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Mobile applications in psychotherapy – case experiences of Mode Flashcard application in schema therapy

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Psychiatric conditions are a relatively common source of subjective distress. These conditions are often associated with functional and vocational impairment, thereby yielding challenges and costs to society. The last decades have witnessed a rapid increase in the prevalence of smartphone use. Meanwhile, different mental health mobile applications have been developed, either for stand-alone use or as adjuncts to existing therapy. Results of recent meta-analyses indicate that app-supported smartphone interventions can affect common mental health problems, and that therapist guidance and engagement reminders bolster the effectiveness of these interventions.

The purpose of the present thesis was to trace and describe users' experiences with a mobile app that was constructed according to a widely used schema psychotherapy technique, the mode flashcard. A mobile app compatible with Android-based user interface was constructed for the purpose of the present study. This app was piloted with one cognitive psychotherapist and three patients as part of their routine psychotherapy. Interviews were used as data collection method. The questions of this semi-structured interview addressed themes such as personal experience of app-assisted therapy, and qualities requested for a successful app. The data consists of answers to this in-depth interview and was analyzed using qualitative content analysis.

The mode flashcard mobile app was perceived to facilitate between-session organization of distressing experiences, promote reflection on mental contents, aid in recalling, and facilitate recruitment of own, healthy resources at difficult moments. In terms of quality features requested for the app, user-friendliness and a visually appealing outlook were mentioned. These appeared to be prerequisites for a user to stay motivated with app use.

Key words
Mobile application, mental health application, app-assisted psychotherapy, cognitive psychotherapy, schema therapy, mode flashcard

CONTENTS

1 INTRODUCTION

Digital technology offers many potential solutions that can either support mental health or treat mental health problems. Smartphone-based mental health apps represent a unique opportunity to increase the availability and accessibility, as well as quality of mental health treatment. The number of mobile health (mHealth) apps focusing on mental health has rapidly increased; a survey by World Health Organization (WHO), published in 2015, revealed that out of a total of 15,000 mobile health apps, nearly one third (29%) focused on mental health diagnosis, treatment, or support (Chandrashekar, 2018).

Today, international (World Health Organization; WHO) as well as national (e. g., National Health Service; NHS) treatment guidelines recommend that mobile applications are integrated in health care services (Grist et al., 2017).

It is hypothesized that well-designed mental health mobile apps that present their content in interactive, engaging, and stimulating ways can promote cognitive learning, personal growth, and mental health enhancement. However, apps fail to find their way to the therapy room accidentally; dissemination and implementation are required. As key influencers in the mental health system, professors in the mental health field and professional associations may either help or hinder the dissemination and implementation of beneficial mobile health technology applications (Lynette & Byron, 2015).

The purpose of this small qualitative study was to explore whether and how, as experienced by service users and psychotherapists, a mobile application can support goal attainment in cognitive psychotherapy. Another purpose was to explore what quality features, according to users, are required from an app. Investigation of technical aspects related to construction of the app is beyond the scope of the present thesis.

2 BACKGROUND

2.1 Mobile applications as part of psychotherapy

Mobile phones are now prevalent worldwide. In 2017, it was estimated that in 2020, 6,1 billion mobile phones will exist in the world (Grist et al., 2017). A wide variety of mobile applications have been developed to support mental health, and there is growing interest in making active use of them. According to an estimate provided by a systematic review, in 2017, there were more than 15 000 health care related mobile applications 29 % of which were designed to support mental health (Grist et al., 2017).

2.1.1 Rationale for the use of mental health apps

A substantial proportion of adults with common mental disorders fail to receive any treatment (Mojtabai et al., 2011); even in high-income economies, psychiatric conditions remain undertreated (Crisholm et al., 2016; Substance Abuse and Mental Health Services Administration, 2016). Hence, finding ways to reduce this treatment gap is crucial (Linardon et al., 2019), and barriers for treatment have been explored. These are found to be structural, or attitudinal (Weisel et al., 2019). Examples of structural treatment barriers include treatment availability, affordability, and time constraints. However, attitudinal factors play an even greater role in impeding treatment seeking (Mojtabai et al., 2011). Low perceived treatment need, poor mental health literacy, preference for self-reliance, as well as fear of stigmatization are examples of attitudinal factors hindering mental health treatment (Grist et al., 2017; Gulliver et al., 2010; Matthews et al., 2008; Mojtabai et al., 2011). Thus, hope has been attached to the potential of mobile device use in overcoming some of the barriers that stand in the way of people seeking or receiving treatment through conventional routes (Grist et al., 2017; Matthews et al., 2008).

In addition to improving access to treatment, mental health applications may serve various functions in the actual treatment of mental health conditions. They may, for instance, help to assess symptoms, educate about mental health conditions, or they

may help to engage the patient in his or her therapy by various homework assignments (e. g., a thought diary or activity schedule) between sessions. In addition, they may help to monitor changes in moods or mental states (modes) between sessions or help the individual practice the coping skills s/he has learned in therapy (Chandrashekar, 2018; Grist et al., 2017; Matthews et al., 2008; Menon et al., 2017). Smartphone interventions offer many advantages even over other digital interventions (e. g., computer-based), including their ability to allow users to engage in exercises and monitor symptoms in situ, that is, in real time, and immediately before and after pivotal events. Another advantage of smartphone apps over computer-based interventions is their capacity to be accessed in private and at a time and location of choice (Stolz et al., 2018).

