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Examining Fidelity of Web-based Acceptance and Commitment Interventions for Women with Chronic Widespread Pain

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Abstract

Objectives. To examine the protocol adherence to the theoretical background of Acceptance and Commitment Therapy (ACT) in a RCT of a web-based intervention including e-diaries and written personalized feedback delivered via smartphone for persons with chronic widespread pain.

Methods. The data consisted of 790 written feedback. A qualitative descriptive design on how ACT and other therapeutic processes were used in the feedback which was applied. The analysis was done with a feedback coding scheme developed employing a combination of an inductive and deductive approach.

Results. The coded feedback messages reflected five of the six main ACT processes in addition to communication and motivation strategies. The degree of inter-rater reliability between the researchers coding the feedback, measured by Cohen's kappa, was 0.790.

Conclusions. Based on the level of adherence to ACT-principles the treatment integrity can be judged as high. The developed coding scheme can serve as a basis for coding written therapeutic feedback and thereby serve as a tool for a reliable assessment of the treatment fidelity in ACT based interventions delivered by internet.

Practice Implications. Internet-delivered psychological interventions to support people with chronic conditions are increasingly common. Such interventions can be seen as person-centered therapeutic approaches. This study indicates that ACT can reliably be delivered in a written web-based format.

Keywords

Chronic Widespread Pain; Acceptance and Commitment Therapy; M- health; Internet; Treatment Fidelity

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Introduction

Internet and mobile phone technology opens up new ways to deliver health-related counseling and therapy. When transforming face to face interventions into online interventions there is a need to evaluate if, and how, the principles of the intervention are applied in the new modus. The purpose of this study was to investigate the adherence of the therapists to Acceptance and Commitment Therapy (ACT) principles in an intervention delivered by a smartphone to patients with chronic widespread pain. Adherence is one of the measures of fidelity and is defined as the extent to which the therapist delivered the intervention according to a protocol [1]. By analyzing fidelity, it is possible to investigate whether theory-based processes of the intervention were the primary mechanism of change outcomes, and whether they

allow for precise replication and comparisons amongst interventions. Fidelity to protocol is also important regarding the dissemination of an intervention because it provides practitioners with guidelines for implementation [2].

Acceptance and Commitment Therapy (ACT)

Acceptance and Commitment Therapy (ACT) is a relatively new development within Cognitive Behavioral Therapy (CBT), sometimes referred to as the 3rd generation of CBT. The objective in ACT is to improve functioning and quality of life by increasing psychological flexibility, defined as the ability to behave in accordance with life values and long term goals also in the presence of interfering thoughts, emotions and bodily symptoms.

Psychological flexibility can be described as a combination of six sub-processes: (1) Values: the deeply meaningful elements in a person's life. Values concern the ideals we have and how we want to live; (2) Committed action: specific and concrete action plans guided by one's values, but which also takes into account and anticipate barriers along the way; (3) Acceptance: openness to experience, urges, emotions, and thoughts allowing them to come and go without a struggle [3]; (4) Contact with the present moment: being fully aware of the psychological and environmental events with openness, interest, receptiveness and without judgment; (5) Cognitive defusion is a process where people learn how to gain a perspective regarding their own thoughts, and thus manage to see their own thoughts the perspective of an outside observer and therefore avoiding being affected by them; and (6) Self-as-context: This process allows people to be aware of psychological content without linking the content to one's personal identity [3-5]. In most ACT treatments, exercises and metaphors are frequently used to discuss behaviors that may appear counterintuitive, such as acceptance of pain and distress [5-6].

ACT shares important features with CBT, such as behavior activation. Also differences exist as acceptance and cognitive defusion strategies are relatively unique for ACT [4-7]. ACT has been evaluated in several randomized controlled trials for persons with chronic pain and other chronic conditions, and results show the utility of this approach for improving health outcomes [8-11]. However, only a few randomized web-based delivered ACT treatment trials have been published to date [12-16] and results point in the same direction.

