.g., Vowles & McCracken, 2010). Such analysis over long-term are less detailed compared to those examining shorter time intervals. In addition, changes that occur in the time frame after an intervention (i.e., between postintervention and FU) are a crucial indicator of the success and maintenance of treatment gains after the intervention. To date no study has examined the association of changes in PF and functioning both during and after an intervention. Such an analysis could determine whether changes in PF during an intervention are related to changes in functioning (i.e., stress and well-being) after the intervention. The knowledge gained by studying these changes might determine whether ACT treatment-related change processes (i.e., PF) are in line with changes in functioning, as assumed by ACT.

Valued Behaviors and Functioning

Research to date has established an association of valued action with functioning (McCracken et al., 2015; McCracken & Jones, 2012; McCracken & Velleman, 2010; McCracken & Vowles, 2007; McCracken & Yang, 2006, 2008; Scott, Yu, & McCracken,

2016; Vowles & McCracken, 2008), although many studies were based on cross-sectional survey data (McCracken & Vowles, 2007; McCracken & Yang, 2006, 2008) and thus provide only a snapshot of the association. Moreover, as reported above for the association of PF with functioning, some intervention studies (e.g., Scott, Yu, & McCracken, 2016; Vowles & McCracken, 2008) examined changes in valued behaviors during an intervention (i.e., preintervention to postintervention) in relation to changes in functioning in the same time period. Others examined changes in valued behaviors during an intervention in relation to changes in functioning over a longer period, from preintervention to FU (Scott, Hann, & McCracken, 2016; Vowles & McCracken, 2008; Vowles et al., 2011). However, investigating changes over the specific period of postintervention to FU has not been the focus of research to date. Thus an investigation of valued behaviors and functioning during and after an intervention would offer more detailed insights into this association. This information might be relevant for treatment refinement.

Research Questions

Two main research questions emerge from the background presented above:

1. Are ACT processes associated with functioning over time?
2. How is symptom burden associated with ACT processes and functioning?

These questions are differentiated in the accompanying manuscripts (see Appendices A–C) as follows:

Manuscript 1: The Link Between Stress, Well-Being, and Psychological Flexibility During an Acceptance and Commitment Therapy Self-Help Intervention (published in the *International Journal of Clinical and Health Psychology*)

- Are changes in PF during the intervention associated with increases in well-being and decreases in stress during and after the intervention?

Manuscript 2: Changes in Valued Behaviors and Functioning in an Acceptance and Commitment Therapy Intervention (published in the *Journal of Contextual Behavioral Science*)

- Are increases in valued behaviors associated with increases in functioning?
- Are initial baseline panic symptoms associated with an increase in valued behaviors?

Manuscript 3: Well-Being in Adults With and Without Major Depression and Social Phobia (in preparation)

- Is comorbidity associated with lower well-being?

Methods

This section provides an overview of study design, sample characteristics, and methods applied in the three independent studies presented in the three manuscripts. While Manuscripts 1 and 2 used longitudinal data, Manuscript 3 used cross-sectional data. Detailed descriptions of each study are given in the respective manuscripts, which can be found in Appendices A–C.

Design and Sample Characteristics

_____**Manuscript 1.** Data were collected in a randomized controlled trial comparing an ACT group to a waiting-list control group (Hofer et al., 2017). The sample consisted of N = 133 individuals, of which n = 91 were included in our analyses as they had filled out the weekly measure of PF required for this analysis. Individuals were recruited via a newsletter of a German health insurance company, and consisted of various backgrounds with different occupations. Participants were eligible if they had an elevated stress score of 17 or more on the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) to ensure that they had at least a moderate or greater stress level. This value of 17 was previously used by other authors (e.g., Brinkborg et al., 2011) and was shown to be the mean of a normative adult population (Cohen & Janicki-Deverts, 2012). Participants also had to be between 18 and 65

years old. Exclusion criteria were suicidal intent or current participation in psychotherapy treatment. Included participants read the self-help book *Burnout: mit Akzeptanz und Achtsamkeit den Teufelskreis durchbrechen* (*Burnout: Break the Vicious Cycle with Acceptance and Mindfulness*; Waadt & Acker, 2013) within 6 weeks and were assessed at baseline, at 6 weeks postintervention and at 3 months (FU).

_____**Manuscript 2.** Forty-one patients with a primary *DSM-IV* (APA, 1994) diagnosis of panic disorder with or without agoraphobia (PD/A) were included in this study conducted in Germany. Participants were recruited from a sample used in a prior randomized controlled trial study on the effects of exposure-based CBT in which they had insufficient improvement (for details see Gloster et al., 2015). These treatment-resistant patients underwent an ACT intervention administered twice a week for 4 weeks. FU took place after 6 months. Inclusion criteria were prior psychotherapy with ≥ 20 sessions of empirically supported treatments (e.g., CBT and/or pharmacotherapy), a diagnosis of PD/A, and age between 18 and 65 years. Exclusion criteria consisted of current psychotherapy, suicidal intent, and diagnoses of substance dependence or bipolar, psychotic, or eating disorders.

_____**Manuscript 3.** Participants were part of an intensive, quasi-experimental study examining symptom fluctuations and memories thereof by means of an event-sampling methodology (for details, see Gloster et al., 2017). They were recruited through leaflets, Internet advertisements, and multiple (university) clinics in Germany and Switzerland. The sample sizes were N = 118 with major depressive disorder (MDD), N=47 with social phobia (SP), and N=119 with neither MDD nor SP (controls). For comparative purposes across participant groups, the clinical groups were subdivided on the basis of comorbidity: MDD (n=74 with comorbid anxiety disorders; n=44 without comorbidity) and SP (n= 9 with comorbid depressive disorders and n=38 without comorbidity). Anxiety disorders included SP, specific phobias, PD/A, and generalized anxiety disorder. Depressive disorders included MDD (single episode or recurrent) and dysthymic disorder. Participants across the three

groups were matched by age and sex. A further inclusion criterion was age between 18 and 65 years. Exclusion criteria were active current suicidal intent and substance dependence.

Measures

All three manuscripts are based on (self-reported) questionnaire data.

Functioning: Functioning, well-being, and stress. Functioning in a narrower sense, well-being, and stress were considered as measures of overall functioning. In Manuscript 2, functioning was assessed with the World Health Organization Disability Assessment Schedule (WHODAS 2.0; Üstün, Kostanjsek, Chatterji, & Rehm, 2010). The WHODAS 2.0 contains 36 items to assess the degree of difficulty respondents experienced over the last 30 days in the following six life domains: cognition, mobility, self-care, getting along, life activities, and participation. Validation studies with individuals with depression and pain disorders demonstrated good reliability scores (Garin et al., 2010; Üstün et al., 2010).

Well-being was assessed via the Mental Health Continuum—Short Form (MHC-SF; Keyes, 2005) in Manuscripts 1 and 3. The MHC-SF is a 14-item questionnaire that measures well-being, including the subcomponents emotional (3 items), social (5 items), and psychological (6 items) well-being over the last month. The MHC-SF has good psychometric properties across different age groups and nations (S.M.A. Lamers et al., 2011; Westerhof & Keyes, 2010).

Stress was captured by means of the PSS (Cohen et al., 1983) in Manuscript 1. The PSS has 10 items to assess stress in certain situations and has demonstrated good validity and reliability (Cohen et al., 1983).

Symptom burden: Levels of symptoms and comorbidity. Level of symptoms and comorbidity were subsumed under symptom burden. In Manuscript 2, level of symptoms in panic symptomatology was assessed with the Panic and Agoraphobia Scale (PAS; Bandelow, 1995), a 13-item questionnaire that measures levels of panic symptoms, avoidance, anticipatory anxiety, disability, and worries about health. The PAS has demonstrated good

reliability and is sensitive to change (Bandelow, 1995; Gloster et al., 2011). The level of panic symptomatology (low, medium, and high) was determined by using a tertiary split at baseline.

Comorbidity in Manuscript 3 was determined with the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID; Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997). The SCID is a semistructured interview for making *DSM-IV* Axis I diagnoses. The interview is separated into different sections corresponding to categories of diagnoses. Sections begin with an entry question that allows the interviewer to skip the associated questions if criteria are not met. Symptoms are coded as present, subclinical, or absent. Studies on the psychometric properties of the SCID provided good reliabilities (Skre, Onstad, Torgersen, & Kringlen, 1991; Williams et al., 1991). Primary and comorbid diagnoses were differentiated via the Clinical Rating Scale (adapted: Unnewehr, Schneider, & Margraf, 1996).

ACT processes: PF and valued behaviors. In this dissertation, PF and valued behaviors (e.g. importance, valued action, and valued living discrepancy) were considered as measures of ACT processes. Two questionnaires were used to measure PF and valued behaviors in Manuscripts 1 and 2. PF was captured with the Open and Engagement State Questionnaire (OESQ, Benoy et al., 2017), which contains four items taking account of relevant PF processes (acceptance, defusion, present moment, self-as-context, values, and committed action). A study on the psychometric properties of the OESQ in patients with PD/A and individuals with burnout indicated good internal consistency (Benoy et al., 2017).

Valued behaviors were assessed with the Valued Living Questionnaire (VLQ; Wilson et al., 2010). Respondents rated how important it was to live in line with personal values and how consistently they did so during the last week in 10 different domains (family, marriage/couples/intimate relationships, parenting, friendship, work, education, recreation, spirituality, citizenship, and physical self-care). Psychometric properties of the VLQ are good (Wilson et al., 2010). Ratings were taken to calculate four scores: importance, valued action,

valued living composite, and valued living discrepancy. Details on the calculation of these scores can be found in Manuscript 2 (Appendix B).

Statistical Analyses

Data were analyzed in SPSS and Mplus (Muthén & Muthén, 2010). To examine whether changes in PF are related to increases in well-being and decreases in stress Manuscript 1 Research Question), we used latent growth curve models (LGMs; Heck & Thomas, 2015) in Mplus. LGMs are suitable for analyzing the nested structure of repeated measures data within a person and take advantage of the statistical power of analyzing multiple time points (Muthén & Curran, 1997). To further test whether increases in valued behaviors were linked to increases in functioning (Manuscript 2 Research Question), two-sided correlations in SPSS were calculated. For this correlation, difference scores (1) between preintervention and postintervention in valued behaviors and functioning and (2) between preintervention and postintervention in valued behaviors and postintervention and FU in functioning were calculated. Linear mixed models (LMMs) were used to test the association of initial panic symptoms at baseline and increases in valued action during the intervention (Manuscript 2 Research Question). The role of comorbidity in well-being of individuals with MDD or SP was tested via general linear models with orthogonal contrasts (Manuscript 3 Research Question).

Results

ACT Processes and Functioning Over Time

The first research question aimed to examine whether ACT processes are associated with functioning over time. During the intervention, we observed associations between ACT processes and functioning as reported in Manuscripts 1 and 2. After the intervention, we observed no associations. The results of both manuscripts are depicted in Table 1.

Table 1. Summary of results of ACT processes and functioning (based on Manuscripts 1 and 2)

Measure	Functioning	Overall well-being[a]	Stress
Change during the intervention			
PF	NA	✔	✔
Importance	✔	NA	NA
Valued action	✔	NA	NA
Valued living discrepancy	✗	NA	NA
Valued living composite	✗	NA	NA
Change after the intervention			
PF	NA	✗	✗
Importance	✗	NA	NA
Valued action	✗	NA	NA
Valued living discrepancy	✗	NA	NA
Valued living composite	✗	NA	NA

Note. ✔ = significant association; ✗ = nonsignificant association; NA = not analyzed
[a]Includes emotional, social, and psychological well-being

Well-being and stress. An increase in PF during the intervention was negatively associated with a decrease in stress and positively associated with an increase in overall well-being (including the three subcomponents emotional, social, and psychological well-being). An increase in PF during the intervention was associated with neither a decrease in stress nor an increase in overall well-being or any of the three subcomponents after the intervention.

Functioning. Among the valued behaviors examined, changes in importance and valued action were associated with functioning during the intervention. In contrast, for the facets valued living discrepancy and valued living composite, no association was observed. Changes in valued behaviors measured during the intervention were not related to functioning after the intervention.

Symptom Burden, ACT Processes, and Functioning

The second research question examined whether symptom burden is associated with ACT processes and functioning. Results from within- and between-group analyses in two studies (Manuscripts 2 and 3) are presented in the following.

Initial symptom level and valued behaviors. We observed an interaction between baseline panic symptomatology and valued action over the course of the study. Such an interaction was not found for importance, valued living composite, or valued living discrepancy. Initial levels of panic symptomatology (i.e., low, medium, and high) were associated with different trajectories in valued action. Whereas the high panic group increased, the low panic group decreased in valued action during the intervention and the medium panic group remained on a nearly constant level between preintervention and FU. Although trajectories were different depending on the preintervention panic symptomatology, all groups attained similar end points in valued action.

Comorbidity and well-being. Overall well-being, as well as emotional, social, and psychological well-being, was lower in individuals with a clinical diagnosis of MDD with comorbidity or SP with comorbidity compared to individuals with a single diagnosis of MDD or SP.

Discussion

This dissertation complements existing research by investigating the association between ACT processes and functioning and the role of symptom burden in this association. To gain better insight into how functioning, stress, well-being, and symptom burden are associated with ACT processes, three independent studies were conducted. First, increases in PF and valued behaviors were associated with increased functioning during but not after the interventions. Importantly, the two manuscripts based on longitudinal data yielded congruent findings. Second, symptom burden was associated with ACT processes and with lower functioning. Findings of this dissertation may be relevant for intervention research and treatment refinement.

ACT Processes and Implications for Functioning Over Time

The first research question addressed whether ACT processes are associated with functioning over time (Manuscripts 1 and 2).

Well-being and stress. Results indicated that increases in PF during the intervention were related to increases in well-being and decreases in stress during the ACT intervention (Manuscript 1). This is in line with one previous study (Brinkborg et al., 2011) that examined the relationship between PF and improvements in well-being and stress in a sample of social workers during an intervention. As such, we replicated these earlier findings with a more representative sample of individuals with heterogeneous occupations.

An increase in PF may serve as a promoter of well-being and a buffer of stress. This is in line with recent research finding that PF moderated the relationship between stress and mental health, implying that PF is a protective factor (Gloster, Meyer, & Lieb, 2016). Our findings also support earlier findings of PF being associated with increased well-being (Fledderus et al., 2010) and decreased stress (Flaxman & Bond, 2010; S.C. Hayes et al., 2004; Lloyd, Bond, & Flaxman, 2013). Thus, certain practical implications for interventions to help individuals improve their well-being and decrease their stress levels can be drawn: One target group may be staff of emergency services such as police officers, fire fighters, or paramedics: A majority of their work is performed under conditions of (acute) stress (Collins & Gibbs, 2003; Johnson et al., 2005; Lucas, Weidner, & Janisse, 2012), conditions that can detract from well-being in the long term. For instance, although police officers often employ active coping strategies (Biggam, Power, & MacDonald, 1997; Maran, Varetto, Zedda, & Ieraci, 2015), stress may exceed what they are capable of coping with effectively. Thus an early ACT prevention program for emergency staff in training may be beneficial to teach strategies for dealing with the everyday challenges in this job sector. Another target group could be refugees. Refugees encounter a variety of personal and socioeconomic stressors (Li, Liddell, & Nickerson, 2016; Steel, Dunlavy, Harding, & Theorell, 2017). To date, little ACT research has been undertaken in refugees (Fondacaro & Harder, 2014). However, studies have begun to adapt CBT treatment protocols to this sensitive target group (Hinton, Rivera, Hofmann, Barlow, & Otto, 2012) and have also indicated the therapeutic benefits of acceptance and

mindfulness approaches (Hinton, Pich, Hofmann, & Otto, 2013). Building on this research, it may be important to tailor targeted ACT interventions aiming at increasing well-being and decreasing stress for this population. This is important as an improvement in well-being can buffer against mental illness and disease later in life (Keyes et al., 2010; Lamers et al., 2015). Furthermore, well-being is linked to health care utilization, psychosocial adaption and functioning, and work productivity (Keyes, 2007; Keyes & Grzywacz, 2005). Beyond this practical relevance, findings support the theory that PF and well-being are strongly linked (Ciarrochi & Kashdan, 2013; S. C. Hayes, 2013).

Contrary to expectations, an increase in PF during the intervention was not associated with changes in well-being and stress after the intervention (i.e., between postintervention and FU). One explanation could be that participants during the intervention already presented positive associations between increases in PF and increases in outcomes (i.e., higher well-being and lower stress). In contrast, between postintervention and FU, further increases in outcomes did not occur at the same magnitude, rendering the association between increases in PF during the intervention and increases in outcomes after the intervention less strong. A further notion is that the underlying study design with the assessment of predictors (PF) and outcomes (well-being and stress) at two time points after the intervention (i.e., postintervention and FU) does not provide a detailed description of changes. Therefore it may be helpful to additionally measure outcomes (well-being and stress) at intermediate time points after the intervention (i.e., between postintervention and FU) to be able to associate these time intervals with those in changes in PF.

Functioning. Our findings showed that certain valued behaviors (i.e., importance, valued action) were associated with increases in functioning during the intervention. This in an important finding as one can view the importance of life domains and one's functioning as independent areas. Yet, everyone can experience moments in life during which they become especially aware of the importance of certain life domains, and they might not realize the

strong link to their functioning. Hence, people who register how meaningful they consider certain life domains report increased functioning at the same time. The same holds true for valued action: Starting to engage in behaviors that are aligned with one's values has clear implications for one's functioning. Our findings further underline associations of valued action and functioning reported in the field of chronic pain (Scott, Hann, et al., 2016; Vowles & McCracken, 2008). However, concerning the facets valued living discrepancy and valued living composite, changes in these facets were not associated with improved functioning. The valued living composite did not change over time, and therefore it was not surprising that it was not associated with changes in functioning. The findings regarding valued living discrepancy were unexpected, as one might suspect that individuals reporting lower discrepancy (between importance and valued action) as a result of treatment (see Manuscript 2) reported improved functioning at the same time. Since this relationship has not been tested previously, this may be an important issue for future research.

In sum, we extended prior findings of an association of valued behaviors and functioning, thus providing support for the theory (S. C. Hayes, 2012a) that valued behaviors—as part of the PF model—and functioning are strongly linked in a vulnerable group of treatment-resistant patients. Our findings might not only have implications for the population aged 18–65 years as in our study but also be applicable to other vulnerable groups, for instance, elderly people with mental disorders. They might equally benefit from promoting valued behaviors in order to improve functioning, as suggested by a prior study presenting the rationale of ACT for elderly people (Petkus & Wetherell, 2013).

Individuals' increases in valued behaviors during the intervention were not linked to increases in functioning after the intervention. These findings are in line with our finding that PF processes during the intervention were not associated with stress and well-being after the intervention as discussed above. It again suggests that measuring functioning at intermediate

time points between preintervention and postintervention and furthermore between postintervention and FU would be informative.

Symptom Burden and Its Implications for ACT Processes and Functioning

The second research question aimed to examine how symptom burden is associated with ACT processes and functioning (Manuscripts 2 and 3).

Valued behaviors. Results showed that baseline levels of panic symptoms were associated with an increase in valued action, whereas importance, valued living composite, and valued living discrepancy did not interact with preintervention panic symptomatology. Furthermore, we found that the three panic symptomatology groups (low, medium, and high determined at baseline) showed different trajectories in valued action. This finding corroborates previous intervention research (Cuijpers et al., 2005; Lutz et al., 2014) and suggests that there are subgroups that respond differently to treatment. Patients with low levels of symptomatology at baseline showed a decrease in their valued action. In contrast, the subgroup with high panic symptomatology at baseline improved the most over the entire course of the intervention (i.e., preintervention to FU). The subgroup with medium panic symptomatology increased slightly during the course of the intervention. All groups reached a similar end point at FU.

To the best of my knowledge, we were the first to examine baseline levels in symptomatology in relation to changes in valued behaviors. Specifically, this investigation provides a clearer picture of how valued action can be promoted, and as such our findings may have certain implications for treatment: Therapists should determine symptom levels at intake and be vigilant in identifying patients presenting low symptomology at baseline in order to prevent this group from decreasing in valued action. Perhaps, in contrast to what is appropriate for the high panic group, the emphasis should be a little less on value work, given that this group already tends to act in line with their values. The relative strength in valued action may perhaps strengthen other potential problem areas of the PF model (S.C. Hayes et

al., 2012b, p. 132), such as acceptance or defusion. Because the symptom burden is less pronounced in this group, individuals may be less motivated to change (McAleavey, Castonguay, & Goldfried, 2014). Therefore, it might be necessary to motivate patients, for example, by applying change talk from motivational interviewing as an add-on treatment component (Hettema, Steele, & Miller, 2005; Rubak, Sandboek, Lauritzen, & Christensen, 2005). It is possible that the three panic symptomatology groups show different change trajectories in other components of the PF model. For instance, patients with low panic also might profit slightly less from other domains in the PF model (e.g., acceptance) in comparison to high-panic patients who have more room to improve. This would need to be tested in future studies. By contrast, the subgroup with high panic symptomatology at baseline may have benefitted from the pronounced focus on values during the treatment and may have acted on those values.

In sum, our findings indicate that differential treatment planning in ACT may be necessary depending on baseline symptomatology. One relevant step might be to place distinct emphasis on components of the PF model depending on the problem areas presented by the patient to pave the way for the best possible changes. Further research is needed to investigate whether the trajectories we found in valued action can also be found in other patient groups with other symptomatology, for example, depression, or whether the trajectories are, for instance, associated with the high comorbidity rates in this sample (Gloster et al., 2015).

Well-being. Findings consistently demonstrated that comorbidity in individuals with a clinical diagnosis was associated with lower overall well-being as well as lower emotional, psychological, and social well-being. At first glance, these findings may appear relatively clear-cut given the presumably higher symptom burden in individuals with comorbidity. However, no study has examined the role of comorbidity in well-being yet. Our study aimed to fill this gap and several implications can be drawn from our findings: The burden of

comorbidity in anxiety and/or depression with decreased well-being may encourage individuals to engage in unhealthy risk behaviors such as smoking, binge drinking, and physical inactivity. Either disorder alone is linked to adverse health behaviors (e.g. Goodman & Whitaker, 2002; Sonntag, Wittchen, Höfler, Kessler, & Stein, 2000) that may be linked to decreased well-being. For instance, individuals with anxiety disorders (Bolton, Cox, Clara, & Sareen, 2006; Menary, Kushner, Maurer, & Thuras, 2011; Robinson, Sareen, Cox, & Bolton, 2009) and mood disorders (Bolton, Robinson, & Sareen, 2009; Crum et al., 2013) frequently engage in self-medication behaviors, the "attempt to medicate themselves for a range of psychiatric problems and painful emotional states" (Khantzian, 1985). Self-medication includes the use of alcohol and drugs to attenuate anxiety (Robinson et al., 2009), suggesting that this might even be more pronounced in individuals with comorbidity and lower well-being. Concerning comorbidity, the number of mental disorders is strongly related to an increased risk of onset of substance use (Merikangas et al., 1998; Swendsen et al., 2010). Moreover, research showed that anxiety–depression comorbidity is also associated with high avoidance rates (Ottenbreit, Dobson, & Quigley, 2014). In everyday life, this could translate to eschewed social interactions in individuals with MDD and anxiety disorders (Alden & Taylor, 2004; Davilla & Beck, 2002), which is in turn linked to diminished well-being. Indeed, avoidance behavior partially explains the association between comorbidity and poor well-being (Sherbourne et al., 2010). Altogether, these findings may help explain the relationship of comorbidity and well-being and thus might provide starting points for strategies for counteracting adverse effects of depression–anxiety comorbidity that could be implemented in prevention and intervention programs aimed at well-being and functioning. One viable option are acceptance- and mindfulness-based programs. Existing acceptance- and mindfulness-based interventions have been associated with improved outcomes for individuals with comorbidity in contrast to traditional CBT, which has been found to be more helpful for single disorders (Arch & Ayers, 2013). This might be accounted for by the stance

that acceptance-focused treatments do not primarily aim at alleviating symptoms but rather aim to train generic skills to promote functioning and level of well-being (S. C. Hayes, Strosahl, & Wilson, 2012a). Furthermore, treatment at an early stage is important because anxiety–depression comorbidity has additionally been linked to physical diseases, such as diabetes, abdominal pain, or migraine (Engum, 2007; Scott et al., 2007; Seldenrijk et al., 2015). Clinically speaking, practitioners should be aware of this association, and inform patients about the related risk factors for mental and physical diseases (e.g., physical inactivity; Goodwin, 2003; Lee et al., 2012). Precedent educational work bridging research and mental health services may be necessary.

