

**Effectiveness of a web-based Acceptance and Commitment Therapy
intervention for wellbeing of parents whose children have chronic conditions:
A randomized controlled trial**

Introduction

Parents of children with a chronic condition or functional disability have an increased risk of stress-related problems and reduced quality of life (Anclair, Hoven, Lannering, & Boman, 2009; Boman, Viksten, Kogner, & Samuelsson, 2004; Lindström, Åman, & Norberg, 2010a; Whalen, Odgers, Reed, & Henker, 2011). The child's chronic condition or functional disability can increase parents' worries and stress in everyday life. This can lead into chronic stress reaction and burnout syndrome (Appels & Schouten, 1991; Melamed, Kushnir, & Shirom, 1992; Toker, Shirom, Shapira, Berliner, & Melamed, 2005). Moreover, several studies have reported other psychological problems such as elevated levels of depressive and anxiety symptoms among parents of children with chronic conditions (Chronis et al., 2003). Such mental health problems can negatively impact parental practices and family functioning (Elgar, McGrath, Waschbusch, Stewart, & Curtis, 2004; Kim-Cohen, Moffitt, Taylor, Pawlby, & Caspi, 2005; Witt & DeLeire, 2009). Therefore, parents of children with a chronic condition could benefit from treatments that provide them tools to handle difficult inner experiences that are evoked when facing challenges and hardships related to parenting a child with a chronic condition.

Web-based treatments offer a solution for delivering evidence-based psychological treatments for this group, who may often have challenges in finding time to access face to face services. Web-based interventions have been developed and tested for a wide range of health problems (Cuijpers, Van Straten, & Andersson, 2008), including parental wellbeing (Hall & Bierman, 2015). Advantages of web-based interventions are that they are not bound by time and place. They are available when most needed and enable flexible integration of the intervention into everyday life. For this very reason, online delivery modalities may be an ideal vehicle for

sustainable treatment delivery to support wellbeing of parents whose children need extra care and assistance and who thus may have reduced capacity to access traditional forms of support.

One treatment approach that is widely applied to web-based programs is Acceptance and Commitment Therapy (ACT) (Brinkborg, Michanek, Hesser, & Berglund, 2011; Lappalainen et al., 2014; Levin, Haeger, Pierce, & Twohig, 2017). ACT incorporates non-judgmental attention to moment to moment experience, experiential acceptance of psychological events, such as difficult emotions, cognitions, and memories, and engagement in meaningful, value-driven activities. Promising results of web-based ACT interventions have been found, for example, for stress (Brinkborg et al., 2011), anxiety (Levin et al., 2017), chronic pain (Buhrman et al., 2013), and depression (Lappalainen et al., 2014; Lappalainen, Langrial, Oinas-Kukkonen, Tolvanen, & Lappalainen, 2015; Levin, Pistorello, Seeley, & Hayes, 2014).

To our knowledge, ACT-based web interventions for parents have just recently started to be investigated (Whittingham, Sheffield, & Boyd, 2016), and no studies have yet investigated the effectiveness of these interventions. However, parenting and parental stress have been identified as an important focus of ACT (Blackledge & Hayes, 2006; Coyne, McHugh, & Martinez, 2011) and other mindfulness-based treatments (Anclair, Lappalainen, Muotka, & Hiltunen, 2018; Neece, 2014). For example, studies that have investigated mindfulness-based programs for parents of children with autism spectrum disorder have found that these programs reduce parental stress, anxiety, and depression, as well as improve sleep, global health, wellbeing, and life satisfaction (e.g., (Dykens, Fisher, Taylor, Lambert, & Miodrag, 2014; Ferraioli & Harris, 2013; Neece, 2014). An ACT-integrated parenting intervention for families of children with cerebral palsy showed increased child functioning and quality of life and decreased parental psychological symptoms (Whittingham, Sanders, McKinlay, & Boyd, 2015). Another pilot study investigated the effects of an ACT intervention combined with problem solving skills training for parents of children diagnosed with a life-threatening illness, and the results showed significant reductions in post-traumatic stress symptoms and improvements in parental psychological flexibility and mindfulness (Burke et al., 2014). These findings indicate that ACT-based approaches are suitable for supporting the wellbeing of parents of children with chronic conditions.

The clinical target of ACT – psychological flexibility, defined as the ability to persist or change one’s own behavior in the service of chosen values, while being aware of the situational context and the own present-moment experience (Hayes, Luoma, Bond, Masuda, & Lillis, 2006) – seems to fit well for the demands of parenting. Psychological flexibility has been linked to psychological symptoms, parental burden, and stress for low income families, parents of preterm infants, and children with various disabilities (Evans, Whittingham, & Boyd, 2012; Lloyd & Hastings, 2008; Weiss, Cappadocia, MacMullin, Vecili, & Lunsky, 2012; Whittingham, Wee, Sanders, & Boyd, 2013). Furthermore, parental psychological flexibility appears to mediate the relationship between problem behaviors in children and mental health problems in parents of children with autism spectrum disorders (Weiss et al., 2012). In addition, a 2-day ACT workshop for parents of children with autism spectrum disorders reduced distress of parents, with indications that improvement in psychological flexibility acted as a process of change (Blackledge & Hayes, 2006). Consequently, targeting psychological flexibility may be an important focus for intervention in parents experiencing distress.

The aim of the current study was to examine the effect of a web-based ACT intervention on burnout and psychological symptoms and processes in parents of children with chronic conditions. Effects were investigated during the intervention and at a 4-month follow-up. More precisely;

1. The primary aim was to examine the effect of a web-based ACT intervention vs. control (waitlist) on burnout and psychological symptoms of depression, anxiety and stress.
2. A secondary aim was to examine the effect of the intervention on psychological processes that are targeted in ACT, i.e., psychological flexibility including experiential avoidance (EA), mindfulness skills, and cognitive fusion.

Methods

Participants

A WEB-BASED ACT INTERVENTION FOR PARENTS

Participants (N = 74) were parents of children (0–18 years old) with type 1 diabetes or functional disabilities (see Table 1 for sample characteristics). To be eligible for this study, the parents had to have a score exceeding 2.75 points on the Shirom-Melamed Burnout Questionnaire (SMBQ) (Shirom & Melamed, 2006), indicating significant burnout symptoms. The participants were required to have access to the Internet and use a computer daily. Persons with a poor knowledge of Swedish (i.e., those who could not fill out the questionnaires in Swedish) were excluded from the study, as were those undergoing any other psychological treatment.

