

## Article

# Empower Psychotherapy with mHealth Apps: The Design of “Safer”, an Emotion Regulation Application

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**Abstract:** In the past decade, technological advancements in mental health care have resulted in new approaches and techniques. The proliferation of mobile apps and smartphones has significantly improved access to psychological self-help resources for individuals. In this paper, a narrative review offers a comprehensive overview of recent developments in mental health mobile apps, serving as a foundation to introduce the design and development of “Safer”. Safer is a mobile application that targets the transdiagnostic process of emotion dysregulation. The review outlines the theoretical framework and design of Safer, an mHealth app grounded in the Dialectical Behavior Therapy (DBT) model, aimed at fostering emotion regulation skills.

**Keywords:** mobile apps; psychotherapy; mental health; psychological treatment; emotional regulation; mHealth; dialectical behavior therapy

## 1. Introduction

mHealth, or the integration of mobile technology into healthcare practices, encompasses all clinical interventions involving the use of mobile devices. With the widespread adoption of smartphones over the past decade, especially during the COVID-19 pandemic, mHealth has become increasingly associated with the use of mobile applications for health and clinical purposes [1–5]. Krebs and Duncan [2], for example, conducted a national survey of US mobile phone owners, showing a significant increase in the adoption of health apps, with 58.2% of respondents reporting having downloaded a health app. This reflects the growing trend in mHealth usage with the rise in smartphone ownership. Torous et al. [3] discussed the transformative role of mobile health applications in the healthcare industry over the last decade. The authors highlighted the potential of digital biomarkers and other clinical data collected through smartphones for improving patient care and management. The World Health Organization released guidelines on digital interventions for health system strengthening in 2020, further emphasizing the potential of mHealth as an essential tool in healthcare. The report identifies various digital health interventions, including mobile applications, and their significant impact on improving health outcomes [4]. Chandrashekar [5,6] highlighted the increased demand for mental health mobile apps during the COVID-19 pandemic. As a result of social distancing measures and heightened stress levels, many individuals turned to mHealth apps to support their mental well-being.

mHealth apps can be categorized into various typologies based on their functionalities, purpose, and target users. We can also trace the evolution of mHealth apps alongside the progress in mobile and digital technologies [2,7–11]. Below are some categories of mHealth apps and their association with technological advancements.

1. Information and education apps (the early 2000s–present): These apps provide users with health-related information, educational content, and guidelines. They may cover various topics, such as general health, nutrition, fitness, and disease-specific information. The emergence of these apps coincided with the early years of smartphone usage and the growing accessibility to the internet on mobile devices.



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2. Remote monitoring and telemedicine apps (mid-to-late 2000s–present): As mobile technology advanced, apps were developed to enable remote monitoring of patients, sharing health data with healthcare providers, and facilitating telemedicine consultations. These apps allow for better management of chronic conditions, such as diabetes or hypertension, and improved access to healthcare services, especially in remote or underserved areas.
3. Personal health tracking and fitness apps (late 2000s–present): These apps gained popularity with the rise of wearable devices and sensors, such as fitness trackers and smartwatches. They help users monitor their physical activities, sleep patterns, heart rates, and other health parameters. They often provide personalized feedback, goal setting, and progress tracking to motivate users to maintain a healthy lifestyle.
4. Mental health and well-being apps (2010s–present): Growing awareness of mental health issues and the increasing need for accessible mental health resources have led to the development of apps focusing on mental well-being. These apps typically offer services such as mood tracking, mindfulness exercises, cognitive-behavioral therapy (CBT) techniques, and stress reduction tools.
5. Social networking and support group apps (2010s–present): With the ubiquity of social media platforms, mHealth apps started incorporating social networking features to create online communities and support groups. Users can share their experiences, provide mutual support, and connect with others dealing with similar health conditions or goals.
6. Artificial intelligence (AI)-powered and personalized health apps (late 2010s–present): The latest generation of mHealth apps leverages AI, machine learning, and big data analytics to offer personalized health recommendations, symptom analysis, and treatment options. These apps can analyze a user's health data and offer tailored suggestions, improving the overall user experience and effectiveness of the app.

It is essential to note that these categories are not mutually exclusive, many mHealth apps may incorporate features from multiple typologies, and different typologies of mHealth apps can also be categorized according to their specific purpose. The development of mHealth apps has revolutionized the way healthcare is delivered and received. These apps offer a range of benefits, including increased accessibility, convenience, and cost-effectiveness. However, some challenges need to be addressed, such as data privacy and security, clinical safety concerns, and issues with user engagement. Despite these challenges, mHealth apps continue to hold promise for improving health outcomes and increasing the dissemination of evidence-based healthcare practices [12].

In the psychological domain, mHealth apps are often used for self-help purposes. For instance, people can use apps to track their moods, practice mindfulness, or learn cognitive-behavioral techniques to manage stress and anxiety. These apps provide a convenient and accessible way for people to improve their mental health and well-being. Moreover, some mHealth apps are designed to complement clinical treatment and improve outcomes in specific health domains. For example, physical therapy apps can help patients improve their motor skills, while apps that use cognitive-behavioral techniques can help patients manage symptoms related to anxiety and depression.

Mental well-being constitutes a significant segment of mHealth applications, boasting over 10,000 apps accessible to users globally [13]. As advancements in technology continue to progress, an increasing body of evidence demonstrates the promising capabilities of mobile health applications to address mental health challenges. This has, in turn, ignited enthusiasm and curiosity among clinicians and researchers in this area. Meta-analyses of mental health apps have shown their efficacy in reducing symptoms related to anxiety, depression, and suicidal intentions [13]. Although recent research has highlighted these possibilities, many challenges remain [14,15].

Some examples of ongoing issues in the current research include poor data governance and data-sharing practices, which can raise concerns about privacy and security. There are also clinical safety concerns about managing adverse events and potentially harmful

content within mental health apps. Low levels of user engagement can be another challenge, as it can affect the effectiveness of the app. Additionally, there is a possibility of “digital placebo” effects, in which users may feel better simply because they are using an app, even if the app itself has no real therapeutic effect. Workforce barriers can also hinder the integration of mental health apps into clinical practice, as some healthcare providers may not have the necessary training to use these technologies effectively [12,14]. Despite these challenges, the development of mental health apps (mHealth apps) continues to be a promising option that has the potential to increase the dissemination of evidence-based mental health care [16]. With continued research and development, mHealth apps may be able to address some of these challenges and help improve the overall quality of mental health care [17,18].

Numerous mHealth apps feature essential components of evidence-based strategies, such as CBT [17], acceptance and commitment therapy [18], and dialectical behavior therapy (DBT) [19]. However, the manner in which each app employs these models varies, as does the way clients utilize the diverse functionalities provided in the apps. Within this promising yet complex landscape, mHealth apps can serve as standalone self-help tools or supplementary aids for psychological treatment. It is important to note that mHealth apps are not meant to replace traditional mental health treatments. Instead, they are designed to be complementary tools that can support and enhance traditional psychotherapy. As such, it is crucial to evaluate the efficacy of mHealth apps in the context of their use as adjuncts to psychotherapy practice. Examining the impact of mHealth apps on psychotherapy outcomes is a critical step toward understanding their potential benefits and limitations. By evaluating the efficacy of these apps in conjunction with traditional psychotherapy, we can gain a better understanding of how they can be used to support and enhance mental health treatment. With continued research and development, mHealth apps have the potential to revolutionize the way mental health care is delivered and improve the lives of millions of people worldwide.

This paper focuses specifically on the use of mHealth apps as adjuncts to psychotherapy for improving patients’ outcomes and reducing symptoms. We aim to provide a comprehensive understanding of the potential benefits and limitations of using these apps in a psychotherapy context. A narrative review serves as a valuable tool to provide an overview of the current landscape in a specific area—in this case, mental health mobile apps. By summarizing and synthesizing the available literature, we provide a solid background to introduce the main focus of this paper, which is the description of the development of an mHealth app. For a more in-depth systematic review of the topic, the authors have already published a recent review [20].