Background of the study

Recently, we designed, tested and reported three innovative web-based CBT/ACT interventions including e-diaries and written personalized therapist feedback delivered via smartphone [17]. The feasibility of these interventions has been investigated in 2 RCTs for persons with irritable bowel syndrome (IBS) and chronic widespread pain (CWP) and a pilot study for persons with type 2 diabetes (DMT2) [12, 16, 18]. The RCTs showed positive results concerning catastrophizing, acceptance and illness impact at 3- and 5-month follow-ups, respectively [12, 16]. The subjective experiences of the interventions of the participants in all interventions were mostly positive [12, 16-19]. To enhance the understanding of the therapeutic process involved in the studies mentioned above, especially the therapist adherence to the theoretical framework, we analyzed the written feedback from the CWP RCT. The aim of the CWP RCT was to investigate the efficacy of a four week smartphone delivered intervention based on ACT principles. Participants were recruited from one rehabilitation center in Norway. In the fourth week of the rehabilitation program participants were randomized into an experimental group (follow-up intervention) and a control group. As the therapists were not from the same staff as at the rehabilitation center, the intervention started with a personal meeting followed by daily e-diaries and written feedback messages via a

smartphone. The participants were asked to complete 3 e-diary entries per day using the smartphone. The diaries included 16 to 24 questions about the current level and interference of pain, feelings and thoughts. They also included questions about planned and previous use of self-management strategies, values-based activities and activities of daily life. A therapist had immediate access to the submitted diaries and used the situational information to formulate personalized feedback based on ACT. During 4 weeks, participants received daily situational feedback (except weekends) [16-20].

Objectives

The present study intends to investigate the ACT processes and other therapeutic strategies that were employed in the feedback. The therapist's adherence to ACT theory was assessed. As adherence is one of the measures of fidelity, the method and results from the present study can further serve as a basis for analyzing the fidelity of similar studies. To our knowledge no study at present has analyzed fidelity of written web based ACT intervention delivered by smartphone.

Methods

Sample

The material that has been analyzed consisted of de-identified written feedback messages from the CWP RCT study [16]. The inclusion criterion for choosing participants from the CWP RCT for this study was that they had received > 75% of scheduled feedback messages. This led to the data material from 42 patients (out of 51 in total) to be included, resulting in a total of 790 feedback messages (205328 words) with a mean of 19 feedback messages per patient.

Description of the written personalized feedback analyzed in the present study

Three therapists wrote the feedback messages in the CWP RCT. All therapists had a background in health care sciences (nursing and/or psychology) and had received training in ACT. The task of the therapists was to formulate written feedback based on ACT with a focus on values, committed action, contact with the present moment, cognitive defusion and acceptance (see Table 1). The information from the submitted electronic diaries, as well as the overall aims expressed in an individual start-up meeting with the participants, provided input for the feedback.

The feedback was intended to support and stimulate self-management. It included positive reinforcement, information, metaphors, ACT exercises and questions aimed at encouraging mindfulness, willingness, and engagement in meaningful activities (see textbox 1).

Table 1: Framework and Principles for Development of Feedback Based on Acceptance and Commitment Therapy Theory

Feedback Elements	Values	Committed Action	Contact with Present Moment	Cognitive defusion	Acceptance
Week 1	Encourage the identification of own life values.	Stimulation of reflection related to action in relationship with own values.	Explanation of the importance of being in the present moment, not in the past or future in order to enjoy the small everyday pleasures.	Explanation about the impact of thoughts on emotions and well-being.	Stimulation of accepting what one can't do anything about. Focusing on what one can do having meaning.
Week 2	Stimulation of value reflection connected to life values and their role in relation to behavioral change. Identification of difference between goals and values.	Focus on maintenance of physical activity recommended for building up the body, as well as nutrition and sleep. Efforts to establish good habits. Balance with other activities as job and housework.	Stimulation of relaxation exercises related to awareness of internal and external experiences in the present moment.	Emphasizing the importance of not fighting against thoughts and feelings. Allowing painful thoughts and feelings to be present as well as the good ones.	Stimulation of reflection about strategies to deal with adversity and not using power on things one cannot do anything about.
Week 3	Stimulation of values reflection as a process and the awareness regarding the possible impact life values may have on the quality of life.	Encourage acting in accordance with values despite pain and discomfort. Identifying possible barriers and strategies to deal with pain and discomfort.	Stimulate the attention in the perception of the taste, smell, sight, other people (what they say and how they behave).	Stimulation of creating distance to the negative thoughts and concerns by suggested written exercises and listening of sound files stored in the smartphone.	Stimulate attention to feelings, thoughts and emotional situations - not avoiding difficult thoughts and feelings, because this avoidance may reinforce these difficult thoughts.
Week 4	Stimulation of using life values as a guide to achieve the satisfaction with current and future days.	Stimulate maintenance of the activities / habits that participants have managed to achieve. Investigate what they want to work with in the future and how they will manage do it.	Encourage awareness and presence in relationships, focus on who is the other, give others attention and at the same time keep attention to own feelings.	Stimulate the use of techniques learned in the exercises after the end of project.	Stimulate the use of techniques learned in the exercises after the end of project.

