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ACT in daily life in early psychosis: an ecological momentary intervention approach

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ABSTRACT

The current article describes the Acceptance and Commitment Therapy (ACT) in Daily Life (ACT-DL) training, a new mobile health treatment protocol for ACT applied in a randomized controlled trial in early psychosis individuals. Between weekly ACT therapy sessions, patients fill out brief questionnaires on an app about their mood, symptoms, activity, and current context, thus promoting awareness - a crucial component of ACT. The app also provides them with visual cues and exercises specifically related to the ACT sessions, to help them implement the techniques previously learned in therapy into their daily lives. Here we assess the feasibility of this protocol in 16 early psychosis individuals, as part of an ongoing randomized controlled trial. Specifically, we investigate the experienced usefulness of the ACT therapy and app, and burden of the protocol. Results indicate that participants find both the therapy sessions and the app useful, and that ACT-DL guides them in putting ACT into everyday practice, although the protocol may be moderately burdensome. These findings indicate that ACT-DL may help early psychosis patients applying ACT skills to diverse contexts of everyday life. Since ACT is not symptom-specific, ACT-DL may also be suited for different target populations. Limitations and future directions are discussed.

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Acceptance and commitment therapy; mindfulness; mobile health; mHealth; ecological momentary intervention

Introduction

In the current article, we describe a new mobile health (mHealth) treatment protocol – ACT in daily life (ACT-DL) – based on acceptance and commitment therapy (ACT, (Hayes, Strosahl, & Wilson, 1999)). The protocol aims to help patients develop more adaptive automatic responses to stressful situations and engage more in their personal values by using a smartphone app to implement the therapeutic content into their everyday life. ACT-DL is being applied in a large-scale randomized controlled trial in early psychosis individuals ($n = 150$) and this article will discuss preliminary results on its feasibility in a subsample.

ACT uses cognitive and behavioral techniques to teach patients psychological flexibility (i.e., the ability to adapt one's cognitive strategies to changing conditions in the environment (Canas, Fajardo, & Salmeron, 2006)), which in turn decreases stress and improves mental health (Bond &

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Bunce, 2000). It focuses on *acceptance* of negative thoughts and emotions instead of trying to change or control them. ACT is not symptom-specific, it can be applied to a wide range of experiences that people have. Similarly, ACT aims to teach patients skills that they can apply in new situations. Furthermore, ACT does not only help patients to handle stressful situations, it also teaches them how to engage more in the values they deem important and yet are not sufficiently reflected in their pattern of behavior – referred to as the *commitment* component (Kanter, Baruch, & Gaynor, 2006). Due to this broad remit, ACT has been demonstrated to be an effective treatment for many mental disorders and mental health problems (A-Tjak et al., 2015; Ruiz, 2010). ACT seems to be equally effective as traditional cognitive behavioral therapy (CBT) in the treatment of anxiety disorders, depression, addiction, and somatic disorders (A-Tjak et al., 2015). It thus seems to be a promising new approach for the treatment of mental health problems.