One promising area of focus for mHealth apps is emotion regulation, as difficulties in regulating emotions are a common feature of many mental health disorders. Emotion regulation is a promising focus for mHealth apps due to its transdiagnostic relevance across mental health disorders, such as anxiety, depression, and borderline personality disorder [21,22]. mHealth apps offer advantages, including accessibility [23], personalization [24], integration with evidence-based therapies, such as DBT and CBT [25,26], self-monitoring [27], and stigma reduction [28]. By targeting emotion regulation, mHealth apps can potentially benefit individuals with various diagnoses, leading to improved mental health outcomes.

To this end, we propose the development of an emotion regulation-focused mobile application called “Safer”, based on the DBT model [25]. The app aims to promote emotion regulation skills in patients and to support their mental health treatment. By focusing on the development of this app and evaluating its efficacy, we hope to contribute to the ongoing conversation about the role of mHealth apps in mental health treatment. With continued research and development, mHealth apps have the potential to play a significant role in improving access to evidence-based mental health care and supporting patients on their journey toward recovery.

## 2. An Overview of Mental Health Mobile Apps

Mental health applications can be divided into different categories. Here, we attempt to classify them by features.

### 2.1. Emotional Help Assistants

A main category of mental health applications includes emotional support assistants, which are frequently developed as chatbots for conversation, concentrating on cognitive restructuring and bias identification [9]. These types of applications typically draw on the CBT framework. The CBT framework is a psychotherapeutic approach founded on the interconnectedness of thoughts, emotions, and behaviors. CBT asserts that negative cognitive patterns and beliefs can lead to negative emotional states and behaviors, and conversely, negative behaviors and emotions can reinforce negative thinking patterns. In CBT, therapists collaborate with clients to identify and evaluate maladaptive thinking patterns and beliefs, and to develop constructive and realistic cognitive schemas. Clients are also encouraged to engage in constructive behavioral practices that promote positive emotional states and to practice newly developed coping skills. The central aim of CBT is to assist clients in cultivating self-awareness, establishing constructive coping mechanisms, and improving their mental health and overall well-being [26,29].

Emotional help assistants have been developed to include an AI module that can guide users toward reframing difficult thoughts or suggest bottom-up techniques for regulating emotions, such as relaxation techniques and breathing exercises [30,31]. Although there is some evidence of their efficacy in regulating emotions, the main limitations seem to be the lack of flexibility and the high cost of developing AI modules that can adapt to clients' needs without sounding robotic and unempathetic, which contradicts the goal of regulating emotions [30–32].

Despite these challenges, emotional help assistants can be useful in several ways. They are available 24/7, making them accessible to people in need, even when mental health professionals and healthcare facilities are closed. Emotional help assistants also provide a private and confidential environment where people can discuss their emotional issues without fear of being judged or stigmatized. Further, with the use of artificial intelligence, emotional help assistants can personalize responses to each user's specific needs and problems, providing personalized suggestions and recommendations based on the information provided by the user. Lastly, emotional help assistants can provide support to help people develop their coping and emotional regulation skills, promoting autonomy and self-efficacy.

In summary, emotional help assistants can be useful in providing emotional and psychological support to people facing emotional distress and improving accessibility, privacy, personalization, symptom monitoring, and self-help support. Continued research and development may help address some of the limitations and challenges in the use of emotional help assistants, and make this technology even more effective and useful for those in need.

### 2.2. Mood Trackers

Mood monitoring constitutes a widespread category of mHealth apps aimed at tracking users' emotions and associating them with life occurrences. These apps employ data collected from user entries to generate charts illustrating mood fluctuations in correlation with identified activities. This functionality can prove advantageous for users who might observe recurring instances of a specific emotion linked to a particular event or situation [33].

Mood trackers are useful not only for tracking moods but also for identifying emotional and behavioral patterns. These apps help people understand the stressors and behavioral habits that may negatively affect their emotional well-being. This feature can improve emotional awareness, which is the ability to recognize, understand, and regulate emotions more effectively. Mood trackers also provide a way to monitor progress over time and

evaluate the effectiveness of emotion management strategies and therapeutic interventions. These apps can be useful for therapists in evaluating progress and suggesting personalized emotion management strategies based on the information gathered from the app.

Although mood trackers are simple and effective tools for improving emotion management and emotional well-being, their main limitation is that they do not provide advice on how to deal with stress. These apps only record and analyze data to display patterns without providing any further guidance or support. Given their advantage of providing a simple and effective way to improve emotion management and emotional well-being, they should be used in conjunction with other tools and strategies to address stress and support emotional health.

### 2.3. Mindfulness Apps

Although various features are provided across different situations, all applications within this category maintain a common emphasis on mindfulness practices. Mindfulness practices are implemented in these apps as guided meditations based on what we can describe as “the awareness that arises from paying attention, on purpose, in the present moment and non-judgmentally” [34]. One of the primary benefits of mindfulness is its ability to reduce symptoms of depression. Several studies have found that mindfulness-based interventions (MBIs), such as mindfulness-based cognitive therapy (MBCT) and mindfulness-based stress reduction (MBSR), can significantly reduce depressive symptoms among individuals with major depressive disorders [35–37]. MBIs are therapeutic approaches that incorporate mindfulness practices to help individuals manage various psychological and physical health issues [38]. Mindfulness is thought to reduce depression by helping individuals develop a more accepting and non-judgmental attitude toward their thoughts and emotions, which can, in turn, reduce the negative impact of negative thoughts and emotions on mood [36].

Mindfulness has also been shown to reduce symptoms of anxiety. A meta-analysis of 39 randomized controlled trials found that MBIs were effective in reducing symptoms of anxiety, with effect sizes comparable to those of CBT. The practice of mindfulness is thought to be particularly effective in reducing anxiety because it helps individuals become more aware of their thoughts and feelings and better able to respond to them in a non-reactive manner [37]. It can also improve overall well-being and reduce stress. Studies have shown that MBIs can lead to improvements in quality of life, subjective well-being, and overall functioning. Furthermore, mindfulness can reduce the negative impact of stress on mental health outcomes by helping individuals develop a more accepting and non-judgmental attitude toward stressful events, thereby reducing the negative impact of stress on mood and well-being [38].

Mindfulness-based mobile applications have been shown to be effective in reducing stress and anxiety by providing a practical way to integrate mindfulness practice into people’s daily lives. These apps are beneficial with all the usual good outcomes of mindfulness practice, such as emotional awareness, improved focus and productivity, greater emotional well-being, and resilience. A significant portion of prevalent mHealth apps falls under this category, accounting for 90% of Apple App Store and Google Play Store offerings alone [16]. This information is noteworthy because apps within this category appear to have the longest usage duration compared to other types, indicating that a considerable number of users remain engaged with the app. This presents a unique instance of apps addressing a primary challenge in mHealth apps—the high drop-out rate—which results in many users abandoning apps after an average of 5.5 days [14]. Mindfulness apps demonstrate usage beyond 15 days, a notable statistic in this domain [14]. A potential reason for this could be that mindfulness practices, as the name suggests, rely on ongoing training and exercise to foster user engagement with the app. Furthermore, apps concentrating on particular techniques for managing emotional emergencies, such as panic attacks, suicidal crises, and self-harm behaviors, tend to be used more frequently than others, likely because they serve as immediate stress alleviation strategies when required [39].

#### 2.4. Self-Care Apps

Self-care applications have gained increasing popularity in recent years as a means of promoting mental health and well-being. Such applications offer various features, including tools for tracking mood, monitoring physical activity, practicing mindfulness, and managing stress. By promoting the development of healthy habits and routines, these applications can improve mental health outcomes by empowering individuals to take charge of their own self-care [40]. Additionally, self-care apps can provide a safe and private environment for users to explore their emotions and thoughts toward developing new habits without fear of judgment or stigmatization. Moreover, self-care apps can facilitate the integration of self-care practices into individuals' daily lives, leading to long-term improvements in mental health and well-being.