Several benefits of mobile health interventions utilizing apps have been listed: (a) the threshold to use these apps is generally low and they provide opportunity to engage individuals in need of treatment timely and anonymously by providing portable and flexible treatment (i. e., accessibility, availability, anonymity), (b) mobile health may reach individuals who would otherwise not seek treatment (i. e., greater access to care), (c) most individuals already experience mobile devices to be an integral part of their everyday life, and forthcoming generations are familiar with mobile devices, and use them naturally to connect with others, communicate, play, or search for information, (d) mobile health could be utilized to deliver large-scale interventions in emerging and low-income economies or geographically isolated areas where resources for mental health are greatly limited (i. e., equality in the distribution of mental health resources), and (e) individuals can be supported in applying treatment-related skills in their real life situations, in which behaviour change is at its most vulnerable, and clinicians often struggle to support individuals appropriately (Grist et al., 2017; Matthews et al., 2008; Weisel et al., 2019). Researchers discuss how, for younger generations, mobile-based services can be more attractive than the traditional sources of information (e. g., books, leaflets, paper and pencil-exercises) since younger people already use web when searching for information on mental health and communicating. Thus, technology-based approaches could be especially suitable for them because their attitude towards technology may be more positive than adults' (Grist et al., 2017; Matthews et al., 2008).

2.2 Cognitive psychotherapy

It is well established that cognitive psychotherapy (CT), a stream of psychotherapy developed by Aaron Beck, can effectively treat a variety of mental disorders (Cristea et al., 2017; Cuijpers et al., 2016; 2014; Olatunji et al., 2013). In cognitive psychotherapy, the main target for therapy are the patient's thoughts and beliefs that cause distress to him or her, as well as emotions associated to these thoughts and belief systems. The basic idea is that thoughts and emotions are interconnected. Therefore, according to the theory, by achieving new flexibility in the way the individual thinks, it is possible to affect the emotional experience. Great value is placed on testing and practicing new behaviours. Hence, various methods of behavioural therapy (BT), including exposure and behaviour change, are also utilized in cognitive therapy. Cognitive therapy is often referred to as cognitive-behavioural therapy (CBT), reflecting the close connection between these two steams of psychotherapy (Karila et al., 2020).

In cognitive psychotherapy, the goal is to help patients observe and organize of their inner experiences, i.e., achieve meta-awareness of mental contents, and modify behaviours that cause them problems. Often, the goal is to find more flexible alternatives. The ultimate goal of therapy is to identify authentic emotions, values, and goals of the patient, and facilitate his or her agency (Karila et al., 2020). Agency emphasizes an individual's autonomy including striving for self-assertion, self-expansion, and the ability to influence the course of his or her own life (Huber et al., 2021). Put simply, it refers to ability to act towards attaining own goals.

During a therapy session, the client and therapist typically explore in detail the patient's problematic experience of a particular, concrete situation in his or her everyday life. The aim is to understand how the problematic experience was triggered, what emotions, thoughts, mental images, beliefs, action urges emerged, and what were the overt behaviours the patient displayed. In other words, the patient and therapist collaborate in seeking to obtain a nuanced understanding of how these different aspects of the patient's problematic experience are related and interact with each other, thereby causing suffering. After conducting a detailed

exploration of the current problem and thus a clear understanding of the problem, the patient and therapist may use problem solving strategies (Beck, 2020).

Cognitive psychotherapy is a joint endeavour; the patient and therapist collaborate aiming to help the patient reach his or her goals. This includes that the patient is acquainted with the basic concepts and interventions of therapy. In this way, a relationship as equal as possible is being facilitated (Beck, 2020). The therapist is like a compassionate other who, especially by asking questions and gently pushing the patient towards practicing new behaviour, helps the patient find alternative ways of thinking and behaving, thereby becoming empowered, and agentic (Karila et al., 2020).

2.2.1 Schema therapy

Schema therapy, a branch of cognitive psychotherapy developed by Jeffrey Young, is an integrative psychotherapy drawing from CBT theory, attachment, as well as object relation theory. Further, techniques from expressive psychotherapies, particularly gestalt therapy, are adopted and applied. Schema therapy was developed to respond to the special needs of individuals suffering from relatively long-term emotional difficulties, including refractory anxiety and depression, eating disorders, imprints of childhood traumas, and personality disorders. In schema therapy, many psychiatric conditions are assumed to arise, in part, because of a mismatch between a child's basic emotional needs and his or her environment (Young et al., 2003).

Schema therapy can be delivered either as individual therapy, or in group format. Today, a conjoint format combining both individual and group therapy, is common for the treatment of personality disorders (Tan et al., 2018). Both modalities have been tested in randomized controlled trials (e. g., Farrell et al., 2009; Giesen-Bloo et al., 2006; Storebø et al., 2020), and schema therapy is now considered as one of the evidence-based based treatments for borderline personality disorder (Choi-Kain et al., 2017).

The schema therapy theory proposes that people with longstanding emotional difficulties often have early maladaptive schemas (life themes), and schema modes. The former refers to trait-like cognitive structures that are, by definition, quite stable. One example of an early maladaptive schema is belief “I am bad”, which is often related to feelings of shame. Together, this belief and related emotion (shame) compose an early maladaptive schema called defectiveness/shame. By contrast, the concept of schema mode refers to fluctuating facets of personality. The “vulnerable child”, “angry child”, “punitive parent”, and “compliant surrender” are examples of modes. These can be understood as cognitive-emotional-behavioral states. If a person’s modes are dissociated, they can switch abruptly, with one mode literally giving way to another that becomes activated and overrides the one that was active just a moment ago (Young et al., 2003).