Table 1. Sample characteristics

Variable	ACT group (n=37)	Control group (n=37)
Parent gender, female [n (%)]	33 (89)	27 (73)
Parent age, yrs [mean (SD)]	43.0 (8.2)	42.3 (5.5)
Parent marital status [n (%)]		
Married/living with partner	30 (81)	29 (78)
Single	7 (19)	8 (22)
Education level of the parent [n (%)]		
Basic	1 (3)	0
Upper secondary	12 (32)	7 (19)
Post-secondary	11 (30)	5 (14)
University level	13 (35)	25 (67)
Number of children living at home [mean (SD)]	2.1 (0.9)	2.2 (0.8)
Child gender, female/male	16/18	12/20
Child age, yrs [mean (SD)]	11.0 (4.6)	9.6 (4.5)
Child age when diagnosed, yrs [mean (SD)]	5.0 (3.9)	4.6 (3.2)
Diagnosis of the child [n (%)]	n=34	n=32
Diabetes	17 (50)	15 (47)
Chromosomal abnormality or genetic disorder	3 (9)	4 (13)
Hypoxic–ischemic brain damage	2 (6)	4 (13)

Autism spectrum disorders	6 (18)	6 (19)
Motor disorders	2 (6)	1 (3)
Developmental disability or other/unknown etiology	4 (12)	2 (6)

Materials

Outcome measures

Burnout symptoms were measured with the Shirom-Melamed Burnout Questionnaire (SMBQ)(Lundgren-Nilsson, Jonsdottir, Pallant, & Ahlberg, 2012; Melamed et al., 1999; Shirom & Melamed, 2006). The SMBQ measures four elements of burnout: Emotional exhaustion and physical fatigue, Listlessness, Tension, and Cognitive weariness. It consists of 22 items that are rated on a 7-point scale ranging from 1 = “Never or almost never” to 7 = “Always or almost always.” High scores correspond to more severe burnout symptoms. The cutoff scores for burnout on the SMBQ are 2.75–3.74 indicating low burnout, 3.75–4.46 indicating high burnout, and ≥ 4.47 indicating a pathological level of burnout. The SMBQ’s psychometric characteristics and factorial validity have been previously demonstrated (Lundgren-Nilsson et al., 2012; Shirom & Melamed, 2006). In our data, Cronbach’s alpha at baseline was 0.91.

The emotional states of depression, anxiety, and stress were measured using the 21-item Depression, Anxiety, and Stress Scale (DASS-21) (Henry & Crawford, 2005). The DASS-21 is a self-report assessment tool that contains three subscales scored on a 4-point Likert scale ranging from 0 = “Strongly disagree” to 3 = “Totally agree.” Each subscale of the DASS consists of seven items that evaluate the emotional states of depression, anxiety, and stress, respectively. The recommended cutoff scores for moderate level of depression, anxiety and stress on the DASS-21 are 14, 10 and 19 respectively, and the recommended cutoff scores for mild level of depression, anxiety and stress are 10, 8 and 15 respectively. The factor structure and validity of the DASS-21 have been demonstrated elsewhere (Alfonsson, Wallin, & Maathz, 2017). In our data, Cronbach’s alpha was 0.93 for the total DASS score and 0.89, 0.83, and 0.85, respectively, for the subcategories depression, anxiety, and stress.

Process measurements

Experiential avoidance was measured by the Acceptance and Action Questionnaire (AAQ-II) (Bond et al., 2011). This includes seven items that assess a person's ability to accept negative emotions and other internal experiences and take value-based actions in the presence of these experiences. The items are rated on a 7-point, Likert-type scale ranging from 1 = "Never true" to 7 = "Always true," with higher scores indicating higher levels of EA (i.e., lower levels of psychological flexibility). The cutoff scores have not been published for experiential avoidance. The structure, reliability, and validity of the AAQ-II have been reported elsewhere (Bond et al., 2011). In this data, Cronbach's alpha was 0.90.

Mindfulness was assessed by the Five Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2006). It includes 39 items that are rated on a 5-point, Likert-type scale ranging from 1 = "Never or very rarely true" to 5 = "Very often or always true", with higher scores indicating higher levels of mindfulness skills. The cutoff scores have not been published for mindfulness skills. FFMQ consists of the following subscales: (a) *Observing* includes noticing internal and external experiences. (b) *Describing* involves naming and labeling internal experiences. (c) *Acting with awareness* means paying attention to own activities of the moment. (d) *Non-judgment of inner experiences* means having a non-evaluative stance towards inner experiences. (e) *Non-reactivity to inner experiences* is the ability to let thoughts and feelings come and go without struggling with them. The structure, reliability, and validity of the FFMQ have been demonstrated (Baer et al., 2008). In our data, Cronbach's alpha was 0.86 for the total FFMQ score, and 0.78, 0.92, 0.91, 0.92, and 0.82, respectively, for the subscales Observing, Describing, Acting with awareness, Non-judgment, and Non-reactivity.

Cognitive fusion was measured using the Cognitive Fusion Questionnaire (CFQ) (Gillanders et al., 2014). This includes 13 items that are rated on a 7-point Likert-type scale ranging from 1 = "Never true" to 7 = "Always true," with higher scores indicating higher levels of cognitive fusion. The cutoff scores have not been published for cognitive fusion. The CFQ contains items reflective of the believability of thoughts, getting stuck on thoughts, and taking action in contrast to thinking. The reliability and validity of CFQ have been demonstrated (Gillanders et al., 2014). In the current data, Cronbach's alpha was 0.84.

The measures were administered in Swedish. The measures have been translated and back-translated for previous studies (Alfonsson et al., 2017; Lilja et al., 2011; Lundgren & Parling,

2017; Lundgren-Nilsson et al., 2012), except for the CFQ which was translated for this study by a group of researchers with long experience in acceptance, mindfulness, and value-based interventions. The internal consistency of the measures and subscales was good (Cronbach's $\alpha = 0.83-0.92$).

Web-based Acceptance and Commitment Therapy intervention

The web-based program was called *ACTParents* and it was designed specifically as part of this study. The purpose of the 10-week intervention was to teach parents skills and strategies to prevent and handle stress and worries in everyday life. The program was accessible via a mobile-responsive website using a desktop, laptop, tablet or mobile phone.

The web-program was guided by a personal coach. The 17 coaches were undergraduate psychology students in their first to third academic year who had no previous experience of ACT or web interventions. They received a 4-hour training in ACT and web coaching before the start of the intervention. In addition, they received 2 hours of supervision once during the intervention period and further supervision when needed. The coaches' task was to support participants throughout the intervention by giving semi-structured feedback to them via the web program.

The supervisors were clinicians and researchers with experience in ACT interventions. The leading supervisor was an experienced clinician, licensed psychologist, and psychotherapist, with nearly 15 years' experience in ACT clinical practice and supervision.

Before the participants started the web program, they had a phone interview with their assigned coach. The interview was adapted from the psychosocial interview model (Robinson, Gould, & Strosahl, 2011). The interview was semi-structured, with questions concerning parents' lifestyle and other factors affecting personal wellbeing, such as "Has something happened recently in your life that has made your situation or problem worse?" "What kind of social relationships do you have?" and "Do you eat regular meals?" The parents were also sent an email which contained credentials of the program and a PDF booklet with instructions and the timetable of the web intervention.

ACTParents intervention consisted of five themed modules that the participants were instructed to complete during the course of 1 week (module 1) or 2 weeks (each of modules 2-5). The program was based on the ACT and included themes such as life values, present moment,

A WEB-BASED ACT INTERVENTION FOR PARENTS

defusion, acceptance, and self-compassion (see Table 2). Acceptance-exercises focusing on one's relationship with self (i.e, self-compassion) were included in the program, since recent studies has supported self-compassion as an useful coping strategy for parents of children with chronic conditions (Mitchell, Whittingham, Steindl, & Kirby, 2018; Neff & Faso, 2015). Each module consisted of text and/or a video, exercises with MP3 audio files, questionnaires, and homework assignments (Figure 1). In addition, there was a discussion forum, where participants could discuss issues with each other, and a free-form diary. At the end of each module (i.e., after every 1-2 weeks), participants had to complete a home assignment based on the theme of the module, write a reflection based on their experiences with the assignment, and submit the reflection to their coach via the program platform. After completion of the home assignment, the participants received semi-structured, written feedback from their assigned coach. The feedback was semi-structured to make sure that it was in line with ACT and individualized based on the reflection of the participant. An email reminder was sent to those participants who did not complete their assignment on time.