Strengths and Limitations of the Manuscripts

Several strengths can be noted: (1) One valuable strength is that we focused on specific functional outcomes (i.e., functioning, stress, well-being). This is a relevant approach in addition to symptom outcomes (McKnight & Kashdan, 2009) and is in alignment with a shift in focus in clinical research from solely symptom reduction to a more comprehensive functioning enhancement. (2) Four different valued behaviors were assessed and calculated, which allowed for detailed analyses of changes. Since only some facets of valued behaviors (e.g. valued action) were examined separately in earlier studies, the present dissertation offers better insights into valued behaviors relevant for functioning. (3) The measures used for functioning (WHODAS), stress (PSS), and well-being (MHC-SF) are reliable and valid measures. (4) In Manuscript 1, LGMs allowed us to estimate the growth of PF over time (measured weekly) and its association with functioning. Estimating the average growth between the repeated measurements gives a more valid estimation than relying on ratings of two time points (e.g., pretreatment and posttreatment). (5) Findings from Manuscripts 1 and 2 complemented each other in respect to the associations of ACT processes with functioning for the time during and after the intervention.

The following limitations should be considered: (1) Participants were limited to people from Germany and Switzerland, aged 18–65 years with sufficient language skills. Conclusions cannot be drawn for individuals from different countries or those who are younger or older. Furthermore, the majority of participants were Caucasian and therefore we cannot draw conclusions about other ethnic groups. Thus, generalizations of the present set of findings are limited. (2) Our analyses do not allow drawing any conclusions about causality and directionality. Even though the theoretical background on PF applied in this dissertation imply a direction from PF to enhanced functioning, the current findings can be interpreted only in an associative manner. (3) Data were based on self-reported measurements that are prone to recall bias. Functioning, stress and well-being may not be captured entirely by self-reported measures and analyses of additional information from other sources (e.g., friends, family or employers and experience sampling) could have resulted in different findings.

Outlook

Link to positive psychology. In respect to a longitudinal perspective, it is assumed that increases in PF and valued behaviors precede improvements in well-being. However, an alternative hypothesis would be that well-being is antecedent to increases in valued behaviors. That view would be in line with the broaden-and built theory (Fredrickson, 2001) in positive psychology and would imply that well-being could lead to successful enactment of values by promoting the so-called upward spiral of positive emotions (Fredrickson, 2001; Garland et al., 2010). A future investigation could test whether changes in PF and valued behaviors temporally precede changes in well-being, or whether well-being precedes PF and valued behaviors.

Importance of social domains for valued behaviors. An important finding in respect to valued behaviors was that individuals engaged in more valued action in social domains compared to nonsocial domains (see Manuscript 2 in Appendix B). An intriguing next step could be to investigate the longitudinal relationship between valued behaviors in social

domains and functioning (e.g. stress and well-being). Such research could support existing findings about the importance of social domains (e.g. relationships; Ozbay et al., 2007; Hostinar, 2015) and integrating potential findings may help improve functioning levels of patients (Reblin & Uchino, 2009; Uchino, 2009).

Epidemiological research. Longitudinal epidemiological studies would help disentangle the association between PF and functioning on a population level rather than limiting analyses to a specific target group, namely, individuals with anxiety or depressive disorders or elevated stress levels. This would allow drawing conclusions about a wider population. Specifically, it would be worth examining whether measurements of PF are associated with functioning (i.e., well-being and stress) over time. Findings may contribute to and extend recent data, showing the moderating role of PF in the relationship of stress and mental health (Gloster et al., 2016).

Conclusion

The studies reported in this dissertation found associations between ACT processes and functioning during the interventions. These associations—supplemented by the literature on either short or long time periods—indicate that acting aligned with one's values is linked to one's functioning. More specifically, an increase in PF might serve as a buffer of stress and promoter of well-being. However, we could not establish associations for ACT processes during an intervention with functioning after the intervention. One explanation may be that increases after an intervention are not of the same magnitude as during an intervention and thus mitigate the relationship with changes in ACT processes during an intervention. A future study could measure ACT processes and functioning at intermediate time points between preintervention and postintervention and furthermore between postintervention and FU to explore the relationship in greater detail and with shorter time intervals.

Our findings also indicate that symptom burden is independently associated with valued behaviors and functioning. Depending on the baseline levels of panic

symptomatology, we observed different trajectories in valued action over the course of an intervention. This provides a clearer picture of how valued action may be promoted and suggests that treatment components may be shaped to the specific needs of patient groups. Moreover, comorbidity was associated with decreased well-being. This may have unique implications for treatment and prevention.

Together, the set of findings in this dissertation contributes to a better understanding of ACT processes with functioning and the role of symptom burden. This may aid future research on treatment processes and pave the way for treatment refinement to help reduce the suffering associated with high rates of depression, anxiety, its comorbidity, and stress.

References

Adams, G. C., Balbuena, L., Meng, X., & Asmundson, G. J. G. (2016). When social anxiety and depression go together: A population study of comorbidity and associated consequences. *Journal of Affective Disorders*, *206*, 48–54. https://doi.org/10.1016/j.jad.2016.07.031

Alden, L. E., & Taylor, C. T. (2004). Interpersonal processes in social phobia. *Clinical Psychology Review*, *24*, 857–882. https://doi.org/10.1016/j.cpr.2004.07.006

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2007). *Stress a major health problem in the U.S., warns APA* [Press release]. Retrieved from http://www.apa.org/news/press/releases/2007/10/stress.aspx

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Arch, J. J., & Ayers, C. R. (2013). Which treatment worked better for whom? Moderators of group cognitive behavioral therapy versus adapted mindfulness based stress reduction for anxiety disorders. *Behaviour Research and Therapy*, *51*, 434–442. https://doi.org/10.1016/j.brat.2013.04.004

Arch, J. J., Craske, M. G., & Angeles, L. (2008). Acceptance and commitment therapy and cognitive behavioral therapy for anxiety disorders: Different treatments, similar mechanisms? *Clinical Psychology Science Practice*, *15*, 263–279.

Bandelow, B. (1995). Assessing the efficacy of treatments for panic disorder and agoraphobia. II. The Panic and Agoraphobia Scale. *International Clinical Psychopharmacology*, *10*, 73–81.

Batelaan, N., Smit, F., de Graaf, R., van Balkom, A., Vollebergh, W., & Beekman, A. (2007). Economic costs of full-blown and subthreshold panic disorder. *Journal of Affective*

Disorders, *104*, 127–136. https://doi.org/10.1016/j.jad.2007.03.013

Benoy, C., Knitter, B., Doering, S., Knellwolf, L., & Gloster, A. T. (2017). *Assessing psychological flexibility: Validation of the Open and Engagement State Questionnaire*. Manuscript submitted for publication.

Biggam, F. H., Power, K. G., & MacDonald, R. R. (1997). Coping with the occupational stressors of police work: A study of Scottish officers. *Stress Medicine*, *13*, 109–115.

Bolton, J., Cox, B., Clara, I., & Sareen, J. (2006). Use of alcohol and drugs to self-medicate anxiety disorders in a nationally representative sample. *Journal of Nervous and Mental Disease*, *194*, 818–825. https://doi.org/10.1097/01.nmd.0000244481.63148.98

Bolton, J. M., Robinson, J., & Sareen, J. (2009). Self-medication of mood disorders with alcohol and drugs in the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Affective Disorders*, *115*, 367–375. https://doi.org/10.1016/j.jad.2008.10.003

Brinkborg, H., Michanek, J., Hesser, H., & Berglund, G. (2011). Acceptance and commitment therapy for the treatment of stress among social workers: A randomized controlled trial. *Behaviour Research and Therapy*, *49*, 389–398. https://doi.org/10.1016/j.brat.2011.03.009

Brown, C., Schulberg, H. C., Madonia, M. J., Shear, K. M., & Houck, P. R. (1996). Treatment outcomes for primary care patients with major depression and lifetime anxiety disorders. *American Journal of Psychiatry*, *153*, 1293–1300.

Brown, T. A., & Barlow, D. H. (1992). Comorbidity among anxiety disorders: Implications for treatment and DSM-IV. *Journal Consulting Clinical Psychology*, *60*, 835–844.

Bundesamt für Statistik. (2012). Swiss Health Survey. Retrieved from https://www.bfs.admin.ch/bfs/de/home/statistiken/gesundheit/erhebungen/sgb.assetdetail.37758.html

Ciarrochi, J., & Kashdan, T. B. (2013). The foundations of flourishing. In T. B. Kashdan & J.

Ciarrochi (Eds.), *Mindfulness, acceptance and positive psychology* (pp. 1–29). Oakland, CA: New Harbinger Press.

Clarke, S., Kingston, J., Wilson, K. G., Bolderston, H., & Remington, B. (2012). Acceptance and commitment therapy for a heterogeneous group of treatment-resistant clients: A treatment development study. *Cognitive and Behavioral Practice*, *19*, 560–572. https://doi.org/10.1016/j.cbpra.2012.03.001

Cleeland, C. S. (2007). Symptom burden: Multiple symptoms and their impact as patient-reported outcomes. *Journal of National Cancer Institute Monographs*, *2007*, 16–21. https://doi.org/10.1093/jncimonographs/lgm005

Cohen, S., & Janicki-Deverts, D. (2012). Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 2009. *Journal of Applied Social Psychology*, *42*, 1320–1334. https://doi.org/10.1111/j.1559-1816.2012.00900.x

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*, 385–396.

Collins, A., & Gibbs, A. C. C. (2003). Stress in police officers: A study of the origins, prevalence and severity of stress-related symptoms within a county police force. *Occupational Medicine*, *53*, 256–264. https://doi.org/10.1093/occmed/kqg061

Crum, R. M., Mojtabai, R., Lazareck, S., Bolton, J. M., Robinson, J., Sareen, J., … Storr, C. L. (2013). A prospective assessment of reports of drinking to self-medicate mood symptoms with the incidence and persistence of alcohol dependence. *JAMA Psychiatry*, *70*, 718–726. https://doi.org/10.1001/jamapsychiatry.2013.1098

Cuijpers, P., van Lier, P. A. C., van Straten, A., & Donker, M. (2005). Examining differential effects of psychological treatment of depressive disorder: An application of trajectory analyses. *Journal of Affective Disorders*, *89*, 137–146. https://doi.org/10.1016/j.jad.2005.09.001

Dahl, J. (2015). Valuing in ACT. *Current Opinion in Psychology*, *2*, 43–46. https://doi.org/10.1016/j.copsyc.2015.03.001

Davilla, J., & Beck, J. G. (2002). Is social anxiety associated with impairment in close relationships? A preliminary investigation. *Behavior Therapy*, *33*, 427–446.

Dindo, L., Liew, J. R. Van, & Arch, J. J. (2017). Acceptance and Commitment Therapy: A transdiagnostic behavioral intervention for mental health and medical conditions. *Neurotherapeutics*, *14*, 546–553. https://doi.org/10.1007/s13311-017-0521-3

Engum, A. (2007). The role of depression and anxiety in onset of diabetes in a large population-based study. *Journal of Psychosomatic Research*, *62*, 31–38. https://doi.org/10.1016/j.jpsychores.2006.07.009

Erwin, B. A., Heimberg, R. G., Juster, H., & Mindlin, M. (2002). Comorbid anxiety and mood disorders among persons with social anxiety disorder. *Behaviour Research and Therapy*, *40*, 19–35. https://doi.org/10.1016/S0005-7967(00)00114-5

Fava, M., Rush, A. J., Alpert, J. E., Balasubramani, G. K., Wisniewski, S. R., Carmin, C. N., … Trivedi, M. H. (2008). Difference in treatment outcome in outpatients with anxious versus nonanxious depression: A STAR*D report. *American Journal of Psychiatry*, *165*, 342–351. https://doi.org/10.1176/appi.ajp.2007.06111868

Fehm, L., Pelissolo, A., Furmark, T., & Wittchen, H. U. (2005). Size and burden of social phobia in Europe. *European Neuropsychopharmacology*, *15*, 453–462. https://doi.org/10.1016/j.euroneuro.2005.04.002

Flaxman, P. E., & Bond, F. W. (2010). Worksite stress management training: Moderated effects and clinical significance. *Journal of Occupational Health Psychology*, *15*, 347–358. https://doi.org/10.1037/a0020522

Fledderus, M., Bohlmeijer, E. T., Fox, J.-P., Schreurs, K. M. G., & Spinhoven, P. (2013). The role of psychological flexibility in a self-help acceptance and commitment therapy intervention for psychological distress in a randomized controlled trial. *Behaviour*

Research and Therapy, *51*, 142–151. https://doi.org/10.1016/j.brat.2012.11.007

Fledderus, M., Bohlmeijer, E. T., Pieterse, M. E., & Schreurs, K. M. G. (2012). Acceptance and commitment therapy as guided self-help for psychological distress and positive mental health: A randomized controlled trial. *Psychological Medicine*, *42*, 485–495. https://doi.org/10.1017/S0033291711001206

Fledderus, M., Bohlmeijer, E. T., Smit, F., & Westerhof, G. J. (2010). Mental health promotion as a new goal in public mental health care: A randomized controlled trial of an intervention enhancing psychological flexibility. *American Journal of Public Health*, *100*, 2372. https://doi.org/10.2105/AJPH.2010.196196

Fletcher, L., & Hayes, S. C. (2005). Relational frame theory, acceptance and commitment therapy, and a functional analytic definition of mindfulness. *Journal of Rational-Emotive and Cognitive-Behavior Therapy*, *23*, 315–336. https://doi.org/10.1007/s10942-005-0017-7

Fondacaro, K. M., & Harder, V. S. (2014). Connecting cultures: A training model promoting evidence-based psychological services for refugees. *Training and Education in Professional Psychology*, *8*, 320–327.

Forman, E. M., Butryn, M. L., Manasse, S. M., & Bradley, L. E. (2015). Acceptance-based behavioral treatment for weight control: A review and future directions. *Current Opinion in Psychology*, *2*, 87–90. https://doi.org/10.1016/j.copsyc.2014.12.020

Fredrickson, B. L. (2001). The role of positive emotion in positive psychology: The broaden-and-build theory of positive emotions. American Psychologist, 56, 218–226. http://dx.doi.org/10.1037/0003-066X.56.3.218.

Garin, O., Ayuso-Mateos, J. L., Almansa, J., Nieto, M., Chatterji, S., Vilagut, G., … Ferrer, M. (2010). Validation of the "World Health Organization Disability Assessment Schedule, WHODAS-2" in patients with chronic diseases. *Health and Quality of Life Outcomes*, *8*: 51. https://doi.org/10.1186/1477-7525-8-51

Garland, E. L., Fredrickson, B., Kring, A. M., Johnson, D. P., Meyer, P. S., & Penn, D. L. (2010). Upward spirals of positive emotions counter downward spirals of negativity: Insights from the broaden-and-build theory and affective neuroscience on the treatment of emotion dysfunctions and deficits in psychopathology. *Clinical Psychology Review*, *30*, 849–864. https://doi.org/10.1016/j.cpr.2010.03.002

Gloster, A. T., Meyer, A. H., & Lieb, R. (2016). Psychological flexibility as a malleable public health target: Evidence from a representative sample. *Journal of Contextual Behavioral Science*, *6*, 166–171. https://doi.org/10.1016/j.jcbs.2017.02.003

Gloster, A. T., Miché, M., Wersebe, H., Mikoteit, T., Hoyer, J., Imboden, C., … Lieb, R. (2017). Daily fluctuation of emotions and memories thereof: Design and methods of an experience sampling study of major depression, social phobia, and controls. *International Journal of Methods in Psychiatric Research.*, *26*, 1–11. https://doi.org/10.1002/mpr.1578

Gloster, A. T., Sonntag, R., Hoyer, J., Meyer, A. H., Heinze, S., Ströhle, A., … Wittchen, H.-U. (2015). Treating treatment-resistant patients with panic disorder and agoraphobia using psychotherapy: A randomized controlled switching trial. *Psychotherapy and Psychosomatics*, *84*, 100–109. https://doi.org/10.1159/000370162

Gloster, A. T., Wittchen, H.-U., Einsle, F., Lang, T., Helbig-Lang, S., Fydrich, T., … Arolt, V. (2011). Psychological treatment for panic disorder with agoraphobia: A randomized controlled trial to examine the role of therapist-guided exposure in situ in CBT. *Journal of Consulting and Clinical Psychology*, *79*, 406–420. https://doi.org/10.1037/a0023584

Goodman, E., & Whitaker, R. C. (2002). A prospective study of the role of depression in the development and persistence of adolescent obesity. *Pediatrics*, *109*, 497–504.

Goodwin, R. D. (2003). Association between physical activity and mental disorders among adults in the United States. *Preventive Medicine*, *36*, 698–703. https://doi.org/10.1016/S0091-7435(03)00042-2

Grant, F., Guille, C., & Sen, S. (2013). Well-being and the risk of depression under stress. *PLoS ONE*, *8*. https://doi.org/10.1371/journal.pone.0067395

Gregg, J. A., Lillis, J., & Schmidt, E. M. (2015). A functional contextual approach to obesity and related problems. *Current Opinion in Psychology*, *2*, 82–86. https://doi.org/10.1016/j.copsyc.2014.12.019

Hämäläinen, J., Isometsä, E., Sihvo, S., Prikola, S., & Kiviruusu, O. (2012). Use of health services for major depressive and anxiety disorders in Finland. *Depression and Anxiety*, *15*, 79–82. https://doi.org/10.1002/da

Hayes, S. A., Orsillo, S. M., & Roemer, L. (2010). Changes in proposed mechanisms of action during an acceptance-based behavior therapy for generalized anxiety disorder. *Behaviour Research and Therapy*, *48*, 238–245. https://doi.org/10.1016/j.brat.2009.11.006

Hayes, S. C. (2013). The genuine conversation. In T. B. Kashdan, & J. Ciarrochi (Eds.), *Mindfulness, acceptance and positive psychology* (pp. 303–322). Oakland, CA: New Harbinger Press.

Hayes, S. C., Bissett, R., Roget, N., Padilla, M., Kohlenberg, B. S., Fisher, G., … Niccolls, R. (2004). The impact of acceptance and commitment training and multicultural training on the stigmatizing attitudes and professional burnout of substance abuse counselors. *Behavior Therapy*, *35*, 821–835.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*, 1–25. https://doi.org/10.1016/j.brat.2005.06.006

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012a). *Acceptance and commitment therapy*. New York, NY: Guilford Press.

Hayes, S. C., Strohsahl, K. D. & Wilson, K. G. (with Sandoz, E. K). (2012b). Case formulation: Listening with ACT ears, seeing with ACT eyes. In *Acceptance and*

commitment therapy (pp. 103–140). New York, NY: Guilford Press.

Heck, R., & Thomas, S. L. (2015). *An introduction to multilevel modeling techniques: MLM and SEM approaches using Mplus*. New York, NY: Routledge.

Hettema, J., Steele, J., & Miller, W. R. (2005). Motivational interviewing. *Annual Review of Clinical Psychology*, *1*, 91–111. https://doi.org/10.1146/annurev.clinpsy.1.102803.143833

Hinton, D. E., Pich, V., Hofmann, S. G., & Otto, M. W. (2013). Acceptance and mindfulness techniques as applied to refugee and ethnic minority populations with PTSD: Examples from "Culturally Adapted CBT." *Cognitive and Behavioral Practice*, *20*, 33–46. https://doi.org/10.1016/j.cbpra.2011.09.001

Hinton, D. E., Rivera, E. I., Hofmann, S. G., Barlow, D. H., & Otto, M. W. (2012). Adapting CBT for traumatized refugees and ethnic minority patients: Examples from culturally adapted CBT (CA-CBT). *Transcultural Psychiatry*, *49*, 340–365. https://doi.org/10.1177/1363461512441595

Hofer, P., Waadt, M., Aschwanden, R., Milidou, M., Acker, J., Meyer, A. H., Lieb, R., & Gloster, A. T. (2017). The effectiveness of an ACT self-help intervention for stress and burnout without therapist contact: An online randomized controlled trial. *Work & Stress*, Advance online publication. doi: 10.1080/02678373.2017.1402389.

Hostinar, C. E. (2015). Recent developments in the study of social relationships, stress responses, and physical health. *Current Opinion in Psychology*, *5*, 90–95. https://doi.org/10.1016/j.copsyc.2015.05.004

Jacobi, F., Wittchen, H.-U., Hölting, C., Höfler, M., Pfister, H., Müller, N., & Lieb, R. (2004). Prevalence, co-morbidity and correlates of mental disorders in the general population: Results from the German Health Interview and Examination Survey (GHS). *Psychological Medicine*, *34*, 597–611.

Johnson, S., Cooper, C., Cartwright, S., Donald, I., Taylor, P., Millet, C., … Johnson, S.

(2005). The experience of work-related stress across occupations. *Journal of Managerial Psychology*, *20*, 178–187. https://doi.org/10.1108/02683940510579803

Kalia, M. (2002). Assessing the economic impact of stress—The modern day hidden epidemic. *Metabolism*, *51*, 49–53. https://doi.org/10.1053/meta.2002.33193

Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Chatterji, S., Lee, S., Ormel, J., … Wang, P. S. (2009). The global burden of mental disorders: An update from the WHO World Mental Health (WMH) Surveys. *Epidemiologia e psichiatria sociale*, *18*, 23–33.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., … Wang, P. S. (2003). The epidemiology of major depressive disorder. *JAMA Psychiatry*, *289*, 3095–3105. https://doi.org/10.1001/jama.289.23.3095

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 617–627.

Kessler, R. C., DuPont, R. L., Berglund, P., & Wittchen, H. (1999). Impairment in pure and comorbid generalized anxiety disorder and major depression at 12 months in two national surveys. *American Journal of Psychiatry*, *156*, 1915–1923.

Kessler, R. C., Stang, P., Wittchen, H.-U., Stein, M., & Walters, E. E. (1999). Lifetime co-morbidities between social phobia and mood disorders in the US National Comorbidity Survey. *Psychological Medicine*, *29*, 555–567. https://doi.org/10.1017/S0033291799008375

Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, *73*, 539–548. https://doi.org/10.1037/0022-006X.73.3.539

Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *The American Psychologist*, *62*, 95–108. https://doi.org/10.1037/0003-066X.62.2.95

Keyes, C. L. M., Dhingra, S. S., & Simoes, E. J. (2010). Change in level of positive mental health as a predictor of future risk of mental illness. *American Journal of Public Health*, *100*, 2366–2371. https://doi.org/10.2105/AJPH.2010.192245

Keyes, C. L. M., & Grzywacz, J. G. (2005). Health as a complete state: The added value in work performance and healthcare costs. *Journal of Occupational and Environmental Medicine*, *47*, 523–532. https://doi.org/10.1097/01.jom.0000161737.21198.3a

Khantzian, E. J. (1985). The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry*, *142*, 1259–1264.

Lamers, F., Van Oppen, P., Comijs, H. C., Smit, J. H., Spinhoven, P., Van Balkom, A. J. L. M., … Penninx, B. W. J. H. (2011). Comorbidity patterns of anxiety and depressive disorders in a large cohort study: The Netherlands Study of Depression and Anxiety (NESDA). *Journal of Clinical Psychiatry*, *72*, 342–348. https://doi.org/10.4088/JCP.10m06176blu

Lamers, S. M. A., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2011). Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF). *Journal of Clinical Psychology*, *67*, 99–110. https://doi.org/10.1002/jclp.20741

Lamers, S. M. A., Westerhof, G. J., Glas, C. A. W., & Bohlmeijer, E. T. (2015). The bidirectional relation between positive mental health and psychopathology in a longitudinal representative panel study. *Journal of Positive Psychology*, *10*, 1–8. https://doi.org/10.1080/17439760.2015.1015156

Landy, L. N., Schneider, R. L., & Arch, J. J. (2015). Acceptance and commitment therapy for the treatment of anxiety disorders: A concise review. *Current Opinion in Psychology*, *2*, 70–74. https://doi.org/10.1016/j.copsyc.2014.11.004

Lappalainen, P., Langrial, S., Oinas-Kukkonen, H., Tolvanen, A., & Lappalainen, R. (2015). Web-based acceptance and commitment therapy for depressive symptoms with minimal

support: A randomized controlled trial. *Behavior Modification*, *39*, 805–834. https://doi.org/10.1177/0145445515598142

Lazarus, R. S. (1974). Psychological stress and coping in adaptation and illness. *International Journal of Psychiatry in Medicine*, *5*, 321–333. https://doi.org/10.2190/T43T-84P3-QDUR-7RTP

Lazarus, R. S. (1992). Coping with the stress of illness. *WHO Regional Publications. European Series*, *44*, 11–31.