These applications can aid users in monitoring their progress while also engaging in other activities, such as guided meditation and mindfulness practices. Such apps emphasize fostering positive habits and supporting their continuity by nurturing mental well-being and cultivating awareness, tranquility, and motivation to create a healthier lifestyle. This is in contrast to emotional help assistant apps, which directly tackle particular distresses or challenging circumstances [40]. These applications can be useful in several ways by providing advice on diet, exercise, or stress management, and by monitoring physical health (e.g., by tracking physical activity, meals eaten, or sleep) or mental health (e.g., by tracking their emotions, thoughts, or stress level).

#### 2.5. Behavior Change Applications

Behavior change mobile applications (BCAs) offer methods for individuals to influence their behaviors, leveraging the ubiquity of smartphones and their intimate integration into daily life. These applications, grounded in a multitude of theoretical frameworks such as Social Cognitive Theory, Operant Conditioning, and Self-Determination Theory, offer various features to facilitate behavior modification, ranging from self-monitoring tools, feedback mechanisms, and social support functionalities [41,42]. Recent systematic reviews suggest that BCAs are effective in promoting health-related behavior change, but their efficacy varies based on the targeted behavior, population, and specific app features [43,44]. Despite this promise, there are still gaps in understanding the most effective design elements, optimal use conditions, and long-term outcomes associated with these applications, warranting further research [45].

#### 2.6. Apps with Treatment Elements

Apps within this category incorporate key elements and principles of "evidence-based psychotherapies," psychological treatments that have been proven to be effective through rigorous scientific research [46], at varying levels, and are designed to be integrated (or used independently) in app-based psychotherapy [47]. These applications are considered technological instruments employed for blended care, a practice that utilizes technology in healthcare to enhance treatment and boost effectiveness [48–50]. Compared to the control groups, these apps exhibit a moderate impact on the depression and anxiety levels of users [14,51].

This type of app often includes a wide range of features, typically focusing on addressing specific disorders, primarily depression, anxiety, and substance abuse. According to a recent meta-analysis, the most prevalent features of mental health apps, listed in descending order, are mindfulness, assessment, crisis management, stimulus control, family/significant other engagement, psychoeducation, relaxation, and meditation [52]. Many other features can be found in these apps, depending on the underlying therapeutic model. However, the ones mentioned above are the most common among the top-rated apps in digital stores.

Some of these apps, if used within psychological treatments, could also be useful for therapists themselves by providing support to traditional therapy as a complement to it, providing patients with additional resources for self-care, and maintaining continuity between therapy sessions [53]. Therapists can also track symptoms and provide feedback

based on the data they collect, evaluate progress, and suggest personalized emotion management strategies [54]. The apps also allow therapists to provide work-at-home resources. Some apps may provide additional resources for patients to use between therapy sessions, providing tools for stress management or emotional regulation [55].

The distribution of various elements from evidence-based methods is crucial for disseminating essential psychological knowledge. Naturally, the prevalence of this type of content in this app category does not imply that it is the most effective. Further, a mental health app's popularity does not guarantee its effectiveness or reliance on evidence-based content, which further complicates providing strong proof of efficacy for such apps in the literature [56]. However, it simultaneously makes determining the most effective components of apps challenging [57].

### 3. Mobile App Adjunction to Psychotherapy

Here, we address some major findings in the literature that highlight both challenges and opportunities for the use of mHealth apps.

#### *Challenges in the Use of mHealth Apps for Treatment*

The primary challenge concerns privacy. Personal digital data privacy is a significant issue that encompasses aspects such as confidentiality, ethical information handling, and data security [58,59]. Potential users of digital mental health services, including apps, have voiced apprehension about data privacy. A growing body of research suggests that privacy concerns surrounding mental health apps, particularly those available in public app stores, are well-founded [60,61]. These studies highlight the importance of carefully considering the privacy and data security practices of mental health apps before using them for personal or clinical purposes.

In Safer, we prioritized user data protection by leveraging the robust authentication frameworks provided by Google and Apple. These authentication systems are renowned for their security and have been adopted across numerous digital platforms. Google and Apple authentication are mechanisms that verify the identity of a user when they log into the application. The benefit of these methods is that they use OAuth protocols, ensuring the user's password is not exposed to our application, thereby reducing the risk of unauthorized access [62].

Upon opening the Safer app, users are presented with the option to sign in using their Google or Apple credentials. Once they choose a preferred method, they are redirected to the respective platform's login page. After successful authentication on the chosen platform, the user is redirected back to the Safer application. The identity provider (Google or Apple) sends an authentication token to our app, which can then be used to secure subsequent requests made by the user during their session. This mechanism provides an additional layer of security as it separates the authentication process from the app itself, meaning user credentials are never stored or processed within Safer, further minimizing data breach risks [63].

Adverse effects present another crucial challenge. Inaccurate content within apps can be potentially harmful, as it may convey ideas that lack scientific support. Unsafe content can also include techniques that should only be administered by expert personnel, as they have the potential to exacerbate psychological symptoms, such as triggering intrusive thoughts, traumatic memories, or inducing harmful behaviors. These symptoms require management by clinicians [64–66]. When developing mental health applications, it is crucial to consider the potential risks associated with apps that do not strictly adhere to evidence-based principles. Content assessments of mental health apps have shown that apps created by non-researchers and non-clinician teams may contain harmful material, which can be particularly problematic for vulnerable individuals [67]. Hence, it is vital to involve clinicians in the development of mHealth apps to ensure that the content is safe and adheres to evidence-based principles [68,69]. Involving mental health professionals in the development process can help improve the overall quality and effectiveness of these

apps, making them more beneficial for users seeking support for mental health concerns. Moreover, the presence of a psychologist or therapist to support the patient is crucial, as not all content has the same impact on individuals, particularly those in critical or vulnerable conditions [24,70]. Personalized guidance and supervision from a mental health professional can help ensure that app-based interventions are appropriately tailored to each individual's needs and circumstances, maximizing the potential benefits and minimizing potential harm. This highlights the importance of using mental health apps as adjuncts to clinical treatment rather than replacements.

Although mHealth apps have the potential to improve mental health outcomes, they can also have an iatrogenic effect if not developed and used appropriately [66,70]. For example, an app that provides inaccurate or harmful information or advice can worsen the user's symptoms or lead to harmful behavior. Similarly, an app that is not designed to meet the user's specific needs or conditions can be ineffective or even harmful, leading to frustration or further distress. Furthermore, some users may become overly reliant on the app, leading to a decrease in self-efficacy or the ability to manage their mental health without the app. Therefore, it is essential to consider the potential risks associated with mental health apps and to ensure that they are developed and used safely and effectively.

The third challenge pertains to engagement. Research studies and app deployments reveal that apps are often abandoned shortly after the initial days of use. The average engagement lasts only about 5.5 days, and in other assessments, a mere 4% of users accessed a mental health app after 15 days [14]. Various factors could contribute to this, as suggested by the literature. Mood fluctuations, crises, lack of motivation, and symptom heterogeneity are intrinsic patient factors that may cause disengagement from the app. Furthermore, designing apps that remain simple and user-friendly while providing comprehensive features is a considerable challenge.