*It's important to emphasize that the feedback messages were tailored and formulated based on several input at the first meeting with the participants, daily e-diaries and the ACT theory. Therefore the table above must be seen as a guideline where the therapist had the freedom to evaluate and choose the ACT component that suited the participant in that specific moment.

Textbox 1: Example of a feedback message

Hi. Now it is the weekend again and I would like to suggest that you use some of your time to think about your values. Values are everything you consider important in your life. It is about finding out what makes your life better, what you enjoy doing, what kind of relationship you want to have with other people and what gives your life meaning. It is important to know that value is something we constantly work towards, not something you achieve and will be finished with. For example, it doesn't make sense to say, "I can stop exercising because now my health is good ". Maintaining good health requires a continuous effort throughout your life. If you think it's important to take care of your health, I would say that, based on the information you have registered in your electronic daily diaries, you are living according to your health values. By living in accordance with your values, you will achieve a higher quality of life. What do you think about this, and where do you stand in relation to your values? I think that by being more conscious about your values in life you can get closer to living the life you want. Have a great weekend! Regards, Helen

Design

The investigation of fidelity was done by accessing the therapist's adherence to the therapy model, comparing the intended content of the feedback (see table 1) with the feedback given. To be able to perform this analysis, a coding scheme for the feedback was developed.

This development process was divided into three parts:

- 1) A qualitative content analysis of the written feedback messages and identification of different codes (categories);
- 2) Refinement of the ACT coding scheme and calculation of inter-rater reliability as one aspect of the psychometric quality of the coding scheme and;
- 3) Coding of all feedback messages to identify how ACT principles were used in the daily feedbacks.

Qualitative content analyses

The feedback messages were analyzed qualitatively using a deductive and inductive approach [21]. The objective was to explore how ACT and other possible processes were employed in the written situational feedback that was given to patients with CWP. Specifically, the focus was on how ACT processes were included in the feedback messages, the interconnection between these processes, and identification of possible patterns in a set of feedback messages (see textbox 1 for example of feedback). First, the data were analyzed using a deductive approach called "template analysis style" developed by William Miller and Benjamin Crabtree (1999) and described by King (1998). The analysis was initiated with predefined categories from ACT theory (values, committed action, contact with present moment, acceptance, cognitive defusion and self as context) [22].

The content of the text was also analyzed inductively to identify other therapeutic processes (i.e. those not explicitly related to ACT theory). Editing organizing style was chosen. This approach consisted of a systematic reading of all data material where relevant observations were registered underway for further interpretation [23]. This comprehensive work made it possible to create new codes that were not part of the ACT processes and identify patterns in the feedbacks. The new codes were related to motivation and communications strategies and were added to the coding scheme.

Refinement towards assessing inter-rater reliability and an ACT coding scheme

Based on the results of the first qualitative content analysis, the second step was to establish coding definitions for the complete coding scheme and criteria that would be suitable for coding of the feedback messages by independent raters. An interactive process was initiated where four persons (AAGN, EAB, HE and RW) coded several feedbacks using the codes based on the first analysis. Through a refinement process based on coding and discussion, the coding scheme was updated.

Based on this, two coders (AAGN &EAB) independently coded 280 text segments from 91 feedback messages and inter-rater reliability was calculated. Inter-rater reliability is a measure used to examine the agreement between two or more persons on the assignment of categories of a categorical variable. It is an important measure in determining how well an implementation of some coding or measurement systems work. The kappa statistic was chosen in this study as it is frequently applied to test inter-rater reliability [24].