Table 2. Content of the ACTParents web program

Modules	Content of the ACTParents program
Introduction	Welcome to the program
Module 1: What is important for you? (Values)	Text: To be a parent. Where are you going? Video: Important for You Experiential exercises (to read and listen): The most important things in life Find what is meaningful in life 90-year birthday party
Assignment, week 2	Reflect on your life values and formulate them. Choose one or more areas of life and life values that feel right for you right now. Act! Think about what action you can perform today.
Module 2: Meaningful actions! (Value-based actions)	Text: Meaningful actions Obstacles on the road Sleep, fatigue Experiential exercises: Do it now! Accept you fatigue

A WEB-BASED ACT INTERVENTION FOR PARENTS

<p>Assignment, weeks 3–4</p>	<p>Select your three most important life values and goals and make a plan to start your journey towards these values. Create a calendar and schedule some activities for tomorrow, next week, next month, etc. Write down your plan as in the example:</p> <ul style="list-style-type: none"> • My life value (what matters to me) is: ... • My intermediate goals towards this value are as follows: 1 ... 2 ... 3 ... • When will you take the first step? Today, tomorrow, next week?
<p>Module 3: Present moment (Present moment)</p>	<p>Text: Present moment Present moment in everyday life</p> <p>Video: Mindfully present</p> <p>Experiential exercises: Let go Follow your breath Mindful in everyday tasks Washing dishes mindfully Mindful eating Mindful listening Body scanner SOAL: Stop, observe, accept, let go</p>
<p>Assignment, weeks 5–6</p>	<ol style="list-style-type: none"> 1. Apply the Stop, Observe, Accept, and Let go (SOAL) method in your everyday life. 2. Use a “present moment thermometer” every night and note how present you have been during the day. Note the activities that have helped you be more present (e.g., hobby, mindful shower, mindful eating, music, dance, yoga, exercises). Try to increase the frequency of activities that make you focus more on the moment and feel good. 3. How can you influence your wellbeing? What actions promoting the good life for you are you willing to choose today or tomorrow?
<p>Module 4: Distance to thoughts and feelings (Defusion)</p>	<p>Text: Thoughts are just thoughts</p> <p>Video: The power of thoughts and feelings</p> <p>Experiential exercises: The little man Leaves in the stream Observer</p>
<p>Assignment, weeks 7–8</p>	<ol style="list-style-type: none"> 1. Put a label on your thoughts, feelings, and body sensations as they appear. Speak loudly for/to yourself, for example: <i>Now I get the feeling that I’m sad ...</i>, <i>Now I have the idea to ...</i> (describe the idea), <i>Now I get the feeling to/that ...</i> (describe the feeling), <i>Now the memory came up of ...</i> (describe the memory),

A WEB-BASED ACT INTERVENTION FOR PARENTS

	<i>Now it feels like this in my body ... (describe the sensation).</i>
Module 5: Openness (Acceptance and self-compassion)	Text: Acceptance, Self-compassion Video: Acceptance Experiential exercises: Tug-of-war Don't think about the cinnamon bun Broken machine Increase your oxytocin levels Self-compassion exercise A good friend
Assignment, weeks 9–10	1. Is there anything in your life that you need to learn to accept? Select any of the acceptance exercises above or apply the general model of acceptance to what you have difficulty in accepting. Practice acceptance several times a week. (a) Note and describe the present moment. (b) Accept what you note. (c) Accept your painful and unpleasant thoughts and feelings. (d) Do not avoid. 2. Be compassionate with yourself and with others. Reflect and tell how it feels and affects you and people close to you. Deliberately seek pleasures in your life every day.
Closing words	Summary of the program (2 pages) Text: The journey continues Over the highest mountains

A WEB-BASED ACT INTERVENTION FOR PARENTS

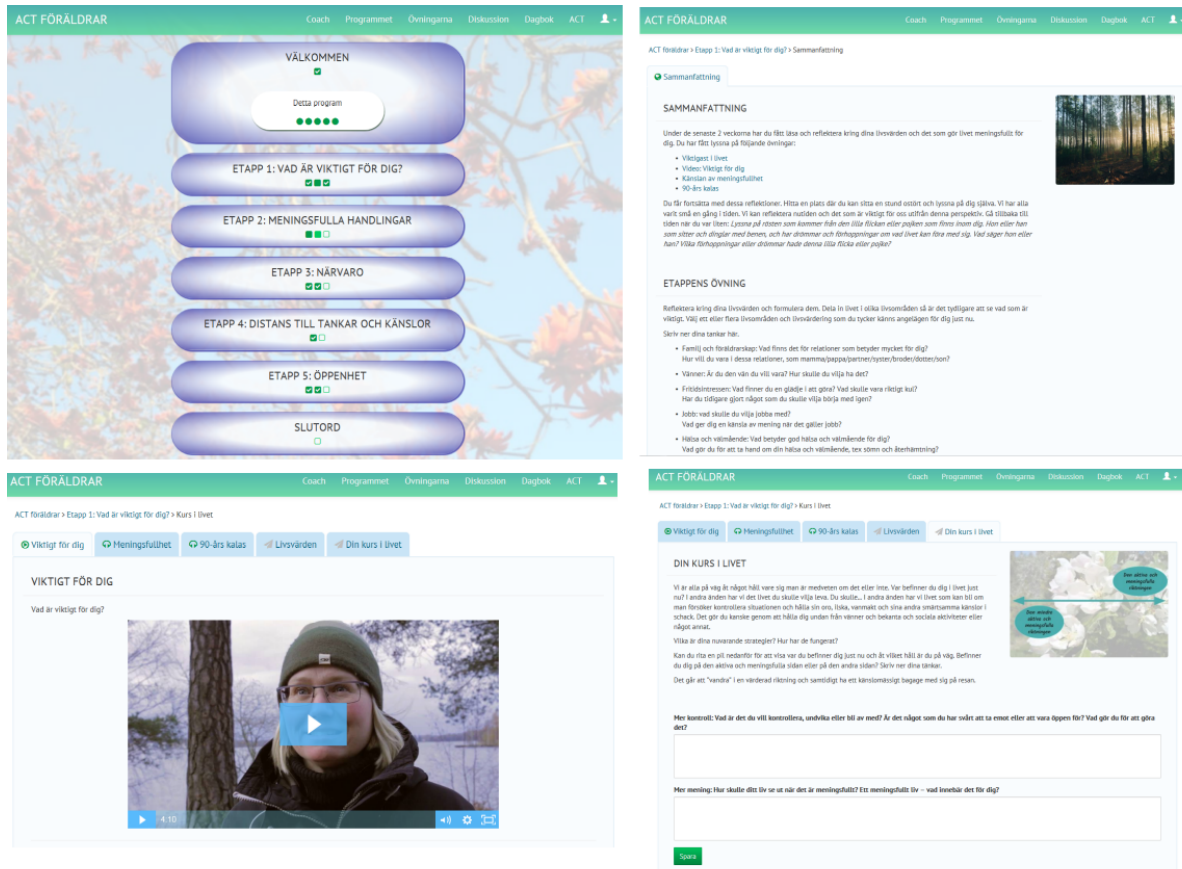


Figure 1. Screenshots of the ACTParents program: the menu page (top left), homework assignment page (top right), video (bottom left), and reflection exercise (bottom right)

Adherence measures

The ACTParents program recorded a timestamped usage log, which included information about participants' login times and actions in the program. Adherence to the program was measured with the total number of usage days and the completion percentage of the program. Furthermore, engagement to the program was assessed based on total usage time and overall satisfaction with the program. Total usage time was calculated as a sum of the duration of individual sessions, and a session was determined as continuous use of the program with less than 20 minutes between subsequent actions within the program. Satisfaction was measured with a 10-point scale ranging from 1 = "Very dissatisfied" to 10 = "Very satisfied".