The overall aim of schema therapy is to help individuals identify and work on their early maladaptive schemas, schema modes, and self-defeating coping strategies. This is achieved through use of a wide range of experiential, cognitive, behavioral therapy techniques (Young et al., 2003). The current wave of schema therapy places major emphasis on working with modes applying experiential techniques, in particular. Different kinds of imagery exercises are used to activate difficult emotional experiences that can then be explored and worked on (Arntz & van Genderen, 2021).

2.2.2 Modes in children

Since the app that was investigated in the present thesis was designed for children, I will briefly delineate schema modes in children, as described by Graaf et al. (2020). Specifically, they describe seven modes in children:

The vulnerable child: The lonely, isolated, or sad child; abused or misused child; scared, unsupported, lost, helpless, powerless, worthless, dependent child; confused, insecure, or overwhelmed by requirements. Internalizing component relevant: feeling distressed in a sad way.

The angry and enraged child: The child is frustrated because his or her basic needs are not fulfilled; desires inappropriate limits, outbursts take place. The child screams,

goes wild, destroys things, or hurts himself or other people. Externalizing component relevant: feeling offended in an angry way.

The impulsive child: The child tends to do impulsive, unreflective actions for his own satisfaction, without regard for other persons or possible negative consequences.

The undisciplined child: Routine or boring task cannot be completed; difficult tasks or requirements are not even attempted. The child gives up quickly, applies himself reluctantly, and does not persist.

The spoiled or egoistic child: The child is – in contrast to the undisciplined or impulsive child – used to all his or her desires coming true. Accordingly, s/he is demanding and disappointed if others fail to fulfil this expectation.

The happy child: The child is content, feels loved and valuable, connected with others, secure, spontaneously sociable, jolly in play, effective and resistant, because basic needs are fulfilled. Further qualities: jolly, amused and/or giggly.

The clever or competent child: The child displays self-efficacy and exhibits self-control. S/he is capable of (age-appropriate) self-monitoring, frustration tolerance, and acceptance of rules, norms, and values. The child takes care of him- or herself, like a good parent. However, s/he does not yet experience this as self-regulation, but still clearly as an internal protector, who has control, enabling comfort. S/he is able to hold in mind the memory of a parent, even if attachment figures are absent. When the child needs help and support s/he is able to connect to a 'helper' and therefore achieves autonomy through fantasized supporters, who protect, accompany, comfort and defend the child (Graaf et al., 2020).

The goal of therapy is to activate and strengthen the child's healthy and wise activity, i.e., the clever child mode that is the facet of personality that encompasses all the wisdom inherent in the child. This mode is encouraged in therapy. However, other modes are not dismissed either, since it is important that the child is allowed to feel, and thus process, for instance, the sadness of the vulnerable child mode. Less functional modes are understood, overall, as an adaptation, and the function of them is

explored in the present. Nevertheless, they benefit from recruitment of the clever/competent child (Graaf et al., 2020).

2.2.3 Mode flashcard as a therapeutic tool

The mode flashcard is a widely used cognitive technique in schema therapy the purpose of which is to help patients analyze and organize experiences triggered by various problem situations or events. Often, flashcards are constructed in advance for later use. Thereafter, they are used in tricky situations where they function as reminders of the patients' healthy resources. In other words, patients can use flashcards when preparing for a potentially tricky events or situations in order to remind themselves of the value of behaviour change and reduce the urge to revert to prior maladaptive behaviour (Young et al., 2003). Flashcards can be especially valuable at moments when emotions are so intense that they override cognitions, since they may aid patients in recruiting their cognitive resources, or re-establishing contact in their inner wisdom. At a concrete level, flashcards summarize patients' everyday experiences in terms of schema modes and their cognitive and emotional implications (Arntz & van Genderen, 2021; Young et al., 2003).

In the following passage, I will offer a hypothetical example of the construction of a traditional paper-and-pen mode flashcard. The Mode Flashcard app draws on the same basic idea. This example is modified from Arntz and van Genderen (2021) and Young et al. (2003): This patient suffers from a severe punitive parent mode, often triggered in situations that provide hints of invalidation by others or her doing wrong or making a mistake. The punitive parent mode induces intolerable guilt that the patient is often unable to bear without resorting to self-destructive behaviour. When constructing the mode flashcard with the aim to help the patient better cope with the punitive parent mode, the patient writes on one side of the flashcard the viewpoint of the punitive parent ("I feel guilty now; I feel it is my fault that X happened. However, this is the voice of the punitive parent. It says: Why did you do that?! You shouldn't have said/done that!"). On the other side of the flashcard, she writes her new, more refined/balanced/nuanced view ("My previous learning was that everything I do is potentially wrong and that others will judge me harshly. Right now, I feel guilty, but

that doesn't mean that I am guilty, since there could be other reasons as to why it didn't work out. People have their own mind, and thus their own reasons for their reactions. It is not necessarily always me provoking all the bad things. And even when I made a mistake, this doesn't mean that I am guilty of everything. People make mistakes; it is normal and part of life. The punitive parent doesn't realize that, and he is exaggerating. I don't need this side right now/anymore".