The last challenge involves therapists rather than patients. A recent study identified training and workload as the most significant obstacles preventing clinicians from incorporating apps into treatment [53,55]. To overcome this challenge, it is necessary to adapt the development of mHealth apps to better suit clinical practice. One potential solution is to draw from technology-enhanced learning approaches that emphasize user engagement through gamification and AI-based tutoring techniques [71–74]. By making the apps more accessible and engaging for therapists, they may be more likely to integrate them into their practice and benefit from their features. Philips and colleagues [12] recently surveyed German psychotherapists to explore their attitudes, past experiences, and expectations concerning blended care, specifically the incorporation of apps in psychotherapy. The overall attitude was favorable [12,75], although some barriers were identified. Some therapists expressed concerns about diminished interpersonal contact, the potential negative effects of technology on the therapeutic alliance, and legal and safety issues related to the apps themselves. Although a universally accepted definition of the therapeutic alliance is lacking, it can be described as the “quality of partnership and mutual collaboration between a therapist and client” [76]. According to Bordin's definition, a therapeutic alliance encompasses an agreement between the therapist and patient on therapy goals, tasks to be performed, and their emotional bond.

The most common reason therapists cited for not implementing blended care was that it might be “too impersonal”, followed by concerns about efficacy, compatibility with their approach, and lack of interest or need [12]. Despite these concerns, most therapists reported a positive (47.5%) or neutral (45.5%) effect on the therapeutic alliance. The use of apps as an adjunct to psychotherapy appeared to be best suited for psychoeducation, exercises, diaries, and video communications. Although there remain many challenges in the definition of the impact on the therapeutic alliance, the use of mobile applications in psychotherapy seems feasible to contribute to the improvement of the therapeutic alliance in several ways:

**Increase patient engagement:** Using a mobile application can increase patient engagement in therapy, as it offers a new and interesting way to engage with one's mental health.

This can increase patient motivation for treatment and contribute to greater participation in therapy.

**Increased therapy engagement:** Using a mobile application can increase patient engagement in therapy, as it provides a means to monitor patients’ progress and collect data about their symptoms between therapy sessions. This can make the patient more aware of their mental state and increase their active participation in therapy.

**A better understanding of one’s problems:** Using a mobile application can help the patient to better understand their mental health problems, as it can provide feedback on their emotional and behavioral activity. This can help the patient identify their problematic thought patterns and behavior and learn new coping strategies.

**Facilitating communication between patient and therapist:** Using a mobile application can facilitate communication between patient and therapist, as it provides a means to communicate one’s progress and concerns to the therapist between therapy sessions. This can improve collaboration between the patient and the therapist and help build a strong therapeutic alliance.

In summary, the use of mobile applications in psychotherapy could contribute to the improvement of the therapeutic alliance by providing a new and interesting way for the patient to engage with their mental health, increasing the patient’s involvement in therapy, improving their understanding of their mental health, and facilitating communication between the patient and the therapist. The challenge lies in making mental health apps feasible and usable for the actual clinical environment, not just for patients but also for psychologists. It is essential to integrate the best practices and benefits from both human expertise and technology. This can be achieved if clinicians are involved in the development of mHealth apps, beyond which modifications can become more challenging to implement and result in tools with limited efficacy [12,14,77,78]. Table 1 summarizes the main aspects to consider as pros and cons of the use of mHealth applications in the psychological context.

**Table 1.** Summary of the main opportunities and challenges for the use of psychological mHealth apps.

Opportunities	Challenges
Improved accessibility to mental health resources	Privacy and data security concerns
Cost-effective interventions for mental health	Limited access to smartphones or the internet for some populations
Personalized care through data-driven insights	Reinforcement of therapeutic approaches (e.g., DBT, CBT)
Reduction of the stigma associated with seeking help	Lack of user engagement or sustained usage
Promotion of self-monitoring and self-awareness	Difficulty in navigating the vast number of available apps
Facilitation of peer support and social networking	Regulatory and ethical concerns

#### 4. Integrating Mobile Technology in Psychotherapy and Vice Versa

The current literature indicates that mHealth interventions when compared to waiting lists, have demonstrated effectiveness in alleviating depression, anxiety, alcohol-related disorders, and overall mental health, and have also been found to be useful as an adjunct to traditional psychotherapy [50,79,80]. Additionally, mobile applications have been shown to play a critical role in emergency and difficult situations, such as during the early stages of the COVID-19 pandemic, when many people required psychological help but were unable to access it [78].

Regarding mHealth apps designed to complement psychotherapy, they are mostly based on evidence-based approaches, such as CBT, acceptance, and commitment therapy (ACT), behavioral activation, mindfulness, DBT metacognitive therapy, compassion-focused therapy, and rumination-focused CBT [17–19,81]. These approaches are commonly

used as a source of inspiration when developing mHealth apps because they have demonstrated effectiveness in treating depression, anxiety, and other complex disorders, such as borderline personality disorder, and are easily translated into digital tools [82–85]. As mHealth increasingly overlaps with medical treatment in the mental health field, it is crucial to ensure that these technologies meet the same high standards expected of any new medicine.

To facilitate the potential progressive integration of mHealth apps into clinical practice, we have outlined some guidelines based on the recent literature. The first recommendation from the literature is to establish transparent data-sharing policies for both users and clinicians, ensuring data protection and properly informing patients [86]. The second key point is that merely incorporating evidence-based practices into apps does not automatically make them evidence-based. mHealth App development should involve clinicians not only during the design phase but also in the evaluation stage, assessing their efficacy through controlled clinical trials [86].

Another essential aspect is addressing engagement during app development, as all efforts may be in vain if no one uses the app. A user-centered approach to app development refers to designing and creating an app with a primary focus on the needs, preferences, and expectations of its target users [87]. This approach ensures that the app is tailored to the user's requirements, making it more intuitive, accessible, and efficient for them to use. By prioritizing the user's perspective during the development process, the app is more likely to meet their specific needs, leading to higher user satisfaction and, ultimately, increased adoption and usage of the app [88]. In the context of mental health apps, a user-centered approach would involve understanding users' mental health needs, their preferences for app features and content, and any potential barriers they might face while using the app [24]. This understanding would then inform the app's design, ensuring that it is well-suited to effectively support the users' mental health journey [84,85,89,90].

It is important to note that there are several ways to amplify engagement through the implementation of various strategies. Among these, gamified elements such as competition can be utilized to boost user involvement and stimulate behavior change [91]. Additionally, incorporating narratives into the application design can enhance user engagement by providing context and meaning, and can potentially lead to improved health outcomes [92]. Complementary physical training components have been found to increase application usage and contribute positively to mental health outcomes, given the well-established connection between physical exercise and mental well-being [93]. Furthermore, the integration of social interaction features, such as peer support or community involvement, can foster a sense of belonging and encourage sustained use of the app [52,94].

It is also important to consider the lack of transdiagnostic elements in most mental health applications. Although many apps are designed to address specific disorders or approaches, there is a shortage of apps that focus on transdiagnostic elements, which means cognitive and emotional processes that are not specific to a disorder but are rather common in a wider spectrum of psychiatric and psychological diseases, such as emotional dysregulation, which is a common feature across various mental disorders [95,96]. Emotional dysregulation refers to the difficulty that individuals face in managing their emotions. As emotions are essential for survival, individuals must learn how to regulate them in terms of intensity, duration, and coherence with the situation to prevent maladaptive behaviors that can have negative consequences on one's mental health [97]. By developing apps that address transdiagnostic elements, such as emotional dysregulation, it is possible to provide users with more effective support that can be tailored to their specific needs. This approach could be particularly useful for individuals who struggle with multiple mental health conditions, as well as for those who have difficulty identifying the root causes of their emotional challenges. Furthermore, apps that focus on emotional dysregulation can also help individuals develop better coping mechanisms and improve their emotional self-awareness, which could lead to long-term benefits for their mental health.

Moreover, focusing on transdiagnostic processes, such as emotional dysregulation, could be economically relevant for the development of mental health applications for several reasons. First, it allows for a broader target market, as emotional dysregulation is present in a wide range of mental health conditions. This increases the potential number of app users and can lead to a larger market share for developers. Second, focusing on transdiagnostic processes may also lead to more efficient and cost-effective treatment, as targeting the underlying processes that contribute to multiple mental health conditions may be more effective than treating each condition individually. Third, it may reduce the stigma associated with specific diagnoses and encourage more people to seek help. Lastly, it aligns with the current trend in mental health research and treatment toward transdiagnostic approaches and may lead to more effective and personalized treatment options in the future.