Most psychotherapies to date, including ACT, are applied in the therapist's office, which may contribute to the lack of success in producing consistently large effect sizes (Hoffman, Papas, Chatkoff, & Kerns, 2007; Powers, Zum Vörde Sive Vörding, & Emmelkamp, 2009; Veehof, Oskam, Schreurs, & Bohlmeijer, 2011). A promising extension to this office-based approach is the mHealth approach, which employs the use of mobile devices for the delivery of health-care services and public health communication in real life (Phillips, Felix, Galli, Patel, & Edwards, 2010). Although still in its infancy, mHealth has been proven to be useful in a wide range of areas, both in physical and mental health, its methods being deployed for treatment of diabetes, asthma, weight loss, smoking, depression, and anxiety (Gerber, Stolley, Thompson, Sharp, & Fitzgibbon, 2009; Kramer et al., 2014; Pallavicini, Algeri, Repetto, Gorini, & Riva, 2009; Quinn et al., 2008; Rodgers et al., 2005; Ryan, Cobern, Wheeler, Price, & Tarassenko, 2005). Using apps to introduce the therapeutic elements into the patient's everyday life, may aid in 1) focusing on the specific needs and complaints of that specific patient, thus making it person-tailored, and 2) translating the techniques that patients have learned at their therapist's office into their everyday lives, thus increasing patient empowerment. Acquiring effective coping skills is an important step in the therapeutic process, but without the ability to apply these strategies when appropriate, they may be of little use to the patient. Unfortunately, situations that require the application of therapeutic techniques (i.e., subjectively stressful situations) often lead individuals to switch from goal-directed to habitual behavior (Schwabe & Wolf, 2009). Hence, individuals often respond by resorting to old, dysfunctional patterns, as these are most familiar to them. Using newly acquired coping strategies needs to be practiced in a real-life context in order to become a response that is easily accessible.

ACT, in particular, may benefit from an mHealth approach. ACT has its philosophical roots in *functional contextualism*, which emphasizes the relevance of the context in which a behavior is taking place and the function the behavior is serving. For example, while avoidance of a dark back alley may be adaptive, avoidance of a supermarket or public places in general (typical behavior in patients diagnosed with agoraphobia) may actually sustain mental illness. In ACT, the central question is not: "Are my thoughts valid?" but: "Is what I am thinking useful for me in this situation?" This philosophical basis makes ACT particularly suitable for expansion to real life using an mHealth approach, putting the therapeutic techniques – quite literally – into context.

In sum, the current article introduces a treatment protocol of ACT-DL, which is an ACT-based mHealth intervention that aims to increase ACT's therapeutic effectiveness through its integration in the patient's everyday life. First, we provide a detailed description of the treatment protocol. As ACT-DL is a novel approach, we assessed its feasibility in a subsample of an ongoing randomized controlled trial in a sample consisting of individuals with an At-Risk Mental State (ARMS) for psychosis or first-episode psychosis (FEP) patients. We hypothesize that patients who finished the protocol consider both the ACT therapy and the ACT-DL app at least moderately useful, and that working with the app is not experienced as a burden. Finally, we discuss the main conclusions drawn from these results.

Methods

In the current article, we describe the new mHealth approach ACT-DL, designed to facilitate the translation of therapeutic techniques learned during in-person ACT sessions into the patient's daily life. In a registered multi-center randomized controlled trial (INTERACT) that is currently ongoing at sites across The Netherlands and Belgium ACT-DL (NTR4252: <http://www.trialregister.nl/trialreg/admin/rctview.asp?TC=4252>) is compared to treatment as usual (TAU) as an intervention in ARMS and FEP individuals. Main outcome measures of this study are symptom-related distress scores, general and social functioning, and (sub-) clinical symptoms. The INTERACT study aims to recruit 150 early psychosis individuals, half of which are randomly assigned to the ACT-DL condition. We have data on feasibility measures from the first 16 participants assigned to the ACT-DL condition who completed the treatment, which are reported in the results section. These measures include 10 questions on the use and burden of the treatment. The full INTERACT study protocol is described elsewhere (Reininghaus et al., [under review](#)).

ACT in daily life treatment protocol

In ACT, acceptance of unwanted experiences provides room for active investment in one's values. *Acceptance* is one of six components that, together with *cognitive defusion*, *self-as-context*, *contact with the present moment*, *values*, and *committed action*, comprise ACT (Hayes, 2004). Mastery of all six components provides an individual with the *psychological flexibility* to handle a broad range of challenging experiences. One of the strengths of new-generation contextual psychotherapies such as mindfulness-based cognitive behavioral therapy (Teasdale, Williams, Segal, & Kabat-Zinn, 2014), metacognitive interpersonal therapy (Dimaggio, Montano, Popolo, & Salvatore, 2015), or ACT, is that it trains a broad and flexible behavioral repertoire that is not symptom-specific but can be applied in almost any situation.