Procedure

The study was approved by the Regional Ethical Review Board at Uppsala University, Uppsala, Sweden. All participants gave written, informed consent to their participation in the study.

The data were collected in two phases, the first group starting in the spring of 2017 and the second in the fall of 2017. The first group was recruited through the pediatric clinic of [blinded], by sending an invitation letter to parents of children with type 1 diabetes. The pediatric clinic sent the invitation letter to all the parents of children with type 1 diabetes belonging to the health care district of [blinded]. Due to a low recruitment rate, in the recruitment of the second group, parents of children with functional disabilities, were also invited through the pediatric habilitation center of [blinded]. The pediatric habilitation center sent the invitation letter to parents whose children were diagnosed with some functional disability and who belonged to the health care district of [blinded]. A reminder letter was sent a couple of weeks after the first invitation letter. Participants enrolled in the study via email or by phone. The initial exclusion criteria were assessed through an online survey including an electronic questionnaire for reported burnout symptoms (SMBQ) (Shirom & Melamed, 2006).

After completing the screening questionnaires (SMBQ) along with the informed consent, participants who met the inclusion criteria were randomly assigned by a researcher outside of the research group to the web-based ACT intervention or to the waitlist control (WLC) group. Block randomization was performed to ensure equal, or close to equal, numbers of participants in each group. The data included eight couples. In order to ensure that the couples were in the same group, only one of the parents was included in the randomization and the other parent was then put in the same group with his or her partner. Furthermore, each participant was randomly assigned to one of the 17 coaches.

Four participants dropped out before the intervention started (two in the ACT group and two in the control group). At study start, the ACT group comprised 37 participants, including three couples; the control group comprised 37 participants, including five couples. Participants in the WLC group were granted access to the ACT web intervention after a 4-month follow-up

A WEB-BASED ACT INTERVENTION FOR PARENTS

measure. Participants completed a web-based survey including outcome (SMBQ, DASS) and process measures (AAQ-II, FFMQ and CFQ) before, halfway through, and at the end of the intervention, as well as 4 months post-intervention (see Figure 2). In addition, feedback about the program was collected in the surveys at the end of the intervention and 4 months post-intervention. Participants in the ACT web intervention group were allowed to continue using the program independently after the intervention period had ended.

A WEB-BASED ACT INTERVENTION FOR PARENTS

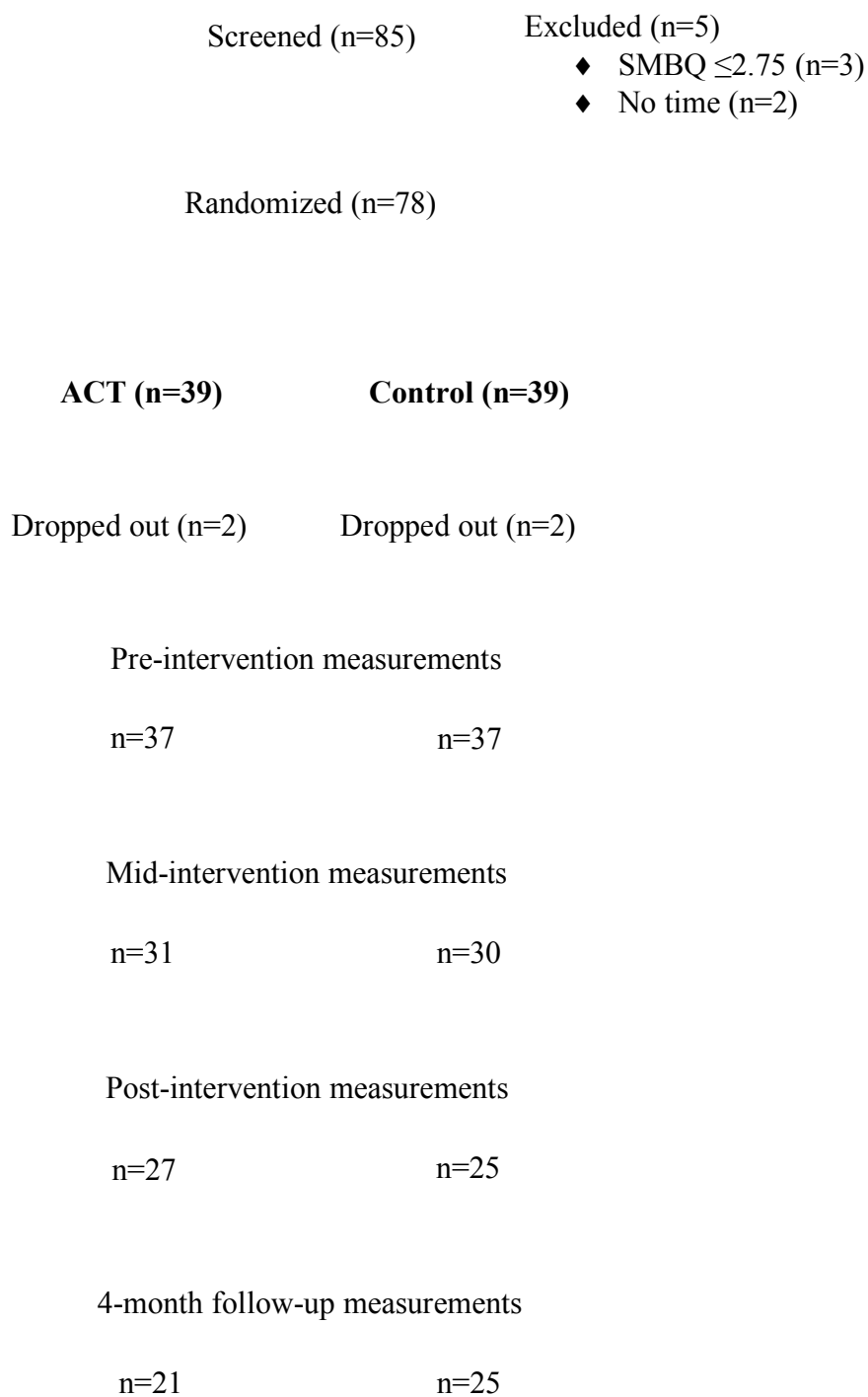


Figure 2. Flowchart of the study design

Statistical methods

Hierarchical linear modeling (HLM) (Wald test) was used to analyze the Group \times Time interaction, i.e., whether the groups changed differently between the measured time points (pre, post, follow-up). Where there was a difference, post hoc tests were conducted to determine whether the difference between groups occurred during or after the intensive intervention period. Hierarchical linear modeling accounts for missing values at random (MAR) and includes all of the available data. The parameters were estimated using the full maximum likelihood (MLF) method (robust maximum likelihood (MLR) estimation in Mplus). In addition, we performed the Group \times Couple interaction analysis in order to investigate if changes were different for couples as compared to other participants.