Analysis of all feedback messages

After an inter-rater reliability assessment was completed a new review process was conducted and a final complete coding scheme was defined. The last step in the analysis process was the coding of all data material (790 feedback messages).

Results

Content of the feedback messages

The deductive analysis allowed identification of all ACT elements present in the feedback messages and the inductive analysis made it possible to identify other elements than ACT in the data. This process resulted in the *development of a complete coding scheme that consisted of 12 codes reflecting five out of the six ACT-processes (self as context was not identified) and seven motivation and communication strategies* (See Figure 1).

The complete coding scheme was used to create a codebook with definitions (See Table 2). The feedback messages, which were divided into text segments, were coded based on the coding scheme and codebook by the researchers. Table 3 illustrates examples of text segments and codes.

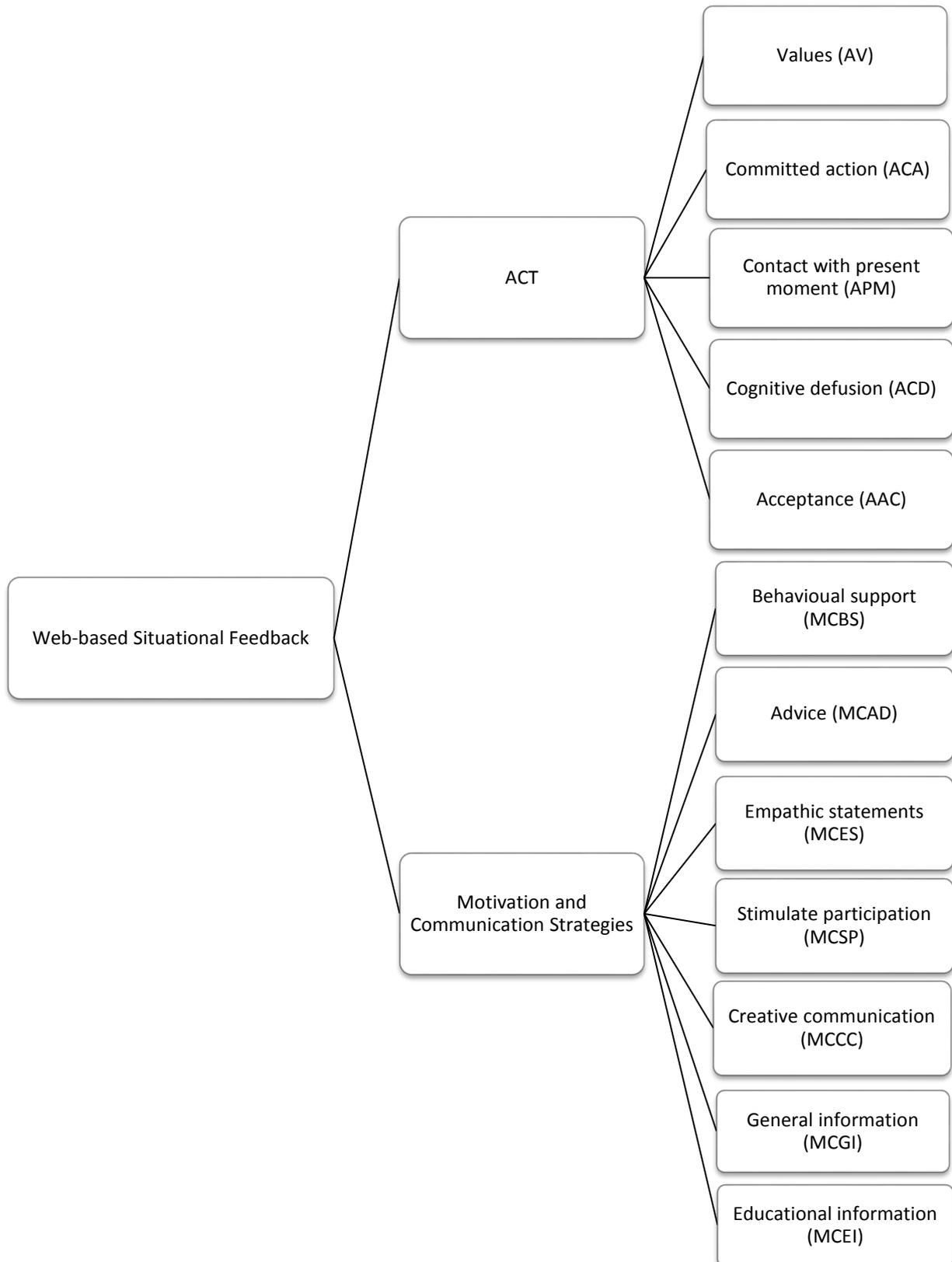
Inter-rater reliability

The inter-rater reliability was calculated based on 280 text segments. The number of observed agreements was 230 (82.14% of the observations). The number of agreements expected by chance was 41.9 (14.95% of the observations), resulting in a Kappa = 0.790 with a 95% confidence interval (from 0.737 to 0.843) and standard error (SE) of kappa = 0.027 According to Cicchetti this degree of agreement is considered to be excellent (on a scale of: poor <0.40; fair= 0.40-0.59; good=0.60-0.74; excellent=0.75-1.00) [25]. *Table 4 shows how the codes were distributed in the data material.*

Therapists adherence to the protocol

The Framework and Principles for Development of feedback based on the ACT theory is shown in Table 1. To analyze the adherence between the planned and given

Figure 1: Final version of the Coding Scheme



* *Self as context* was not identified in this material. This process was covered in the daily diaries with awareness and reflection questions.

Table 2: Codebook with codes' definition

PROCESSES/ STRATEGIES	CODE	FUNCTION
ACT		