ACT-DL is an ACT-based mHealth program aimed at transferring the skills and insights learned during weekly ACT sessions into the practice of daily life. In ACT-DL, patients engage in a mobile intervention that requires the active exercise of ACT principles throughout the day in addition to standard ACT sessions. The program's total duration can be adapted to the patient's demands or therapist's professional appraisal (e.g., sessions can be repeated if needed). As noted earlier, in contrast to some other treatments, ACT is not aimed at symptom reduction, but rather applies to the full range of an individual's experiences. This approach ideally lends itself to an mHealth format based on the experience sampling method (ESM; Csikszentmihalyi, Larson, & Prescott, 1977; Csikszentmihalyi & Larson, 2014), a structured diary technique assessing current experiences repeatedly throughout the day. Using mobile technology, ACT-DL guides individuals in the application of ACT in the real-world and in real-time, within the scope of their current experiences and situation.

In ACT-DL, individual ACT sessions are provided under the guidance of an ACT therapist in every week of the program. An overview of the sessions' content, as well as a description of ACT-DL components and techniques, is provided below. During the sessions, people are introduced to the basic principles of ACT and provided with insights, exercises, and metaphors that help in implementing ACT in their lives. ACT-DL makes use of metaphors as a reminder of its basic ideas in an intuitive format. In ACT-DL, a metaphor is presented as a visual image of an abstract situation that cues the individual to apply ACT principles to any given situation. When trying to change old behavior patterns or to achieve a lasting change, the frequent practice of new behaviors is necessary. Hence, in addition to the metaphors, practical exercises are a crucial element of ACT-DL.

Following an ACT session, the patients engage on at least three consecutive days in a mobile ACT phase focusing on the components discussed in that week's session. The ACT-DL teaches patients to apply the newly discussed ACT components to their daily lives in the form of exercises and metaphors. The mHealth modules of ACT-DL make use of a mobile application that can be

installed on a smartphone, tablet, or dedicated device. During the mobile intervention periods, patients receive each day prompts on their mobile aid at eight semi-random moments. When prompted, they are provided with a short questionnaire assessing their current mood, symptoms and activity, which guides them in the process of becoming aware of their momentary psychological state and increases their contact with the present moment. At the end of the questionnaire, patients are either presented with a visual illustration of an ACT metaphor or with a written description of an ACT exercise. In case of acceptance or defusion exercises, patients have to indicate whether they currently suffer from unwanted experiences. Depending on their response, they receive an exercise that taps into current negative experiences or an exercise to train general ACT principles. Throughout ACT-DL, patients are given the opportunity to activate an ACT exercise at any time they need assistance in dealing with difficult thoughts or emotions. Furthermore, they are advised to do an extra exercise in the morning, afternoon, and evening of each day. The theme of the metaphors and exercises depends on the ACT components that are discussed during that week's session.

During the ACT session on personal values, the patients identify three values (e.g., family, career, health) which they feel are not sufficiently reflected in their daily behavior. After the next ACT session, discussing committed action, patients are asked to take some time in the morning to consider one of these three personal values. They are instructed to choose a value with the intention of acting in ways consistent with it throughout the day. Patients are asked to set a practical, feasible goal for that day, to guide them in their commitment to the chosen value. After every questionnaire, and once more at the end of the day, patients are asked to evaluate the extent to which they were able to live in keeping with their chosen value and if they were able to reach their goal for the day.

After all components are trained separately, the mobile intervention expands to cover the full range of ACT processes and patients learn to flexibly adopt skills and mindsets depending on the context. Patients are instructed to employ learned techniques specifically in situations when they are needed (i.e., at times of distress). This renders the intervention person-tailored and interactive, considering current mental state as well as contextual situation.