Effect sizes are reported using Cohen's *d*. Cohen's *d* was calculated from baseline to follow-up within, and corrected between, groups to estimate ESs using the estimated values. A within-group ES of 0.5 is considered small, 0.8 medium, and 1.1 large, and a corrected between-group ES of 0.2 is considered small, 0.5 medium, and 0.8 large (Roth & Fonagy, 1996).

Results

Before treatment started, there were no significant differences ($p < .10$) in any of the measures between the two groups. Regarding outcome measures, intervention effects (Group \times Time interaction) were found for burnout symptoms (SMBQ), the total DASS-21 score, and the DASS-21 score, Depression subscale. Differences in changes were significant during the active treatment period (from pre to post). Unexpectedly, the intervention did not have a significant effect on symptoms of anxiety (DASS-21, anxiety) and stress (DASS-21, stress). For process measures, the intervention effects were significant for the total mindfulness score (FFMQ) and its subscales Observing, Describing, Acting with awareness, and Non-reactivity to inner experiences but not for Non-judgement. The subscales Observing and Non-reactivity improved in the ACT group compared to the control group during the intervention period (pre to post). The subscale Acting with awareness improved during the follow-up period and the subscale Describing showed improvement both during the intervention and at follow-up. Overall, the effects of the intervention were maintained during the follow-up period (Table 3).

The between-group ES at follow-up was large for the primary outcome measure of burnout (SMBQ, $d = 1.05$) and the total FFMQ score ($d = 0.98$). A medium between-group effect ($d \geq 0.50 < 0.80$) was found for the total DASS score, and the DASS Depression and Anxiety subscale scores, as well as the FFMQ subscales Observing, Acting with awareness, and Non-reactivity. A small difference between the groups ($d \geq 0.20 < 0.50$) was observed in stress, psychological flexibility, cognitive fusion and in the FFMQ subscale Describing and Non-judgment. Mean scores, standard deviations, interactions, and between- and within-group ESs are presented in Table 3.

In order to investigate if the intervention effect was different for couples, we analyzed the Group \times Couple interaction effect for change in all variables. For depression symptoms, there was a significant interaction from pre to post-measures indicating that the intervention effect was significant among couples (Wald test, $p = .00$), but not for the other participants ($p = .17$). Among couples, the depression score decreased from 13.0 to 6.8, whereas for controls there was no change (Pre score 12.4 and post-score 12.9) In addition, there was a significant interaction in the FFMQ subscale Acting with awareness from post to follow-up measures indicating that the change was significant for other than couples ($p = .03$), but not for the couples ($p = .30$). Among non-couples, Acting with awareness increased in ACT group (post-score 26.4 and follow-up score 28) and decreased in the control group during the follow-up period (post-score 25.3 and follow-up score 22).

A WEB-BASED ACT INTERVENTION FOR PARENTS

Table 3. Estimated sample statistics (mean ± standard deviation (SD)) and the effect of the intervention on outcomes

	ACT				Control				Effect ^a	Pre-post ^b	Post-fup ^c	d ^d
	Pre	Post	Fup	d ^e	Pre	Post	Fup	d ^e				
SMBQ	4.79 ±0.91	4.01 ±1.30	3.39 ±1.56	0.88	4.87 ±0.82	4.74 ±1.06	4.78 ±1.32	0.20	0.001	0.004	0.159	1.05
DASS	40.76 ±26.67	30.66 ±24.70	23.90 ±27.11	0.55	41.24 ±21.28	34.44 ±20.10	47.73 ±38.74	0.08	0.027	0.038	0.397	0.54
Depression	12.76 ±10.06	8.45 ±8.95	6.35 ±9.26	0.52	13.19 ±8.69	10.92 ±8.04	16.10 ±13.02	0.03	0.012	0.067	0.276	0.57
Anxiety	8.70 ±9.37	6.60 ±8.45	5.30 ±8.95	0.34	8.00 ±6.80	6.04 ±7.14	11.32 ±15.00	0.02	0.137	–	–	0.37
Stress	19.30 ±9.96	15.60 ±11.17	12.25 ±10.57	0.57	20.05 ±9.39	17.48 ±9.13	20.32 ±12.41	0.22	0.167	–	–	0.41
AAQ	22.32 ±9.75	19.46 ±8.80	17.96 ±8.26	0.36	22.62 ±9.40	21.43 ±11.42	21.23 ±11.22	0.12	0.378 ^f	–	–	0.22
CFQ	49.51 ±11.33	42.31 ±15.33	39.73 ±14.42	0.63	49.14 ±13.15	41.82 ±16.54	47.74 ±16.33	0.17	0.170	–	–	0.45
FFMQ	117.84 ±16.25	132.28 ±21.83	137.55 ±23.06	0.86	116.92 ±18.15	124.98 ±31.55	116.23 ±21.06	0.00	0.002	0.015	0.180	0.98
Observing	24.62 ±6.09	26.40 ±5.32	28.41 ±5.75	0.55	23.84 ±5.69	23.71 ±7.54	24.61 ±5.03	0.01	0.018	0.035	0.882	0.56
Describing	26.51 ±6.69	29.86 ±5.54	29.97 ±6.63	0.44	25.97 ±7.54	28.53 ±9.67	25.97 ±8.55	0.02	0.000	0.047	0.000	0.40
Acting with awareness	22.76 ±7.04	26.15 ±7.14	27.36 ±6.90	0.57	22.51 ±6.13	25.46 ±8.49	21.15 ±8.50	0.03	0.011	0.389	0.007	0.58
Non-judgment	24.76 ±7.39	26.57 ±7.41	28.04 ±6.14	0.42	25.43 ±7.80	26.87 ±9.70	24.53 ±7.88	0.06	0.131	–	–	0.45
Non-reactivity	19.19 ±5.20	23.31 ±5.39	23.78 ±5.91	0.76	19.16 ±4.73	20.42 ±6.16	19.98 ±5.48	0.10	0.003	0.001	0.913	0.73

^a p-value for differences in changes between the study groups using all measured time points (pre, post, fup) using estimated parameters (hierarchical linear model, Wald test). Bold text indicates significant p-value <0.05.

^b p-values of the post hoc analyses: difference in change between pre and post.

^c p-values of the post hoc analyses: difference in change between post and follow-up.

^d Cohen’s d from baseline to follow-up between the ACT group and the control group using estimated parameters.

^e Cohen’s d from baseline to follow-up within the group using estimated parameters.

^f The estimation was done using full maximum likelihood (MLF) for AAQ.

AAQ = Acceptance and Action Questionnaire; ACT = Acceptance and Commitment Therapy; CFQ = Cognitive Fusion Questionnaire; DASS = Depression, Anxiety and Stress Scale; FFMQ = Five Facet Mindfulness Questionnaire; fup = follow-up; SMBQ = Shirom-Melamed Burnout Questionnaire.

The adherence measures are reported for the participants of the ACT group who completed the post-intervention measures ($n = 27$). The mean number of total usage days was 13.3 during the 10-week (70 days) intervention period (median = 12; SD = 8.9; range 2-36). On average, the participants completed 85.0% of the program (median = 93.1; SD = 18.7; range 32.8-100), that is, more than four out of five modules. The mean total usage time was 3.6 hours (median = 2.9 hours; SD = 2.2). The mean satisfaction rating was 7.5 (median = 9; SD = 2.5; range 2-10).