2.3 Between-session activity in psychotherapy

Effective use of homework is integral to cognitive psychotherapy. That is, in cognitive therapy, patients are required to engage in homework assignments. Homework can function as a vehicle for self-monitoring, testing out old or new ideas, putting new skills into practice, and improving functioning in the diversity of situations in which patients' problems occur. These are the theorized mechanisms of therapeutic change in cognitive therapy. Process of between-session activity is hypothesized to increase patients' self-efficacy and hence, ultimately, reduce vulnerability to relapse (Kazantzis et al., 2010).

Theoretical ideas on the clinically meaningful contribution of between-session activity to psychotherapy outcome have gained empirical support in a number of studies. Kazantzis et al. (2010) conducted a meta-analysis of the impact of homework on psychotherapy. These researchers found that overall, study conditions including homework as a main component produced superior treatment effects to those not including homework. 62% of patients would improve when receiving therapy with homework, compared with only 38% receiving therapy without homework. Furthermore, there was a clear benefit for homework assignments over and above the effects of an already effective therapy. Hence, findings from the Kazantzis et al. (2010) meta-analysis support the central thesis that in the context of the cognitive-behavioural therapies, therapy with homework is better than therapy without homework.

Some aspects of psychotherapy can be understood as bearing similarity with learning. More specifically, psychotherapy is about learning new skills - be it self-observation, decrease in avoidance, or practising new behaviours. The goal of therapy is to foster generalization in learning, meaning that new skills, or behaviours are intended be

practiced in different contexts in the patient's real life. A patient's completion of a homework assignment signals the beginning of generalization, given that this skill has been transferred from the session to the patient's everyday life. As the patient engages in independent practice in different contexts with or without in-session discussion, there is evidence of further generalization of the skill to the patient's life outside the therapy room. Ultimately, the goal is to enable the patient to develop complex reasoning about adaptive skills use in various and changing contexts (Kazantzis et al., 2010).

Given that engagement in homework assignments is found to enhance effectiveness of psychotherapy and since there is still room for improvement in the overall effectiveness of cognitive psychotherapy (David et al, 2018), well-designed apps could be of help if they can increase the desirability and attractiveness of between-session activity.

3 RESEARCH QUESTIONS

My research questions were the following:

1. What, if any, added value a mobile app can bring to therapy, and to homework engagement in particular?
2. How can a mobile app contribute to achieving therapy goals?
3. How do patients and therapist experience the use of app as part of therapy?
4. What are the qualities of a successful app, according to patients and therapists?
5. Are there any disadvantages?

4 MATERIAL AND METHODS

4.1 The Mode Flashcard Mobile App

A Finnish Mode Flashcard application was developed for this thesis. It is available free of charge at
https://play.google.com/store/apps/details?id=com.andershomm.skeematerapia
and can be downloaded to on mobile device with Android user interface. Using screenshots from this application, I will illustrate the specific questions and tasks included in it in the following:

1. **Emotion and trigger**: When (trigger) occurs
   _____
   the first thing I feel is (emotion)
   _____.

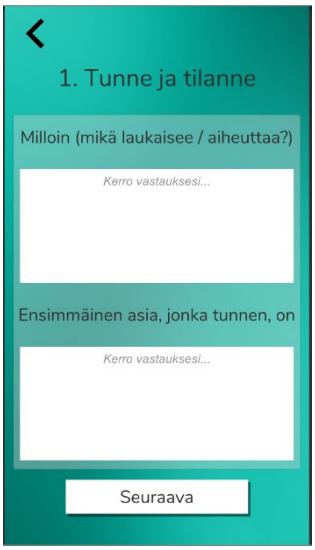

Figure 1. Emotion and situation

2. **Dysfunctional mode and identification of valid need:** I know that my_____ mode/modes is/are probably being triggered in situations which I find are difficult to endure. In order to avoid the bad feeling associated with this mode, I activate and bring into the fore the_____ mode that is able to meet my needs for _____ at least in the short-term.

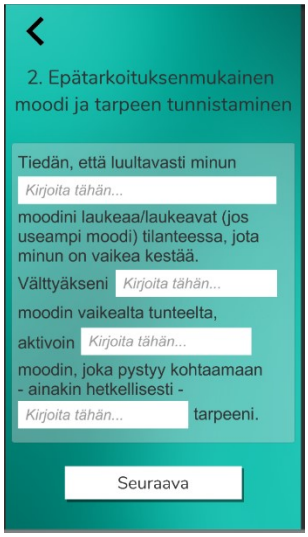

Figure 2. Dysfunctional mode and identification of the need

3. **Learning history related to the dysfunctional mode:** This problematic coping mode is something that I learned from

_____

(Jot down persons and experiences that have affected your learning to resort to this mode.)

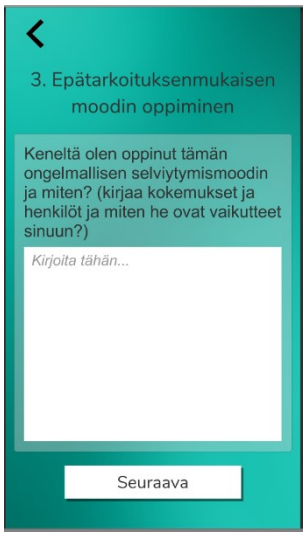

Figure 3. Learning history related to the dysfunctional mode

4. **Clever mode**: There is a lot of evidence that I really have a competent side in me; I call this side _____. And this one knows that _____. (Write down your reasons why the clever mode is good for you).
   Evidence that this mode really lives in me include:_____.