The following paragraphs describe each of the eight modules of ACT-DL, including the ACT component central to the module and the structure of its daily-life part. During the first session, a brief introduction to ACT and its principles and cornerstones are provided where the therapist explicitly stresses that ACT is a behavioral therapy and explains the use and importance of metaphors and exercises. The therapist furthermore provides an overview of the ACT-DL program, including the ACT-DL mobile application and the concept of the questionnaires, metaphors, and exercises within the mobile intervention. Participants also receive a workbook that contains all exercises and metaphors that will be discussed throughout the training so they have access to all content at all time. Although therapists can choose the order of the modules, some logical structure should be applied (e.g., Cognitive Defusion should precede the Self as Context module and the Values module logically precedes the Committed Action module). The last paragraph of this section describes how ACT-DL can be applied flexibly and tailored to each unique situation.

Creative hopelessness module

Creative hopelessness is a process of understanding that despite all frantic efforts to avoid negative experiences, the suffering remains (note that the fact that the individuals sought help for their complaints indicates the ineffectiveness of these efforts). During the week following this session, on three consecutive days patients engage in the daily-life part this session, using the ACT-DL mobile app module: creative hopelessness. This module contains two different ACT metaphors and four ACT exercises with the theme "creative hopelessness". In addition to each module in the mobile intervention, ACT-DL contains a questionnaire and four exercises of the "contact with the present moment" component. Awareness of current thoughts and feelings is a necessity in the process of integrating the ACT skills and insights in daily life and offers an alternative coping style, and hence

these skills are practiced from the first session on. In the “creative hopelessness” module, the questionnaires and exercises will help the patients gain consciousness about their avoidant coping strategies in the process of creative hopelessness.

Acceptance module

In this session, acceptance is offered as the alternative to control and avoidance. This session focuses on the acceptance of unpleasant emotions or sensations and learning to “just notice” them, instead of trying to make them disappear. Patients practice acceptance through exposure to their pain. Pain, here, does not necessarily refer to physical suffering, but instead to any unwanted sensation or emotion. In the acceptance module, patients are provided with two ACT metaphors and seven ACT exercises centered on the “acceptance” component. During three days of the week following the session, they learn to face their own pain without attempting to control it in order to diminish the unnecessary suffering. Throughout the day, ACT metaphors remind them of the newly learned coping strategies to stop fighting pain. Practical exercises help them to put the theory into practice and experience their unwanted emotions and sensations without trying to change them.

Cognitive defusion module

With regard to unwanted thoughts, cognitive defusion is offered as a possibility to take some distance from thoughts. ACT is built on the premise that people have a tendency to respond to their thoughts in a fused manner, treating them as if they were facts. To defuse from one’s thoughts is a skill that can only be mastered through practice, and patients are guided in this process by exercises that focus on observation of, and distancing from their thoughts. This week’s mobile intervention module contains two metaphors of the “cognitive defusion” component, and seven exercises focused on cognitive defusion. “Cognitive defusion” is a core ACT skill that requires substantial exercise. Once patients of the ACT-DL program are able to detach from their thoughts, they can transfer these techniques to thoughts about the self as well and let go of their self-image, which is the topic of the “self as context” module.

Self as context module

The ACT session of this module discusses the “self as context” component. Here, the distancing from unpleasant beliefs (as learned during the cognitive defusion session), is generalized to include beliefs about the self as well. From an ACT perspective, the fusion between self-image and thoughts or feelings limits behavioral flexibility. As patients experience that their self-image takes different forms in different contexts they learn to realize that the self is not a rigid entity and that ultimately the observing self is the only characteristic of the self that persists over time. Like the ACT session, the daily life module of this week centers on the “self as context” component and contains two metaphors with this theme. The module further consists of four “self as context” exercises, which guide the patients throughout the day in the process of understanding this relatively abstract component and living with a flexible self-image.