Values	AV	Stimulate patient's reflection regarding their own values and the values' impact on their life. Help the patient to identify the difference between goals and values. Stimulate awareness of gratitude and enthusiasm regarding feelings for increasing awareness of values.
Committed Action	ACA	Encourage the patient to committed behavior related to their own values through reflecting on strategies related to well planned actions, barrier and follow-up. Stimulate planning of activities in the form of value-oriented goals.
Contact with Present Moment	APM	Stimulate breathing exercises for relaxation and variety in activities. Stimulate attention and awareness of internal and external experiences in the present moment.
Cognitive Defusion	ACD	Stimulate awareness of thought processes instead thought content. Stimulate understanding in thought content as a result of the context in which thoughts are a product of specific (s) situation (s).
Acceptance	AAC	Encourage the patient to make active choices to act in accordance with their values, despite the difficult thoughts, emotions and physical sensations that are unpleasant, but which we cannot directly eliminate or reduce.
Motivation and Communication		
Behavioural Support	MCBS	Support the patient in the change process by recognizing the patient's willingness and efforts to change behavior. Provide confirmation of the patient's coping strategies. Motivate the patient in the change process through the use of praise and positive words. Encourage the patient to be their own supporter by practicing self-talk. Use specific records from patient diary forms in order to deliver a message. Summarize developments during the follow-up period to emphasize key elements.
Advise	MCAD	Give specific and constructive advice for appropriate behavior or to a specific situation.
Empathic Statements	MCES	Recognize the patient's experiences and feelings, showing empathy, understanding and respect.
Stimulate Participation	MCSP	Encourage patient to provide written information to ensure the most individualized follow-up.
Creative Communication	MCCC	Communicate the message through the use of selected wisdom words.
General Information	MCGI	Provide information of a general, not therapeutic purpose
Educational Information	MCEI	Explain scientific purpose and significance related to advice, training and / or intervention