Emotional dysregulation is a transdiagnostic factor prevalent across nearly all mental disorders and psychological distress. The onset, duration, intensity, and nature of emotional experiences are aspects that individuals can manage; therefore, enhancing emotional regulation constitutes a vital set of skills that can be developed [97,98]. Thus, we designed an emotion regulation-focused app called “Safer—Supportive Assistant for Emotion Regulation”, which is described in the next section.

## 5. The Design of an Emotion Regulation Application

Here, we gather all the previous information on mHealth applications to propose a possible design for an emotion regulation-focused app. The app we describe in this case is a prototype, and it is currently under development with the name “Safer—Supportive Assistant for Emotion Regulation” at the Natural and Artificial Cognition Lab at the University of Naples “Federico II”. It is a mobile application for the support of emotion regulation based on DBT principles, and it will be tested and used as a feasible tool to support emotion regulation in young adults.

### 5.1. Focus on Emotion Regulation

The focus on emotional regulation and dysregulation in the design and development of a mental health app is supported by the scientific literature, which identifies emotional regulation skills as a fundamental and transversal element of psychopathology [99–101]. Similar to the Unified Protocol for Emotional Disorders [96,102], Safer is a digital tool developed to support emotional regulation. The focus here is not on a specific diagnosis but on the transdiagnostic construct of emotion regulation and dysregulation.

Emotion regulation refers to the process by which people seek to influence their emotional experience, its intensity, duration, and behavioral expression [101,102]. Emotion regulation can be conscious, automatic, intentional, or involuntary, and involves a wide range of regulation strategies, such as cognitive modulation, behavioral modulation, and physiological modulation [103]. The ability to effectively regulate emotions is considered a core competency for psychological well-being and the ability to adapt socially [104–108]. In contemplating the design and development of a technological tool that allows for improving this fundamental skill for mental health, we referred to one of the most used models to describe the processes of emotional regulation, described by Gross [100,103,104]. According to this model, emotion regulation is a process that involves two main phases: emotion evaluation and emotion modulation. In the first stage, the individual evaluates the emotion based on the context and their past experiences. In the second stage, the individual adopts an emotion regulation strategy to modulate the intensity or duration of the emotion. These strategies can be cognitive, behavioral, or physiological and can be adopted in an automatic or controlled way. Gross’ model has important implications for understanding emotions and for psychotherapy, as it highlights the importance of emotional awareness and regulation strategies for managing dysfunctional emotions [100,109].

Emotion dysregulation can affect mental health in several ways: (1) Vulnerability to mental disorders: Emotion dysregulation may increase vulnerability to mental disorders,

as it can make it more difficult for people to manage stressful life events and the resulting negative emotions; (2) Maintenance of mental disorders: Emotion dysregulation may also contribute to the maintenance of mental disorders, as it can prevent people from using effective coping strategies to manage negative emotions. This can lead to increased avoidance of stressful situations or self-harming behaviors that make the situation worse; (3) Difficulties in interpersonal relationships: Emotion dysregulation can negatively affect interpersonal relationships, as it can make it more difficult for people to express their needs and emotions clearly and assertively. This can lead to interpersonal conflicts and social isolation; (4) Impact on quality of life: Emotional dysregulation can negatively impact people's quality of life, as it can make it more difficult to enjoy daily activities and interpersonal relationships.

Thus, emotion dysregulation is a transdiagnostic factor that can affect mental health in several ways, increasing vulnerability to mental disorders, contributing to the maintenance of mental disorders, influencing interpersonal relationships, and affecting people's quality of life. Understanding and effectively managing emotion dysregulation is important for improving people's mental health and well-being.

Given the evidence in the literature that emotional regulation processes are a fundamental element for the promotion of mental health [62–67], we reflect on which model to use to structure the content and the organization of the elements to be included in the app design.

### 5.2. Theoretical Background

Developing a mental health mobile application can help reach a wider audience and facilitate access to mental health services [13–20]. However, if the goal of the application is to be used as part of a therapeutic intervention, integration with individual or group therapy is essential to ensure the effectiveness of the intervention itself [12,14,61,79].

Using mobile applications in psychotherapy can have several benefits, including increasing patient engagement and facilitating symptom tracking between therapy sessions [14,110,111]. Additionally, using the application can provide a platform for teaching and practicing the skills learned in therapy. However, the standalone use of the application can be limiting, as the patient does not have the guidance and support of a therapist for the interpretation of the data and the application of the learned skills. Using the app on its own may also be insufficient to address more complex mental health issues, such as borderline personality disorders or severe depression [14,78,79]. To ensure the effectiveness of using the mobile application in psychotherapy, it is important to develop the application with the supervision of mental health professionals, such as psychologists or psychiatrists [6,59,110]. Furthermore, the application should be integrated with therapy, so that the therapist can monitor the use of the application, provide feedback on the activities performed and support the learning of the skills learned.

Currently, one of the intervention models effective for the management of emotional dysregulation that has convincingly and exhaustively described its role in psychopathology is the DBT model [19,82–86]. Emotion regulation, a key element of DBT, is considered crucial for reducing psychological distress and enhancing individuals' quality of life [18,25,112]. DBT employs a blend of behavioral and cognitive-behavioral strategies to assist people in managing negative emotions and fostering improved interpersonal relationships. Specifically, DBT focuses on teaching four core emotion regulation skills:

- Emotional awareness: The ability to recognize and identify emotions.
- Emotional regulation: The ability to manage emotions effectively and to use coping strategies to reduce emotional intensity.
- Acceptance: The ability to accept negative emotions without judgment or negative reaction.
- Stress tolerance skills: The ability to manage emotional stress without acting impulsively or engaging in self-harming behaviors.

DBT teaches these skills through the use of several techniques, including mindfulness, meditation, distraction training, guided imagery, and behavioral analysis. The tools used

in DBT help people identify their emotions, understand the function of their actions, learn self-control strategies, and improve communication with others. These skills can help people better manage negative emotions, improve their quality of life, and reduce the risk of self-harm or suicidal behavior.

### 5.3. Safer Design Pattern

In considering the possible structure and content of the Safer app, a pertinent element is the use of a simple layout for the design of the user interface (UI) and user experience (UX), which can be important for several reasons, particularly ease of navigation [113]. UI refers to the design and arrangement of the visual and interactive elements of a digital product, such as a mobile application or website. The UI focuses on creating a pleasing and intuitive visual experience for the user by providing an interface that is easy to use and understand. The goal of the UI is to make interacting with the product as easy and intuitive as possible, making sure that the user can easily find the functions and information they need. UX refers to the user's overall experience when using a digital product, such as a mobile application or website. UX focuses on creating a satisfying and positive user experience for the user, making sure that the interface is easy to use, that the user can easily find what they need, and that the product meets their needs. of the user. The goal of UX is to create a pleasant and meaningful user experience that can motivate users to continue using the product.

To achieve a good user interface and user experience, various design principles and guidelines have been considered:

**Usability:** The design should result in an app that is easy to use, efficient, and meets the needs of its users. Usability can be measured through metrics such as task completion rates, error rates, and user satisfaction ratings.

**Consistency:** The design elements and interactions should be consistent throughout the app, promoting familiarity, and reducing confusion.

**Feedback:** Users should receive timely and informative feedback on their actions, helping them understand the consequences of their interactions and any errors that may occur.

**Flexibility:** The design should offer multiple ways for users to interact with the app, accommodating diverse user preferences and abilities.

**Minimalism:** The design should be kept simple and focused on essential features, reducing cognitive load, and making it easier for users to navigate and use the app.