Discussion

This study is among the first to investigate an ACT-based online treatment for enhancing wellbeing among parents of children with chronic conditions. Specifically, the objective was to examine whether an ACT-based web intervention without face to face contact is effective in alleviating self-reported burnout and other psychological symptoms, and improving psychological flexibility skills. In comparison to the WLC condition, the guided ACT web intervention produced significant improvements in burnout and depressive symptoms. Improvements were also observed in the mindfulness skills of observing, describing, acting with awareness, and non-reactivity, as well as in cognitive defusion. All improvements were maintained or increased at follow-up 4 months after the guided intervention ended.

Improvements in depression symptoms were evident for couples participating together in the intervention, but not when the spouse or partner was not included in the intervention, indicating the benefit of getting support from a partner going through the same treatment. Of course, it is possible that also some of those partners who did not participate in the study, were doing exercises of the web-intervention together with their partners. However, this finding suggest that

it could be beneficial to include both parents of a child with chronic condition to psychological treatment in order to increase its effectiveness.

In favour of the ACT group, we observed a large between-group ES ($d \geq 0.80$) for burnout and the total FFMQ score, and a medium between-group ES ($d \geq 0.50$) for depression and anxiety symptoms, as well as for acting with awareness, observing and non-reacting. Our results are consistent with the results of a meta-analysis of computer-based psychological treatments for depression, reported by Richards and Richardson (2012), who found between-group ESs of $d = 0.78$ for therapist-supported, $d = 0.58$ for administrative-supported, and $d = 0.36$ for unsupported treatments. Our results provide further evidence that guided web-based ACT can significantly reduce psychological distress and enhance mindfulness skills (e.g., (Lappalainen et al., 2014) and suggest that an ACT web intervention supported by a coach giving semi-structured written feedback, without any face to face contact, can be an effective treatment model.

Our results are consistent with previous findings supporting mindfulness and ACT-based approaches for parents of children with chronic conditions or serious illnesses (Anclair et al., 2018; Burke et al., 2014; Dykens et al., 2014; Ferraioli & Harris, 2013; Neece, 2014). Several previous studies have also shown that gains of ACT interventions for parents are maintained after the intervention (e.g., (Blackledge & Hayes, 2006; Burke et al., 2014). For example, a study of ACT on values-directed overt behavior in parents of children with autism reported the greatest effects more than 6 months post-training (Gould, Tarbox, & Coyne, 2017). These findings suggest that ACT interventions can provide skills for parents that they can utilize independently in everyday life.

Although we found a significant impact on mindfulness skills and defusion, we did not find significant intervention effects (Group \times Time effects) for the acceptance-related measures of EA and non-judgment, which are often considered main treatment processes in ACT treatments. However, between-group ESs indicated small (AAQ, $d = 0.22$; FFMQ, Non-judgment subscale, $d = 0.45$) differences when compared to the control condition (WLC) in both of these measures. Also, in a previous study with the same population, we found that EA explains psychological symptoms at baseline [blinded]. Possible explanations for the non-significant intervention effects

could be due to the format, length or content of the intervention or targeted population. It is possible that acceptance-related processes benefit more from face-to-face contact or that they need more time to improve whereas other mindfulness skills were affected during the 10-week web-intervention and the 4-month follow-up period. Several previous studies of the web-based interventions have suggested support for ACT in improving different aspects of psychological flexibility, but findings have been partly mixed (Brown, Glendenning, Hoon, & John, 2016). Accordingly, more systematic investigation of associations between the intervention features and affected psychological processes are warranted.

It is also possible that not all acceptance-related measures used in the present study were sensitive for this population. In the present study, the general measure of EA (AAQ-II) was used, but there exist several targeted measures that have been modified for different populations. Targeted measures of EA have been found to be more accurate in predicting psychological and behavioral outcomes (Gifford et al., 2004; Sairanen et al., 2015; Sairanen et al., 2017). Targeted measures exist also for EA related to parenting. In future studies, it could be useful to include targeted measures of EA in measuring processes of change in parents. The Parental Psychological Flexibility Questionnaire (PPFQ) (Burke & Moore, 2015) is designed to assess how parents of pre-adolescents and adolescents accept negative thoughts, emotions, and urges about their child and still act in ways that are consistent with effective parenting. Also a targeted measure of psychological flexibility has been developed for parents of young people with chronic pain (Wallace, McCracken, Weiss, & Harbeck-Weber, 2015).

Correspondingly, we found significant impact on burnout and depression symptoms, but not on anxiety and stress symptoms (measured by DASS-21). However, even though we did not observe statistically significant intervention effects (Group \times Time effects) for anxiety and stress, our results suggest clinically significant changes in respected variables. There was a small between-group ES ($d = 0.37$) for anxiety and stress ($d = 0.41$) symptoms, in favor of the ACT group. In addition, based on the recommended cut-off scores of DASS-21, the average anxiety level in the ACT group decreased from mild to normal and stress level from moderate to normal.

Limitations

Our findings should be taken in the context of certain limitations. Firstly, the follow-up period was only 4 months and therefore the results of long-term effects are only directional. However, the positive trend of improvements during the follow-up period suggests sustainability.

Secondly, there was a notable number of dropouts during the intervention and follow-up, which may have affected the results, even though this was considered in the analysis by using the MLF method. The number of dropouts in the treatment group (27% at post-intervention measures and 43% at follow-up) is in line with the findings of a meta-analysis of computer-based interventions for depression, showing dropout rates of 74% for unsupported, 38.4% for administrative-supported, and 28% for therapist-supported treatments (Richards & Richardson, 2012).

The majority of the participants were female (81%); consequently, the generalizability of the results is limited. On the other hand, this may reflect the findings that mothers (compared to fathers) of children with chronic conditions are more prone to having psychological symptoms (Lindström, Åman, & Norberg, 2010b; Sultan, Leclair, Rondeau, Burns, & Abate, 2016; Yeh, 2002). In addition, other than to psychology students who have received a brief training in the ACT model, the results cannot be generalized to therapists or other healthcare professionals conducting treatment.

Another limitation of the present study concerns the measures. All the measures were self-reports, which could influence the validity of the study. Further research should replicate these results with behavioral or physiological outcomes. For example, ecological momentary assessment (by using e.g., smart phones, smart watches) could be used to measure parents' level of distress, mindfulness and value related behaviors within daily life in order to identify beneficial behavioral changes during the intervention. Finally, the use of a WLC group can be considered a potential weakness in our study as such a group does not offer a strong test of treatment efficacy and effect sizes in trials with a waitlist control group have found to be larger than in trials with no-treatment or treatment-as-usual control conditions (Gold et al., 2017).

Clinical implications and future directions

Having a child with a chronic condition or functional disability involves worries and stress that parents need to handle in everyday life. Hence, parents of children with chronic conditions have

a need for treatments that provide tools for handling difficult emotional experiences and that could be integrated into everyday life. This study provides evidence that an ACT-based web intervention of 10 weeks can have a positive impact on burnout and depressive symptoms, as well as mindfulness skills, in parents of children with a chronic condition. The results also indicate that an ACT web intervention can be successfully delivered by undergraduate psychology students giving semi-structured feedback without any face to face contact. This kind of a treatment model has the potential to be low cost and available for large populations.