Table 3: Example of feedback messages divided in text segments pain study

Feedback	Text segments	Code
1	Hi, Here comes the initial feedback and I wish to congratulate you for your efforts during these four weeks of intense treatment at Jeløy. I look forward to working with you further and I hope I can support you doing what you evaluate as good for you.	MCBS
1	Since we have not met each other face to face please give me a hint if you feel I should write something different to you than I do.	MCSP
1	I have a small task for you today. Can you use a few minutes tonight to think about how the period at Jeløy has affected you and how you want it to influence you in the future? The challenge in the coming weeks will be to continue to use what you have learned at Jeløy in your everyday life at home. It might require a lot effort from you because it isn't easy to change habits – at least in the start. But through determination, patience and in believing in yourself you will manage to achieve most of the changes you want. Remember, each step you take in the right direction is important and can lead you to live the life you desire.	ACA
1	It is challenging to go back to your home, so be patient! Regards Ann	MCAD
3	I think there is a big difference in how much people reflect on their values, actions aimed at achieving these and possible barriers connected to them. But I also believe that by being more aware of those things you can come closer to living according to your life values.	AV
6	As a kind of awareness training can you today be extra conscious of your sensations and surroundings? It's not always easy to be a hundred percent present here and now. Perhaps you may have experienced that you occasionally go on autopilot? What happens with what you do then? Is it like things just float by? Do you pay special attention to something? Could you today try to do everything you usually do with your full awareness? Whatever it is, a conversation with a friend, house cleaning, eating, observing the nature or other things. Try to do only one thing at a time. The challenge is to stay focused on what you are doing and don't let your mind concentrate on something else that can interfere with your exercise. By directing the focus away from what has happened or might happen - you can more easily manage to "live in the present moment".	APM
7	Hi, I see that you are frustrated by the bad weather because you feel that it affects your mood. However you show a positive attitude by hoping for both better weather and mood tomorrow. But what can you do today? The weather is like it is, impossible to control. Is there something you can do in spite of it? Could stretching exercises be an alternative? Have a good day, regards Ann	AAC
12	Some of the questions in the daily diaries are formulated to try to capture a kind of worst case thoughts, which is common in persons with chronic pain. Pain affects thought content negatively.	MCEI
12	I have observed that you usually choose alternatives regarding negative statements in the daily diary (for example: "you are afraid of pain" or "you worry that it will not recede"). This is something to be aware of. It is important to be conscious of how these thoughts might affect your feelings, than what you can choose to do. Mindfulness training is largely applied to achieve such consciousness.	ACD
12	You wrote that you are trying to think positively but that this is not easy when you have headaches and are tired - I understand you very well!	MCES

Table 4: Distribution of the data material used in the inter-rater reliability analyses.

	AV	ACA	APM	ACD	AAC	MCBS	MCAD	MCES	MCSP	MCCC	MCGI	MCEI	SUM
AV	26	3											29
ACA	6	15		1	1	5	3						31
APM			17										17
ACD				11			1						12
AAC					8								8
MCBS	1	1		1		75	7	6				2	93
MCAD		1				1	14						16
MCES						1		11					12
MCSP							2	1	5			1	9
MCCC										14			14
MCGI								1				28	29
MCEI			1			1	2					6	10
SUM	33	20	18	13	9	83	29	19	5	14	31	6	280

Table 5: Overview of all data material coded

P	TF	AV	ACA	APM	ACD	AAC	MCBS	MCAD	MCES	MCSP	MCCC	MCGI	MCEI	TTS
1	19	7	4		4	3	22	2	4	2		7	5	60
2	20	6	6	5	4	2	20	6	2	1		7	2	61
3	15	7	7	3		1	15	7	6	2		5	1	54
4	18	4	9	2	3	2	15	3	5	1	1	4	2	51
5	13	3	5	3	1		11		2	1		2	1	29
6	20	3	15	3	1	1	25	2	3	1	1	9	4	68
7	21	8	6	3	4		23	5	4	1		15	3	72
8	21	4	4	5	1	1	23	4	4	2		7	4	59
9	19	3	3	7	2	3	16	2	9		1	6	2	54
10	20	5	4	3	4	1	17	5	5	4	1	9	4	62
11	14	4	6	3	2		10	1	5	2		2	2	37
12	20	6	16	7	1	1	12	5	6	3	1	5	3	66
13	21	6	6	3	2	1	13	2	1	1	1	6	1	43
14	21	8	6	3	2	1	14	6	8	1		1		50
15	19	6	4	3	3	1	14	3	1	1	1	3	2	42
16	21	6	5	3	4	2	12	1	2	1		5	4	45
17	22	7	6	5	3	3	17	2	4		1	6	2	56
18	20	5	4	6	4	1	9	4	5	1		2	1	42
19	20	6	5	3	3		15	1	4	1		3	2	43
20	21	3	10	3	2	2	20	10	3	8	1	5	3	70
21	16	4	2	2	1		15	2	2	1		11		40
22	20	5	6	4	8	1	16	5	4	2	1	2	2	56
23	20	7	8	2	3	4	20	4	2	4	2	12	5	73
24	18	6	7	8	1		17	4	2	1	1	7		54
25	19	6	5	4	2	2	17	3	5	1	1	3	1	50
26	21	6	11	2	1	1	16	11	7		2	6	3	66
27	21	9	5	2		1	13	3	3	3	2	11	2	54
28	19	10	3	5	2	4	10	5	6		3	7	4	59
29	20	6	9	4	3	2	19	2	4	2	4	5	3	63
30	19	8	4	3	3	1	12	4	1	1	1	7	2	47
31	19	5	4	4	3	1	14	5	3	5	2	10	4	60
32	18	5	3	4	2	2	10	4	5	2	3	10	2	52
33	19	4	8	2	2	1	14	6	5	2	3	10	2	59
34	16	8	2	3	2	2	11	5	1	1	3	3	2	43
35	20	7	4	5	3	2	16	4	5	1	3	4		54
36	17	6	6	4	4	1	15	5	2	1	3	5	1	53
37	18	5	5	6	3	2	9	4			3	5	4	46
38	16	6	3	4	2	1	5	2	1	1	1	7	1	34
39	15	6	4	4		2	9	4	3	2	1	6	5	46
40	17	10	2	2	1	4	10	4	4		3	6	3	49
41	17	4	3	3	4	3	12	5	8	1	3	7	4	57
42	20	8	4	3	1	2	15	5	3	2	1	6	2	52
S	790	248	239	153	101	65	618	167	159	67	55	259	100	2231