These principles can guide the development of an app's UI and UX [89,90], ensuring that they meet the needs of users and promote positive outcomes. To measure usability and user experience, a variety of methods can be employed, such as user testing, surveys, interviews, and analytics data from app usage [8].

A simple and intuitive layout makes it easier for users to find and use the app's different features. This can be especially important for people who may have trouble focusing on or managing their time [6,13,114,115]. Further, anxiety reduction is a key element in the design of the UI, since a simple layout can reduce users' anxiety, as it does not require them to search for or understand complex or excessive information. A simple, clean layout can make app information and features clearer and easier to understand, without causing confusion or frustration, and can help users save time and find what they need quickly, without having to navigate through many menus or complex features. Overall, a clear layout improves accessibility for people with cognitive or vision impairments, as it is easier to navigate and understand. It is also reasonable that the design of a mental health app should be mindful that people seeking help with mental health issues may already feel overwhelmed or vulnerable. A simple layout can help create a more reassuring and supportive user experience.

Another key element we have considered is notifications. Notifications in a mental health app can have negative effects if not handled properly, such as information overload, repeated or too frequent notifications can be stressful and overload users with information, causing them to feel overwhelmed and out of control [6,116]. Notifications can disrupt users'

activities, such as work or sleep, leading to annoyance, irritation, and frustration [117]. Excessive notifications may also distract users from their daily tasks, resulting in decreased concentration and productivity. Furthermore, notifications related to emotional or mental health issues can exacerbate users’ anxiety and worsen their emotional states. Lastly, frequent notifications or those creating a sense of urgency can foster app addiction, prompting users to constantly check their phones and overuse the app. To minimize these negative effects, it is crucial to manage notifications effectively. The app should offer customization options for notifications, including the ability to disable notifications or adjust their frequency [118]. Further, notifications should be written clearly and calibrated to avoid inducing anxiety or stress, and should only be sent when necessary, such as to remind users to complete a specific task or engage in self-care.

One last element to consider is progress charts. Tracking charts can be a useful tool in a mental health app to help users visualize their progress and improvements over time. However, some adverse effects could occur if they are not used properly [90,119]. Tracking charts can cause stress and anxiety if they show a decrease or lack of improvement over time. This could make users feel judged or critical of themselves, thereby generating an effect contrary to the desired one. Charts may distort a user’s perception of their mental state and emotions by focusing on a few selected aspects and not considering other factors [117]. Excessive use of tracking graphs could lead to user addiction, prompting them to constantly check their progress and experience anxiety or frustration if the results do not meet their expectations.

Notably, monitoring charts simplify the user experience by providing a graphical representation of information; however, this may reduce the complexity of users’ emotions and thoughts, neglecting their multifactorial nature [119]. Using tracking graphs may also result in a plateau effect, in which users fail to see further improvement despite making progress, leading to frustration and demotivation. However, tracking charts can be beneficial when shared with therapists, who can better understand data and progress and communicate it in an understandable and supportive way to their clients.

Considering the possible negative effects of the presence of notifications and charts inside mHealth applications, we considered the hypothesis that Safer could work by default without visible charts and notifications, with the option of turning these features for the user. In the following Table 2 below, there is a short summary of these three main aspects.

**Table 2.** Summary of the design elements and description of the choices applied to Safer.

Design Element	Description
User interface (UI) and user experience (UX)	Simple layout for easy navigation and reduced anxiety. UI refers to visual and interactive elements, while UX focuses on user satisfaction and ease of use.
Notifications	Properly managed notifications to avoid information overload, interruptions, or addiction. Customization options for frequency and content are necessary.
Progress charts	Use tracking charts with caution to avoid stress, anxiety, or distortion of users’ perceptions. Consider showing charts to therapists instead of users directly. Be aware of potential negative effects, such as addiction, oversimplification of emotions, or plateau effects. Offer the option to enable or disable progress charts for the user.

Next, we discuss how to implement DBT content in the structure of Safer.

#### 5.4. The Structure of the Application

For the design of Safer, a modular approach was chosen that would allow the content of the app to be adapted to the user to favor the personalization of its use according to his needs. A modular approach can also have other advantages regarding maintenance, scalability, and the development of additional functions, which can be implemented without

altering other elements of the app that remain independent. This technical aspect can then translate into an overall better quality of the app because it allows faster updates and the revision and expansion of the features already present. In Figure 1 below, we have depicted the structure of the app and its modules.

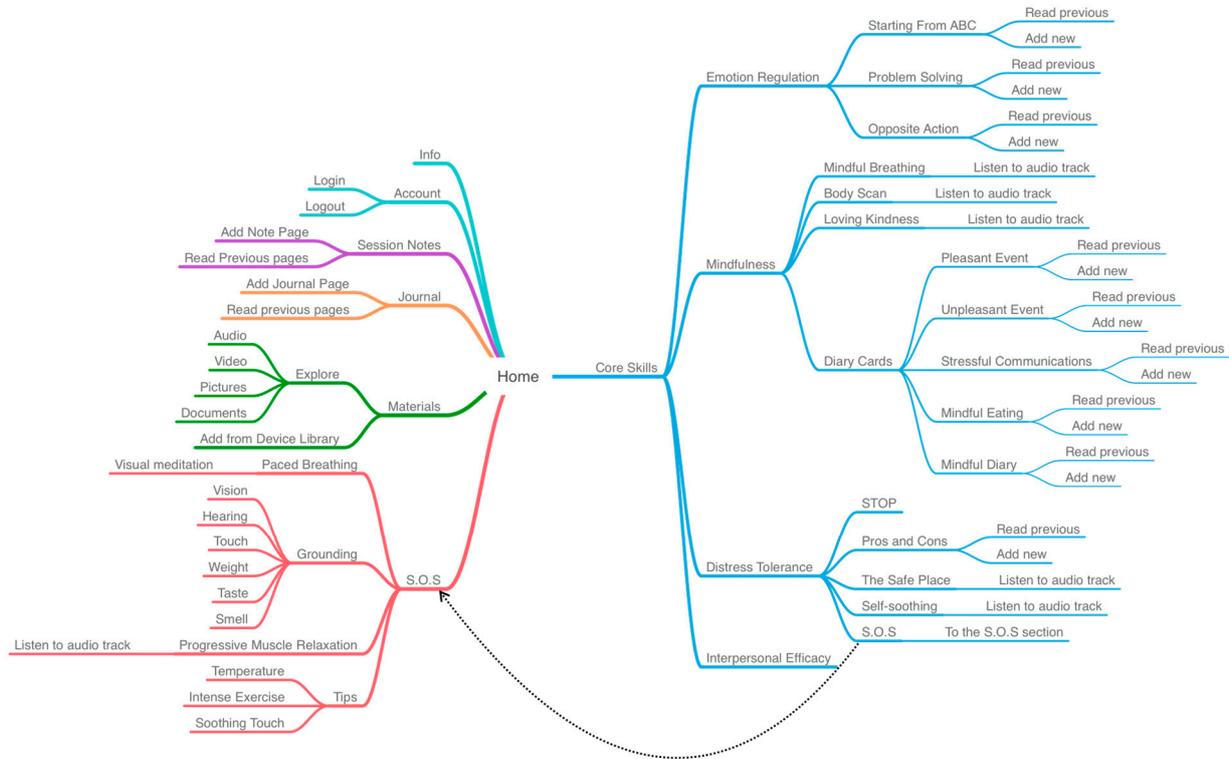


Figure 1. The structure of the “Safer” app and its modules.