Lee, I.-M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., & Katzmarzyk, P. T. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and. *The Lancet*, *380*, 219–229. https://doi.org/10.1016/S0140-6736(12)61031-9

Li, S. S. Y., Liddell, B. J., & Nickerson, A. (2016). The relationship between post-migration stress and psychological disorders in refugees and asylum seekers. *Current Psychiatry Reports*, *18*, 1–9. https://doi.org/10.1007/s11920-016-0723-0

Lieb, R., Meinlschmidt, G., & Araya, R. (2007). Epidemiology of the association between somatoform disorders and anxiety and depressive disorders: An update. *Psychosomatic Medicine*, *69*, 860–863. https://doi.org/10.1097/PSY.0b013e31815b0103

Lieb, R., Schreier, A., & Müller, N. (2003). Epidemiologie von Angsttörungen. *Psychotherapie*, *8*, 86–102.

Lloyd, J., Bond, F. W., & Flaxman, P. E. (2013). The value of psychological flexibility: Examining psychological mechanisms underpinning a cognitive behavioural therapy intervention for burnout. *Work & Stress*, *27*, 181–199. https://doi.org/10.1080/02678373.2013.782157

Lucas, T., Weidner, N., & Janisse, J. (2012). Where does work stress come from ? A generalizability analysis of stress in police officers. *Psychology & Health*, *27*, 1426–1447. https://doi.org/10.1080/08870446.2012.687738

Lutz, W., Hofmann, S. G., Rubel, J., Boswell, J. F., Shear, M. K., Gorman, J. M., … Barlow, D. H. (2014). Patterns of early change and their relationship to outcome and early treatment termination in patients with panic disorder. *Journal of Consulting and Clinical Psychology*, *82*, 287–297. https://doi.org/10.1037/a0035535

Lyons, M. D., Huebner, E. S., & Hills, K. J. (2013). The dual-factor model of mental health: A short-term longitudinal study of school-related outcomes. *Social Indicators Research*, *114*, 549–565. https://doi.org/10.1007/s11205-012-0161-2

Maran, D. A., Varetto, A., Zedda, M., & Ieraci, V. (2015). Occupational stress, anxiety and coping strategies in police officers. *Occupational Medicine*, *65*, 466–473. https://doi.org/10.1093/occmed/kqv060

McAleavey, A. A., Castonguay, L. G., & Goldfried, M. R. (2014). Clinical experiences in conducting cognitive-behavioral therapy for social phobia. *Behavior Therapy*, *45*, 21–35. https://doi.org/10.1016/j.beth.2013.09.008

McCracken, L. M., Davies, M., Scott, W., Paroli, M., Harris, S., & Sanderson, K. (2015). Can a psychologically based treatment help people to live with chronic pain when they are seeking a procedure to reduce it? *Pain Medicine*, *16*, 451–459. https://doi.org/10.1111/pme.12623

McCracken, L. M., & Gutiérrez-Martínez, O. (2011). Processes of change in psychological flexibility in an interdisciplinary group-based treatment for chronic pain based on acceptance and commitment therapy. *Behaviour Research and Therapy*, *49*, 267–274. https://doi.org/10.1016/j.brat.2011.02.004

McCracken, L. M., & Jones, R. (2012). Treatment for chronic pain for adults in the seventh and eight decades of life: A preliminary study of acceptance and commitment therapy (ACT). *Pain Medicine*, *13*, 861–867.

McCracken, L. M., & Velleman, S. C. (2010). Psychological flexibility in adults with chronic pain: A study of acceptance, mindfulness, and values-based action in primary care. *Pain*,

148, 141–147. https://doi.org/10.1016/j.pain.2009.10.034

McCracken, L. M., & Vowles, K. E. (2007). Psychological flexibility and traditional pain management strategies in relation to patient functioning with chronic pain: An examination of a revised instrument. *Journal of Pain*, *8*, 700–707. https://doi.org/10.1016/j.jpain.2007.04.008

McCracken, L. M., & Yang, S.-Y. (2006). The role of values in a contextual cognitive-behavioral approach to chronic pain. *Pain*, *123*, 137–145. https://doi.org/10.1016/j.pain.2006.02.021

McCracken, L. M., & Yang, S.-Y. (2008). A contextual cognitive-behavioral analysis of rehabilitation workers' health and well-being: Influences of acceptance, mindfulness, and values-based action. *Rehabilitation Psychology*, *53*, 479–485. https://doi.org/10.1037/a0012854

McKnight, P. E., & Kashdan, T. B. (2009). The importance of functional impairment to mental health outcomes: A case for reassessing our goals in depression treatment research. *Clinical Psychology Review*, *29*, 243–259. https://doi.org/10.1016/j.cpr.2009.01.005

McLaughlin, T. P., Khandker, R. K., Kruzikas, D. T., & Tummala, R. (2006). Overlap of anxiety and depression in a managed care population: Prevalence and association with resource utilization. *Journal of Clinical Psychiatry*, *67*, 1187–1193.

Menary, K. R., Kushner, M. G., Maurer, E., & Thuras, P. (2011). The prevalence and clinical implications of self-medication among individuals with anxiety disorders. *Journal of Anxiety Disorders*, *25*, 335–339. https://doi.org/10.1016/j.janxdis.2010.10.006

Merikangas, K. R., Mehta, R. L., E., M. B., Walters, E. E., Swendsen, J. D., Aguilar-Gaziola, S., … Kessler, R. C. (1998). Comorbidity of Substance use disorders with mood and anxiety disorders: results of the international consortiumin psychiatric epidemilogy. *Addictive Behaviors*, *23*, 893–907.

Michelson, S. E., Lee, J. K., Orsillo, S. M., & Roemer, L. (2011). The role of values-consistent behavior in generalized anxiety disorder. *Depression and Anxiety*, *28*, 358–366. https://doi.org/10.1002/da.20793

Muthén, B. O., & Curran, P. J. (1997). General longitudinal modeling of individual differences in experimental designs: A latent variable framework for analysis and power estimation. *Psychological Methods*, *2*, 371–402. https://doi.org/10.1037/1082-989X.2.4.371

Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Author.

Ohayon, M. M., & Schatzberg, A. F. (2010). Social phobia and depression: Prevalence and comorbidity. *Journal of Psychosomatic Research*, *68*, 235–243. https://doi.org/10.1016/j.jpsychores.2009.07.018

Ottenbreit, N. D., Dobson, K. S., & Quigley, L. (2014). An examination of avoidance in major depression in comparison to social anxiety disorder. *Behaviour Research and Therapy*, *56*, 82–90. https://doi.org/10.1016/j.brat.2014.03.005

Ozbay, F., Johnson, D. C., Morgan, C. A., Morgan, C. A., Charney, D., & Southwick, S. Social suport and resilience to stress: From neurobiology to clinical practice. *Psychiatry*, *4*, 35–40.

Petkus, A. J., & Wetherell, J. L. (2013). Acceptance and commitment therapy with older adults: Rationale and considerations. *Cognitive and Behavioral Practice*, *20*, 47–56. https://doi.org/10.1016/j.cbpra.2011.07.004

Pinto, S., Fumincelli, L., Mazzo, A., Caldeira, S., & Martins, J. C. (2017). Comfort, well-being and quality of life: Discussion of the differences and similarities among the concepts. *Porto Biomedical Journal*, *2*, 6–12. https://doi.org/10.1016/j.pbj.2016.11.003

Rapaport, M. H., Clary, C., Fayyad, R., & Endicott, J. (2005). Quality-of-life in depressive and anxiety disorders. *American Journal of Psychiatry*, *162*, 1171–1178.

https://doi.org/10.1176/appi.ajp.162.6.1171

Räsänen, P., Lappalainen, P., Muotka, J., Tolvanen, A., & Lappalainen, R. (2016). An online guided ACT intervention for enhancing the psychological wellbeing of university students: A randomized controlled clinical trial. *Behaviour Research and Therapy*, *78*, 30–42. https://doi.org/10.1016/j.brat.2016.01.001

Reblin, M., & Uchino, B. N. (2009). Social and emotional support and its implication for health. *Current Opinion in Psychiatry*, *21*, 201–205. https://doi.org/10.1097/YCO.0b013e3282f3ad89.Social

Robinson, J., Sareen, J., Cox, B. J., & Bolton, J. (2009). Self-medication of anxiety disorders with alcohol and drugs: Results from a nationally representative sample. *Journal of Anxiety Disorders*, *23*, 38–45. https://doi.org/10.1016/j.janxdis.2008.03.013

Rubak, S., Sandboek, A., Lauritzen, T., & Christensen, B. (2005). Motivational interviewing: A systematic review and meta-analysis. *British Journal of General Practice*, *55*, 305–312.

Saarni, S. I., Suvisaari, J., Sintonen, H., Pirkola, S., Koskinen, S., Aromaa, A., & Lönnqvist, J. (2007). Impact of psychiatric disorders on health-related quality of life: General population survey. *British Journal of Psychiatry*, *190*, 326–332. https://doi.org/10.1192/bjp.bp.106.025106

Scott, K. M., Bruffaerts, R., Tsang, A., Ormel, J., Alonso, J., Angermeyer, M. C., … Von Korff, M. (2007). Depression – anxiety relationships with chronic physical conditions: Results from the World Mental Health surveys. *Journal of Affective Disorders*, *103*, 113–120. https://doi.org/10.1016/j.jad.2007.01.015

Scott, W., Hann, K. E. J., & McCracken, L. M. (2016). A comprehensive examination of changes in psychological flexibility following acceptance and commitment therapy for chronic pain. *Journal of Contemporary Psychotherapy*, *46*, 139–148. https://doi.org/10.1007/s10879-016-9328-5

Seldenrijk, A., Vogelzangs, N., Batelaan, N. M., Wieman, I., Schaik, D. J. F. van, & Penninx, B. J. W. H. (2015). Depression, anxiety and 6-year risk of cardiovascular disease. *Journal of Psychosomatic Research*, *78*, 123–129. https://doi.org/10.1016/j.jpsychores.2014.10.007

Sherbourne, C. D., Sullivan, G., Craske, M. G., Roy-Byrne, P., Golinelli, D., Rose, R. D., … Stein, M. B. (2010). Functioning and disability levels in primary care out-patients with one or more anxiety disorders. *Psychological Medicine*, *40*, 2059–2068. https://doi.org/10.1017/S0033291710000176

Simon, G. E., Revicki, D., Heiligenstein, J., Grothaus, L., Vonkorff, M., Katon, W. J., & Hylan, T. R. (2000). Recovery from depression, work productivity, and health care costs among primary care patients. *General Hospital Psychiatry*, *22*, 153–162.

Skre, I., Onstad, S., Torgersen, S., & Kringlen, E. (1991). High interrater reliability for the Structured Clinical Interview for DSM-III-R Axis I (SCID-I). *Acta psychiatrica Scandinavica*, *84*, 167–173.

Smit, F., Cuijpers, P., Oostenbrink, J., Batelaan, N., de Graaf, R., & Beekman, A. (2006). Costs of nine common mental disorders: Implications for curative and preventive psychiatry. *Journal of Mental Health Policy and Economics*, *9*, 193–200.

Steel, J. L., Dunlavy, A. C., Harding, C. E., & Theorell, T. (2017). The psychological consequences of pre-emigration trauma and post-migration stress in refugees and immigrants from Africa. *Journal of Immigrant and Minority Health*, *19*, 523–532. https://doi.org/10.1007/s10903-016-0478-z

Stein, M. B., & Kean, Y. M. (2000). Disability and quality of life in social phobia: Epidemiologic findings. *American Journal of Psychiatry*, *157*, 1606–1613. https://doi.org/10.1176/appi.ajp.157.10.1606

Sonntag, H., Wittchen, H.-U., Höfler, M., Kessler, R. C., & Stein, M. B. (2000). Are social fears and DSM-IV social anxiety disorder associated with smoking and nicotine

dependence in adolescents and young adults ? *European Psychiatry,* 15, 67–74.

Stucki, G. (2005). International classification of functioning, disability, and health (ICF): A promising framework and classification for rehabilitation medicine. *American Journal of Physical Medicine & Rehabilitation*, *84*, 733–740. https://doi.org/10.1097/01.phm.0000179521.70639.83

Swendsen, J., Conway, K. P., Degenhardt, L., Glantz, M., Jin, R., Merikangas, K. R., … Kessler, R. C. (2010). Mental disorders as risk factors for substance use, abuse and dependence: Results from the 10-year follow-up of the National Comorbidity Survey. *Addiction*, *105*, 1117–1128. https://doi.org/10.1111/j.1360-0443.2010.02902.x

Teychenne, M., Costigan, S. A., & Parker, K. (2015). The association between sedentary behaviour and risk of anxiety: a systematic review. *BMC Public Health*, 15, 1–8. https://doi.org/10.1186/s12889-015-1843-x

Trompetter, H. R., Bohlmeijer, E. T., Lamers, S. M. A., & Schreurs, K. M. G. (2016). Positive psychological wellbeing is required for online self-help acceptance and commitment therapy for chronic pain to be effective. *Frontiers in Psychology*, *7*: 353. https://doi.org/10.3389/fpsyg.2016.00353

Uchino, B. N. (2009). Understanding the links between social support and physical health of perceived and received support. *Perspectives on Psychological Science*, *4*, 236–255.

Unnewehr, Schneider, & Margraf (1996). Kinder-DIPS: diagnostisches Interview bei psychischen Störungen im Kindes-und Jugendalter. Berlin, Deutschland: Springer-Verlag

Üstün, T. B., Kostanjsek, N., Chatterji, S., & Rehm, J. (2010). *Measuring health and disability: Manual for WHO Disability Assessment Schedule*. Geneva, Switzerland: World Health Organization.

Vowles, K. E., & McCracken, L. M. (2008). Acceptance and values-based action in chronic pain: A study of treatment effectiveness and process. *Journal of Consulting and Clinical*

Psychology, *76*, 397–407. https://doi.org/10.1037/0022-006X.76.3.397

Vowles, K. E., & McCracken, L. M. (2010). Comparing the role of psychological flexibility and traditional pain management coping strategies in chronic pain treatment outcomes. *Behaviour Research and Therapy*, *48*, 141–146. https://doi.org/10.1016/j.brat.2009.09.011

Vowles, K. E., McCracken, L. M., & O'Brien, J. Z. (2011). Acceptance and values-based action in chronic pain: A three-year follow-up analysis of treatment effectiveness and process. *Behaviour Research and Therapy*, *49*, 748–755. https://doi.org/10.1016/j.brat.2011.08.002

Waadt, M., & Acker, J. (2013). *Burnout: mit Akzeptanz und Achtsamkeit den Teufelskreis durchbrechen*. Bern, Switzerland: Hans Huber.

Westerhof, G. J., & Keyes, C. L. M. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development*, *17*, 110–119. https://doi.org/10.1007/s10804-009-9082-y

Williams, J. B. W., Gibbon, M., First, M. B., Spitzer, R. L., Davies, M., Borus, J., … Wittchen, H.-U. (1991). The Structured Clinical Interview for DSM-III-R (SCID). II. Multisite test-retest reliability. *Archives of General Psychiatry*, *49*, 630–636.

Wilson, K. G., Sandoz, E. K., Kitchens, J., & Roberts, M. (2010). The Valued Living Questionnaire: Defining and measuring valued action within a behavioral framework. *The Psychological Record*, *60*, 249–272.

Wittchen, H.-U. (1996). What is Comorbidity—Fact or Artefact? *British Journal of Psychiatry Supplement*, *168*, 7–8.

Wittchen, H.-U. & Essau, E. A. (1993). Epidemiology of anxiety disorders. In R. Michels (Ed.). Psychiat (pp.1-25). Philiadelphia: J.B. Lippincott.

Wittchen, H. U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jönsson, B., … Salvador-Carulla, L. (2011). The size and burden of mental disorders and other disorders

of the brain in Europe 2010. *European Neuropsychopharmacology*, *21*, 655–679. https://doi.org/10.1016/j.euroneuro.2011.07.018

Wittchen, H.-U., Nelson, C. B., & Lachner, G. (1998). Prevalence of mental disorders and psychosocial impairments in adolescents and young adults. *Psychological Medicine*, *28*, 109–126.

Wittchen, H.-U., Wunderlich, U., Gruschwitz, S., & Zaudig, M. (1997). *SKID-I Strukturiertes Klinisches Interview für DSM-IV Achse I: Psychische Störungen*. Göttingen, Germany: Hogrefe.

Wood, A. M., & Joseph, S. (2010). The absence of positive psychological (eudemonic) well-being as a risk factor for depression: A ten year cohort study. *Journal of Affective Disorders*, *122*, 213–217. https://doi.org/10.1016/j.jad.2009.06.032

World Health Organization. (2002). *Towards a common language for functioning, disability and health: ICF*. Retrieved from http://www.who.int/classifications/icf/en/

Zettle, R. D. (2015). Acceptance and commitment therapy for depression. *Current Opinion in Psychology*, *2*, 65–69. https://doi.org/10.1016/j.copsyc.2014.11.011

Zhou, Y., Cao, Z., Yang, M., Xi, X., Guo, Y., Fang, M., … Yukai, D. (2017). Comorbid generalized anxiety disorder and its association with quality of life in patients with major depressive disorder. *Nature Publishing Group*, *7*, 1–8. https://doi.org/10.1038/srep40511

Appendix A-D

Appendix A (Manuscript 1)

Wersebe, H., Lieb, R., Meyer, A. H., Hofer, P. & Gloster, A. T. (2017). The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention. *International Journal of Clinical and Health Psychology*, 18, 60-68.

Appendix B (Manuscript 2)

Wersebe, H., Lieb, R., Meyer, A. H., Hoyer, J., Wittchen, H.-U., & Gloster, A. T. (2017). Changes of valued behaviors and functioning during an Acceptance and Commitment Therapy Intervention *Journal of Contextual Behavioral Science*, 6, 63-70

Appendix C (Manuscript 3)

Wersebe, H., Lieb, R., Meyer, A. H., Miche, M., Mikoteit, T., Imboden, C., Hoyer, J., Bader, K., Hatzinger, M., Gloster, A. T. (submitted). Well-Being in Major Depression and Social Phobia with and without comorbidity

Appendix D (Curriculum Vitae)

Appendix A

The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention

Hanna Wersebe, Roselind Lieb, Andrea H Meyer, Patrizia Hofer & Andrew T. Gloster

Published in *International Journal of Clinical and Health Psychology*

International Journal of Clinical and Health Psychology (2017) xxx, xxx–xxx

International Journal of Clinical and Health Psychology

www.elsevier.es/ijchp

ORIGINAL ARTICLE

The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention

Hanna Wersebe, Roselind Lieb, Andrea H. Meyer, Patrizia Hofer, Andrew T. Gloster*

University of Basel, Switzerland

Received 15 June 2017; accepted 18 September 2017

KEYWORDS
Acceptance and commitment therapy;
Well-being;
Psychological flexibility;
Stress;
Experiment

Abstract
Background/Objective: Prolonged stress can overwhelm coping resources, leading people to seek mental health care. Acceptance and commitment therapy (ACT) is an intervention that enhances well-being and reduces distress, assumedly by means of increasing psychological flexibility (PF). We examined the association between a total increase in PF during an intervention and decreases in stress and increases in well-being during and after the intervention.
Method: The intervention was a randomized controlled trial of an ACT-based self-help intervention. Participants were 91 individuals reporting elevated levels of work-related stress. Measurements were completed at preintervention, postintervention, and 3-month follow-up.
Results: Structural equation models revealed that the total increase in PF during the intervention was negatively associated with a decrease in stress ($b = -0.63$, $SE = 0.14$, $p < .001$) and positively associated with an increase in well-being during the intervention ($b = 0.48$, $SE = 0.11$, $p < .001$), but not with a decrease in stress ($b = 0.03$, $SE = 0.27$, $p > .05$) and well-being ($b = -0.04$, $SE = 0.39$, $p > .05$) following the intervention.
Conclusions: Our study provides empirical support for decreasing stress and promoting well-being through ACT and emphasizes the potential of PF in promoting well-being.

* Corresponding author. University of Basel, Department of Psychology, Division of Clinical Psychology and Intervention Science, Missionsstrasse 62A, 4055 Basel, Switzerland.
E-mail address: andrew.gloster@unibas.ch (A.T. Gloster).

http://dx.doi.org/10.1016/j.ijchp.2017.09.002

Please cite this article in press as: Wersebe, H., et al. The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention. *International Journal of Clinical and Health Psychology* (2017), http://dx.doi.org/10.1016/j.ijchp.2017.09.002

PALABRAS CLAVE
terapia de aceptación y compromiso;
bienestar;
flexibilidad psicológica;
estrés;
estudio ex post facto

Relación entre estrés, bienestar y flexibilidad psicológica durante una intervención de autoayuda de Terapia de Aceptación y Compromiso

Resumen
Antecedentes/Objetivo: El estrés prolongado puede inhibir los recursos de adaptación, llevando a las personas a solicitar servicios de salud mental. La Terapia de Aceptación y Compromiso (ACT) es una intervención que fomenta el bienestar y reduce la ansiedad, presuntamente mediante el aumento de la flexibilidad psicológica (PF). Examinamos la asociación entre un aumento total en PF durante una intervención y el descenso del estrés y el aumento del bienestar durante y después de la intervención.
Método: En un ensayo aleatorio controlado de una intervención de autoayuda con base en ACT participaron 91 individuos con niveles elevados de estrés laboral. Completaron mediciones pre, post y seguimiento a tres meses.
Resultados: Modelos de ecuaciones estructurales revelaron que el aumento total en PF durante la intervención está negativamente asociado a la reducción del estrés ($b = -0{,}63$, $SE = 0{,}14$, $p < 0{,}001$) y positivamente asociado con el aumento del bienestar durante la intervención ($b = 0{,}48$, $SE = 0{,}11$, $p < 0{,}001$), pero no con el descenso del estrés ($b = 0{,}03$, $SE = 0{,}27$, $p > 0{,}05$) y el bienestar ($b = -0{,}04$, $SE = 0{,}39$, $p > 0{,}05$) después de la intervención.
Conclusiones: Se proporciona base empírica de la reducción del estrés y el fomento del bienestar mediante ACT, enfatizando el potencial de PF para fomentar el bienestar.

Nearly everyone experiences stress in daily life, such as work deadlines, family arguments or being late for an appointment. These stressors can have a strong impact on well-being (Almeida, 2005; Schönfeld, Brailovskaia, Bieda, Zhang, & Margraf, 2016; Thoits, 2010). One particular deleterious type of stress is related to work. People who work may experience a substantial level of work-related stress (Eurofound, 2005). In one U.S. report, 40% of all professionals stated that their job is very or extremely stressful (American Psychological Association Center for Organizational Excellence, 2014). Work-related stress is associated with increased absenteeism and reduced efficiency at work and large costs for society (Henderson, Glozier, & Elliott, 2005; Kalia, 2002; Sultan-Taïeb, Chastang, Mansouri, & Niedhammer, 2013). Further, prolonged stress can lead to stress related disorders, which is subject to the Eleventh Revision of International Classification of Diseases and Related Health Problems (ICD-11) (Keeley et al., 2016; Maercker et al., 2013). Also it has been associated with a range of adverse health outcomes, such as anxiety and depression (Fawzy & Hamed, 2017; Herr et al., 2017; Melchior et al., 2007; Tennant, 2001), coronary disease (e.g. Li, Zhang, Loerbroks, Angerer, & Siegrist, 2014), and sleep problems (e.g. Faber & Schlarb, 2016).

Challenges of prolonged stress may at times exceed a person's capacity to cope effectively, and this is when mental health care may be sought. However, traditionally, the focus in mental health care has been on treating mental disorders and symptoms rather than promoting well-being (Seligman & Csikszentmihalyi, 2000). It has been recognized that mental health is more than simply the absence of mental illness. For instance, it has been addressed in the two-continua model of mental health that states that positive mental health or well-being is related to, but different from mental illness (Keyes, 2005). Well-being can be broken down into emotional, social, and psychological well-being (Diener, Napa Scollon, & Lucas, 2009; Diener, Suh, Lucas, & Smith, 1999; Ryff, 1989). Emotional well-being refers to feelings of happiness and (life) satisfaction. Psychological well-being refers to living a rich life, in which one's abilities are taken into account. Social well-being refers to the feeling that one values and is valued by the society in which one lives.