Legend: P= Participant; TF= Total of Feedback messages; TTS= Total of Text segments; S= Sum

feedback, the feedback messages given were divided in text segments (a total of 2231) and coded by AN according to previous experience with the coding process based on the complete coding scheme and codebook. Table 5 shows how the different codes were used in the feedback messages and these results confirm that, in general, all codes were well represented in the feedback messages.

Out of the total 2231 text segments coded, 806 were ACT and 1436 were motivation/ communication codes. All 42 participants received text segments that represented the AV and ACA codes. 41 received text segments

representing the APM code, 39 the ACD code and 36 the ACC code. From a total of 42 participants 32 received text segments representing all ACT codes.

Discussion

The results of this study show that, by using the developed coding scheme, the ACT processes were identified in the feedback messages of the CWP RCT intervention and that the level of inter-rater reliability among the coding of each

researcher was excellent. In short, all participants received the text segments coded as “values” (AV) and “committed action” (ACA) and these were equally distributed between the participants. These two ACT-processes are important to build up participants' understanding of the therapeutic process. As shown in the results not all participants received text segments representing all ACT codes. It is important to emphasize that although the development of feedback messages was based on ACT-theory, this does not imply that all ACT processes are required for the treatment of each participant.

In addition to the excellent inter-rater reliability, the total coded material illustrated in Table 5 confirms that the ACT theory was consistently used in the feedback messages. The good representation of the different ACT codes in the feedback messages confirms that these were developed according to the framework and principles established for the CWP RCT as shown in table 1 and that the therapists adhered to the treatment protocol. The use of ACT-elements may have contributed to the positive results achieved in the CWP RCT [16, 19]. It has been concluded that as the impact of web-based interventions increases, the more extensively theory is used [26]. However, theories may need to be revised to fit the new format of web-based/mobile interventions [27].

Seven codes related to motivation/communication strategies were also found during the development of the coding scheme. This was expected because the use of communication strategies is needed in order to deliver ACT. The motivation elements are needed to support and stimulate the participants to complete the intervention.

Analysis of texts has become an important research tool in numerous areas and coding is a key part of these analyses. For establishing treatment integrity, a prerequisite for such analysis is to ensure strong consistency between the text and the coding. Quality control of this consistency is essential to attribute the results to the treatment [28]. In order to analyze how ACT's theoretical framework and other possible therapeutic processes were reflected in written web-based situational feedback delivered through a smartphone, a coding process was conducted. To our knowledge, this is the first study to analyze, in detail, the content of written personalized therapist feedback using this method.