Figure 4. Clever mode

5. **Clever behaviour:** I know that my dysfunctional mode _____ will do me more harm than good. Therefore, if gets triggered in the future, and if I then want to go into my clever mode_____, I can do the following: _____

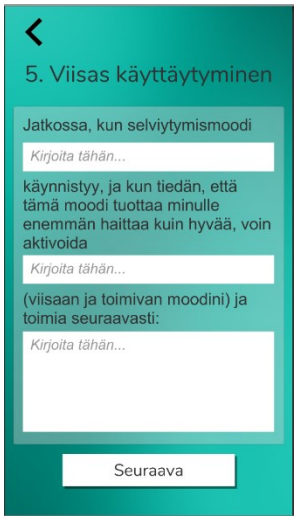

Figure 5. Clever behaviour

Since research has robustly demonstrated that engaging patients in homework assignments between therapy sessions positively affects the gains of psychotherapy (Kazantzis et al., 2010), I wanted to investigate whether a mobile app could provide any added value in terms of achieving these treatment aims. A schema therapy Mode Flashcard (Graaf et al., 2020; Young et al., 2003) App was developed in collaboration with Dr. Professor Christoph Loose, a distinguished German psychotherapist whose contributions to the development of schema therapy for children and adolescents are noteworthy. Two meetings were held with Dr. Loose, the Finnish psychotherapist who was my interviewee, a student in information technology at Satakunta University of

Applied Sciences who was responsible for the technical development of the app, and the author of the thesis. During these meetings, Dr. Loose offered his suggestions in terms of content, and also commented on the development process. Thereafter, the student constructed the app as part of project Digimieli financed by the European Social Fund (ESF). The app was thus developed specifically to respond the needs of the present thesis.

4.2 Sampling

Cognitive therapists were recruited for this study from the Finnish Schema Therapy Society. The chief executive officer (hereafter, CEO) of the Finnish Center for Cognitive Psychotherapy Luote had a central role in the recruitment process: she approached members of the Finnish Schema Therapy Society through their own Facebook group, informed them about the present study and possibility to participate. The Finnish Schema Therapy Society encompasses a total of 80 members. It was chosen as the recruitment channel since it was assumed that the potential piloters should be well versed into the use of mode flashcards in psychotherapy.

Two therapists took an interest in the app. For the other, incompatibility of the app with iOS user interface (viz., iPhone) prevented participation. Finally, only one therapist consented and piloted the app with three patients, one of whom was adult and two minors (one teen and one aged 9). Therefore, I was unable to take saturation (Saunders et al., 2018) into account in the sampling process.

4.3 Data gathering

The therapist piloted the app with three patients for an average of two months. Thereafter, she interviewed these patients regarding their experience with the app using the same questions author used in her interview. For the minors, these questions were adapted to age-appropriate level.

Author interviewed the therapist. This semi-structured in-depth interview lasted 90 minutes and was audiotaped. The data of this thesis consists of this audio-recording that I transcribed verbatim.

4.4 Data analysis

4.4.1 Choice of method

Data was content-analyzed. I chose this method since it is being widely used in Finnish nursing research (e.g., Kyngäs et al., 2020, Tuomi & Sarajärvi, 2017). Thus, literature on this method is easily available for beginners.

My choice of method was further informed by the possibility to quantify the data. Specifically, by using content analysis, it is possible to analyze the data qualitatively and, at the same time, to quantify it (Gbrich, 2007). Thematic analysis, a cousin of content analysis and another suitable method for beginners, by contrast, provides a purely qualitative, detailed, and nuanced account of data (Braun & Clarke, 2006). As I did not know in advance the number of my future interviewees, when planning for the research, I wanted to retain the possibility to quantify the data, if needed. Finally, with one interviewee, this failed to be of relevance.

4.4.2 Data analysis phase

To date, little is known about user experiences related to apps as adjuncts to psychotherapy. Therefore, I wanted to approach my date using an inductive frame. Inductive approach is applied to the data when the researcher either has no knowledge or has partial, fragmented, and/or insufficient knowledge about a certain phenomenon. Using an inductive approach, relevant themes are let emerge from the data (Kyngäs et al., 2020). That is, the researcher approaches the data with an open mind, with no or only few preconceived ideas. In other words, search for predetermined phenomena does not govern approach to the data.

When using content analysis, the primary aim is to describe the phenomenon in a conceptual form (Elo & Kyngäs, 2008). Hence, author immersed myself into the audio-recorded data and transcribed it verbatim. Data abstraction commenced already when transcription was still under way, as author noticed material related to my research questions. I labeled different text fragments with different codes. Thereafter, I assigned the same code to all subsequent text fragments representing the same idea. I read the transcribed data through several times in order to verse into it and obtain understanding of it. Most codes could be later grouped together to form larger categories that described overarching themes while some codes remained loners. I retained them all, since I wanted to stay close to the data and not to lose any information. In analyzing the data, I attempted to follow guidelines by Kyngäs et al. (2020).

5 RESULTS

Two categories pertaining to a) the quality features of a successful app and b) potential added value offered to psychotherapy were identified. Concerning the first, that is, the quality features of a successful app, qualitative content analysis yielded six categories the themes of which were 1) user-friendliness, 2) visualization, 3) user's familiarity with the underlying theory, 4) personalization, 5) language fluency, and 6) ubiquity. In terms of the second, i. e., the potential added value to therapy, qualitative content analysis identified the following categories: 1) enhanced reflection, 2) enhanced recall, and 3) help available at difficult moments. A summary of these findings is presented in Table 1.

Table 1. Summary of findings.