Prior studies with population-based samples investigating the interdependence of well-being and psychopathology (Keyes, 2007; Lamers, Westerhof, Glas, & Bohlmeijer, 2015; Trompetter, de Kleine, & Bohlmeijer, 2016) showed that well-being protects against mental illness through components such as positive relationships with others, autonomy, and environmental mastery. Two such studies showed that well-being over time buffers against mental illness and disease later in life (Grant, Guille, & Sen, 2013; Lamers et al., 2015). The latter showed that a decrease in psychopathology was linked to improved well-being, and a decrease in well-being was linked to higher levels of psychopathological symptoms. Another study indicated that low well-being was strongly associated with depression 10 years later (Wood & Joseph, 2010), and another found that changes of levels of well-being were related to the prevalence and incidence of mental illness in a 10-year time span (Keyes, Dhingra, & Simoes, 2010). In sum, findings consistently support the two-continua model and indicate the relevance of well-being for mental health care.

The two-continua model and existing studies about the impact of well-being indicate the need for interventions that explicitly promote well-being (Hayes, Strosahl, & Wilson, 1999, 2012; Keyes, 2007). Acceptance and Commitment

Therapy (ACT) is a cognitive behavioral therapy, which may fit well with mental health promotion, and one of the central goals of ACT is to increase psychological flexibility (PF). PF is the ability to adapt to a variety of different situational demands when doing so is useful for living a meaningful life, and it is thought to be an important mechanism of change during ACT interventions (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Acceptance and mindfulness are core processes of PF (Baer et al., 2008; Carmody & Baer, 2008; Soysa & Wilcomb, 2015). Another crucial focus is valued action and behavior change processes. Pursuing one's values has been found to be related to well-being and functioning, for instance, in mental health professionals (Veage et al., 2014), students (Sagiv & Schwartz, 2000), and (treatment-resistant) patients (Gloster, Sonntag, et al., 2015; Wersebe et al., 2016). Research has demonstrated that ACT is effective in promoting well-being (e.g., Bohlmeijer, Fledderus, Rokx, & Pieterse, 2011; Bohlmeijer, Lamers, & Fledderus, 2015; Fledderus, Bohlmeijer, Smit, & Westerhof, 2010). Though not always linear, results of an ACT effectiveness trial indicate that well-being improved in the ACT group compared to the control group from preintervention to postintervention and follow-up (Fledderus et al., 2010). Studies that examined guided self-help over the Internet aiming at increasing positive mental health found that over the course of therapy, participants reported significant improvements in all three aspects of well-being (e.g., Bohlmeijer et al., 2015; Fledderus, Bohlmeijer, Pieterse, & Schreurs, 2012). These findings indicate that change processes in acceptance and valued action are beneficial for an engaged and meaningful life (Hayes et al., 1999, 2012). Taken together, there are solid indications for the association of PF, and its increase through ACT, and well-being.

Enhancing PF has also been shown to be effective in reducing stress (e.g., Brinkborg, Michanek, Hesser, & Berglund, 2011; Dahl, Wilson, & Nilsson, 2004; Flaxman & Bond, 2010). Results in the treatment of social workers, for instance, show that stress decreased in an intervention group compared to a control group and that pre- to post-treatment changes in PF were linked to these decreases in stress (Brinkborg et al., 2011). One study's finding showed pre–post reductions in distress following an ACT intervention (Flaxman & Bond, 2010). Importantly, an increase in PF following the intervention resulted in reduced distress among working individuals. Research indicates that participants not only decreased in their stress levels but also in sick leave utilization (Dahl et al., 2004). In short, individuals with symptoms of work stress might especially benefit from ACT, as this intervention changes the focus from symptom reduction to engagement in acceptance and mindfulness (Carmody & Baer, 2008; Soysa & Wilcomb, 2015) and valued behaviors (Clarke, Kingston, James, Bolderston, & Remington, 2014; Gloster, Sonntag, et al., 2015)—core PF processes.

The purpose of the present study was to examine an increase in PF and its association with decreases in stress and increases in well-being during and following a self-help intervention based on ACT. In this study, a sample of individuals with heterogeneous occupations and with at least moderate levels of stress read an ACT self-help book. We hypothesized that a change in PF during the intervention (i.e., preintervention to postintervention) would be associated with (1) decreases in stress during the intervention (i.e., pre-intervention to post-intervention), and after the intervention (i.e., postintervention to followup), and (2) increases in well-being during (i.e., preintervention to postintervention), and after (i.e., postintervention to followup) the intervention.

Method

Design and procedure

Data were collected in an online randomized controlled trial comparing an ACT group to a waiting list (WL) control group for individuals with at least moderate levels of stress (Hofer et al., 2017). Participants were randomized to immediate intervention or one of two WL groups. Participants in the immediate intervention received a self-help book with weekly reading assignments and weekly assessments. The WL groups differed with respect to the presence (WL+) versus absence (WL−) of a weekly measurement of PF during their intervention. Participants in the WL− group were not contacted during the waiting period or the intervention. For this study, data of the participants in the WL− group were used only after they received treatment. After the waiting period, participants in the WL groups received the self-help book. Follow-up for all participants took place 3 months after the 6-week-intervention. The study was approved by the local ethics committee and full informed consent was secured from all participants.

Participants

Participants were recruited via a newsletter of a German health insurance company sent to members nationwide who were eligible for inclusion if they had an elevated score of 17 or more on the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). This value was chosen as it marks the mean of a normative adult population (Cohen & Janicki-Deverts, 2012) and has been used in several other studies (e.g., Brinkborg et al., 2011). This cut-off value assured that participants had a moderate or greater stress level. Individuals who were currently in psychotherapy treatment or showed clinically significant suicidal intent as indicated by a score greater than 1 on Item 9 of the Beck Depression Inventory-II (Beck, Steer, & Brown, 1996) were excluded. For the present study, the immediate intervention group and the WL+ were used, as participants in these groups filled out the weekly measure of PF relevant for the present study. In total, 133 participants were included in the study, of which 92 filled out the weekly measure on PF. We included 91 in our analysis (due to missing data).

Intervention

Participants received the self-help book *Burnout: mit Akzeptanz und Achtsamkeit den Teufelskreis durchbrechen (Burnout: Break the Vicious Cycle with Acceptance and Mindfulness*; Waadt & Acker, 2013a). The intervention was delivered with no therapist contact. The book consists of 11 chapters and presents processes and techniques stemming

from ACT. After each chapter participants were asked to complete practical exercises. Audio instructions for ACT processes were available for download on the book's website (Waadt & Acker, 2013b). To complete the book in 6 weeks, chapters were assigned in sections.

Measures

Participants completed measures at preintervention, postintervention, and follow-up. The ACT group (immediate intervention) and the WL+ group also completed weekly measurements during the intervention to assess PF. All questionnaires were administered online.

Mental Health Continuum—Short Form (MHC-SF; Keyes, 2005). The MHC-SF is a 14-item questionnaire that measures well-being scaling from 1 (*never*) to 6 (*every day*). Respondents rated their emotional well-being (3 items), social well-being (5 items), and psychological well-being (6 items) over the last month. For each aspect of well-being a mean score across the individual items was computed. Higher scores indicate greater well-being (Keyes, 2005; Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). The MHC-SF has demonstrated good psychometric properties across various age groups and nations (Lamers et al., 2011; Westerhof & Keyes, 2010).

Perceived Stress Scale (PSS; Cohen et al., 1983). The PSS is a 10-item self-report measure of perceived stress in certain situations. Higher scores indicate higher perceived stress levels (0–40 points). The PSS has shown good validity and reliability (Cohen et al., 1983).

Open and Engagement State Questionnaire (OESQ; Benoy, Knitter, Doering, Knellwolf, & Gloster, 2017). The OESQ is a one-dimensional measure that captures PF across 4 items considerating all six processes of ACT (acceptance, defusion, present moment, self-as-context, values and committed action), referring to its core processes, referring to its core processes. Higher scores indicate higher PF (0–4 points). A study on the psychometric properties of the OESQ in patients with panic disorder with agoraphobia and individuals with burnout indicated good internal consistency (Cronbach's ($\alpha = .87$) (Benoy et al., 2017).

Statistical analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 22.0 and Mplus version 6.12 (Muthén & Muthén, 2010). Hypotheses were tested with structural equation models, specifically latent growth curve models (LGMs; Heck & Thomas, 2015) (see Figure 1). LGMs are suitable for analyzing the nested structure of repeated measures data within a person and take advantage of the statistical power of analyzing multiple time points (Muthén & Curran, 1997). LGMs can incorporate incomplete cases in the analyses by using full-information maximum-likelihood estimation. Growth is described here using two parameters from the LGM, the intercept and the slope. The intercept is the score at a set time point—in this case the first week after preintervention. The linear slope is the average growth rate between repeated measurements of PF between pre- and postintervention. To test our assumptions that an increase in PF between preintervention and postintervention would be associated with pre–post decreases in stress and increases in well-being, we correlated the slope coefficient of PF from the LGM with the difference scores of stress and well-being. We used a correlation approach because PF was concurrently measured with stress or well-being between pre- and postintervention. To test our hypothesis that an increase in PF between pre- and postintervention would be associated with decreases in stress and increases in well-being between postintervention and follow-up, we regressed difference scores of well-being and stress on the slope coefficient of PF. The α level for statistical significance for all analyses was set to .05.

Results

Descriptive statistics

Descriptive statistics of all measures involved in the analyses at preintervention, postintervention, and follow-up are shown in Table 1. Well-being and PF increased over time while stress decreased.

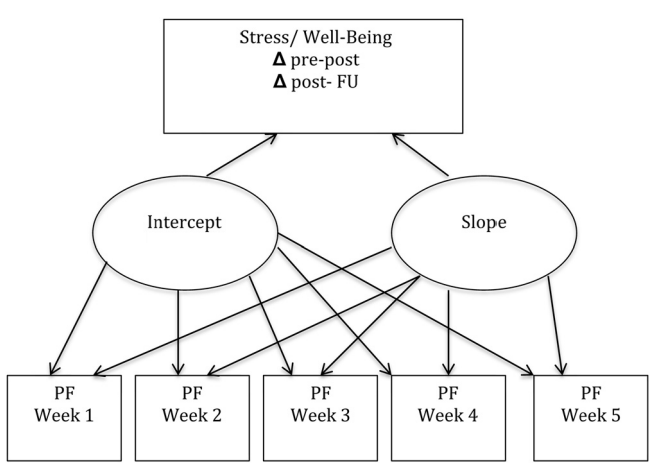

Figure 1 Structural Equation Model.

Please cite this article in press as: Wersebe, H., et al. The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention. *International Journal of Clinical and Health Psychology* (2017), http://dx.doi.org/10.1016/j.ijchp.2017.09.002

Table 1 Descriptive statistics of measures of well-being and psychological flexibility.

Measure	Baseline			Post			Follow-up		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Stress[a]	91	25.77	4.95	77	19.78	6.61	76	17.51	6.29
Overall well-being[b]	91	2.10	1.04	82	2.62	1.13	76	2.89	1.05
Emotional well-being[b]	91	2.24	1.16	81	2.72	1.22	76	3.16	1.14
Social well-being[b]	91	1.76	1.75	81	2.29	1.23	76	2.45	1.17
Psychological well-being[b]	91	2.28	1.12	81	2.80	1.20	76	3.08	1.14
Psychological flexibility[c]	91	14.91	6.71	74	23.34	8.82	71	23.80	8.72

[a] Measured with the Perceived Stress Scale.
[b] Measured with the Mental Health Continuum—Short Form.
[c] Measured with the Open and Engagement State Questionnaire.

Sample characteristics

Participants were largely female (72%), with an average age of 42.4 years (*SD* = 9.6) and ranging from 23-60 years. Participants were all Caucasian with the vast majority being German (97%), and the remaining Austrian and Hungarian. The social class distribution was as follows: 6.6% originated from the lowest, 30.8 from the lower middle, 56% from the middle and 6.6% from the upper middle social class. Further, 67% of the participants had an upper secondary education, 27.5% a higher education, 3.3% an other education while 2.2% had no education.

Is an increase in PF associated with a decrease in stress and an increase in well-being?

During the intervention. LGMs indicated that an increase in PF during the intervention was significantly negatively related to a decrease in stress and positively related to an increase in overall well-being as well as all three of its components: emotional, social, and psychological well-being during the intervention (Table 2). Estimates were highest for the association of PF with stress and overall well-being. Of the well-being subscales, emotional and psychological well-being resulted in higher estimates compared to social well-being.

After the intervention. An increase in PF during the intervention was not significantly associated with a decrease in stress and increase in well-being including all three subcomponents (emotional, social and psychological well-being) after the intervention (Table 2). Estimates for the association of PF with stress and overall well-being, including the subscales, were very small. As sex and age are not associated with both predictor (PF) and outcome (stress/well-being), the analyses were not controlled for sex and age (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001).

Table 2 Association between an increase in psychological flexibility during the intervention and changes in stress and well-being during or after the intervention.

Measure	Estimate	*SE*	*p* value
Change during the intervention			
Stress	−0.63	0.14	.00
Overall well-being	0.48	0.11	.00
Emotional well-being	0.45	0.13	.00
Social well-being	0.29	0.13	.02
Psychological well-being	0.36	0.12	.00
Change after the intervention			
Stress	0.03	0.27	.91
Overall well-being	-0.04	0.39	.91
Emotional well-being	-0.13	0.33	.70
Social well-being	-0.12	0.42	.78
Psychological well-being	-0.13	0.33	.70

Note. Reported estimates are based on standardized values.

Discussion

The aim of this study was to investigate the association of an increase in PF with stress and well-being for individuals with at least a moderate level of stress. To the best of our knowledge, this is the first study to examine whether an increase in PF during an intervention is related to decreases in stress and increases in well-being after the intervention. As hypothesized, we found that a total increase in PF during the intervention was related to a decrease in stress and an increase in well-being during the intervention, but not after the intervention. These findings are in line with earlier research in the treatment of stress among social workers (Brinkborg et al., 2011), which found that changes in PF during an intervention were linked with decreases in stress during the intervention. Prolonged high levels of stress typically involve serious disruptions in daily life, and studies have suggested that ACT alters responses to stress in a way that leads to a reduction of stress (Bond & Bunce, 2003; Frögéli, Djordjevic, Rudman, & Livheim, 2016; Lloyd, Bond, & Flaxman, 2013). A group intervention study of individuals with psychological distress found that increases in PF during the intervention were related to increased well-being at postintervention (Fledderus et al., 2010). Our findings indicate that individuals with symptoms of stress benefit from a structured self-help intervention such as ours, which promoted changes in PF.

Well-being has crucial implications for the individual, society, and the economy and importantly, our findings imply that PF is linked to well-being. Evidence suggests that well-being is clearly connected to health care utilization, psychosocial adaptation and functioning, and work

productivity (Chida & Steptoe, 2008; Keyes, 2004; Keyes & Grzywacz, 2005) and that ACT interventions are positively related to enhanced well-being (Bohlmeijer et al., 2015; Fledderus et al., 2010; Livheim et al., 2014; Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016).

A total increase in PF during the intervention was not associated with decreases in stress and increases in well-being after the intervention. Thus, people's increase in PF during the intervention was not related to their decreases in stress and increases in well-being after the intervention. This is partly opposed to earlier findings (e.g., Fledderus et al., 2010), that found increases of PF during the intervention (i.e. baseline to post treatment) were linked to improved well-being at follow-up. One study (Brinkborg et al., 2011) has examined the relationship between PF and improvements in stress and well-being during the intervention. To our knowledge, however, it has not previously been tested whether increases in PF during the intervention are linked to decreases in stress and increases in well-being after the intervention. Hence, our findings extend earlier research.

This study needs to be interpreted with several limitations taken into account. First, this study relied on self-reported measurements. These are prone to biases inherent in this assessment approach. Analyses of information stemming from other sources (e.g., experience sampling, friends and family or employers) may have resulted in different findings as self-report measures may not capture stress and well-being in their full complexity. A combination of self-report measures with physiological measures may deliver further insights. Second, the study sample was limited to individuals with symptoms of moderate to elevated levels of stress from the general population. Therefore findings cannot be extrapolated to individuals of low or (very) high stress. Third, participants were recruited through a newsletter of a health insurance company, which may have led to selection bias. Thus, participants were likely motivated and believed in the treatment approach as well its efficacy. Nevertheless, recruiting with the newsletter of the health insurance company is at the same time a strength as it allowed to sample nationwide. This is unique in a study in individuals with elevated levels of stress and more representative of the general population than recruiting in one particular company. However, identity of the participants was not revealed to the health insurance company. It may be possible that individuals are less willing to read a self-help book or may react differently if offered, for instance, by the employer. Further, it remains unknown whether the change process in PF with stress and well-being are similar in clinical populations, for example. As this is the first time that bivariate analyses of PF with stress and well-being were executed based on a self-help intervention, we cannot draw any conclusion whether strengths of associations are different in face-to-face therapy or guided self-help.

These limitations notwithstanding, our study shows that individuals with elevated stress levels at baseline reported an increase in PF, which was associated with a decrease in stress and an increase in well-being during an ACT intervention. Further, our results are of clinical importance, as self-help interventions are easily accessible, inexpensive (Ebert et al., 2016; Marks & Cavanagh, 2009), and can evidently promote crucial processes of change in stress and well-being. Further strengths of the study are the sample of individuals with heterogeneous occupations and that it is interconnected with studies designed to examine PF across different levels of analysis, including genetic research, in which PF has been linked with genetic polymorphisms (Gloster, Gerlach, et al., 2015). We have extended the existing body of literature by explicitly investigating the link between changes in PF, stress, and well-being and thus integrating research on PF, stress, and well-being.

More research on the temporal relationship between PF and stress and well-being is certainly needed. Future research should investigate if the association of changes between PF and stress and well-being is different in face to face therapy or guided self-help. Future work should also, for instance, extend the number of measurements of the outcome (e.g., after each week or session). This would enable a more fine-grained analysis of when relevant changes occur and how these changes are associated with each other. This is important as the reduction of stress and promotion of well-being could help deter more serious problems from developing. Our longitudinal analysis emphasized the potential of PF in promoting well-being and creating substantial changes in participants' lives and thus provides support for the theory that PF and well-being are strongly linked (Ciarrochi & Kashdan, 2013; Hayes, 2013).

Funding

The work was supported in part by the Swiss National Science Foundation (FNSNF) under Grant no. 100014_149524/1 & PP00P1_163716/1.

References

Almeida, D. M. (2005). Resilience and Vulnerability to Daily Stressors Assessed via Diary Methods. *Current Directions in Psychological Science*, *14*, 64–68.

American Psychological Association Center for Organizational Excellence (2014). *2014 Work and well-being survey.*. Retrieved from http://www.apaexcellence.org/assets/general/2014-work-and-wellbeing-survey-results.pdf

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., & Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, *15*, 329–342. http://dx.doi.org/10.1177/1073191107313003

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory-II*. San Antonio, TX: Psychological Corporation.

Benoy, C., Knitter, B., Doering, S., Knellwolf, L., & Gloster, A. T. (2017). *Assessing Psychological Flexibility: Validation Of The Open and Engagement State Questionnaire*. Manuscript submitted for publication.

Bohlmeijer, E. T., Fledderus, M., Rokx, T. A. J., & Pieterse, M. E. (2011). Efficacy of an early intervention based on acceptance and commitment therapy for adults with depressive symptomatology: Evaluation in a randomized controlled trial. *Behaviour Research and Therapy*, *49*, 62–67. http://dx.doi.org/10.1016/j.brat.2010.10.003

Bohlmeijer, E. T., Lamers, S. M. A., & Fledderus, M. (2015). Flourishing in people with depressive symptomatology increases with Acceptance and Commitment Therapy. Post-hoc analyses of a

randomized controlled trial. *Behaviour Research and Therapy*, *65*, 101–106. http://dx.doi.org/10.1016/j.brat.2014.12.014

Bond, F. W., & Bunce, D. (2003). The role of acceptance and job control in mental health, job satisfaction, and work performance. *The Journal of Applied Psychology*, *88*, 1057–1067. http://dx.doi.org/10.1037/0021-9010.88.6.1057

Brinkborg, H., Michanek, J., Hesser, H., & Berglund, G. (2011). Acceptance and commitment therapy for the treatment of stress among social workers: A randomized controlled trial. *Behaviour Research and Therapy*, *49*, 389–398. http://dx.doi.org/10.1016/j.brat.2011.03.009

Carmody, J., & Baer, R. A. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine*, *31*, 23–33. http://dx.doi.org/10.1007/s10865-007-9130-7

Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: A quantitative review of prospective observational studies. *Psychosomatic Medicine*, *70*, 741–756. http://dx.doi.org/10.1097/PSY.0b013e31818105ba

Ciarrochi, J., & Kashdan, T. B. (2013). The foundations of flourishing. In T. B. Kashdan, & J. Ciarrochi (Eds.), *Mindfulness, acceptance and positive psychology* (pp. 1–29). Oakland, CA: New Harbinger Press.

Clarke, S., Kingston, J., James, K., Bolderston, H., & Remington, B. (2014). Acceptance and commitment therapy group for treatment-resistant Participants: A randomised controlled trial. *Journal of Contextual Behavioral Science*, http://dx.doi.org/10.1016/j.jcbs.2014.04.005

Cohen, S., & Janicki-Deverts, D. (2012). Who's Stressed? Distributions of Psychological Stress in the United States in Probability Samples from 1983, 2006, and 2009. *Journal of Applied Social Psychology*, *42*, 1320–1334. http://dx.doi.org/10.1111/j.1559-1816.2012.00900.x

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*, 385–396.

Dahl, J., Wilson, K. G., & Nilsson, A. (2004). Acceptance and commitment therapy and the treatment of persons at risk for long-term disability resulting from stress and pain symptoms: A preliminary randomized trial. *Behavior Therapy*, *35*, 785–801. http://dx.doi.org/10.1016/S0005-7894(04)80020-0

Diener, E., Napa Scollon, C., & Lucas, R. E. (2009). The evolving concept of subjective well-being: The multifaceted nature of happiness. *Assessing Well-Being*, *15*, 67–100. http://dx.doi.org/10.1016/S1566-3124(03)15007-9

Diener, E., Suh, M. E., Lucas, E. R., & Smith, L. H. (1999). Subjective Well-Being: Three Decades of Sucess. *Psychological Bulletin*, *25*, 270–302.