To ensure the quality of the data material, a systematic reading of all the feedbacks was performed and an inclusion criterion was determined. To enter the study, the participant should have received a minimum of 75% of the scheduled feedbacks. Problems with receiving feedback could be caused by technical errors or by the participant's dropping out. For most of the cases that were excluded, technical issues and non-therapeutic communication dominated the content of the feedback (e.g repetitions of same feedback, several explanations about why technical errors occurred, etc.).

The intervention used in the CWP RCT can be classified as complex intervention. Such studies follow a protocol where the chosen theory is an important part of the intervention development process [29]. Through the use of a coding scheme as the basis for coding of feedback, it was possible to analyze the therapists' adherence to the

concepts during execution and to suggest corrections for futures projects. The developed coding scheme and codebook can be actively applied in future studies as a tool for the therapists when giving feedback.

Experience from the coding process supported the need for an interactive process. The first time the coding scheme and codebook were used (by two researchers) a lower level of alignment of the individual codes was attained. However, through a revision process of coding scheme and codebook, the alignment was increased and a high level of inter-rater reliability was achieved. A similar experience was described by Hruschka and collaborators [28]. The coding team consisted of four members who participated actively in the coding process, discussions and revisions. Further studies should examine how the number of coders could affect the coding process and results.

After a process of several rounds, a final coding scheme with two hierarchal levels and 12 codes was achieved. The need of such an extensive coding process is described in other studies [28-30].

Polit and Beck also used a combined approach that integrated the inductive deductive codes for studying the role of feedback in relation to performance in nursing practice. The results achieved in their study showed how this approach can meet the research requirements within qualitative methods [31].

As previously mentioned, the coding scheme was organized in a hierarchical way, reflecting the five ACT core processes used in the CWP RCT intervention. Messages relating to these processes were given in the form of direct instructions, reflection exercises, awareness training and reference to available audio files. Frequently these processes overlapped and interacted with each other with the aim of promoting therapeutic effects for the patient. The analyses did not take into consideration this effect, which might have influenced the results. The coding of the data was the first step towards understanding these interactions and further analyses are necessary to draw any conclusion.

Current web based interventions which utilize written personalized therapeutic feedback are often time consuming for the health personnel involved [18]. With the present possibilities within information technology, automation of parts of the feedback process should be possible. The feedback messages given could be stored and analyzed. The generated information could be used as a basis for the development of new feedback messages that could finally be controlled by therapists and tailored to patients. A coding scheme representing the therapeutic theory concept can be a key in the next step of the development of web-based intervention. The use of new technology to make this kind of intervention more effective, while still taking care of the patients' individual needs, suggests a very interesting future area of research. Treatment fidelity consists of both adherence and competence from the perspective of the therapist. Competence refers to the degree to which the therapist delivered the intervention skillfully. The methods for analyzing competence are developed for face to face treatment sessions [1, 20]. In order to evaluate the therapist's competence in web-based interventions, with e-

diaries and written feedback messages, a method for this evaluation has to be developed.

Conclusions and Practice Implications

Web-based interventions are becoming increasingly popular and appear to be an important and cost-effective supplement in future health care. A reliable and valid coding system is essential to explore therapeutic change processes in this type of treatment. In this study a coding scheme and a code book for ACT-oriented web-based personal feedback were developed with high inter-rater reliability. Results based on the developed coding scheme showed that the feedback provided was consistent with ACT theory. The utility of the coding scheme should be further evaluated in future studies, but results from the present study imply that it may be used as a basis to assess treatment fidelity in web-based ACT-interventions.

Web interventions based on Cognitive Behavioral Therapy are a promising complement to established treatments and may be a valuable alternative for future treatment of people with chronic conditions. The advantages of web based interventions may also include a reduction of therapist time, reduced waiting lists and the stigma associated to therapist visits, allowing patients to work at their own pace thus saving travel time [32]. Thus, they appear to be valuable person-centered therapeutic approaches.

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OBK, HE and SvD were responsible for the development of CWP RCT. EAB performed the initial qualitative analysis of the feedbacks as part of his master thesis at Oslo University College. EAB, AAGN, RW and HE performed the revision of the coding system. AAGN coded all data material and drafted the manuscript. All authors read and approved the final manuscript. HE supervised the study.

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Therapy program for women experiencing chronic widespread pain.

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