Quality features of a successful app	Added value to therapy
user-friendliness	enhanced reflection
visualization	enhanced recall
user's familiarity with the underlying theory	help available at difficult moments
personalization	
fluent language	
Ubiquity	

5.1 Quality features of a successful app

5.1.1 User-friendliness

The respondents' answers revealed that when integrating the mobile app into therapy, user-friendliness is of utmost importance. The interface should be easy to use and intuitive, and one should be able to use it without instructions.

Participants in the present study did not mention any problems related to the actual use of the app. Using clear questions, the app itself appeared to guide the user from previous stage to the next. Use was also facilitated by the therapist collaborating with the patient. In this case, the therapist could explain to the patient, for instance, what is meant by a certain app question. In this way, the patient became familiar with the functions of the app.

5.1.2 Visualization

All users requested more visuals. The clarity of the functions fails to be enough; the app also needs to have a pleasant and attractive outlook.

One respondent wished that their own answer, written in the app, would stand out more clearly. Specifically, in the app version that was piloted in the current study, questions and answers were typed using similar font, thereby blurring distinction between the two. As participants brought up, a clearer distinction between questions and answers would aid in reading of own answers afterwards, a process that may be very relevant with respect to therapy goals.

5.1.3 User's familiarity with underlying theory

The mode flashcard app that was investigated in the current study was based on the principles of schema therapy. One respondent stated that the use of the app required a basic understanding of different modes. Indeed, this was a prerequisite, since the current app was intended to serve as an adjunct to existing therapy, i. e., the aim was to support therapy, not to replace it. Therefore, before commencing app use, the patient needs to be familiarized with the questions posed by the app (and thus the underlying theory).

5.1.4 Personalization

All respondents, the patients as well as the therapist, missed illustration in the app. Specifically, the opportunity to attach a self-drawn image, reflecting the specific emotional states related different modes, was regarded highly relevant and thus missed. In the therapy session, the patient, assisted by a therapist, reflects on his or her behaviours. The modes are labelled with a name, and often further illustrated by drawing or painting. Participants also suggested the possibility to select an image from an existing gallery as alternative for the opportunity to attach self-made images. Self-made or selected images are a powerful way to enhance personalization of app. This would create a sense of ownership that promotes commitment. When an app looks unique, it will also be more comfortable to use.

5.1.5 Language fluency

The application should be visually pleasing, but fluent language is also important. This was noted by all respondents; the present version failed to reach the language standards requested for an app.

5.1.6 Ubiquity

Ubiquity was mentioned as an advantage, but also as a disadvantage of the app. The app was difficult to use at school where peers became curious about what the patient performing with the phone. However, this problem may reflect the difficulties inherent in engagement in between-session activity rather than qualities of or use of app per se.

5.2 Added value to psychotherapy

Concerning the potential of the app to offer added value to therapy, three categories emerged: 1) enhanced reflection, 2) enhanced recall, 3) help available at difficult moments.

5.2.1 Enhanced reflection

Patients were asked to jot down their thoughts when filling in the Mode Flashcard, a process that was experienced as helpful:

> *"I really noticed how writing things down made them visible to me and urged me to reflect on them. These are difficult issues for me, and therefore making them visible is helpful.* "

The process of writing down their mental contents urged patients to organize them at a more concrete level and with increased clarity. Patients noticed how a more reflective approach to own mental contents differed from rumination that was habitual and experienced as unhelpful. Furthermore, reflection on own emotions and thoughts was associated with ability to consider alternative, helpful solutions:

> *"It was helpful to reflect on what happens in me and what may help".*

5.2.2 Enhanced recall

Patients reported benefits from the opportunity to return to important therapy issues at a concrete level between the therapy sessions. These were contained within the app which facilitated recall and remembrance.

> *"The flashcard functioned as a therapy aid, since it reminded me of insights gained during the sessions. The possibility to have a look at the flashcard, I mean physically, between the sessions, was helpful. Compared to attempting to just recall all those therapy issues, it was beneficial to have the opportunity to consult the card."*

5.2.3 Help available at difficult moments

The Mode Flashcard App contains guidance for the patient towards wise behaviour. The patient and the therapist have worked on this guidance in advance during therapy sessions. That is, the content of these wise coping strategies, as well as ideas on how to implement these have already been negotiated in a calm situation. These are unique to this patient, as well as problem-specific, meaning that guidance is not universal but rather pertains to the specific problem of this unique patient.

One patient described benefits of consulting the flashcard when at the grocery store, at a moment when flooded with obsessive thoughts that blocked behaviour. This patient reported how he paused, read the flashcard, thus refreshing the instructions he had made for himself at an earlier point to cope with a specific, recurring problem:

> *The flashcard functioned as a concrete reminder of the healthy adult mode. Despite being distraught I was able to establish contact with the healthy adult.*

6 DISCUSSION

As part of this thesis, a mobile app intending to facilitate between-session activity in psychotherapy was constructed and investigated. This app was adapted from

traditional paper-and-pencil version of mode flashcard which is a widely used cognitive technique in schema therapy. User experiences were gathered through a semi-structured interview, and qualitative content analysis was applied to the interview data. On findings pertaining to quality features of the app, respondents highlighted user-friendliness, and the visual and personal elements of the app. Findings indicate that failure of the app to meet certain standards concerning these qualities renders it unattractive to the user. On findings pertaining to the perceived added value to therapy, a proportion of patients found that the Mode Flashcard app was of help when they attempted to organize their between-session struggles. Overall, participants reported that app-facilitated writing aided them in pausing and reflecting on their mental contents. According to their experiences, the use of app also helped them to recall and remember insights gained in therapy.