Ebert, D. D., Heber, E., Berking, M., Riper, H., Cuijpers, P., Funk, B., & Lehr, D. (2016). Self-guided internet-based and mobile-based stress management for employees: Results of a randomised controlled trial. *Occupational and Environmental Medicine*, http://dx.doi.org/10.1136/oemed-2015-103269, oemed-2015

Eurofound. (2005). Fourth European Working Conditions Survey. In *European Foundation for the Improvement of Living and Working Conditions*.. Retrieved from www.eurofound.eu.int/pubdocs/2006/78/en/1/ef0678en.pdf

Faber, J., & Schlarb, A. A. (2016). The Relation of Sleep, Distress, and Coping Strategies—What Male and Female Students Can Learn from Each Other? *Health*, *8*, 1356–1367. http://dx.doi.org/10.4236/health.2016.813136

Fawzy, M., & Hamed, S. A. (2017). Psychological stress among medical students in Assiut University, Egypt. *Psychiatry Research*, *255*, 186–194. http://dx.doi.org/10.1016/j.psychres.2017.05.027

Flaxman, P. E., & Bond, F. W. (2010). A randomised worksite comparison of acceptance and commitment therapy and stress inoculation training. *Behaviour Research and Therapy*, *48*, 816–820. http://dx.doi.org/10.1016/j.brat.2010.05.004

Fledderus, M., Bohlmeijer, E. T., Pieterse, M. E., & Schreurs, K. M. G. (2012). Acceptance and commitment therapy as guided self-help for psychological distress and positive mental health: A randomized controlled trial. *Psychological Medicine*, *42*, 485–495. http://dx.doi.org/10.1017/S0033291711001206

Fledderus, M., Bohlmeijer, E. T., Smit, F., & Westerhof, G. J. (2010). Mental health promotion as a new goal in public mental health care: A randomized controlled trial of an intervention enhancing psychological flexibility. *American Journal of Public Health*, *100*, 2372. http://dx.doi.org/10.2105/AJPH.2010.196196

Frögéli, E., Djordjevic, A., Rudman, A., & Livheim, F. (2016). A randomized controlled pilot trial of acceptance and commitment training (ACT) for preventing stress-related ill health among future nurses. *Anxiety, Stress, & Coping*, *29*, 1–17. http://dx.doi.org/10.1080/10615806.2015.1025765

Gloster, A. T., Gerlach, A. L., Hamm, A., Höfler, M., Alpers, G. W., Kircher, T., Ströle, A., Lang, T., Wittchen, H. U., Deckert, J., & Reif, A. (2015). 5HTT is associated with the phenotype psychological flexibility: Results from a randomized clinical trial. *European Archives of Psychiatry and Clinical Neuroscience*, *265*, 399–406. http://dx.doi.org/10.1007/s00406-015-0575-3

Gloster, A. T., Sonntag, R., Hoyer, J., Meyer, A. H., Heinze, S., Stroehle, A., Eifert, G., & Wittchen, H.-U. (2015). Treating Treatment-Resistant Patients with Panic Disorder and Agoraphobia Using Psychotherapy: A Randomized Controlled Switching Trial. *Psychotherapy and Psychosomatics*, *84*, 100–109. http://dx.doi.org/10.1159/000370162

Grant, F., Guille, C., & Sen, S. (2013). Well-Being and the Risk of Depression under Stress. *PLoS ONE*, *8* http://dx.doi.org/10.1371/journal.pone.0067395

Hayes, S. C. (2013). The genuine conversation. In T. B. Kashdan, & J. Ciarrochi (Eds.), *Mindfulness, acceptance and positive psychology* (pp. 303–322). Oakland, CA: New Harbinger Press.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, *44*, 1–25. http://dx.doi.org/10.1016/j.brat.2005.06.006

Hayes, S. C., Strosahl, K., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiental approach to behavior change*. New York: Guilford Press.

Hayes, S. C., Strosahl, K., & Wilson, K. G. (2012). *Acceptance and commitment therapy: An experiental approach to behavior change*. New York: Guilford Press.

Heck, R., & Thomas, S. L. (2015). *An Introduction to Multilevel Modeling Techniques: MLM and SEM Approaches Using Mplus*. New York: Routledge.

Henderson, M., Glozier, N., & Elliott, K. H. (2005). Long term sickness absence: Is caused by common conditions and needs managing. *British Medical Journal*, *330*, 802–803. http://dx.doi.org/10.1136/bmj.330.7499.1087-a

Herr, R. M., Li, J., Loerbroks, A., Angerer, P., Siegrist, J., & Fischer, J. E. (2017). Effects and mediators of psychosocial work characteristics on somatic symptoms six years later: Prospective findings from the Mannheim Industrial Cohort Studies (MICS). *Journal of Psychosomatic Research*, *98*, 27–33. http://dx.doi.org/10.1016/j.jpsychores.2017.05.00

Hofer, P., Waadt, M., Aschwanden, R., Milidou, M., Acker, J., Meyer, A. H., Lieb, R., & Gloster, A. T. (2017). *The effectiveness of an ACT Self-help Intervention for Stress and Burnout without Therapist Contact: An Online Randomized Controlled Trial*. Manuscript submitted for publication.

Kalia, M. (2002). Assessing the economic impact of stress-The modern day hidden epidemic. *Metabolism*, *51*, 49–53. http://dx.doi.org/10.1053/meta.2002.33193

Keeley, J. W., Reed, G. M., Roberts, M. C., Evans, S. C., Robles, R., Matsumoto, C., Brewin, C. R., Cloitre, M., Perkonigg, A., Rousseau, C., Gureje, O., Lovell, P., Sharon, P., & Maercker, A. (2016). Disorders specifically associated with stress: A case-controlled field study for ICD-11 mental and behavioural disorders. *International Journal of Clinical and Health Psychology*, *16*, 109–127. http://dx.doi.org/10.1016/j.ijchp.2015.09.002

Keyes, C. L. M. (2004). The nexus of cardiovascular disease and depression revisited: The complete mental health perspective and the moderating role of age and gender. *Aging & Mental Health*, *8*, 266–274. http://dx.doi.org/10.1080/13607860410001669804

Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, *73*, 539–548. http://dx.doi.org/10.1037/0022-006X.73.3.539

Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *The American Psychologist*, *62*, 95–108. http://dx.doi.org/10.1037/0003-066X.62.2.95

Keyes, C. L. M., Dhingra, S. S., & Simoes, E. J. (2010). Change in level of positive mental health as a predictor of future risk of mental illness. *American Journal of Public Health*, *100*, 2366–2371. http://dx.doi.org/10.2105/AJPH.2010.192245

Keyes, C. L. M., & Grzywacz, J. G. (2005). Health as a complete state: The added value in work performance and healthcare costs. *Journal of Occupational and Environmental Medicine/American College of Occupational and Environmental Medicine*, *47*, 523–532. http://dx.doi.org/10.1097/01.jom.0000161737.21198.3a

Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry*, *158*, 848–856. http://dx.doi.org/10.1176/appi.ajp.158.6.848

Lamers, S. M. A., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2011). Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF). *Journal of Clinical Psychology*, *67*, 99–110. http://dx.doi.org/10.1002/jclp.20741

Lamers, S. M. A., Westerhof, G. J., Glas, C. A. W., & Bohlmeijer, E. T. (2015). The bidirectional relation between positive mental health and psychopathology in a longitudinal representative panel study. *The Journal of Positive Psychology*, *10*, 1–8. http://dx.doi.org/10.1080/17439760.2015.1015156

Li, J., Zhang, M., Loerbroks, A., Angerer, P., & Siegrist, J. (2014). Work stress and the risk of recurrent coronary heart disease events: A systematic review and meta-analysis. *International Journal of Occupational Medicine and Environmental Health*, *28*, 8–19. http://dx.doi.org/10.2478/s13382-014-0303-7

Livheim, F., Hayes, L., Ghaderi, A., Magnusdottir, T., Högfeldt, A., Rowse, J., Turner, S., Hayes, S. C., & Tengström, A. (2014). The Effectiveness of Acceptance and Commitment Therapy for Adolescent Mental Health: Swedish and Australian Pilot Outcomes. *Journal of Child and Family Studies*, 1–15. http://dx.doi.org/10.1007/s10826-014-9912-9

Lloyd, J., Bond, F. W., & Flaxman, P. E. (2013). The value of psychological flexibility: Examining psychological mechanisms underpinning a cognitive behavioural therapy intervention for burnout. *Work & Stress*, *27*, 181–199. http://dx.doi.org/10.1080/02678373.2013.782157

Maercker, A., Brewin, C. R., Bryant, R. A., Cloitre, M., Reed, G. M., Van Ommeren, M., Humayun, A., Jones, L. M., Kagee, A., Llosa, A. E., Rousseau, C., Somasundaram, D. J., Souza, R., Suzuki, Y., Weissbecker, I., Wessely, S., First, M. B., & Saxena, S. (2013). Proposals for mental disorders specifi cally associated with stress in the International Classification of Diseases-11. *Lancet*, *381*, 1683–1685.

Marks, I., & Cavanagh, K. (2009). Computer-aided psychological treatments: Evolving issues. *Annual Review of Clinical Psychology*, *5*, 121–141. http://dx.doi.org/10.1146/annurev.clinpsy.032408.153538

Melchior, M., Caspi, A., Milne, B. J., Danese, A., Poulton, R., & Moffitt, T. E. (2007). Work stress precipitates depression and anxiety in young, working women and men. *Psychological Medicine*, *37*, 1119–1129. http://dx.doi.org/10.1017/S0033291707000414

Muthén, B. O., & Curran, P. J. (1997). General longitudinal modeling of individual differences in experimental designs: A latent variable framework for analysis and power estimation. *Psychological Methods*, *2*, 371–402. http://dx.doi.org/10.1037/1082-989X.2.4.371

Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.

Räsänen, P., Lappalainen, P., Muotka, J., Tolvanen, A., & Lappalainen, R. (2016). An online guided ACT intervention for enhancing the psychological wellbeing of university students: A randomized controlled clinical trial. *Behaviour Research and Therapy*, *78*, 30–42. http://dx.doi.org/10.1016/j.brat.2016.01.001

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*, 1069–1081. http://dx.doi.org/10.1037/0022-3514.57.6.1069

Sagiv, L., & Schwartz, S. H. (2000). Value priorities and subjective well-being: Direct relations and congruity effects. *European Journal of Social Psychology*, *30*, 177–198. http://dx.doi.org/10.1002/(Sici)1099-0992(200003/04)30:2<177:Aid-Ejsp982>3.0.Co;2-Z

Schönfeld, P., Brailovskaia, J., Bieda, A., Zhang, X. C., & Margraf, J. (2016). The effects of daily stress on positive and negative mental health: Mediation through self-efficacy. *International Journal of Clinical and Health Psychology*, *16*, 1–10. http://dx.doi.org/10.1016/j.ijchp.2015.08.005

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, *55*, 5–14. http://dx.doi.org/10.1037//0003-066X.55.1.5

Soysa, C. K., & Wilcomb, C. J. (2015). Mindfulness, self-compassion, self-efficacy, and gender as predictors of depression, anxiety, stress, and well-being. *Mindfulness*, *6*, 217–226. http://dx.doi.org/10.1007/s12671-013-0247-1

Sultan-Taïeb, H., Chastang, J.-F., Mansouri, M., & Niedhammer, I. (2013). The annual costs of cardiovascular diseases and mental disorders attributable to job strain in France. *BMC Public Health*, *13*, 748. http://dx.doi.org/10.1186/1471-2458-13-748

Tennant, C. (2001). Work-related stress and depressive disorders. *Journal of Psychosomatic Research*, *51*, 697–704. http://dx.doi.org/10.1016/S0022-3999(01)00255-0

Thoits, P. A. (2010). Stress and Health: Major Findings and Policy Implications. *Journal of Health and Social Behavior*, *51*, S41–S53. http://dx.doi.org/10.1177/0022146510383499

Trompetter, H. R., de Kleine, E., & Bohlmeijer, E. T. (2016). Why Does Positive Mental Health Buffer Against Psychopathology? An Exploratory Study on Self-Compassion as a Resilience Mechanism and Adaptive Emotion Regulation Strategy. *Cognitive Therapy and Research*, 1–10. http://dx.doi.org/10.1007/s10608-016-9774-0

Veage, S., Ciarrochi, J., Deane, F. P., Andresen, R., Oades, L. G., & Crowe, T. P. (2014). Value congruence, importance and success and in the workplace: Links with well-being and burnout amongst mental health practitioners. *Journal of Contextual Behavioral Science*, *3*, 258–264. http://dx.doi.org/10.1016/j.jcbs.2014.06.004

Waadt, M., & Acker, J. (2013a). *Burnout: mit Akzeptanz und Achtsamkeit den Teufelskreis durchbrechen*. Bern: Hans Huber.

Waadt, M., & Acker, J. (2013b). *Downloadbereich ACT gegen Burnout*.. Retrieved from http://www.act-gegen-burnout.de/download.php

Wersebe, H., Lieb, R., Meyer, A. H., Hoyer, J., Wittchen, H.-U., & Gloster, A. T. (2016). Changes of valued behaviors and functioning during an Acceptance and Commitment Therapy Intervention. *Journal of Contextual Behavioral Science*, 1–8. http://dx.doi.org/10.1016/j.jcbs.2016.11.005

Westerhof, G. J., & Keyes, C. L. M. (2010). Mental Illness and Mental Health: The Two Continua Model Across the Lifespan. *Journal of Adult Development*, *17*, 110–119. http://dx.doi.org/10.1007/s10804-009-9082-y

Wood, A. M., & Joseph, S. (2010). The absence of positive psychological (eudemonic) well-being as a risk factor for depression: A ten year cohort study. *Journal of Affective Disorders*, *122*, 213–217. http://dx.doi.org/10.1016/j.jad.2009.06.032

Please cite this article in press as: Wersebe, H., et al. The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention. *International Journal of Clinical and Health Psychology* (2017), http://dx.doi.org/10.1016/j.ijchp.2017.09.002

Appendix B

Changes of valued behaviors and functioning during an Acceptance and Commitment Therapy Intervention

Hanna Wersebe, Roselind Lieb, Andrea H Meyer, Jürgen Hoyer, Hans-Ulrich Wittchen & Andrew T. Gloster

Published in *Journal of Contextual Behavioral Science*

Journal of Contextual Behavioral Science 6 (2017) 63–70

Contents lists available at ScienceDirect

Journal of Contextual Behavioral Science

journal homepage: www.elsevier.com/locate/jcbs

Empirical research

Changes of valued behaviors and functioning during an Acceptance and Commitment Therapy Intervention

Hanna Wersebe[a], Roselind Lieb[a], Andrea H. Meyer[a], Jürgen Hoyer[b], Hans-Ulrich Wittchen[b], Andrew T. Gloster[a,b,*]

[a] University of Basel, Department of Psychology, Division of Clinical Psychology and Epidemiology, Switzerland
[b] Technische Universität Dresden, Clinical Psychology and Psychotherapy, Germany

ARTICLE INFO

Keywords:
Acceptance and Commitment therapy
Values
Valued behaviors
Panic disorder
Treatment-resistant patients
Functioning

ABSTRACT

Background: Living in line with one's values is believed to be beneficial for a person's well-being. Working with values in the therapeutic context often reveals that individuals do no live congruent with their chosen values. This study aimed to investigate how patients' valued behaviors change during an Acceptance and Commitment Therapy (ACT) and how these changes are associated with functioning. Further, this study aimed to examine whether valued behaviors changed depending on pre-treatment levels of symptomatology.
Methods: This was a standardized randomized controlled trial with an ACT intervention. Participants were 41 adult patients with treatment-resistant panic disorder. Measurements were completed at pre-treatment, 4-weeks-post-treatment, as well as 6-months after treatment.
Results: The discrepancy between how important something is and how much someone does in accordance to their values decreased across treatment. Higher pre-treatment panic symptomatology led to higher improvements in valued action, compared to lower pre-treatment symptomatology. Yet, all patients reached comparable end-points. Functioning increased over the entire study period and increases in functioning were associated with increases in importance and valued action.
Discussion: Our study extends prior findings about valued behaviors in ACT by showing that treatment-resistant patients with panic disorder decreased the discrepancy between what is considered important and valued action. Further studies investigating changes in valued behaviors across various diagnoses and treatments are clearly necessary.

1. Introduction

Living according to one's values is beneficial for a person's well-being (Rogers, 1965). One therapy that explicitly concentrates on values is Acceptance and Commitment Therapy (ACT). ACT is a variant of cognitive behavioral therapy (CBT) and, one of the central goals of ACT is to help clients live more in touch with and act according to their values. In ACT, values are defined as "freely chosen, verbally constructed consequences of ongoing, dynamic, evolving patterns of activity, which establish predominant reinforces for that activity that are intrinsic in engagement in the valued behavioral pattern itself" (Wilson & DuFrene, 2009). Concentrating on values in the therapeutic context often reveals that individuals do not live in line with their stated values (Michalak, Heidenreich, & Hoyer, 2011; Wilson, Sandoz, Kitchens, & Roberts, 2010). Individuals may be clear about what they value but their behavior towards their values may be ineffectual or infrequent. The reason for this may include that individuals form behavior patterns that allow them to avoid experiences and events with uncomfortable sensations. As a result, values may be compromised.

Acceptance-Based Behavior Therapy is believed to help by linking specific actions to the client's own chosen values in order to achieve valued action. Valued action can be defined as effective behavior linked to chosen values (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Interestingly, patients with mental disorders may show less valued action compared to healthy counterparts. For instance, patients with Generalized Anxiety Disorder (GAD) reported less valued action compared to non-anxious controls, and after an Acceptance-Based Behavior Therapy intervention valued action increased significantly (Michelson, Lee, Orsillo, & Roemer, 2011) Patients with high levels of symptomatology increased less in valued action compared to those with lower levels of symptoms. Another study showed that engaging in valued action is associated with both improved quality of life and well-

* Correspondence to: University of Basel, Department of Psychology, Division of Clinical Psychology and Intervention Science, Missionsstrasse 60-62, CH-4055 Basel, Switzerland.
E-mail address: Andrew.gloster@unibas.ch (A.T. Gloster).

http://dx.doi.org/10.1016/j.jcbs.2016.11.005
Received 4 February 2016; Received in revised form 3 October 2016; Accepted 9 November 2016

being and less seizures in epilepsy patients (Lundgren, Dahl, & Hayes, 2008).

Prior research showed that most complaints of individuals entering psychotherapy are about domains in interpersonal areas (Davies-Osterkamp, Strauss, & Schmitz, 1996). In another study more than half of the sample chose social relationships as most meaningful to them as opposed to religion, physical activities and other domains (Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012). Further, a considerable number of anxiety and depression patients rate social domains such as relationships, parenthood, and intimacy as essential treatment goals Grosse & Grawe (2002). Although the significance of social domains has been identified, to our knowledge no study has directly compared how patient's valued behaviors differs and changes within treatment in respect to social and non-social domains.

Given the concentration of values within ACT, it is reasonable to expect that this change is associated with an increase in functioning. That is, a person who is engaged in his/her life in a way that is subjectively meaningful is also likely to subjectively report high levels of functioning. Indeed, a number of studies investigated the impact of ACT on functioning, e.g., within the treatment of chronic pain (e.g. McCracken & Yang, 2006; Steiner, Bogusch, & Bigatti, 2013; Vowles & McCracken, 2008). In accordance with the WHO definition, functioning is in the present study understood as the ability to carry out objective performances and routine activities in a given life domain, for instance at home, work, school and other areas in which roles may have to be performed. Other outcome studies also showed that ACT interventions are associated with improved functioning, for instance in the treatment of eating disorders (Juarascio, Forman, & Herbert, 2010), substance use disorders (Luoma, Kohlenberg, Hayes, & Fletcher, 2012) and worksite stress (Flaxman & Bond, 2010). Vowles and McCracken (2008) showed that daily functioning improved significantly throughout the study period.

Of individuals starting treatments, a large number do not respond to treatment. For anxiety disorders a number between 33% and 50% were estimated (e.g. Taylor, Abramowitz, & McKay, 2012). That estimate does not include patients who have residual symptoms despite some treatment success (Brown, Antony, & Barlow, 1995; Fava & Mangelli, 1999). Treatment-resistant patients may especially benefit from ACT, as this treatment changes the focus from symptom reduction to the engagement in valued behaviors (Clarke, Kingston, James, Bolderston, & Remington, 2014; Clarke, Kingston, Wilson, Bolderston, & Remington, 2012; Hayes, Strosahl & Wilson, 2012; Gloster, Sonntag, Hoyer, Meyer, & Heinze et al., 2015; Gloster, Gerlach et al., 2015). Further, in ACT patients learn to live more flexibly with their symptoms and include values in their every day life even though symptoms may persist (Gloster, Chaker, Klotsche, Hummel & Hoyer, 2011; Hayes, Strosahl & Wilson, 2012).

Thus, building on the relevance of valued behaviors (Michelson, Lee, Orsillo, & Roemer, 2011), and perhaps in particular in treatment-resistant patients (Clarke, Kingston, James, Bolderston, & Remington, 2014; Gloster et al., 2015) we aim to investigate changes of valued behaviors and their association with functioning in a standardized randomized controlled trial with an ACT intervention. We hypothesize, (1a) that valued behaviors increase over the course of the study, (1b) that valued behaviors in social and non-social domains differ from each other at all time points and, (1c) that valued behaviors in social domains increase more than in non-social domains. Given that no research has examined how valued behaviors differs in respect to social and non-social domains, we considered our analyses addressing these hypotheses as exploratory. Further, we hypothesize (2) that initial lower levels of panic symptomatology are associated with a subsequent higher increase in valued action. Finally, we expect (3a) functioning to increase over the course of the study and (3b) a positive association between increases in valued action and increases in functioning.

2. Methods

2.1. Design

Data were collected within a randomized controlled trial (RCT) of ACT compared to Waiting list (WL) for patients with treatment-resistant PD and/or agoraphobia (PD/A) in Germany. Patients were randomized to immediate treatment (n =33) or a WL condition (n=10). Follow-Up (FU) took place after 6 months. A comprehensive description of the procedures can be found elsewhere (Gloster et al., 2015). That study examined the efficacy of patients with PD and/or agoraphobia that were non-responding to prior state-of-the-art therapy and switched to ACT.

2.2. Participants

Participants were recruited from a sample used in a prior RCT study on the effects of exposure based CBT that failed to improve (for details see Gloster et al., 2015). Forty-one patients with a primary DSM-IV diagnosis of PD with or without agoraphobia were included in the study. The majority of the sample was female (69.8%), with an average age of 36.9 years and had 10–13+ years of education and was employed. Most of the patients had a comorbid disorder, and among them social phobia and any specific phobia were most frequent. Furthermore, patients had on average a history of 42.3 previous therapy sessions of a state-of-the-art treatment of CBT, pharmacotherapy, or both (cf. Gloster et al., 2015). Patients were eligible for inclusion in the trial if they failed or had insufficient improvement in previous gold-standard treatments (Gloster et al., 2009, 2011). Specifically, patients with prior psychotherapy were supposed to have had ≥20 sessions of empirically supported treatments, such as cognitive-behavioral therapy with exposure in situ, cognitive restructuring etc. Patients with prior pharmacology had an intake of an approved drug for the minimum dosage in line with the recommended guidelines (Bandelow et al., 2008).

2.3. Intervention

An adapted manual of ACT for anxiety disorders was used (Eifert & Forsyth, 2005, Eifert & Gloster, 2016). ACT is a behavioral treatment and its general goal is to increase psychological flexibility (PF). PF consists of six processes: acceptance, present moment awareness, defusion, self-as-context (observer perspective), value clarification, and valued action. All six core processes of psychological flexibility were addressed. Values were discussed in the initial session and concentrated again in the second half of the treatment. Over the course of treatment patients learn to become more aware and accepting of anxiety and other uncomfortable emotions. Patients ultimately acquire this new stance so they can engage in important domains of their life while experiencing anxiety or unpleasant emotions. The intervention consisted of eight sessions administered twice weekly over 4 weeks. The sessions lasted between 90 and 120 min. The intervention was administered by graduate students of a CBT university training center. Therapists were experienced in CBT, but had no prior experience with ACT treatments. In addition, therapists were trained with a 3-days intensive training, readings, self-study and were tested via a competency test. The manual was also successfully applied in a large randomized clinical trial comparing ACT and CBT (Arch et al., 2012). After a 4-week waiting period patients in the WL were offered treatment. Patients in the WL did not receive treatment during the FU period.

2.4. Measures

2.4.1. Valued Living Questionnaire (VLQ-2; Wilson et al., 2010)

Values were measured with the Valued Living Questionnaire.

Respondents rate one a 1–10 scale the importance of 10 different domains: family, marriage /couples/ intimate relationships, parenting, friendship, work, education, recreation, spirituality, citizenship, and physical self-care. Using the same scale, respondents are asked to rate how consistently they have lived in accord with each value. The respondents' ratings are used to generate four different scores of different facets of valued behaviors: (1) importance; (2) valued action; (3) valued living composite; and (4) valued living discrepancy. The (1) importance score and (2) valued action score are created by adding the responses of the respective category and calculating the average across the 10 domains. The (3) valued living composite is a weighted mean of valued action and is calculated by multiplying the (1) importance and (2) valued action responses for each area. The valued living composite can range from 10 to 100 and takes into account the relative importance a respondent assigns to a given value in the context of how consistently it was lived. The (4) valued living discrepancy is the difference between importance and the actual valued action and is calculated by subtracting importance from valued action. The discrepancy score can range from -9 to 9. A study on the psychometric properties of the VLQ in undergraduate students indicated adequate internal consistency (Cronbach's α=0.74) (Wilson et al., 2010).

In the present paper, we refer to the four different scores (i.e., importance, valued action, valued living composite and valued living discrepancy) as facets of valued behaviors, whereas valued behaviors is used as an overarching term for the four different facets.

Valued Behaviors in Social vs. *Non- Social Domains*. To examine valued behaviors (importance, valued action, valued living composite and discrepancy) in social domains the mean of the domains family, intimate relationships, parenthood and friendships were compared to the remaining six non-social domains (e.g., work, education, etc).