However, further research is needed to investigate the presented treatment model and its effects in a larger population sample. Also, it would be worthwhile to explore the reason for the relatively high dropout rate within this population, and how to increase adherence.

Unfortunately, in the current study the reasons for the drop-out were not assessed. Majority of those who completed the intervention were satisfied with the web-program, but it is possible that those who dropped out did not find it beneficial.

In addition, different subgroups and moderators of change could be investigated to explain who would benefit from an ACT-based web intervention. For example, conditions of onset as well as the current conditions of the chronic diseases of children can affect the effectiveness of the intervention. In the current study, children had a wide range of chronic conditions and thus parents may have had different treatment demands. The treatment model of the current study may have been more suitable for some parents than the others. On the other hand, the treatment focused on general psychological processes (i.e., psychological flexibility) that can be applied to a wide range of psychological and behavioral problems in different context (Hayes et al., 2006).

Moreover, we suggest that the mechanisms by which low intensity, web-based interventions can produce benefits and positive changes need to be further explored. Future studies could examine mediators in ACT web interventions, thereby contributing to knowledge on factors that are important for successful treatments. The present study suggests that mindfulness skills and defusion can be affected by an ACT-based web intervention as the participating parents appear to have improved their ability to observe their internal experiences non-judgmentally, seeing thoughts as thoughts, and acting with awareness instead of reacting to internal experiences.

Further research is needed to investigate whether these skills induce improvements in wellbeing and decrease psychological symptoms in parents of children with chronic conditions.

References

- Alfonsson, S., Wallin, E., & Maathz, P. (2017). Factor structure and validity of the Depression, Anxiety and Stress Scale-21 in Swedish translation. *Journal of Psychiatric and Mental Health Nursing, 24*(2-3), 154-162.
- Anclair, M., Hoven, E., Lannering, B., & Boman, K. (2009). Parental fears following their child's brain tumor diagnosis and treatment. *Journal of Pediatric Oncology Nursing, 26*(2), 68-74.
- Anclair, M., Lappalainen, R., Muotka, J., & Hiltunen, A. J. (2018). Cognitive behavioural therapy and mindfulness for stress and burnout: a waiting list controlled pilot study comparing treatments for parents of children with chronic conditions. *Scandinavian Journal of Caring Sciences, 32*(1), 389-396.
- Appels, A., & Schouten, E. (1991). Burnout as a risk factor for coronary heart disease. *Behavioral Medicine, 17*(2), 53-59.
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., . . . Williams, J. M. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment, 15*(3), 329-342. doi:10.1177/1073191107313003; 10.1177/1073191107313003
- Blackledge, J. T., & Hayes, S. C. (2006). Using acceptance and commitment training in the support of parents of children diagnosed with autism. *Child & Family Behavior Therapy, 28*(1), 1-18.
- Boman, K. K., Viksten, J., Kogner, P., & Samuelsson, U. (2004). Serious illness in childhood: the different threats of cancer and diabetes from a parent perspective. *Journal of Pediatrics, 145*(3), 373-379.
- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., . . . Zettle, R. D. (2011). Preliminary Psychometric Properties of the Acceptance and Action Questionnaire-II: A Revised Measure of Psychological Inflexibility and Experiential Avoidance. *Behavior Therapy, 42*(4), 676-688.
- 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*(6), 389-398.
- Brown, M., Glendenning, A., Hoon, A. E., & John, A. (2016). Effectiveness of web-delivered acceptance and commitment therapy in relation to mental health and well-being: a systematic review and meta-analysis. *Journal of Medical Internet Research, 18*(8).
- Buhrman, M., Skoglund, A., Husell, J., Bergström, K., Gordh, T., Hursti, T., . . . Andersson, G. (2013). Guided internet-delivered acceptance and commitment therapy for chronic pain patients: A randomized controlled trial. *Behaviour Research and Therapy, 51*(6), 307-315.
- Burke, K., & Moore, S. (2015). Development of the parental psychological flexibility questionnaire. *Child Psychiatry and Human Development, 46*(4), 548-557.
- Burke, K., Muscara, F., McCarthy, M., Dimovski, A., Hearps, S., Anderson, V., & Walser, R. (2014). Adapting acceptance and commitment therapy for parents of children with life-threatening illness: Pilot study. *Families, Systems, & Health, 32*(1), 122.
- Chronis, A. M., Lahey, B. B., Pelham Jr, W. E., Kipp, H. L., Baumann, B. L., & Lee, S. S. (2003). Psychopathology and substance abuse in parents of young children with attention-

- deficit/hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42(12), 1424-1432.
- Coyne, L. W., McHugh, L., & Martinez, E. R. (2011). Acceptance and commitment therapy (ACT): Advances and applications with children, adolescents, and families. *Child and Adolescent Psychiatric Clinics of North America*, 20(2), 379-399.
- Cuijpers, P., Van Straten, A., & Andersson, G. (2008). Internet-administered cognitive behavior therapy for health problems: a systematic review. *Journal of Behavioral Medicine*, 31(2), 169-177.
- Dykens, E. M., Fisher, M. H., Taylor, J. L., Lambert, W., & Miodrag, N. (2014). Reducing distress in mothers of children with autism and other disabilities: a randomized trial. *Pediatrics*, 134(2), e454-e463.
- Elgar, F. J., McGrath, P. J., Waschbusch, D. A., Stewart, S. H., & Curtis, L. J. (2004). Mutual influences on maternal depression and child adjustment problems. *Clinical Psychology Review*, 24(4), 441-459.
- Evans, T., Whittingham, K., & Boyd, R. (2012). What helps the mother of a preterm infant become securely attached, responsive and well-adjusted? *Infant Behavior & Development*, 35(1), 1-11. doi:<https://doi.org/10.1016/j.infbeh.2011.10.002>
- Ferraioli, S. J., & Harris, S. L. (2013). Comparative effects of mindfulness and skills-based parent training programs for parents of children with autism: Feasibility and preliminary outcome data. *Mindfulness*, 4(2), 89-101.
- Gifford, E. V., Kohlenberg, B. S., Hayes, S. C., Antonuccio, D. O., Piasecki, M. M., Rasmussen-Hall, M. L., & Palm, K. M. (2004). Acceptance-based treatment for smoking cessation. *Behavior Therapy*, 35(4), 689-705. doi:10.1016/S0005-7894(04)80015-7
- Gillanders, D. T., Bolderston, H., Bond, F. W., Dempster, M., Flaxman, P. E., Campbell, L., . . . Ferenbach, C. (2014). The development and initial validation of the Cognitive Fusion Questionnaire. *Behavior Therapy*, 45(1), 83-101.
- Gold, S. M., Enck, P., Hasselmann, H., Friede, T., Hegerl, U., Mohr, D. C., & Otte, C. (2017). Control conditions for randomised trials of behavioural interventions in psychiatry: a decision framework. *The Lancet Psychiatry*, 4(9), 725-732.
- Gould, E. R., Tarbox, J., & Coyne, L. (2017). Evaluating the effects of Acceptance and Commitment Training on the overt behavior of parents of children with autism. *Journal of contextual behavioral science*.
- Hall, C. M., & Bierman, K. L. (2015). Technology-assisted interventions for parents of young children: Emerging practices, current research, and future directions. *Early childhood research quarterly*, 33, 21-32.
- 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), 1-25.
- Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, 44(2), 227-239.
- Kim-Cohen, J., Moffitt, T. E., Taylor, A., Pawlby, S. J., & Caspi, A. (2005). Maternal depression and children's antisocial behavior: nature and nurture effects. *Archives of General Psychiatry*, 62(2), 173-181.
- Lappalainen, P., Granlund, A., Siltanen, S., Ahonen, S., Vitikainen, M., Tolvanen, A., & Lappalainen, R. (2014). ACT Internet-based vs face-to-face? A randomized controlled trial of two ways to deliver Acceptance and Commitment Therapy for depressive symptoms: An 18-month follow-up. *Behaviour Research and Therapy*, 61, 43-54.
- 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(6), 805-834.