The first module is related to the DBT Skills [25] and it is called “Core Skills”, and therefore includes a series of exercises that represent the digitization of the exercises that are present in this approach and include:

- Distress tolerance: These skills help individuals endure and accept difficult or painful situations without reacting impulsively or in a self-destructive way. They include relaxation techniques, distraction, improvement of the present moment, and a reality check.
- Emotion regulation: These skills help individuals identify, understand and effectively manage their emotions. They include observing and describing emotions, reducing emotional vulnerability, increasing positive experiences, and modifying unwanted emotions.
- Interpersonal effectiveness: These skills help individuals establish and maintain healthy relationships, communicate effectively, and resolve conflicts. They include the ability to make requests, say no, set boundaries, and maintain self-esteem in social interactions.
- Mindfulness: These skills help individuals develop greater awareness of the present moment, of their emotions, thoughts, and bodily sensations. They include focused attention, non-judgmental observation, description, and full participation in the present experience and are presented both as self-reflection exercises and audio tracks of guided meditations.

The DBT skills section represents a fundamental element in the app’s design, with the possibility of saving all the exercises performed in the cloud and, therefore, being able to increase metacognitive monitoring and awareness applied to the accumulated experiences.

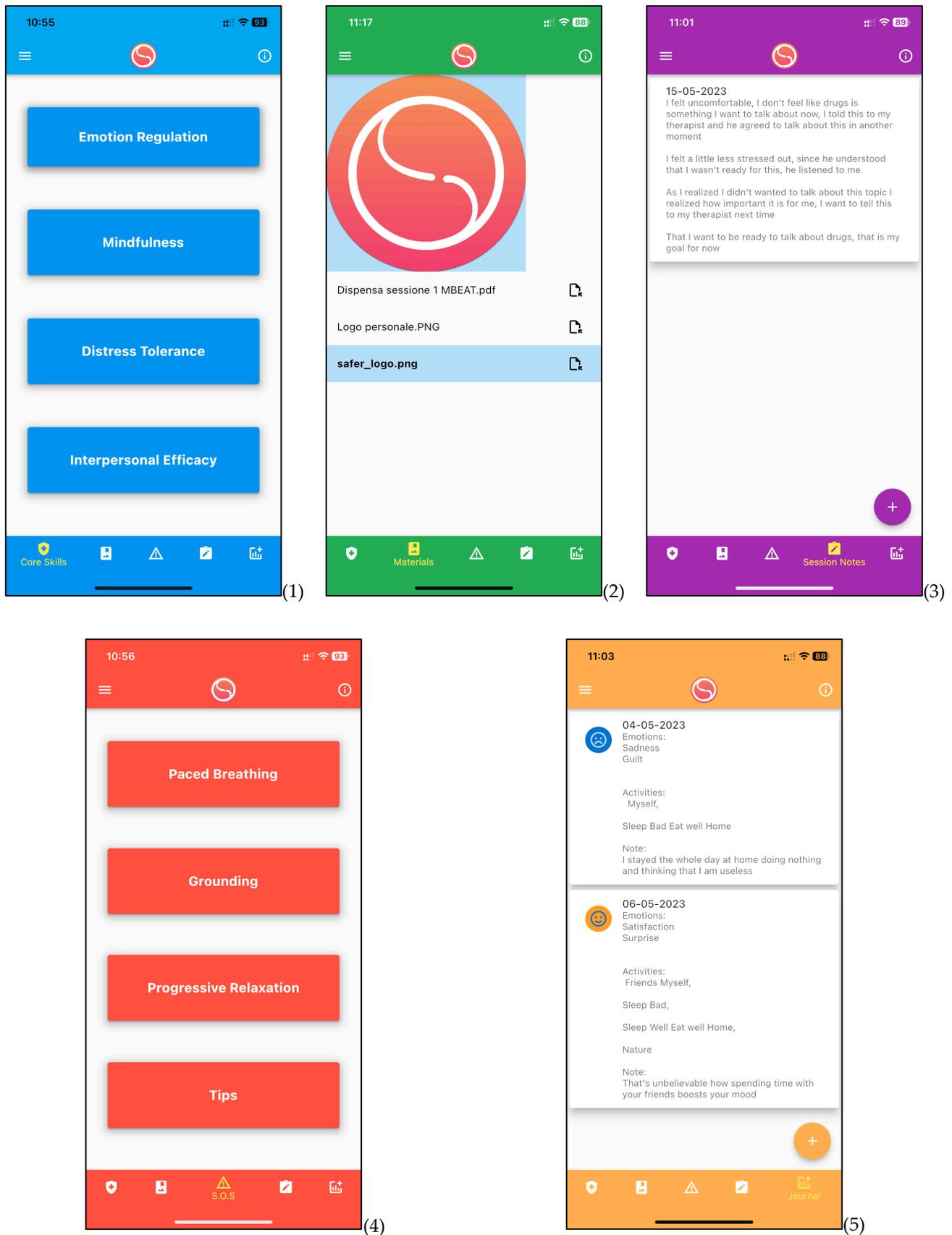
The second module concerns “Materials”, and has been designed as a container of visual and audio text elements that can be uploaded to the cloud and displayed in the appropriate specific section of the app, directly by the user. This section is designed

to allow the storage and display of elements connected to one's psychotherapeutic or psychological journey and can include both psychoeducational material and any other multimedia element that can be connected to a significant experience relating to issues that cause discomfort to the user. The "Materials" section of the Safer app is also designed to be used with the collaboration of the therapist, who can provide materials through other platforms, such as emails and WhatsApp, which the patient can then upload into this specific section. The module is thus a multimedia portfolio of elements useful for the user's psychological journey, benefiting from the temporal and practical advantage of having all related materials in a single place within the same app, where he also finds the other digital elements useful for his psychological well-being.

The third module of the app is the "S.O.S" section, and is made up of simple access buttons to emotional regulation techniques in emergency conditions, such as anxiety crises, emotional crises, panic attacks, and dissociative episodes. Featured in this module is a guided breathing activity, in which the user follows a calming breathing rhythm guided by a moving image. There is also a grounding exercise that guides the user to look for objects around him that meet specific criteria from a sensory point of view (e.g., "Find 5 blue objects around you", "Find 5 smooth objects around you", and "Find 5 sounds you can hear around you"). Grounding exercises are based precisely on the use of the orientation reflex applied to the environment in the search for sensory stimuli, which is incompatible with conditions of emotional hyperactivation. The sensory anchoring produced by grounding exercises is considered very useful for managing states of intense psychophysiological activation. Another element present in this section of the app is a progressive muscle relaxation exercise, proposed via an audio track, which is useful for producing a state of relaxation and managing states of anxiety or high arousal. Lastly, there are suggestions relating to the use of temperature, in particular cold water on the face, and the use of intense physical exercise, as effective coping strategies in emergency conditions to reduce the state of hyperactivation, which may be accompanied by an emotional crisis. The entire third module is based, with some additions, on the DBT TIPP's, a set of strategies for managing emotional crises [25].

The fourth module in Safer allows the user to add notes relating to psychotherapy sessions, and it is called "Session Notes". Notes can be saved in the cloud and are therefore always available to the user. Each note allows the user to note the date of the session, any difficulties during that session, whether those difficulties were handled and how by the client or the therapist, whether the user noticed something different after the session, and any other elements subsequently reflected upon, which they would like to discuss in the next session. There is also space for additional notes. The purpose of this module is to provide a tool for self-monitoring one's psychotherapy journey, useful for noting one's experiences and progress in a textual and simple form, which can allow one to preserve and use reflections relating to the therapy itself, following the hypothesis that this activity could represent an aid for the patient in sharing emotions and thoughts on psychotherapy, thus providing a useful tool for the therapeutic alliance [20,120–122].

The last module in Safer is represented by the "Journal". In this module, the user can add pages to a digital diary, which is also saved in the cloud. Each page of the diary allows the use of a visual scale to report the user's mood, mark from a menu which emotions are most present, note which activities are carried out on that day by selecting them from a menu, and report notes on events of the day. All the notes can be viewed in a single menu, where they are collected in chronological order. The modular structure of the app in five modules seems to be an effective design pattern that presents content with clear and quick access to the various functions of the app. Considering the problems related to engagement encountered in the use of mHealth apps, the ease and speed of use, combined with the clarity of the contents and a minimalist graphical presentation focused on customization, could prove to be effective in encouraging the continued use of this instrument. Figure 2 shows screenshots of the main sections of the Safer app.