2.4.2. Panic and Agoraphobia Scale (PAS; Bandelow, 1995)

The PAS is a self-reported 13-item questionnaire that measures levels of panic symptoms, avoidance, anticipatory anxiety, disability, and worries about health. All items are scored from 0 to 4. Scores on the PAS have good reliability, and are sensitive to change (Bandelow, 1995; Gloster et al., 2011).

2.4.3. World Health Organization Disability Assessment Schedule (WHODAS 2.0, Üstün, Kostanjsek, Chatterji, & Rehm, 2010)

The WHODAS 2.0 is a 36-item self-administered questionnaire. It captures the following six life domains: Cognition, mobility, self-care, getting along, life-activities, and participation. Patients are asked to rate how much difficulty they had in these specific domains of functioning in the past 30 days. Results from a validation studies with a sample having conditions such as depression, osteoarthritis, osteoporosis, rheumatoid arthritis, chronic widespread pain (CWP), and low back pain demonstrated good reliability scores (Cronbach's α=0.85–0.95)(Garin et al., 2010; Üstün et al., 2010). For the present study an overall WHODAS score was used, whereas higher item scores mean more difficulty.

2.5. Statistical Analyses

Data were analyzed using SPSS 21.0. Data were cleaned and examined with regard to distributional assumptions (normal distribution, homogeneity of group variances). Hypotheses 1, 2 and 3a were tested with linear mixed models (LMMs). LMMs can incorporate incomplete cases in the analyses and further assume that the missing data pattern is either missing completely at random (MCAR) or missing at random (MAR) in order to lead to unbiased results (Little & Rubin, 2002). Fixed effects were the within-subjects factors time (Hypothesis 1a and Hypothesis 3a), and social versus non-social domains (Hypothesis 1b) plus the interaction between the two (Hypothesis 1c), and the between-subjects variable panic symptomatology (PAS) (Hypothesis 2). We only included a random intercept and no random slope coefficient, as the latter did not improve model fit. Measuring times were baseline, 4-week post-treatment, and the 6-month FU. In order to test hypothesis 2, which examined if levels of panic symptomatology influence valued action, the sample was divided into high, medium and low groups using a tertiary split. For hypotheses 1a to 3a contrasts using linear and quadratic polynomials were calculated for the factor time to test linear and curve-linear time trajectories. As the results from the quadratic polynomials were not significant for hypotheses 1a to 2, they are only reported for hypothesis 3a.

Hypothesis 3b (increases in valued action are positively associated with increases in functioning) was firstly examined by means of a two-sided correlation between the two difference scores "pre-treatment valued action minus post-treatment valued action" and "pre-treatment minus post-treatment functioning (WHODAS)" and secondly tested with the two difference scores "pre-treatment valued action minus post-treatment" and "post-treatment minus FU functioning (WHODAS)".

Alpha was set at 0.05 for all analyses. Between-group and within-group effect sizes were calculated according to Cohen's *d*. Effect sizes of 0.2, 0.5, and 0.8 refer to small, moderate, and large, respectively (Cohen, 1988). Reported effect sizes are based on patients who completed questionnaires, using descriptive statistics.

3. Results

3.1. Descriptives

The means and standard deviations of all variables involved in the analyses at pre-treatment, post-treatment and FU are displayed in Table 1. The table shows higher means for social compared to non-social facets across all four facets of patients' valued behaviors. Between group effect sizes between social and non-social domains are presented in Table 2.

3.2. Valued behaviors increase over the course of the study (Hypothesis 1a)

Patients' reported valued living discrepancy decreased over the course of ACT (see Table 3), whereas patients' valued behaviors regarding importance, valued action, and valued living composite did

Table 1
Descriptive statistics of all outcome measures.

	Baseline			Post			FU		
	N	M	SD	N	M	SD	N	M	SD
Facets of Valued Behaviors									
Importance	41	6.69	1.75	35	6.68	1.28	32	6.61	1.32
Social	41	7.73	2.13	35	8.13	1.49	32	8.09	1.42
Non-Social	39	5.98	1.71	34	5.85	1.39	32	5.87	1.46
Valued Action	40	4.73	1.92	34	4.97	1.11	32	5.28	1.76
Social	40	5.35	2.45	34	5.96	1.65	32	6.24	2.32
Non-Social	38	4.38	1.57	33	4.41	1.15	32	4.80	1.75
Valued Living Composite	32	62.03	29.79	31	57.09	35.18	32	42.34	19.96
Social	40	46.90	26.88	34	52.86	17.36	32	56.04	19.96
Non-Social	38	31.39	17.56	33	31.66	11.66	32	35.49	19.71
Valued Living Discrepancy	40	−1.93	1.87	34	−1.71	1.32	32	−1.32	1.01
Social	40	−2.33	1.96	34	−2.23	1.63	32	−1.84	1.76
Non-Social	38	−1.57	1.64	33	−1.37	1.36	32	−1.07	1.06
General/Symptom Measures									
PAS	41	19.94	11.34	32	14.02	10.76	33	11.62	10.72
WHODAS	41	26.27	15.99	22	14.23	11.36	24	11.19	11.23

Note: PAS = Panic and Agoraphobia Scale; WHODAS=World Health Organization Disability Assessment Schedule

Table 2
Effect sizes (Cohen's d) between socical and non-social domains and at each time point.

	baseline	post	FU
Facets of valued behaviors			
Importance	0.91	1.58	1.54
Valued Action	0.47	1.09	0.70
Valued Living Composite[a]	0.68	1.43	1.03
Valued Living Discrepancy[b]	−0.42	−0.57	−0.53

Note:
[a] Valued Living Composite = computed mean of the multiplied respondents of the facets importance and valued action scores.
[b] Valued Living Discrepancy = difference between importance and valued action and is calculated by subtracting importance from valued action.

Table 3
Changes in outcomes scores of valued behaviors over the course of the study.

Hypothesis	H1a: Valued Behaviors increase	H1b: Valued Behaviors in social and Non-social domains differ	H1c: Valued Behaviors in social domains increase more than in non-social domains
	Time	Group	Time x group
	F	F	F
Facets of Valued Behaviors			
Importance	0.08	152.67**	2.16
Valued Action	3.08	35.21**	1.10
Valued Living Composite[a]	2.75	66.39**	1.21
Valued Living Discrepancy[b]	4.62*	19.98**	0.004

Note: Time = linear trend for time over the course of the study; Group = comparisons between social and non-social facets; averaged across the three time points; Time x group = linear trend for time times group interaction.
[a] Valued Living Composite = computed mean of the multiplied respondents of the facets importance and valued action scores.
[b] Valued Living Discrepancy = difference between importance and valued action and is calculated by subtracting importance from valued action.
* $p < 0.05$.
** *$p < 0.01$.

not change over the course of the study (Table 1 and Table 3, left column, and Fig. 1).

In order to test whether treatment response is also reflected in valued living discrepancy, we examined responders and non-responders. Responders were defined as ≤18 ('mild' or less) on the PAS (Gloster et al, 2015). A *t*-test revealed a significant difference between responders (N=23; M=−1.28, SD=1.04) and non-responders (N=8; M=−2.47, SD=1.47; t (32)=−2.74, p=0.010) as defined at post-treatment with respect to patients' valued living discrepancy. Another *t*-test revealed a significant difference between responders (N=26, M=−1.15, SD=0.98) and non-responders (N=6; M=−1.63, SD=1.04; t (30)=1.08, p=0.029) as defined at FU with respect to patients' valued living discrepancy.

3.3. Valued behaviors in social and non-social domains differ from each other at all time points (Hypothesis 1b)

The results, as shown in the middle column of Table 3 and in Fig. 1, indicate that there are significantly higher values for social compared to non-social domains across time points with respect to all four facets of valued behaviors. Effect sizes between social and non-social domains were medium to high for all four facets: importance, d=1.08; valued action, d=0.58; valued living composite, d=0.77; valued living discrepancy, d=−0.45.

To get a clearer idea of the relevance of social domains following treatment we tested the association of social domains with functioning for the facet valued living discrepancy, which was significant (r=−0.49, p=0.03). The lower the valued living discrepancy for social domains after treatment, the higher the functioning at post-treatment.

3.4. Valued behaviors in social domains increase more than in non-social domains (Hypothesis 1c)

Linear changes in patient's valued behaviors over time did not vary between social and non-social domains for any of the four facets (see right column in Table 3 and Fig. 1).

3.5. Initial lower levels of panic symptomatology are associated with a higher increase in valued behaviors (Hypothesis 2)

We found an interaction effect between linear change across the study period and pre-treatment panic symptomatology (F (2,60) =3.44, p=0.039), whereas patients' valued behaviors regarding importance, valued living discrepancy and valued living composite did not show an interaction effect with pre-treatment panic symptomatology.

As shown in Fig. 2, the three panic symptomatology groups (low, medium and high) showed different trajectories with respect to valued action. The panic symptomatology groups differed with respect to their means: low panic symptomatology group (N=12): M=8.58, SD=4.91, middle PAS group (N=14): M=26.92, SD=5.28, high PAS group (N=15): M=43.46, SD=4.89. The high panic group increased, whereas the low panic group decreased in valued action during therapy, and the medium panic group remained more or less on the same level between pre-treatment and follow-up. All three groups finally reached similar end-points.

3.6. Functioning increases over the course of the study (Hypothesis 3a)

Patients' functioning showed a curve-linear increase over the course of the study (linear trend, F (1,47) =28.45, $p < 0.001$; quadratic trend (F(1,45) = 7.05, p = 0.011). Thus functioning increased from baseline to post-treatment, and further mildly between post-treatment and FU.

3.7. Increases in valued behaviors are positively associated with increases in functioning (Hypothesis 3b)

Difference scores in patients' valued behaviors and their functioning both measured between pre- and post-treatment were negatively correlated with each other (Importance: r=−0.485, p=0.026; valued action: r=−0.45, p=0.049; valued living discrepancy: r=−0.177, p=0.454 and valued living composite: r=−0.407, p=0.073). The negative correlation between the two difference scores implies that increases in valued behavior were related to improved functioning from pre-to post-treatment. The negative correlation between the two difference scores implies that increases in valued behavior were related to improved functioning from pre-to post-treatment.

In contrast, difference scores in patients' valued behaviors between pre- and post-treatment and functioning between post-treatment and FU were not correlated (importance: r=0.16, p=0.55; valued action: r=−0.15, p=0.589; valued living discrepancy=−0.51, p=0.42; valued living composite: r=−0.002, p=0.99).

We were also interested to test whether difference scores in patients' valued action in social and non-social domains and their functioning (WHODAS) were related. In fact both difference scores in patients' valued action in social domains and their functioning (WHODAS) measured between pre- and post-treatment were negatively correlated with each other (r=−0.12, p=0.65). This implies that an increase in valued action is associated with improved functioning. Difference scores in patients' valued action in non-social domains and their functioning (WHODAS) were positively correlated (r=0.013,

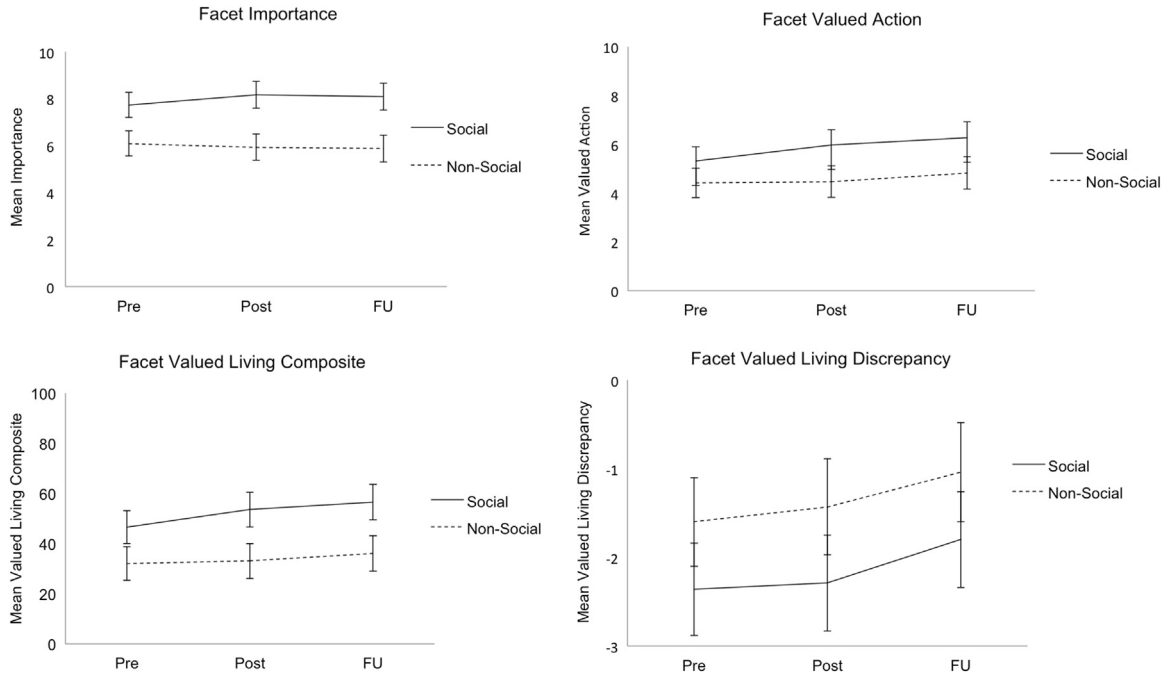

Fig. 1. Facets in valued behaviors (importance, valued action, valued living composite and valued living discrepancy) in social and non-social domains of the Valued Living Questionnaire (VLQ) over the entire study period.

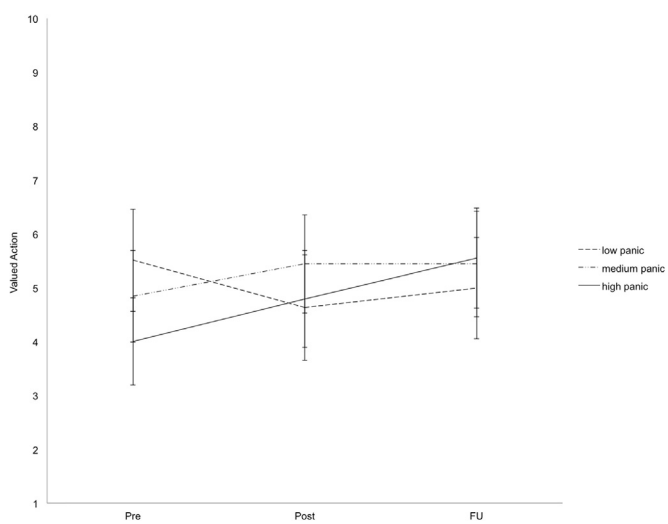

Fig. 2. Trajectories of valued action depending on pre-treatment symptomatology.

p=0.964). This correlation between the two difference scores implies that valued action in non-social domain is not related to functioning.

In order to test whether changes in valued action are related to changes in panic symptomatology (PAS), we examined another correlation between valued action and panic symptomatology, both measured between pre- and post- intervention. Difference scores in patients' valued action and their panic symptomatology (PAS) both measured between pre- and post-treatment were negatively correlated with each other (r=−0.54, p=0.0002). This negative correlation between the two difference scores implies that an increase in valued action goes hand in hand with an decrease in panic symptomatology.

4. Discussion

The aim of this study was to investigate patients' changes in valued behaviors and functioning following an ACT intervention. To the best of our knowledge, this is the first study to examine whether patients' valued behaviors of social and non-social domains differ or show different increases throughout treatment. We found that patients' valued behaviors in social domains were consistently higher than in non-social domains at all time points of the study. The amount of change in social and non-social domains of valued behaviors was the same. Interestingly, although pre-treatment panic symptomatology (i.e., low, medium and high) was associated with different rates of improvement in valued action, all reached the same end-point. Increases in valued action were also associated with increased functioning.

Patients' responses on the different facets of valued behaviors revealed different rates of increases. The facet importance did not significantly change over the course of the study. This is consistent with an earlier study showing that that the facet is more stable than others (Wilson et al., 2010). Our patients' responses in importance were slightly lower at pre-treatment compared to subjects from a community sample (Moffitt & Mohr, 2014).

Patients also did not show a significant increase in the facet valued action over the course of the study. Our results are not in accord with the finding by Michelson et al. (2011), who found an improvement of valued action between pre-treatment and post-treatment in their GAD group. One difference between that study and ours is the study length as patients in that study received treatment over 18 weeks as opposed to 4 weeks to post-treatment in our study. Another difference is the sample size, which was slightly smaller in our study. Interestingly, patients in our sample showed higher valued action at pre-treatment compared to adults in a community sample (Moffitt & Mohr, 2014).

As observed in this study, patients' reporting in the facets importance and valued action did not increase significantly over the course of the study. Given that the valued living composite is the mean of the product of the facets importance and valued action, a lack of significant difference is not surprising. To draw a comparison a group of healthy undergraduate students showed similar responses at pre-treatment on the valued living composite (Czech, Katz, & Orsillo, 2011).

We did find, however, that patients' valued living discrepancy (i.e., difference between importance and valued action) decreased significantly over the course of the study. Our finding may be explained by the hypothesized change-processes entailed within ACT: Through therapy,

patients examine their values, which may result in more awareness. This often leads to the realization that their current actions differ from their chosen values (Hayes, Strohsahl, & Wilson, 2012; p. 309). This discrepancy may galvanize and motivate patients for change, also after therapy - an assumption that could be confirmed in our sample as patients improved throughout FU. This change following treatment suggests that the generalization process of applying newly acquired skills continues to unfold during the time in which patients apply techniques learnt in therapy independently. We further observed differences between responders and non-responders that could be reflected in the valued living discrepancy. For non-responders the valued living discrepancy was larger at post-test, but it decreased at FU whereas responders showed a steady progression of valued living discrepancy over the course of treatment. The change in the valued living discrepancy has some clinical implications, as clinical effort should be on the increase of valued action. It could be that the VLQ is not sensitive enough to capture changes after therapy. Future research building on these findings would benefit from more statistical power as the small sample size limited the power to detect changes in valued action.

As hypothesized, we found that patients valued behaviors in social and non-social domains differed at all time points of the study. Mean level of all four facets were higher for social than non-social domains, and this remained consistent across all time points. To the best of our knowledge, this was the first time the difference between social and non-social valued behaviors was explicitly tested. Our findings are in agreement with earlier (intervention) studies from other areas, such as happiness research. For instance, in the Parks et al. (2012) study more than half of the sample chose social relationships as most meaningful as opposed to other life domains such as religion and physical activities. In addition, it is known that strains of individuals entering psychotherapy predominantly affect interpersonal areas (Davies-Osterkamp et al., 1996) and that the most frequently defined goals of psychotherapy are in interpersonal goals, relationships, and intimacy (Grosse & Grawe, 2002). Further, our finding may be meaningful for prosocial considerations (Wilson, Hayes, Biglan, & Embry, 2014).

We hypothesized that patient's valued behaviors across all four facets (i.e., importance, valued action, valued living discrepancy, and valued living composite) in social domains increase more than in non-social domains while our results suggest that patients increased their valued behaviors to the same extend in both social and non-social domains across all facets. It is possible that the processes that initiate valued action in the most important domains (i.e., those explicitly discussed during therapy) spread to valued action in many other domains. Even finer grained data (e.g., Experience Sampling Methods) would be necessary to capture such change.

Our expectation that patient's initial lower levels of panic symptomatology were associated with a higher subsequent increase in valued behaviors, was partly supported. As a matter of fact, results showed, that depending on the pre-treatment panic symptomatology (i.e., low, medium and high) patients had different trajectories with respect to valued action only. The group with low panic symptoms at pre-treatment showed initially relatively high valued action and at post-treatment the level of valued action resembled the one of the high panic group. The group with high panic symptoms at pre-treatment, contrary to our hypothesis, had the steepest increase in valued action. It may be that the patients' high levels of panic did not allow them to focus on valued action and through treatment they started to engage in valued action. Interestingly, recent data of session-by-session data, however, suggest that values change before suffering and negative reaction to symptoms (Gloster, Klotsche, Ciarrochi, Eifert, & Hoyer, in review). In that study it was found that levels of valued behaviors preceded changes in subsequent suffering during the treatment as measured at each session. This finding shows that (re)engagement in things that matter to an individual is associated with decreases in suffering. In the end, patients benefitted equally from ACT therapy and reached FU values that were very close to each other. Our findings are in accord with the study of Michelson et al. (2011) which found that the higher the symptom burden, the lower pronounced the valued action.

With respect to our hypothesis that patient's functioning increased over the course of the study, we found that functioning indeed improved over the entire study period. This finding can be linked to prior literature that examined the effectiveness of ACT in (chronic) pain (McCracken & Vowles, 2014; Vowles, McCracken, & Eccleston, 2007). Chronic pain typically involves serious disruptions of functioning in daily life, and studies suggest that ACT alters responses to pain in a way that leads to reduction of disability and increased functioning (McCracken & Eccleston, 2005). Previous studies used pain-related measures (e.g. McCracken, Vowles, & Eccleston, 2005) or symptom outcome measures (Clarke et al., 2012, 2014) to assess functioning while we used a general measure of functioning in major life domains.

We hypothesized that patients' increases in valued behaviors during treatment is associated with increases in functioning across two time frames: a) during the treatment (i.e., pretreatment to post-treatment) and b) following the treatment (i.e., post-treatment to FU). The first test revealed a significant correlation between the two difference scores in the facets importance and valued action. The correlation between difference scores in importance and functioning implies that a person who becomes more aware of how important she/he considers certain life domains starts to engage in actions that are subjectively meaningful to him/her and reports increased functioning at the same time. The correlation between the difference scores in valued action and functioning is in line with earlier research findings that changes in valued action were related to improved functioning from pre-to post-treatment and to FU (Vowles & McCracken, 2008). These findings suggest that a person who starts to engage in actions that are subjectively meaningful to him/her, reports increased functioning at the same time. We did not find a meaningful association between valued living discrepancy and functioning, which is opposed to McCracken and Yang (2006) finding. Hence, less valued living discrepancy was not meaningfully related to improved functioning in our sample. Given that the valued living composite did not change significantly, it may not be surprising that no meaningful relationship between the composite and functioning were found. The second test revealed that patients' increases in valued behaviors during treatment were not significantly associated with increases in functioning after treatment. The reason for this could be that functioning did not change as much after treatment compared to the time during treatment.

Notwithstanding, our findings may help to inform about the validity of the VLQ itself. Specifically, our results confirmed our hypothesis 3b (A positive association between increases in valued action and increases in functioning) and were consistent with theoretical assumptions. The valued action facet was moderately correlated with the construct of functioning (pre- and post-treatment) and this could be interpreted as evidence for validity of the VLQ. Thus, our findings contribute to the literature.

This study needs to be interpreted in the light of several limitations. First, the sample size was relatively small, which may have limited statistical power. Second, in this paper we were interested in treatment related change and therefore did not include the wait-list control condition. As such, the observed findings cannot be interpreted as wait-list controlled effects. Third, in this study we only relied on self-reported measurements. Observations from different sources (e.g., therapist, experience sampling, etc.) may have resulted in alternative findings. Forth, the study sample is limited to patients with treatment-resistant panic disorder and/or agoraphobia. Generalization to other populations needs to be tested.

With these limitations notwithstanding, the current study shows that ACT processes help patients to decrease the discrepancy between how important something is and how much someone does in respect to what is important in one's life. For the first time significant differences between social and non-social domains in patients' valued behaviors

were observed, indicating the relative relevance of nurturing social relationships and social life domains in comparison to non-social life domains. Of clinical importance, is that although patients' pre-treatment panic symptomatology differed, patients improved equally. This is an important finding for clinical care that corresponds with the finding that initial levels of panic symptoms are related with different change trajectories in the outcome (Lutz et al., 2014). Patients in our study reported increased functioning over the course of the study, matching earlier findings (McCracken & Yang, 2006; Vowles & McNeil, 2007). Further strengths of the study are a clear definition of treatment resistance and that this study focuses on patients that failed in appropriate prior first line CBT, and is interconnected with studies designed to examine mechanism of action across different levels of analysis, including genetic research (Domschke et al., 2011; Gloster, Gerlach, et al., 2015; Reif et al., 2014, Straube et al., 2014), fMRI research (Reif et al., 2014; Straube et al., 2014), psychophysiology (Richter et al., 2012) and temporal assessments of changes in therapy (Gloster et al., 2014). More research in the field of valued behaviors in ACT is certainly needed. Future studies should, for instance, investigate the role of values in samples across diagnoses or perhaps more importantly different treatments to determine if results are not limited to patients with anxiety disorders. Our findings show that the ACT techniques play an important role to promote behavior change consistent with personal values, which were associated with increased functioning.