Contact with the present moment module

As patients of the ACT-DL program practice with the “contact with the present moment” component throughout the other modules, they are familiar with the concept when they start this session. As the name suggests, this component teaches patients to focus less on the past and future, and more on the here and now. As such, the “contact with the present moment” is also about awareness about the environment (both internal and external) instead of lingering in thoughts. Possibly even more than other components, these exercises need practice, which is why a considerable part of this session is dedicated to practical exercise. Practicing continues during the daily life module in the week following this session, where two “contact with the present moment” metaphors remind patients to be aware of the current moment and the same four exercises that they have been practicing with thus far guide them in the process.

Values module

In contrast, with the previous modules, this module aims to help people live a life guided by values, rather than uncomfortable experiences. A first step in doing so is to become aware of what matters most to the individual. During this session, patients are invited to think about their personal values. Values are those principles that matter most to a person, which serve as a direction in life, as a guide for our behavior. Exploration of personal values is necessary to invest in them, which is the aim of the next ACT component: “committed action”. The ACT-DL module of this session contains two metaphors of the “values” component. Furthermore, in addition to the four “contact with the present moment” exercises, during three days following this session, patients are provided with four exercises of the “values” component. These exercises aid them in further exploring which values are important to them.

Committed action module

Putting theory into practice, the “committed action” session is dedicated to the formulation of meaningful, realistic, concrete goals that are in accord with the personal values identified during the “values” session. Setting concrete goals helps the patients to translate the abstract idea of a value into practical actions to carry out. Patients learn that knowing what is important to them is an important first step, but in itself does not influence their lives; committed action is necessary. The “committed action” daily life module contains two new metaphors and four new exercises that aim to help patients to set goals and reach them taking one step at the time. The final additions to this module are the morning and evening questionnaires, which remind the patients of their chosen values and let them think about actions to invest in them.

Psychological flexibility module

The last step in ACT pertains to the integration of all components by means of psychological flexibility, providing the patients with a variety of skills to adapt to every situation. The central theme of the last ACT session is learning to apply ACT skills in a flexible manner to any given situation, depending on the demands of the present moment. Exercises that require switching between different ACT skills during the session provide the patients with an opportunity to practice with psychological flexibility. During this last week of the therapy, patients are provided with a module that brings all previous components together. This module contains one metaphor for each of the components acceptance, cognitive defusion, values, and committed action and all acceptance, cognitive defusion, values, committed action, and contact with the present moment exercises. In addition, it contains morning and evening questionnaires (which remind them to commit to a valued action every day) and “contact with the present moment” questionnaires. Thus, during the final week of ACT-DL the patients are guided in the flexible application of all skills they learned throughout the therapy.

The end of the ACT-DL program does not imply that patients should stop using the daily life protocol. The period of the last daily life module may be prolonged for as long as patients wish. As has been emphasized before, ACT skills need sufficient practice before they become intuitively integrated in everyday life. The daily life protocol aids this integration to the point where the patients feel that they adopted all skills and are able to apply them naturally in daily life.

ACT-DL as a flexible treatment

As presented here, ACT-DL adds an mHealth protocol to a standard ACT therapy. However, for various reasons (e.g., symptomatology, personality characteristics, practicalities, etc.) ACT-DL may be adjusted to match the diverse needs of the patients. First of all, ACT is a flexible treatment that can be fully adapted to the patient’s needs and the therapist’s preferences. Not only can a therapist decide on the order of the modules, they can also opt to spend an extra week on the same module, or skip a module altogether. Another option is to add a psychoeducation session at the start of the therapy. Especially when patients experience excessive fear or confusion about their symptoms,

starting off with a psychoeducation session aimed at normalization of the symptoms may create conditions where patients are more open for treatment in general. Another possibility is to shorten the therapy when this is desirable, or when one is limited to a preset number of sessions. For example, “cognitive defusion” and the “self as context” may be discussed in one session, as may values and committed action; the contact with the present moment module may be left out as this component runs through all daily life modules in the form of exercises. Finally, the ACT-DL protocol can also be applied in group sessions.