Patient self-efficacy and the degree to which patients engage with their treatment has been identified as one of the most significant factors in achieving positive therapeutic outcomes. Alongside engagement during clinical sessions, a key aim in improving patient self-efficacy is to increase the degree to which patients engage in prescribed therapeutic activities between therapeutic sessions (Assay & Lambert, 1999; Kazantzis et al., 2010). Findings from the present study indicated that use of the Mode Flashcard App stimulated writing and thus visualization of mental contents. This, in turn, seemed to stimulate enhanced reflection on these mental contents. Furthermore, reading of prior, self-made instructions included in the app supported initiation of new coping behaviours, engendering control over own behaviour. All these aspects can be understood as related to enhanced self-efficacy. These findings indicate that app use functioned as intended: it appeared to facilitate between-session practice and integration of new skills into patients' real life. However, to achieve this aim, the patient needs to be able to recall aspects of his or her previous work in therapy between the sessions. Findings from my study demonstrated that app use functioned as a memory aid, helping patient remember their goals and "wise adult mode" even at moments of intense distress.

Some critical questions remain: to what extent do these positive findings reflect use of the Mode Flashcard app? Or do they just reflect benefits related to more general use of the mode flashcard technique? Does the app format offer some advantage over and

above the traditional paper-and-pencil format? Even though the present study design precludes concluding on these questions, hypotheses can be advanced. Specifically, it has been proposed that the mobile phone is a promising means for achieving greater client engagement between therapeutic sessions (Matthews et al., 2008). It may thus be relevant to consider *how* this greater engagement could be facilitated. Findings from this study suggested that to easiness of use is of utmost importance; the user must be able to start using the app without effort. In order to be user-friendly, the app should be well-designed. Moreover, the user interface should be visually appealing. All participants in this study missed personalization; they wanted to personalize their app by adding self-drawn pictures. This is also an important finding that needs to be taken into account in the development phase of future apps. The possibility to personalize the app could probably enhance motivation to use it. Regarding how apps could aid in facilitating greater engagement is between-session therapy assignments, I hypothesize that careful focusing on the planning and piloting phases may be key factors. Meticulous planning and development, in combination with thorough piloting the apps could enhance user-friendliness and yield persuasive design aspects. A piloting phase would ensure that user experiences will impact the outlook and interface. Similarly, in discussing the results of their meta-analysis, Weisel et al. (2019), suggest that full technological potential should be exploited when intending to improve the effectiveness of mental health apps. Accordingly, a number of researchers propose that well-designed mental health mobile apps that present their content in interactive, engaging, and stimulating ways have the potential to promote cognitive learning, personal growth, and mental health enhancement (Chandrashekar, 2018; Grist et al., 2017; Lan et al., 2018; Matthews et al., 2008; Menon et al., 2017). Author hypothesize that gamification elements could enhance motivation and increase engagement. Examples on gamification are, for instance, possibility to see and review one´s success, opportunity to proceed from one level to the next, or collection of points.

6.1 Implications for dissemination and implementation

Despite expanding research, the use of modern technology, including mental health apps, is at its' infancy in the mental health field. Mental health apps remain a relatively underutilized resource (Lan et al., 2018; Lynette & Byron, 2015). The fact that author

was able to recruit only one therapist for piloting the app investigated as part of my thesis was an important finding per se. I assume it may reflect overall hesitancy towards use of technology on the field. However, reasons for this are conceivably numerous and variable.

In blended-treatment formats, where the app is utilized as part of pre-existing psychotherapy, the therapist needs to believe in the potential advantages provided by app use. Otherwise, it is unlikely that s/he will introduce the app to the patient, at least in a persuasive way. Moreover, to be able to familiarize the patient with the app, the therapist may need some basic information about the app and its' user interface (East & Havard, 2015). Here, too, user-friendliness is probably of utmost importance, particularly if the therapist has little or no previous exposure to technology-aided therapy. User-friendliness is also an asset in case the therapist is overburdened and therefore fears that the use of mobile apps in therapy would increase his or her workload (Grist et al., 2017).

The preliminary findings of the study suggest that in order to lower the threshold for use, apps either need to draw on robust empirical evidence, or personally perceived advantages. Research is called for since both patients and therapists request valid information and methods with minimal potential for harm induction. In addition to rigorous research, another potential solution is construction of apps that draw on pre-existing and widely used material that has previously been used in a more traditional format, as in the present study where an app was constructed based on the paper-and-pen version of the mode flashcard. Construction of new drawing on pre-existing, valid, and attractive resources may enhance acceptability in the eyes of therapy users and providers as the advantages of the traditional version of the product are well-known. Then, the focus of attention shifts to the perceived risks of technology that may constitute a major hindrance to dissemination and implementation.

Data management and security are central questions that need to be thoroughly addressed and solved before introducing the app. In the current study, some users requested password protection in order to better secure their data entries. Indeed, some apps fail to offer password protection and to protect user data from external access (Alqahtani & Orji, 2020). Mobile apps are also capable of collecting a tremendous amount of personal information from users while failing to fully inform the users of

their privacy policy. In addition, some apps sell users' personal data to a third party (Glenn & Monteith, 2014), a process that might occur even without the users' consent. This could lead to commercial exploitation of individuals using the app. For instance, emails are often required and this information, together with other mental health information disclosed during app usage, could potentially be used to send targeted product promotions to current or former app users, conceivably engendering unintended harm to them (Wang et al., 2020).