Acknowledgement

The study was funded by the German Federal Ministry of Education and Research (BMBF; project No. 01GV0615) as part of the BMBF Psychotherapy Research Funding Initiative and by the Swiss National Science Foundation (FNSNF, Grant Number # 100014_149524/1).

References

Arch, J. J., Eifert, G. H., Davies, C., Plumb Vilardaga, J. C., Rose, R. D., & Craske, M. G. (2012). Randomized clinical trial of cognitive behavioral therapy (CBT) versus acceptance and commitment therapy (ACT) for mixed anxiety disorders. *Journal of Consulting and Clinical Psychology*, 80, 750–765. http://dx.doi.org/10.1037/a0028310.

Bandelow, B. (1995). Assessing the efficacy of treatments for panic disorder and agoraphobia. II. The Panic and Agoraphobia Scale. *International clinicalPsychopharmacology*, 10, 73–81.

Brown, T., Antony, M. M., & Barlow, D. H. (1995). Diagnostic comorbidity in panic disorder: Effect on treatment outcome and course of comorbid diagnoses following treatment. *Journal of Consulting and Clinical Psychology*, 63, 408–418.

Clarke, S., Kingston, J., Wilson, K. G., Bolderston, H., & Remington, B. (2012). Acceptance and commitment therapy for a heterogeneous group of treatment-resistant clients: A treatment development study. *Cognitive and Behavioral Practice*, 19, 560–572. http://dx.doi.org/10.1016/j.cbpra.2012.03.001.

Clarke, S., Kingston, J., James, K., Bolderston, H., & Remington, B. (2014). Acceptance and commitment therapy group for treatment-resistant participants: A randomised controlled trial. *Journal of Contextual Behavioral Science*. http://dx.doi.org/10.1016/j.jcbs.2014.04.005.

Czech, S. J., Katz, A. M., & Orsillo, S. M. (2011). The effect of values affirmation on psychological stress. *Cognitive Behaviour Therapy*, 40, 304–312. http://dx.doi.org/10.1080/16506073.2011.585347.

Davies-Osterkamp, S., Strauss, B., & Schmitz, N. (1996). Interpersonal problems as predictors of symptom related treatment outcome in longterm psychotherapy. *Psychotherapy Research*, 6, 164–176. http://dx.doi.org/10.1080/10503309612331331688.

Domschke, K., Reif, A., Weber, H., Richter, J., Hohoff, C., Ohrmann, P., & Deckert, J. (2011). Neuropeptide S receptor gene — converging evidence for a role in panic disorder. *Molecular Psychiatry*, 16, 938–948. http://dx.doi.org/10.1038/mp.2010.81.

Eifert, G. H., & Forsyth, J. P. (2005). *Acceptance and Commitment therapy for Anxiety Disorders: A Practitioner's Treatment Guide to Using Mindfulness, Acceptance, and Values-Based Behavior Change Strategies* Oakland: New Harbinger Publications.

Eifert, Georg H. and Gloster, A.T, ACT bei Angststörungen 2016, Göttingen: Hogrefe

Fava, G. A., & Mangelli, L. (1999). Subclinical symptoms of panic disorder: New insights into pathophysiology and treatment. *Psychotherapy Psychosomatics*, 68, 281–289.

Flaxman, P. E., & Bond, F. W. (2010). Worksite stress management training: Moderated effects and clinical significance. *Journal of Occupational Health Psychology*, 15, 347–358. http://dx.doi.org/10.1037/a0020522.

Garin, O., Ayuso-Mateos, J. L., Almansa, J., Nieto, M., Chatterji, S., Vilagut, G., & Ferrer, M. (2010). Validation of the "World Health Organization Disability Assessment Schedule, WHODAS-2" in patients with chronic diseases. *Health and Quality of Life Outcomes*, 8, 51. http://dx.doi.org/10.1186/1477-7525-8-51.

Gloster, A., Chaker, S., Klotsche, J., Hummel, K., & Hoyer, J. (2011). Assessing psychological flexibility: Incremental validity and other psychometric properties of the AAQ-II. *Psychological Assessment*, 23, 970–982. http://dx.doi.org/10.1037/a0024135.

Gloster, A. T., Wittchen, H. U., Einsle, F., Höfler, M., Lang, T., Helbig-Lang, S., & Arolt, V. (2009). Mechanism of action in CBT (MAC): Methods of a multi-center randomized controlled trial in 369 patients with panic disorder and agoraphobia. *European Archives of Psychiatry and Clinical Neuroscience*, 259, 155–166. http://dx.doi.org/10.1007/s00406-009-0065-6.

Gloster, A. T., Wittchen, H.-U., Einsle, F., Lang, T., Helbig-Lang, S., Fydrich, T., & Arolt, V. (2011). Psychological treatment for panic disorder with agoraphobia: A randomized controlled trial to examine the role of therapist-guided exposure in situ in CBT. *Journal of Consulting and Clinical Psychology*, 79, 406–420. http://dx.doi.org/10.1037/a0023584.

Gloster, A. T., Klotsche, J., Gerlach, A. L., Hamm, A., Ströhle, A., Gauggel, S., & Wittchen, H.-U. (2014). Timing matters: Change depends on the stage of treatment in cognitive behavioral therapy for panic disorder with agoraphobia. *Journal of Consulting and Clinical Psychology*, 82, 141–153. http://dx.doi.org/10.1037/a0034555.

Gloster, A. T., Sonntag, R., Hoyer, J., Meyer, A. H., Heinze, S., Stroehle, A., & Wittchen, H.-U. (2015). Treating treatment-resistant patients with panic disorder and agoraphobia using psychotherapy: A randomized controlled switching trial. *Psychotherapy and Psychosomatics*, 100–109. http://dx.doi.org/10.1159/000370162.

Gloster, A. T., Gerlach, A. L., Hamm, A., Höfler, M., Alpers, G. W., Kircher, T., & Reif, A. (2015). 5HTT is associated with the phenotype psychological flexibility: results from a randomized clinical trial. *European Archives of Psychiatry and Clinical Neuroscience*, 399–406. http://dx.doi.org/10.1007/s00406-015-0575-3.

Gloster, A.T., Klotsche, J., Ciarrochi, J., Eifert, G., & Hoyer, J. (in review). Increasing Valued Behaviors Prededes Reduction in Suffering: Findings from a Randomized Controlled Trial using ACT

Grosse, M., & Grawe, K. (2002). Bern inventory of treatment goals: PART 1. Development and first application of a taxonomy of treatment goal themes. *Psychotherapy Research: Journal of the Society for Psychotherapy Research*, 12, 79–99. http://dx.doi.org/10.1080/713869618.

Hayes, S. C., Strohsahl, K., & Wilson, K. G. (2012). *Acceptance and commitment therapy: An experiental approach to behavior change* New York: Guilford Press.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: model, processes and outcomes. *Behaviour Research and Therapy*, 44, 1–25. http://dx.doi.org/10.1016/j.brat.2005.06.006.

Juarascio, A. S., Forman, E. M., & Herbert, J. D. (2010). Acceptance and commitment therapy versus cognitive therapy for the treatment of comorbid eating pathology. *Behavior Modification*, 34, 175–190. http://dx.doi.org/10.1177/0145445510363472.

Little, R. J., & Rubin, D. B. (2002). *Statistical Analysis with Missing Data* ((2nd ed.)) Hoboken, NJ: John Wiley.

Lundgren, T., Dahl, J., & Hayes, S. C. (2008). Evaluation of mediators of change in the treatment of epilepsy with acceptance and commitment therapy. *Journal of Behavioral Medicine*, 31, 225–235. http://dx.doi.org/10.1007/s10865-008-9151-x.

Luoma, J. B., Kohlenberg, B. S., Hayes, S. C., & Fletcher, L. (2012). Slow and steady wins the race: A randomized clinical trial of acceptance and commitment therapy targeting shame in substance use disorders. *Journal of Consulting and Clinical Psychology*, 80, 43–53. http://dx.doi.org/10.1037/a0026070.

Lutz, W., Hofmann, S. G., Rubel, J., Boswell, J. F., Shear, M. K., Gorman, J. M., Woods, S. W., & Barlow, D. H. (2014). Patterns of early change and their relationship to outcome and early treatment determination in patients with panic disorder. *Journal of Consulting and Clinical Psychology*, 82, 287–297.

McCracken, L. M., & Eccleston, C. (2005). A prospective study of acceptance of pain and patient functioning with chronic pain. *Pain*, 118, 164–169. http://dx.doi.org/10.1016/j.pain.2005.08.015.

McCracken, L. M., & Yang, S.-Y. (2006). The role of values in a contextual cognitive-behavioral approach to chronic pain. *Pain*, 123, 137–145. http://dx.doi.org/10.1016/j.pain.2006.02.021.

McCracken, L. M., & Vowles, K. E. (2014). Acceptance and commitment therapy and mindfulness for chronic pain: Model, process, and progress. *The American Psychologist*, 69, 178–187. http://dx.doi.org/10.1037/a0035623.

McCracken, L. M., Vowles, K. E., & Eccleston, C. (2005). Acceptance-based treatment for persons with complex, long standing chronic pain: A preliminary analysis of treatment outcome in comparison to a waiting phase. *Behaviour Research and Therapy*, 43(10), 1335–1346. http://dx.doi.org/10.1016/j.brat.2004.10.003.

Michalak, J., Heidenreich, T., & Hoyer, J. (2011). Goal conflicts and goal integration: theory, assessment, and clinical implications. , in: Cox, W. M., & Klinger, E. (Eds.). (2011). Handbook of motivational counselling: Motivating people for change . 2nd ed. Chichester: Wiley, 89–108.

Michelson, S. E., Lee, J. K., Orsillo, S. M., & Roemer, L. (2011). The role of values-consistent behavior in generalized anxiety disorder. *Depression and Anxiety*, 28(5), 358–366. http://dx.doi.org/10.1002/da.20793.

Moffitt, R., & Mohr, P. (2014). The efficacy of a self-managed acceptance and commitment therapy intervention DVD for physical activity initiation. *British Journal of Health Psychology*, 1–15. http://dx.doi.org/10.1111/bjhp.12098.

Parks, A. C., Della Porta, M. D., Pierce, R. S., Zilca, R., & Lyubomirsky, S. (2012). Pursuing happiness in everyday life: The characteristics and behaviors of online happiness seekers. *Emotion*, 12, 1222–1234. http://dx.doi.org/10.1037/a0028587.

Reif, A., Richter, J., Straube, B., Höfler, M., Lueken, U., Gloster, A. T., & Deckert, J.

(2014). MAOA and mechanisms of panic disorder revisited: From bench to molecular psychotherapy. *Molecular Psychiatry*, 19, 122–128. http://dx.doi.org/10.1038/mp.2012.172.

Richter, J., Hamm, A. O., Pan-Farr, C. A., Gerlach, A. L., Gloster, A. T., Wittchen, H. U., & Arolt, V. (2012). Dynamics of defensive reactivity in patients with panic disorder and agoraphobia: Implications for the etiology of panic disorder. *Biological Psychiatry*, 72, 512–520. http://dx.doi.org/10.1016/j.biopsych.2012.03.035.

Rogers, C. (1965). Toward a Modern Approach To Values: the Valuing Process in the Mature Person. *Journal of abnormal psychology*, 68, 160–168.

Steiner, J. L., Bogusch, L., & Bigatti, S. M. (2013). Values-based action in fibromyalgia: Results from a randomized pilot of acceptance and commitment therapy. *Health Psychology Research*, 1, 176–181. http://dx.doi.org/10.4082/hpr.2013.e34.

Straube, B., Reif, A., Richter, J., Lueken, U., Weber, H., Arolt, V., & Kircher, T. (2014). The functional -1019C/G HTR1A polymorphism and mechanisms of fear. *Translational Psychiatry*, 4, e490. http://dx.doi.org/10.1038/tp.2014.130.

Taylor, S., Abramowitz, J. S., & McKay, D. (2012). Non-adherence and non-response in the treatment of anxiety disorders. *Journal of Anxiety Disorders*, 26, 583–589. http://dx.doi.org/10.1016/j.janxdis.2012.02.010.

Üstün, T. B., Kostanjsek, N., Chatterji, S., & Rehm, J. (2010). *). Measuring Health and Disability Manual for WHO Disability Assessment Schedule* Geneva: World Health Organization.

Vowles, K. E., & McCracken, L. M. (2008). Acceptance and values-based action in chronic pain: A study of treatment effectiveness and process. *Journal of Consulting and Clinical Psychology*, 76, 397–407. http://dx.doi.org/10.1037/0022-006X.76.3.397.

Vowles, K. E., McCracken, L. M., & Eccleston, C. (2007). Processes of change in treatment for chronic pain: The contributions of pain, acceptance, and catastrophizing. *European Journal of Pain*, 11, 779–787. http://dx.doi.org/10.1016/j.ejpain.2006.12.007.

Vowles, K. E., McNeil, D. W., Gross, R. T., McDaniel, M. L., Mouse, A., Bates, M., & McCall, C. (2007). Effects of pain acceptance and pain control strategies on physical impairment in individuals with chronic low back pain. *Behavior Therapy*, 38, 412–425. http://dx.doi.org/10.1016/j.beth.2007.02.001.

Wilson, D. S., Hayes, S. C., Biglan, A., & Embry, D. D. (2014). Evolving the future: Toward a science of intentional change. *Behavioral and Brain Sciences*, 37, 395–460. http://dx.doi.org/10.1017/S0140525×13001593.

Wilson, K. G., & DuFrene, T. (2009). *Mindfullness for two* Oakland, CA: New Harbinger.

Wilson, K. G., Sandoz, E. K., Kitchens, J., & Roberts, M. (2010). The valued living Questionnaire: Defining and Measuring valued action within a Behavioral framework. *The Psychological Record*, 60, 249–272.

Appendix C

Well-Being in Major Depression and Social Phobia with and without comorbidity

Hanna Wersebe, Roselind Lieb, Andrea H. Meyer, Marcel Miche, Thorsten Mikoteit, Christian Imboden, Jürgen Hoyer, Klaus Bader, Martin Hatzinger & Andrew T. Gloster

Submitted Manuscript

Well-Being in Major Depression and Social Phobia with and without comorbidity

Abstract

Background/Objective: Lower levels in well-being have been observed in individuals with Major Depression (MDD) and Social Phobia (SP), but well-planned direct comparisons with control individuals, not suffering from a mental disorder, are lacking. Furthermore, MDD is highly comorbid with anxiety disorders, and SP with depressive disorders. This study is among the first to examine differences in well-being in individuals with a clinical diagnosis of MDD or SP compared to individuals with no such diagnosis and to test differences in well-being within the combined diagnostic categories respective with and without anxiety-depressive comorbidity. Method: Participants were 119 individuals with a diagnosis of MDD, 47 SP and 118 controls. Results: Results revealed that overall well-being as well as emotional, psychological, and social well-being were lower in the MDD and SP group compared to the control group. Individuals with comorbidity reported lower well-being than individuals without comorbidity. Conclusions: These findings have clinical implications as presence of comorbidity may require a different therapeutic approach than with no comorbidity.

Keywords

Mental health; Major Depressive Disorder; Social Phobia; comorbidity; well-being; observational descriptive study

Introduction

Major depressive disorders (MDD) and Social Phobia (SP) are among the most frequent mental disorders (Kessler, Chiu, Demler, & Walters, 2005) affecting a substantial number of individuals every year and with ranges between 17.2 -19 million for MDD and 5.4 - 9.3 million for SP in Europe (Wittchen et al., 2011). Both MDD and SP are associated with high drop out rates in the labor market and economic costs (Chiu et al., 2017; Banerjee, Chatterji & Lahiri, 2014; Jia & Lubetkin, 2017; Wittchen et al., 2011). Further, MDD and SP are related to a high burden by impairments in social role performance, and disturbed relationships (Wittchen, Nelson, & Lachner, 1998).

Comorbidity between mood and anxiety disorders is common (Beesdo et al., 2007; Jacobi et al., 2004; Kessler et al., 2005). Among individuals with MDD, 57.5 % also meet criteria for at least one other 12-month anxiety disorder (Kessler, Merikangas, & Wang, 2007). Similarly, among individuals with SP 14.9% meet lifetime criteria for MDD (Kessler, Stang, Wittchen, Stein, & Walters, 1999) and 60% of individuals in treatment for SP meet criteria for depression (Merikangas & Angst, 1995). The combination of high prevalence, comorbidity and impairment make MDD and SP important disorders from a public health perspective. Research has shown that individual and economic difficulties are even more pronounced in individuals with comorbid depression and anxiety disorders (Beesdo et al., 2007; Cavicchioli et al., 2018; Kessler et al., 2003). Furthermore, the presence of comorbidity is associated with higher severity, mortality and longer duration of symptoms (Abreu et al., 2018; Kessler, Chiu, Demler, & Walters, 2005; Meier et al., 2016), and higher risk for treatment resistance (Rizvi et al., 2014).

Given the high impact of depressive and anxiety disorders on everyday life, many individuals seek professional help (Boerema et al., 2016; Johansson, Carlbring, Heedman, Paxling, & Andersson, 2013; Magaard et al., 2017). However, efforts to treat MDD and SP

tend to aim to reduce specific symptoms (Lorenzo-Luaces, Keefe, & DeRubeis, 2016), thereby assuming that well-being will increase as well. Interestingly, there is accumulating evidence showing that the absence of mental disorders or symptoms are only moderately related to the presence of well-being (S. M. A. Lamers, Westerhof, Glas, & Bohlmeijer, 2015; Trompetter, Lamers, Westerhof, Fledderus, & Bohlmeijer, 2017). This relation has been formulated in a two-continua model that states that although they are related, "mental health and mental illness are not opposite ends of a single continuum" (Keyes, 2005, p. 546). According to that model (Keyes, 2005), well-being includes emotional well-being, psychological well-being and social well-being. Emotional well-being refers to feelings of pleasure and happiness including life satisfaction. Psychological well-being refers to feelings of self-acceptance, environmental mastery and positive relations to others. Social Well-Being refers to feelings of social contribution, integration and acceptance. The model implies that an individual experiencing many symptoms of psychopathology is more likely to experiencing low well-being. However, this association is only moderate. Thus, an individual may be suffering from mental illness and still experience well-being at the same time. To date, there is no research yet that examined the implications of the two-continua model in terms of differences in well-being in adults with and without MDD and SP.

In the light of the high depression-anxiety comorbidity and its clinical implications, it is important to understand whether comorbidity renders further reduction in well-being. The gained knowledge may help to improve current interventions. Perhaps, in clinical practice well-being should be addressed more in individuals with comorbidity. As for the depression-anxiety comorbidity, research to date is mainly on quality of life (Rapaport, Clary, Fayyad, & Endicott, 2005; Zhou et al., 2017) and there is little research comparing quality of life in individuals with depression-anxiety comorbidity to individuals with no comorbidity (Johansson et al., 2013; Norberg, Diefenbach, & Tolin, 2008). These studies consistently showed lower quality of life in individuals with depression-anxiety comorbidity when

compared to individuals without comorbidity. For instance, individuals with anxiety-depressive comorbidity had lower health related quality of life than those with no comorbidity (Riihimäki et al., 2016). Another study showed that anxiety-depressive comorbidity was associated with lower overall quality of life compared to the comparative community sample (Rapaport et al., 2005). To date, no study has examined comorbidity in respect to well-being in individuals with MDD and SP.

This study aimed to address this gap in research while building on the relevance of well-being (Keyes, 2002) and examines differences in well-being in individuals with a primary MDD or SP diagnosis compared to controls as well as in individuals with a comorbid anxiety or depressive disorders. We hypothesized that 1a) individuals with MDD report lower well-being than controls, 1b) Individuals with SP report lower well-being than controls, and that 2) Individuals with comorbidity within the combined diagnostic categories report lower well-being than individuals without comorbidity.

Method

Participants

Participants were recruited from March 2014 to August 2016 through leaflets, Internet advertisements, and through three (university) clinics in Germany and Switzerland (Gloster et al., 2017) as well as private practices in Switzerland. Participants consisted of N=118 with primary DSM-IV MDD, N=47 with primary DSM-IV SP, and N=119 with neither MDD nor SP (controls). The majority of each clinical group (66.0% in both MDD and SP) and the control group (67.0%) were female, with an average age of 32 years. Likewise, most participants had 10-13+ years of education (>75%). Employment status differed per group: In the MDD group 52.5% were employed, while 46.6% were unemployed; in the SP group 38.3% were employed while 61.7% were unemployed and in the control group 57.1% were employed and 39.5% were unemployed. For the purpose of comparisons across participant groups, the clinical groups were subdivided on the basis of presence of current comorbidity:

MDD (*n*=74 with comorbid anxiety disorders; *n*=44 without comorbid anxiety disorder) and SP (*n*= 9 with comorbid depressive disorders and *n*=38 without comorbid depressive disorder). Comorbid anxiety disorders included Social Phobia, Specific Phobias, and Panic disorder with or without agoraphobia, and Generalized Anxiety Disorder. Comorbid depressive disorders included MDD and Dysthymic Disorder. Individuals in the MDD group could present multiple anxiety comorbidities, and individuals in the SP group could present multiple depressive comorbidities. Current primary diagnoses (i.e. last four weeks) were determined with the Structured Clinical Interview for DSM- IV Axis I Disorders (SCID; Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997). All comorbid diagnoses refer to the past month (e.g. Social Phobia, Specific Phobias, and Panic disorder with or without agoraphobia), except for Generalized Anxiety Disorder that refers to the last six months and Dysthymic Disorder that refers to the last two years. The study team rated diagnoses on the Clinical Rating Scale (adapted: Unnewehr, Schneider, & Margraf, 1996), in which the highest rating corresponded to the primary diagnosis. Participants across the three groups were matched by age and sex. Further inclusion criteria were age between 18-65 years and the ability to understand German. Exclusion criteria were active current suicidal intent and substance dependence.

Procedure

This study used a subset of a quasi-experimental, intensive, longitudinal study with diagnostic status of group as the quasi-experimental factor examining symptom fluctuations and memories thereof by means of event sampling methodology (for details see Gloster et al., 2017). Trained psychology graduate and doctoral students collected the data. For the present study, data from the baseline assessment of participants in the MDD, SP and control group were used. All procedures were approved by the local ethics committee.

Measures

Structured Clinical Interview for DSM- IV Axis I Disorders (SCID; Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997).

Diagnoses of mental disorders were assessed with the *Structured Clinical Interview for DSM-* IV *Axis I Disorders (SCID;* Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997*).* The SCID is a semistructured interview for clinicians and trained researchers for making *DSM-* IV Axis I diagnoses. The interview is separated into different sections corresponding categories of diagnoses. Sections begin with an entry question that allow the interviewer to skip the associated questions if the entry conditions are not met. Symptoms are coded as present, or absent. Studies on the psychometric properties of the SCID indicated good reliabilities (Skre, Onstad, Torgersen, & Kringlen, 1991; Williams et al., 1992). Inter-rater agreement has been reported to be between 0.72 was SP and 0.93 for MDD (Skre et al., 1991).

Mental Health Continuum-Short Form (MHC-SF; Keyes, 2005)

The MHC-SF *(Keyes, 2005)* is a 14-item questionnaire that measures well-being on a scale from 1 (never) to 6 (every day), whereas the emotional well-being (3 items), social well-being (5 items) and psychological well-being (6 items) in the last month was captured. For each aspect of well-being a mean score across the respective items was calculated. Higher scores indicate greater emotional, social and psychological well-being (Keyes, 2005; S. M. A. Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). The MHC-SF has presented good psychometric properties across various age groups and countries (Cronbach's α=0.74 - 0.89) (S. M. A. Lamers, et al., 2011; Westerhof & Keyes, 2010).