Measures and statistics

To assess the feasibility of the ACT-DL protocol in the INTERACT study, we asked participants who completed the treatment, upon completion, to answer several questions about the use and burden of the protocol using a paper questionnaire. Usefulness of the ACT therapy was assessed using the items: “Was the ACT training useful to you?”, “Where the ACT sessions useful to you?”, and “Where the home exercises useful to you?” Usefulness of the ACT-DL app was assessed using the items: “Was the app useful to you?”, “Did the app help you applying the exercises in daily life”, and “Did the app help you becoming aware of how you feel?” Burden of the app was assessed by asking: “The number of beeps per day was burdensome” and “The duration of the beeps was burdensome.” All items were rated on 7-point Likert scales, ranging from 1 (not at all) to 7 (very) with 4 as a middle option (moderately). Finally, we asked participants to indicate how they did the exercises, with response options “Using the app”, “Using the workbook”, and “Without either the app or the workbook” in a YES/NO format. Responses per item were averaged and standard deviations were calculated if applicable.

Results

Preliminary results on treatment evaluation in the INTERACT study are available for 16 individuals who finished the ACT-DL protocol thus far. These indicate that participants evaluate the overall training ($M = 5.63$; $SD = 1.17$), the ACT therapy sessions ($M = 5.63$; $SD = 1.36$), and the home exercises ($M = 4.81$; $SD = 1.63$; [Figure 1](#)) as useful. Furthermore, participants in the INTERACT study evaluated the app as useful ($M = 4.56$; $SD = 1.69$) and reported that the app helped them applying the exercises in daily life ($M = 4.75$; $SD = 1.71$) and made them aware of their feelings ($M = 5.25$; $SD = 1.56$; [Figure 2](#)). These results confirm that ACT-DL is able to aid individuals in integrating skills they learn during therapy sessions in their everyday lives. Moreover, 100% of the participants indicated that they used the app to guide their exercises, compared to 75% who used the workbook for this purpose. Only 38% reported doing exercises by themselves, without either the app or the workbook. These data show that ACT-DL offers a feasible way of guiding patients in the application of ACT principles in their lives. Finally, participants in the INTERACT study rated both the total number of beeps per day ($M = 4.0$; $SD = 1.73$) and the amount of time required to fill out one beep questionnaire ($M = 4.44$; $SD = 1.66$) as moderately burdensome ([Figure 3](#)), suggesting that adhering to the protocol is relatively demanding and indicating options for improvement (i.e. fewer and shorter beep questionnaires).

Discussion

The approach described in the current protocol, i.e. the adoption of ESM or self-monitoring, differs from other mHealth approaches to ACT. While mHealth has been implemented in ACT trainings before (Bricker et al., 2014; Cheng et al., 2013; Lappalainen et al., 2013; Ly, Asplund, & Andersson, 2014), no former mHealth ACT protocol has integrated ESM into a face-to-face ACT training program. Earlier approaches to the combination of ACT and mHealth used text-messaging and/or audio-files as a substitute for guided face-to-face therapy sessions (Bricker et al., 2014; Cheng

Figure 1. Usefulness of ACT-DL.

Figure 2. Usefulness of the app.

et al., 2013; Ly et al., 2014) and required the patients to self-initiate use of the provided electronic tools (Bricker et al., 2014; Lappalainen et al., 2013; Ly et al., 2014). On the one hand, ESM supports habit formation in different contexts. On the other hand, guided, personal ACT training builds on

Figure 3. Burden of the app.

a framework that emphasizes the importance of context in our behavior and which has been proven to be effective for a wide array of psychological obstacles (A-Tjak et al., 2015; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Öst, 2014; Powers et al., 2009; Ruiz, 2010; Veehof et al., 2011). The combination of both may particularly aid in developing healthy and consistent coping behavior in real life and an overall increased quality of life.