- Levin, M. E., Haeger, J. A., Pierce, B. G., & Twohig, M. P. (2017). Web-based acceptance and commitment therapy for mental health problems in college students: A randomized controlled trial. *Behavior Modification, 41*(1), 141-162.
- Levin, M. E., Pistorello, J., Seeley, J. R., & Hayes, S. C. (2014). Feasibility of a prototype web-based acceptance and commitment therapy prevention program for college students. *Journal of American College Health, 62*(1), 20-30.
- Lilja, J. L., Frodi-Lundgren, A., Hanse, J. J., Josefsson, T., Lundh, L.-G., Sköld, C., . . . Broberg, A. G. (2011). Five facets mindfulness questionnaire—reliability and factor structure: a Swedish version. *Cognitive Behaviour Therapy, 40*(4), 291-303.
- Lindström, C., Åman, J., & Norberg, A. (2010a). Increased prevalence of burnout symptoms in parents of chronically ill children. *Acta Paediatrica, 99*(3), 427-432.
- Lindström, C., Åman, J., & Norberg, A. L. (2010b). Increased prevalence of burnout symptoms in parents of chronically ill children. *Acta Paediatrica, 99*(3), 427-432.
- Lloyd, T., & Hastings, R. P. (2008). Psychological variables as correlates of adjustment in mothers of children with intellectual disabilities: cross-sectional and longitudinal relationships. *Journal of Intellectual Disability Research, 52*(1), 37-48.
- Lundgren, T., & Parling, T. (2017). Swedish Acceptance and Action Questionnaire (SAAQ): a psychometric evaluation. *Cognitive Behaviour Therapy, 46*(4), 315-326.
- Lundgren-Nilsson, Å., Jonsdottir, I. H., Pallant, J., & Ahlberg, G. (2012). Internal construct validity of the Shirom-Melamed Burnout questionnaire (SMBQ). *BMC Public Health, 12*(1), 1.
- Melamed, S., Kushnir, T., & Shirom, A. (1992). Burnout and risk factors for cardiovascular diseases. *Behavioral Medicine, 18*(2), 53-60.
- Melamed, S., Ugarten, U., Shirom, A., Kahana, L., Lerman, Y., & Fromm, P. (1999). Chronic burnout, somatic arousal and elevated salivary cortisol levels. *Journal of Psychosomatic Research, 46*(6), 591-598.
- Mitchell, A. E., Whittingham, K., Steindl, S., & Kirby, J. (2018). Feasibility and acceptability of a brief online self-compassion intervention for mothers of infants. *Archives of women's mental health, 21*(5), 553-561.
- Neece, C. L. (2014). Mindfulness-based stress reduction for parents of young children with developmental delays: Implications for parental mental health and child behavior problems. *Journal of Applied Research in Intellectual Disabilities, 27*(2), 174-186.
- Neff, K. D., & Faso, D. J. (2015). Self-compassion and well-being in parents of children with autism. *Mindfulness, 6*(4), 938-947.
- Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: a systematic review and meta-analysis. *Clinical psychology review, 32*(4), 329-342.
- Robinson, P., Gould, D., & Strosahl, K. (2011). *Real behavior change in primary care: Improving patient outcomes and increasing job satisfaction*: New Harbinger Publications.
- Roth, A., & Fonagy, P. (1996). *What works for whom? A critical review of psychotherapy research*. London: Guildford Press.
- Sairanen, E., Tolvanen, A., Karhunen, L., Kolehmainen, M., Järvelä, E., Rantala, S., . . . Lappalainen, R. (2015). Psychological Flexibility and Mindfulness Explain Intuitive Eating in Overweight Adults. *Behavior Modification, 0145445515576402*.
- Sairanen, E., Tolvanen, A., Karhunen, L., Kolehmainen, M., Järvelä-Reijonen, E., Lindroos, S., . . . Mattila, E. (2017). Psychological flexibility mediates change in intuitive eating regulation in acceptance and commitment therapy interventions. *Public Health Nutrition, 1-11*.
- Shirom, A., & Melamed, S. (2006). A comparison of the construct validity of two burnout measures in two groups of professionals. *International Journal of Stress Management, 13*(2), 176.
- Sultan, S., Leclair, T., Rondeau, E., Burns, W., & Abate, C. (2016). A systematic review on factors and consequences of parental distress as related to childhood cancer. *European journal of cancer care, 25*(4), 616-637.

A WEB-BASED ACT INTERVENTION FOR PARENTS

- Toker, S., Shirom, A., Shapira, I., Berliner, S., & Melamed, S. (2005). The association between burnout, depression, anxiety, and inflammation biomarkers: C-reactive protein and fibrinogen in men and women. *Journal of Occupational Health Psychology, 10*(4), 344.
- Wallace, D. P., McCracken, L. M., Weiss, K. E., & Harbeck-Weber, C. (2015). The role of parent psychological flexibility in relation to adolescent chronic pain: Further instrument development. *Journal of Pain, 16*(3), 235-246.
- Weiss, J. A., Cappadocia, M. C., MacMullin, J. A., Vecili, M., & Lunsy, Y. (2012). The impact of child problem behaviors of children with ASD on parent mental health: The mediating role of acceptance and empowerment. *Autism, 16*(3), 261-274.
- Whalen, C. K., Odgers, C. L., Reed, P. L., & Henker, B. (2011). Dissecting daily distress in mothers of children with ADHD: An electronic diary study. *Journal of Family Psychology, 25*(3), 402.
- Whittingham, K., Sanders, M. R., McKinlay, L., & Boyd, R. N. (2015). Parenting intervention combined with Acceptance and Commitment Therapy: a trial with families of children with cerebral palsy. *Journal of pediatric psychology, 41*(5), 531-542.
- Whittingham, K., Sheffield, J., & Boyd, R. N. (2016). Parenting acceptance and commitment therapy: a randomised controlled trial of an innovative online course for families of children with cerebral palsy. *BMJ open, 6*(10), e012807.
- Whittingham, K., Wee, D., Sanders, M., & Boyd, R. (2013). Predictors of psychological adjustment, experienced parenting burden and chronic sorrow symptoms in parents of children with cerebral palsy. *Child: Care, Health and Development, 39*(3), 366-373.
- Witt, W. P., & DeLeire, T. (2009). A family perspective on population health: The case of child health and the family. *WMJ: official publication of the State Medical Society of Wisconsin, 108*(5), 240.
- Yeh, C. H. (2002). Gender differences of parental distress in children with cancer. *Journal of advanced nursing, 38*(6), 598-606.