Statistical Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 22.0. Prior to analysis data was tested for normality and outliers. Our hypotheses that individuals with a diagnosis report lower well-being than controls (hypothesis 1a and 1b), and that individuals with comorbidity within the combined diagnostic categories report lower

well-being than individuals without comorbidity (hypothesis 2) were tested by means of a general linear model with orthogonal contrasts. The two a priori defined contrasts were a) control group versus MDD or SP groups, and b) comorbidity versus no comorbidity within the combined MDD and SP groups. We controlled for the recruitment location. The α level for statistical significance for all analyses was set to 0.05. Between-group effect sizes were calculated according to Cohen's d. Effect sizes of 0.2, 0.5, and 0.8 refer to small, moderate, and large effects, respectively (Cohen, 1988).

Results

Descriptive Statistics

Descriptive statistics of all measures involved in the analyses are shown on the left-hand side of Table 1.

Individuals with a MDD report lower well-being than controls (Hypothesis 1a)

Overall well-being as well as emotional, social and psychological well-being were all significantly lower in individuals with MDD compared to the control participants, with large effect sizes throughout (Table 1).

Individuals with a SP report lower well-being than controls (Hypothesis 1b)

Likewise, individuals with SP endorsed in significantly lower overall well-being, emotional, social and psychological well-being compared to the control group, with large effect sizes, respectively (Table 1).

Individuals with comorbidity within the combined diagnostic categories report lower well-being than individuals without comorbidity (Hypothesis 2)

Significant differences were found among individuals with and without comorbidity within the combined diagnostic categories (i.e. MDD and SP) in overall, as well as emotional, social and psychological well-being (Table 2). Thus, individuals with comorbidity reported lower overall, as well as emotional, social and psychological well-being.

Discussion

The aim of this study was to investigate differences in well-being in individuals with a diagnosis of MDD or SP and in individuals with comorbidity within the combined diagnostic groups, respectively. To the best of our knowledge, this is the first study to examine differences in individuals with MDD or SP in well-being with an explicit control group. As hypothesized, we found that individuals with a diagnosis showed lower well-being compared to controls. This finding supports previous literature reporting low to medium ranges in quality of life in individuals with MDD and SP (Rapaport et al., 2005). A previous study compared well-being to a community norm (Rapaport et al., 2005), however, we are unaware of any studies that tested these patterns of well-being against an control group matched for age and sex. While previous studies used quality of life as outcome measures to examine differences in individuals with a clinical diagnosis compared to those without a clinical diagnosis (Johansson et al., 2013; Norberg et al., 2008), we used an explicit measure of well-being. In contrast to quality-of-life measures, the well-being measure applied in the present study incorporates the presence of emotional, social and psychological well-being and thus is taking different aspects of well-being into account. Importantly, this concept of well-being can be directly linked to the definition of well-being of the WHO (2004), which states that well-being is present when "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" (WHO, 2004). Furthermore, it is known that individuals with MDD and SP experience lower positive affect, emotions and evaluate events as less pleasant and more stressful compared to individuals without MDD and SP (Blanco & Joormann, 2018; Dunkley et al., 2017), factors that likely contribute to a generally lower well-being in individuals with MDD and SP. Moreover, individuals with MDD and SP are clearly limited in daily activities (e.g. missed work days, throwbacks at work) in comparison to individuals without MDD and SP (e.g. Broadhead, Blazer, George, & Tse, 1990).

As hypothesized, individuals with comorbidity reported lower well-being than individuals with no anxiety-depressive comorbidity. Although there is research in the field of quality of life, a construct that is sharing similarities with well-being, there is no research so far in terms of differences in well-being in adults with and without anxiety-depressive comorbidities. Our findings are consistent with those studies reporting lower quality of life (Caviccioli et al., 2018; Norberg et al., 2008; Zhou et al., 2017) in individuals with comorbid disorders, perhaps due to the higher symptom burden, compared to individuals no comorbidity. For instance, a study examining associations of anxiety-depression comorbidity and quality of life found that comorbidity to depression in anxiety disorders is linked to lower quality of life (Norberg et al., 2008). We extended their findings by including a depression diagnosis group, showing that depression was associated with low well-being ratings already. Likewise, a study investigating comorbidity in anxiety disorders indicated that well-being decreased as individuals moved from having one disorder to having multiple disorders (Sherbourne et al., 2010). This indicates that clinicians should be aware for patients presenting depression-anxiety comorbidity and that there is greater burden on those with comorbidity. The presence of comorbidity may require a different therapeutic approach than with single disorders. Indeed, there is evidence that acceptance- and mindfulness-based interventions are linked to improved outcomes for patients with comorbidity, and traditional Cognitive-Behavioral Therapy (CBT) more helpful for single disorders (Arch & Ayers, 2013). This is in line with previous research, e.g. a switching trial from CBT to Acceptance and Commitment Therapy (ACT) in treatment-resistant patients, that presented a high comorbidity rate (Gloster et al., 2015; 2017).

Furthermore, we observed a descriptive pattern in well-being in that individuals in the control group reported the highest well-being, followed by individuals with SP without comorbidity and ultimately individuals with MDD without comorbidity. This pattern corresponds to one found in earlier studies (Rapaport et al., 2005; Riihiäki et al., 2016), which

found that impairments in quality of life were higher in individuals with MDD than in individuals with SP. This suggests that SP may have a rather specific impact on well-being in individuals' lives, while MDD may have a more general and overarching impact on peoples' lives.

This study needs to be interpreted in the light of several limitations. First, we relied on self-reported measurements to assess well-being. These are prone to biases inherent in this assessment approach. Additional analyses of information stemming from other sources (e.g., friends and family or employers) may have resulted in different overall findings as self-report measures may not capture well-being in their full complexity. Second, the study sample is limited to participants with and without MDD and SP. This and because of the potential effects of self-selection and treatment, the results may raise the question of generalizability. Fourth, we had no data on the long-term course of the two clinical disorders. Thus findings cannot be generalized to individuals with chronic depression and their association to well-being.

With these limitations in mind, the current study extended the existing body of literature by explicitly investigating differences in well-being in individuals with and without MDD or SP, as well as in the subgroups of MDD or SP with and without comorbidity to anxiety disorders or to depressive disorders. Also, this is the first study examining the implications of the 2-continua model in terms of well-being in adults with and without MDD and SP. Future studies should, for instance, investigate the role of well-being in different samples other than depressive or anxiety disorders to determine whether results are not limited to these particular clinical groups. It may also be helpful to incorporate well-being measures in addition to treatment outcome assessments to evaluate treatment outcomes in an additional informative way and to augment symptom-based treatment change analyses. Moreover, studies should clarify the temporal relationship of a clinical diagnosis of MDD or SP and low well-being. This is important as well-being are both diminished in individuals

with a clinical diagnosis and evaluating (temporal) pathways may allow to intervene with targeted psychological help.

Our findings not only suggest that individuals with a clinical diagnosis (i.e. MDD or SP) clearly differed from individuals with no clinical diagnosis of MDD or SAD (i.e. controls) in respect to well-being, but also that individuals with comorbidity within both diagnostic categories engage in lower well-being than those without comorbidity. Thus, our findings are of clinical importance and may indicate the need to enhance well-being (Keyes, 2007) in individuals with a clinical diagnosis. One intervention that promotes well-being is ACT (Ciarrochi & Kashdan, 2013).

References

Abreu, L. N., Oquendo, M. A., Galfavy, H., Burke, A., Grunebaum, M. F., Sher, L., Sullivan, G. M., Sublette, M.E. & Lafer, B. (2018). Are comorbid anxiety disorders a risk factor for suicide attempts in patients with mood disorders ? A two-year prospective study. European Psychiatry, 47, 19–24. https://doi.org/10.1016/j.eurpsy.2017.09.005

Arch, J. J., & Ayers, C. R. (2013). Which treatment worked better for whom? Moderators of group cognitive behavioral therapy versus adapted mindfulness based stress reduction for anxiety disorders. Behaviour Research and Therapy, 51, 434–442. https://doi.org/10.1016/j.brat.2013.04.004

Banerjee, S., Chatterji, P., & Lahiri, K. (2014). Identifying the Mechanisms for Workplace Burden of Psychiatric Illness. Medical Care, 52, 112–120.

Beesdo, K., Bittner, A., Pine, D. S., Stein, M. B., Höfler, M., Lieb, R., & Wittchen, H.-U. (2007). Incidence of social anxiety disorder and the consistent risk for secondary depression in the first three decades of life. Archives of General Psychiatry, 64, 903–912.

Blanco, I., & Joormann, J. (2018). Examining Facets of Depression and Social Anxiety: The Relation among Lack of Positive Affect, Negative Cognitions, and Emotion Dysregulation. The Spanish Journal of Psychology, 20, 1–11. https://doi.org/10.1017/sjp.2017.43

Boerema, A. M., Kleiboer, A., Beekman, A. T. F., van Zoonen, K., Dijkshoorn, H., & Cuijpers, P. (2016). Determinants of help-seeking behavior in depression: a cross-sectional study. *BMC Psychiatry*, *16*, 78. https://doi.org/10.1186/s12888-016-0790-0

Broadhead, W. E., Blazer, D. G., George, L. K., & Tse, C. K. (1990). Depression, disability days, and days lost from work in a prospective epidemiologic survey. *The Journal of the American Medical Association, 264*, 2524–2528.

https://doi.org/10.1001/jama.1990.03450190056028

Chiu, M., Lebenbaum, M., Cheng, J., Oliveira, C. De, & Kurdyak, P. (2017). The direct healthcare costs associated with psychological distress and major depression: A population-based cohort study in Ontario, Canada. PLoS ONE, 12, 1–13.

Ciarrochi, J., & Kashdan, T. B. (2013). The foundations of flourishing. In *Mindfulness, acceptance and positive psychology* (pp. 1–29). Oakland: New Harbinger Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, N.J.: Lawrence Erlbaum.

Dunkley, D. M., Lewkowski, M., Lee, I. A., Preacher, K. J., Zuroff, D. C., Berg, J., Foley, J. E., Myhr, G. & Westraich, R. (2017). Daily Stress, Coping, and Negative and Positive Affect in Depression: Complex Trigger and Maintenance Patterns. *Behavior Therapy*, *48*, 349–365. https://doi.org/10.1016/j.beth.2016.06.001

Gloster, A. T., Klotsche, J., Ciarrochi, J., Eifert, G., Sonntag, R., Wittchen, H.-U., & Hoyer, J. (2017). Increasing valued behaviors precedes reduction in suffering: findings from a randomized controlled trial using ACT. Behaviour Research and Therapy, 91, 64–71. https://doi.org/10.1016/j.brat.2017.01.013

Gloster, A., Miché, M., Wersebe, H., Mikoteit, T., Hoyer, J., Imboden, C., Bader, K., Meyer, A. H., Hatzinger, M. & Lieb, R. (2017). Daily fluctuation of emotions and memories thereof: design and methods of an experience sampling study of major depression, social phobia, and controls. *International Journal of Methods in Psychiatric Research*, *26*, 1–11. https://doi.org/10.1002/mpr.1578

Gloster, A. T., Sonntag, R., Hoyer, J., Meyer, A. H., Heinze, S., Ströhle, A., Eifert, G. & Wittchen, H.-U. (2015). Treating treatment-resistant patients with panic disorder and agoraphobia using psychotherapy: a randomized controlled switching trial. *Psychotherapy and Psychosomatics*, *84*, 100–109. https://doi.org/10.1159/000370162

Jacobi, F., Wittchen, H.-U., Hölting, C., Höfler, M., Pfister, H., Müller, N., & Lieb, R. (2004).

Prevalence, co-morbidity and correlates of mental disorders in the general population: results from the German Health Interview and Examination Survey (GHS). Psychological Medicine, 34, 597–611.

Jia, H., & Lubetkin, E. I. (2017). Incremental decreases in quality-adjusted life years (QALY) associated with higher levels of depressive symptoms for U.S. Adults aged 65 years and older. Health and Quality of Life Outcomes, 15, 9. https://doi.org/10.1186/s12955-016-0582-8

Johansson, R., Carlbring, P., Heedman, Å., Paxling, B., & Andersson, G. (2013). Depression, anxiety and their comorbidity in the swedish general population: point prevalence and the effect on health-related quality of life. *PeerJ*, *1*, 1–18. https://doi.org/10.7717/peerj.98

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., Rush, A. J., Walters, E. E. & Wang, P. S. (2003). The epidemiology of major depressive disorder. Results from the national comorbidty survey replication (NCS-R). *The Journal of the American Medical Association*, *289*, 3095–3105. https://doi.org/10.1001/jama.289.23.3095

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-Month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 617–627. https://doi.org/10.1001/archpsyc.62.6.617

Kessler, R. C., Merikangas, K. R., & Wang, P. S. (2007). Prevalence, comorbidity, and service utilization for mood disorders in the United States at the beginning of the twenty-first century. *Annual Review of Clinical Psychology*, *3*, 137–158. https://doi.org/10.1146/annurev.clinpsy.3.022806.091444

Kessler, R. C., Stang, P., Wittchen, H.-U., Stein, M., & Walters, E. E. (1999). Lifetime co-morbidities between social phobia and mood disorders in the US National Comorbidity

Survey. *Psychological Medicine*, *29*, 555–567. https://doi.org/10.1017/S0033291799008375

Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Research*, *43*, 207–22. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12096700

Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, *73*, 539–548. https://doi.org/10.1037/0022-006X.73.3.539

Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: a complementary strategy for improving national mental health. *The American Psychologist*, *62*, 95–108. https://doi.org/10.1037/0003-066X.62.2.95

Lamers, S. M. A., Westerhof, G. J., Glas, C. A. W., & Bohlmeijer, E. T. (2015). The bidirectional relation between positive mental health and psychopathology in a longitudinal representative panel study. *The Journal of Positive Psychology*, *10*, 1–8. https://doi.org/10.1080/17439760.2015.1015156

Lorenzo-Luaces, L., Keefe, J. R., & DeRubeis, R. J. (2016). Cognitive-Behavioral Therapy: nature and relation to non-cognitive behavioral therapy. *Behavior Therapy*, *47*, 785–803. https://doi.org/10.1016/j.beth.2016.02.012

Magaard, J. L., Seeralan, T., Schulz, H., & Brütt, A. L. (2017). Factors associated with help-seeking behaviour among individuals with major depression: a systematic review. PLoS ONE, 12, 1–17.

Meier, S. M., Mattheisen, M., Mors, O., Mortensen, P. B., Laursen, T. M., & Penninx, B. W. (2016). Increased mortality among people with anxiety disorders: total population study. The British Journal of Psychiatry, 209, 216–221. https://doi.org/10.1192/bjp.bp.115.171975

Merikangas, R. M., & Angst, J. (1995). Comorbidity and social phobia: evidence from

clinical, epidemiologic, and genetic studies. *European Archives of Psychiatry and Clinical Neuroscience*, *244*, 297–303. https://doi.org/10.1007/BF02190407

Norberg, M. M., Diefenbach, G. J., & Tolin, D. F. (2008). Quality of life and anxiety and depressive disorder comorbidity. *Journal of Anxiety Disorders*, *22*, 1516–1522. https://doi.org/10.1016/j.janxdis.2008.03.005

Rapaport, M. H., Clary, C., Fayyad, R., & Endicott, J. (2005). Quality-of-life in depressive and anxiety disorders. *American Journal of Psychiatry*, *162*, 1171–1178. https://doi.org/10.1176/appi.ajp.162.6.1171

Riihimäki, K., Sintonen, H., Vuorilehto, M., Jylha, P., Saarni, S., & Isometsa, E. (2016). Health-related quality of life of primary care patients with depressive disorders. European Psychiatry, 37, 28–34. https://doi.org/10.1016/j.eurpsy.2016.04.008

Rizvi, S. J., Grima, E., Tan, M., Rotzinger, S., Lin, P., Mcintyre, R. S., & Kennedy, S. H. (2014). Treatment-Resistant Depression in Primary Care Across Canada. The Canadian Journal of Psychiatry, 59, 349–357.

Sherbourne, C. D., Sullivan, G., Craske, M. G., Roy-Byrne, P., Golinelli, D., Rose, R. D., Chavira, D. A., Bystritsky, A. & Stein, M. B. (2010). Functioning and disability levels in primary care out-patients with one or more anxiety disorders. *Psychological Medicine*, *40*, 2059–2068. https://doi.org/10.1017/S0033291710000176

Skre, I., Onstad, S., Torgersen, S., & Kringlen, E. (1991). High interrater reliability for the structured clinical interview for DSM-III-R Axis. *Acta Psychiatrica Scandinavica*, *84*, 167–173.

Trompetter, H. R., Lamers, S. M. A., Westerhof, G. J., Fledderus, M., & Bohlmeijer, E. T. (2017). Both positive mental health and psychopathology should be monitored in psychotherapy: confirmation for the dual-factor model in acceptance and commitment therapy. *Behaviour Research and Therapy*, *91*, 58–63. https://doi.org/10.1016/j.brat.2017.01.008

Unnewehr, Schneider, & Margraf (1996). Kinder-DIPS: Diagnostisches Interview bei psychischen Störungen im Kindes-und Jugendalter. Berlin, Deutschland: Springer-Verlag

Westerhof, G. J., & Keyes, C. L. M. (2010). Mental illness and mental health: the two continua model across the lifespan. *Journal of Adult Development*, *17*, 110–119. https://doi.org/10.1007/s10804-009-9082-y

World Health Organization. (2004). Promoting mental health: concepts, emerging evidence, practice. Geneva, Switzerland.

Williams, J. B. W., Gibbon, M., First, M. B., Spitzer, R. L., Davies, M., Borus, J., Howes, M. J., Kane, J., Harrison, G. P., Rounsaville, B. & Wittchen, H.-U. (1992). The retructured clinical interview for DSM-III-R (SCID) multisite test-retest reliability. *Archives of General Psychiatry*, *49*, 630–636.

Wittchen, H.-U, Wunderlich, U., Gruschwitz, S. & Zaudig, M. (1997). Strukturiertes Klinisches Interview für DSM-IV. Achse I: Psychische Störungen. Hogrefe, Göttingen.

Wittchen, H.-U., Nelson, C. B., & Lachner, G. (1998). Prevalence of mental disorders and psychosocial impairments in adolescents and young adults. *Psychological Medicine*, *28*, 109–126.

Wittchen, H. U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jönsson, B., Olesen, J., Allgulander, C., Alonso, J., Faravelli, C., Fratiglioni, L., Jennum, P., Lieb, R. Maercker, A., Os, van J., Preisig, M., Salvador-Carulla, L., Simon, R. & Steinhausen, H.-C. (2011). The size and burden of mental disorders and other disorders of the brain in Europe 2010. *European Neuropsychopharmacology*, *21*, 655–679. https://doi.org/10.1016/j.euroneuro.2011.07.018

Zhou, Y., Cao, Z., Yang, M., Xi, X., Guo, Y., Fang, M., Cheng, L. & Yukai, D. (2017). Comorbid generalized anxiety disorder and its association with quality of life in patients with major depressive disorder. *Nature Scientific Reports*, *7*, 1–8.

https://doi.org/10.1038/srep40511

Table 1.
Descriptive Measures of all outcome measures and results of group comparisons

	MDD-group (N=118)		SP-group (N=47)		Control-Group (N=119)		Difference between MDD and control group				Difference between SP and control group			
	M	SD	M	SD	M	SD	p-value	Cohen's d	95% CI	Mean difference	p-value	Cohen's d	95% CI	Mean difference
Measure														
Well-Being	1.67	0.85	2.03	0.96	3.21	0.91	<0.001	1.75	-1.76, -1.30	-1.53	<0.001	1.26	-1.46, -0.85	-1.18
Emotional	1.73	0.96	2.55	1.12	3.77	0.92	<0.001	2.17	-2.28, -1.78	-2.04	<0.001	0.79	-1.53, -0.87	-1.22
Social	1.39	0.94	1.51	0.96	2.57	1.14	<0.001	1.13	-1.43, -0.90	-1.18	<0.001	1.00	-1.38, -0.68	-1.06
Psychological	1.87	0.98	2.20	1.19	3.47	0.96	<0.001	1.65	-1.85, -1.33	-1.60	<0.001	1.18	-1.58, -0.89	-1.27

Note. CI= Confidence Interval; MDD= Major Depressive Disorder; SP= Social Phobia; Mean differences refer to the difference between the respective clinical group and the control group

Table 2.

Descriptive measures of clinical groups with and without anxiety-depressive comorbidity and results of group comparison

	Combined MDD and SP comorbidity vs. no comorbidity		
	p-value	95% CI	Mean difference
Measure			
Well-Being	<0.001	-0.80, -0.25	-0.49
Emotional	<0.001	-1.04, -0.44	-0.71
Social	0.001	-0.85. -0.22	-0.49
Psychological	0.009	-0.73, -0.10	-0.38

Note. CI= Confidence Interval; MDD= Major Depressive Disorder; SP= Social Phobia

Mean differences refer to the difference between the respective clinical group and the control group.

CURRICULUM VITAE

Hanna Paulina Wersebe

Education / Achievements

02/2014 – 02/2017	PhD student in the project 'Daily Symptoms in Major Depressive Disorder and Social Phobia: Factors that Influence Fluctuations and the Memory Gap' (Prof. Gloster), funded by the SNSF, Department of Psychology, Division Clinical Psychology and Epidemiology, University of Basel
08/2011 – 08/2013	Master of Science, Free University of Amsterdam
06/2012	(Co-) Founder of the William James Study Association
10/2008 – 07/2011	Bachelor of Science, Friedrich-Schiller- University Jena

Positions and Employments

01/2017 – current	Assistant Psychologist, Psychiatric Clinics of the University of Basel
09/2013 – 11/2013	Internship at the 'Saartjie Baartman Centre for Women and Children', Cape Town
10/2013 – 12/2013	Internship at the 'Agency for Refugee Education, Skills Training & Advocacy (ARESTA)', Cape Town
09/2012 – 12/2012	Student Assistant, Clinical Department, Free University of Amsterdam
08/2010 – 10/2010	Internship at the national aeronautics and space research centre 'Luft- und Raumfahrtpsychologie des Zentrums für Luft- und Raumfahrt e.V.', Deutsche Luft- und Raumfahrt (DLR), Hamburg
06/2007 – 12/2007	IT Business Support, Philips GmbH, Hamburg
09/2004 – 06/2007	Apprenticeship in Industrial Office Management

Trainings

antelope @university career program for female PhD students in 2016
Workshops & Coachings
- How to become a more efficient researcher,
- Power, Politics and personal Effectiveness
- How to present at international conferences
- Process, Finance and Career Coachings
- Expert Exchange (Prof. Orsillo, Suffolk University, Boston/USA)

Transferable skills, University of Basel
- How to give feedback (February, 2016)
- Self-Branding and Self-Promotion (March, 2015)
- Conflict management (August, 2014)

Publications

Wersebe, H., Lieb, R., Meyer, A. H., Hofer, P., & Gloster, A. T. (2017). The link between stress, well-being, and psychological flexibility during an Acceptance and Commitment Therapy self-help intervention. International Journal of Clinical and Health Psychology. Advance Online Publication

Gloster, A., Miché, M., Wersebe, H., Mikoteit, T., Hoyer, J., Imboden, C., … Lieb, R. (2017). Daily fluctuation of emotions and memories thereof: Design and methods of an experience sampling study of major depression, social phobia, and controls. *International Journal of Methods in Psychiatric Research*, *26*, 1–11.

Wersebe, H., Lieb, R., Meyer, A. H., Hoyer, J., Wittchen, H.-U., & Gloster, A. T. (2017). Changes of valued behaviors and functioning during an Acceptance and Commitment Therapy Intervention. *Journal of Contextual Behavioral Science*, 6, 63-70.

Wersebe, H.; Sijbrandij, M., & Cuijpers, P. (2013). Psychological Group-Treatments of Social Anxiety Disorder: A Meta-Analysis. *PLoS ONE* 8:e79034

Conference and Poster Presentations

Wersebe, H., Lieb, R., Meyer, A. H., Hofer, P., Gloster, A.T. (2016, September). Temporal relationship between psychological flexibility and Well-Being during an Acceptance and Commitment Therapy Self-Help Intervention. Open Paper presentation at the European Association for Behavioral and Cognitive Therapies conference (EABCT), Stockholm, Sweden.

Wersebe, H., Lieb, R. Meyer, A. , Hoyer, J., Wittchen, H. U., Gloster, A.T (2015, July/ November). Changes of valued behaviors and functioning during an Acceptance and Commitment Therapy Intervention. Poster presented at the 8th international congress and 13th national congress of clinical Psychology, Granada, Spain and at the Contextual Behavioral Science (ACBS) world conference Berlin, Germany