The current protocol provides patients with a certain number of “reminders” in addition to the possibility to self-initiate coping and other experiential exercises in order to counteract the potential difficulties patients may experience if required to self-initiate new coping strategies in their everyday lives. These reminders increase the likelihood that exercises are carried out at different times of day and in different environments, as reflected by the higher percentage of participants using the app to guide their exercises in the INTERACT study. Moreover, the use of ESM in itself governs the acquisition of self-insight and awareness of one’s emotions, behavior, physical, and social environment (Barta, Tennen, & Litt, 2012; Telford, McCarthy-Jones, Corcoran, & Rowse, 2012). This reflects the “contact with the present moment” component of ACT, as was also reported by the participants (see Figure 2). It is, therefore, a suitable extension for this type of therapy.

An initial version of ACT-DL introduced in the current article has already been tested on its feasibility and acceptability among psychiatric patients in a feasibility study (Batink et al., 2016). One hundred sixty-one in-patients with varying DSM-IV diagnoses (both on axis I and axis II, with the exception of psychotic disorder) participated in the trial. Overall, patients evaluated the training favorably and experienced the addition of the mHealth component as a useful training component, promoting the use of ACT in daily life. Moreover, patients indicated that they would recommend the use of ACT-DL to others. Based on findings of this first feasibility study the current protocol was developed further and is currently being implemented in the INTERACT study, testing its effectiveness in ARMS individuals and early stage of psychosis. The preliminary findings reported here suggest ACT-DL to be feasible in a sample of early psychosis individuals as well, which is encouraging.

Next to the potential to improve the effectiveness of ACT, the current protocol may have some limitations. First and foremost, patients might need to adjust to the number of prompts and their potentially disruptive nature. ESM implies that patients are prompted with several beeps per day, requiring them to interrupt their daily routine on multiple occasions each day. This procedure might be experienced as challenging. However, patient reports from other ESM studies by our group have shown that many individuals grow fond of the device and find it a valuable tool in their treatment process (Wichers et al., 2011). Another potential limitation is that execution of some of the ACT-DL exercises, such as mindfulness exercises, in the presence of others might lead to an unpleasant degree of self-awareness. However, since the ACT-DL exercises were designed to be carried out in varying life situations, usually the presence of others would not hinder execution of those exercises. Moreover, only regular engagement in the exercises within varying environments will establish a routine in the application of the newly acquired ACT skills. If patients practice these skills in only one environment (i.e., an environment where it is easy to practice), generalization of these skills to different contexts will be much less likely to occur. Hence, it is assumed that this initial burden will eventually turn into a valuable procedure. Regarding the preliminary results reported here, inferences about the feasibility of the protocol are limited by the small sample size and the fact that we only acquired these data from participants who completed the full protocol. Results from the full sample, as well as from other studies, will inform us about their generalizability.

Advancements in technology imply advancements in mHealth, and the current protocol holds potential that has not yet been exhausted. One possibility to further improve the current ACT-DL protocol is to build on the answers patients provide via the ESM questionnaires, i.e., to use momentary indications of mood and symptoms to subsequently feedback exercises adjusted to these indications (Steinhart, Myin-Germeys, & Reininghaus, 2019). For instance, whenever a patient indicates they are ruminating, a mindfulness exercise that specifically tackles rumination would be suggested at the end of the questionnaire. This adjusted feedback mechanism based on patients' current needs, a feature that has already successfully been implemented into other mHealth protocols (Harrison et al., 2011), would imply an even greater degree of personalizing treatment.

The present paper introduces an innovative approach to improve translation of ACT techniques into the patient's daily life. Preliminary data in early psychosis individuals indicate that ACT-DL is regarded feasible and useful in this group, and that it aids patients in incorporating ACT skills in their daily lives. Utilizing the inherent properties of ESM in an mHealth approach, the ACT-DL protocol aims at helping patients to a faster habit formation that is not context-dependent, substituting former, unhealthy coping strategies with adaptive ones and supporting patients in pursuing their personal values. If this protocol further proves to fulfil this aim, it will be made available for clinical use in the future.

Disclosure statement

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