**Figure 2.** Main sections of the app. From left to right: (1) “Core Skills”, (2) “Materials”, (3) “S.O.S”, (4) “Session Notes”, and (5) “Journal”.

Safer is currently in its alpha version and is being developed using Flutter [123,124] and Firebase [125,126] as the main technological platforms. Flutter is an open-source development framework created by Google that allows developers to create native applications for both Android and iOS devices using a single source code. This saves time and resources for the development and maintenance of the application. Firebase, also a product of Google, is a mobile app development platform that provides various backend services, such as user authentication, real-time databases, image storage, and push notification management. Using Firebase allows us to focus on creating the app's features and user experience, while Firebase provides a secure and scalable infrastructure.

## 6. Conclusions and Future Research

The purpose of this paper was to summarize key findings in the literature regarding the use of mobile mental health apps in conjunction with psychotherapy and psychological treatments and to describe the design of the prototype mobile application for emotion regulation skills support, safer. Although many challenges remain, such as the impact of mHealth apps on therapeutic alliances, recent findings suggest that these apps can positively influence therapeutic alliances by empowering patients to manage their mental health in the real world, and this would be part of testing the app in preliminary usability and feasibility studies. However, addressing the needs of psychotherapists and psychologists is crucial for effective app development, including their preferences, needs, and willingness to use mHealth apps in conjunction with psychotherapy.

Considering the vast number of mental health apps available, in our opinion, development guidelines and frameworks and randomized controlled trials should be prioritized to create evidence-based apps and standard methodologies for their design and development. It is also important to consider specific transdiagnostic elements rather than complex disorders and to identify which populations may benefit most from these tools. Overall, any device integrated with psychotherapy interventions must be designed to empower the psychotherapeutic process.

Recent studies suggest that integrating mHealth apps with psychotherapy can improve patients' agency in the real world by providing them with technological help that can have a strong impact in emergencies, reminding grounding skills of DBT, or allowing access to psychoeducational content that can help with social skills or emotional regulation. However, it is important to note that addressing the needs of psychotherapists and psychologists is crucial for the successful integration of these apps in psychotherapy. Collecting data about their preferences, needs, and propensity to use mHealth apps is essential for developing effective apps. With over ten thousand mental health apps available to the public, it is important to focus on building development guidelines and frameworks and conducting randomized controlled trials to develop evidence-based apps rather than revising current apps. Beyond addressing disorders, it is important to evaluate the target populations for whom these tools can be most beneficial, focusing on other demographics, such as age or specific transdiagnostic elements. Since psychotherapy interventions deal with mental health, any device designed with their integration must be built around and empower psychotherapeutic processes.

This study has several limitations that need to be addressed. One of the limitations is the limited scope of the work, which primarily focuses on the design and development of an mHealth app targeting emotion regulation. As a result, the review and discussions may not cover all aspects of mental health apps or cater to all potential user groups. Another limitation is the early-stage development of Safer, which is currently in its alpha version. This means that the app has not yet undergone rigorous testing or validation with real users; thus, the effectiveness and usability of the app may not be fully determined or supported by empirical evidence. Moreover, we still do not have data to present about the usability and feasibility of Safer. Therefore, it is necessary to complete the next deployment phases to target users and investigate the emerging evidence from studies involving Safer. Further, the insights and recommendations provided in this work may not apply to all mHealth

apps or mental health interventions. The design decisions and theoretical framework for Safer are specific to this app and its target user group, and other applications may require different approaches.

The originality of this study lies in its approach, as it focuses on designing and developing a mHealth app, Safer, specifically targeting emotion regulation within a transdiagnostic context. Although numerous mHealth apps address various aspects of mental health, the emphasis on emotion regulation as a transdiagnostic process is a specific feature of this mobile application. Safer also includes specific elements such as the “Materials” and “Session Notes” section that are specifically designed to be used within psychotherapy or psychological support. This article presents a narrative review of the latest advancements in mobile apps for mental health before proposing a design for Safer. This comprehensive approach to understanding the current landscape of mental health apps and subsequently developing an app with a targeted purpose contributes to the study’s strengths.

Considering the need for further research in the field of mental health applications, the currently developing app “Safer” represents an attempt to integrate the scientific knowledge gathered on the topic. As a next step, feasibility and usability studies will need to be conducted to assess the app’s impact on emotion regulation skills and therapeutic alliances within treatment settings. This will be an interesting and challenging undertaking, as it will provide insights into the efficacy of the app’s design in improving emotion regulation strategies, strengthening therapeutic alliances, increasing patients’ mastery, and providing overall better mental health support technologies. The outcomes of these studies will be valuable in guiding the development of future apps, and in improving the integration of mHealth apps within the field of mental health treatment.

We also have to study accessibility and diversity in the design of digital interfaces to ensure that they cater to users with varied abilities. This includes those with visual impairments, for whom contrast and font size adjustments, as well as the provision of alternative text for images, can enhance usability. For individuals with hearing impairments, accessibility can be improved through captioning and transcripts for audio and video content. Moreover, ensuring that all functionalities are accessible through voice navigation can greatly benefit users with motor impairments, who may struggle with precise movements. In terms of cognitive impairments, the simplicity and clarity of content are crucial to ease use and comprehension. This involves avoiding complex language and jargon, providing clear instructions, and logically organizing content.

Lastly, adjustable time limits can play a significant role in enhancing accessibility for those who may need additional time to read or interact with content due to various impairments. The absence of these design considerations can lead to challenges in perceiving, understanding, navigating, and interacting with the application, potentially excluding a significant user base. Therefore, a thoughtful and inclusive design approach is essential to create an application that is accessible and usable for everyone, and it will be an important topic to investigate and improve in the name of better accessibility to the app for users with different kinds of disabilities.

It is essential to evaluate the efficacy of mental health apps not only in normative populations but also in non-normative populations, as these apps should cater to a wide range of individuals with diverse needs, backgrounds, and conditions. Although insights from normative populations can provide valuable information on the overall effectiveness of mental health apps, non-normative populations, such as those with severe mental illnesses or marginalized groups, may have distinct needs and challenges that must be considered during the design and development process. For instance, individuals with severe mental illnesses might require more personalized and intensive interventions, whereas marginalized groups could benefit from culturally sensitive and accessible apps. Thus, it is vital to conduct efficacy studies on both normative and non-normative populations to ensure that mental health apps are effective and accessible to all individuals who may benefit from them.

At this stage, the Safer app is not intended to be a medical device; rather, it is being developed for research purposes. Its primary goal is to explore the potential benefits and effectiveness of digital tools in supporting mental health and well-being. It is important to note that any feasibility and usability study involving the Safer app must involve medical personnel, who can provide valuable insights and ensure that the app aligns with evidence-based practices and ethical standards. Additionally, before conducting any study or trial, the research team must obtain approval from the ethical committee of the institution where the app is being tested. This approval process ensures that the study adheres to strict ethical guidelines, prioritizes the well-being and safety of the participants, and maintains the integrity of the research. By focusing on research and involving appropriate medical personnel and ethical oversight, the development and evaluation of the Safer app can provide valuable insights into how digital tools can support mental health and well-being while ensuring the safety and ethical treatment of all involved.

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## Abbreviations

(in alphabetic order)

Acronym	Description
ACT	Acceptance and Commitment Therapy
AI	Artificial Intelligence
BCA	Behavioral Change Applications
CBT	Cognitive Behavior Therapy
DBT	Dialectical Behavior Therapy
MBCT	Mindfulness-Based Cognitive Therapy
MBI	Mindfulness-Based Interventions
MBSR	Mindfulness-Based Stress Reduction
mHealth	Mobile Health
OAuth	Open Authorization
UI	User Interface
UX	User Experience

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