Importantly, attitudes may hinder dissemination and implementation of modern technology into mental health treatment. For instance, interaction between the patient and the clinician, and the relationship, is often considered the cornerstone of mental health treatment (Assay & Lambert, 1999). If treatment providers feel that this basic foundation is being threatened, they may ask: Why develop digital psychotherapy tools that discourage or even downplay the relationship aspect of mental health treatment? On the other hand, there may be room for both face-to-face treatment and complementary digital aids. Smartphone interventions could also fit within prevention as well as within the stepped-care model, in which low intensity interventions are offered as a first step in treatment, and for those who for some reason cannot receive standard psychological treatment, with more intensive resources reserved for those who fail to respond (Linardon et al., 2019; van Straten et al., 2015). Hence, mental health apps are not intended to replace professional clinical service. Rather, blended-care formats, or adds-on that utilize technology within an existing treatment process, are recommended (Linardon et al., 2019).

Conceivably, dissemination and implementation could be advanced by introducing mental health technology to students in training (East & Havard, 2015). Moreover, to gather personal experience, novice therapists should have opportunity to experiment with various applications during their training. Internet-based psychoeducation, online counselling, and use of virtual reality as part of psychotherapy are examples of areas students should be familiarized with during their training. Attitudes cannot be expected to change in a fast pace, however. Between-therapists sharing of experiences could possibly slowly modify attitudes, furthering dissemination and implementation. Sharing could occur in virtual professional groups or in congresses. If a therapist has, say, successfully conducted exposure treatment using virtual reality for a problem that

is difficult/impossible to treat using traditional exposure, s/he could share this experience with other professionals, thereby helping others realize the full potential of mental health technology. This kind of experiences could slowly attenuate the fear, or aversion, attached to the use of mental health technology.

6.2 Implications for future research

Execution of this small research project yielded some ideas regarding future research. Specifically, to increase trustworthiness of findings, user experiences should be gathered from a larger population.

Findings from the present study indicated that an ascetic outlook undermines motivation for app use. Previous research has reported similar findings (Alqahtani & Orji, 2020; Wu et al. 2021). Hence, the version that is being studied should already be quite finalized and trimmed, both in terms of function and aesthetics. Otherwise, it remains unappealing to the user.

In my study, I lost one potential research subject to incompatible user interface. Therefore, in terms of user interface, piloting should be possible with devices using different interfaces.

Cognitive psychotherapy comprises a wide array of therapy techniques; mode flashcard is but one among many others. Digital versions could be developed for other therapy tools as well. Conceivably, use of technology could even enable construction of new tools. Moreover, mental health apps could use, for instance, experts-by-experience, and include peer support groups. It is important that the development and construction of new digital tools is based on real needs of the field. Patients and therapists should be included, and their needs placed at the forefront in the development process, since users can give impetus for the development of tools that are valuable in the real world. Thus, the development of digital mental health services should be user-driven and solution-focused, including app developers, researchers, and clinicians in the development process (Hickey et al., 2015; Hsin et al., 2016; Torous & Roberts, 2017; Torous et al., 2018).

Finally, to enable high-quality research into mental health technology, some more global structures may need to be considered, or regulations developed. Currently, absence of transparency on the part of app developers prevents a truly informed evaluation of apps (Henson et al., 2019). Therefore, concerning evaluation of the effectiveness of the wide variety of the mental health apps, development of regulatory best practice guidelines with strong emphasis on transparency has been proposed (van Daele et al., 2020; Wang et al., 2020).

6.3 Strenghts and limitations

A key strength of my thesis lies in the actuality of the topic, as international as well as national treatment guidelines recommend integration of digital applications into health care services (Grist et al., 2017). Further, researchers are urged to inquire service users about their experiences with these devices (Alqahtani & Orji, 2020; Linardon, 2019); this service user perspective was central to my thesis. Moreover, the process of this thesis was innovative, since a new mobile app was constructed and piloted as part of this thesis.

A major limitation of this small qualitative study pertains to its' small sample size. As I was able to recruit only one therapist, I was unable to take saturation into account in sampling. Another limitation is related to variable, presumably often short length of the piloting period. It is possible that app use failed to become an integrated part of psychotherapy routines. With a larger number of users and piloting weeks, my results might have revealed a more nuanced picture.

The extent to which findings from the present study can be generalized to other populations remains to be explored in further studies. Therefore, they should be regarded as hypothesis-generating.

7 CONCLUSIONS

The treatment of mental health problems is expected to change over the next few decades as a result of the widespread availability of Internet and mobile-device applications, and their use to deliver psychological interventions, thereby facilitating more equal access to care (Linardon et al., 2019). These interventions can be preventive, or they can target a specific mental health condition, or support general wellbeing. They can be delivered in a standalone format, or in blended-care formats where variable amount of professional support is provided along with mobile mental health treatment. In app-supported psychotherapy, technology is used as an adjunct to existing therapy. For instance, research has robustly demonstrated that engagement in homework improves therapy outcomes (Kazantzis et al., 2010). Mobile apps may possess qualities that can enhance motivation to engage in homework assignments (Matthews et al., 2008). The smartphone is typically carried nearly everywhere. Furthermore, attractive visual as well as personalized elements are easily added to apps. Moreover, plenty of opportunities for the integration gamification elements exist.

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