DOI:10.17951/j.2024.37.4.123-145

ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA

VOL. XXXVII, 4 SECTIO J 2024

Maria Curie-Skłodowska University, Lublin

AGNIESZKA NALEPA

ORCID: 0009-0001-4326-7616
agnieszka.nalepa98@gmail.com

KATARZYNA KOPECKA-PIECH

ORCID: 0000-0001-9973-4423
katarzyna.kopecka.piech@umcs.pl

# *Support in the Palm of Your Hand. Affordances of Mobile Apps to Help with Panic Attacks and Anxiety Disorders*

Wsparcie w zasięgu twojej dłoni. Specyfika aplikacji mobilnych służących do pomocy w atakach paniki i zaburzeniach lękowych

How to quote this paper: Nalepa, A., Kopecka-Piech, K. (2024). Support in the Palm of Your Hand. Affordances of Mobile Apps to Help with Panic Attacks and Anxiety Disorders. *Annales Universitatis Mariae Curie-Skłodowska. Sectio J, Paedagogia-Psychologia*, *37*(4), 123–145. DOI: 10.17951/j.2024.37.4.123-145.

## ABSTRACT

Given the rising number of people suffering from anxiety disorders and the increasing interest in mental health technologies, the purpose of the study was to examine mobile apps that support users with anxiety disorders, particularly panic attacks. The aim of the research was to determine the functional affordances of selected mobile apps by analyzing their three dimensions: technological capabilities, context of use and possibilities of user action. An analysis was used to answer three questions: 1) What functionalities do these apps offer users? 2) What is the premise of the applications and the context of their operation? 3) Which elements of the apps have the potential to have a positive and which have a negative impact on users? For this purpose, the operation and design of a selection of four apps were analyzed using the walkthrough method: Rootd – Relief from Anxiety & Panic; Dare: Anxiety and Panic Attacks; Clear Fear; and Panic Shield. Basic feature offerings included built-in breathing exercises, journaling, statistical analysis, and in some cases notifications. The apps examined used proven methods of psychotherapy, i.e. cognitive behavioral therapy, mindfulness techniques and mood tracking. Apps provided immediate help in a moment, but not long-term support. In addition, the analyzed applications raise data protection concerns.

**Keywords:** mobile apps; panic attacks; anxiety; anxiety disorders; the walkthrough method

## INTRODUCTION

The subject of this study is mental health apps, specifically their functional affordances that determine how the apps are used. It touches upon structural and critical issues i.e. undersupplying of mental health support and putting responsibility on the individual. Panic attacks are a disorder affecting about 2.7% of the US population (Hull, Jenni, 2022). A study of more than 147,000 participants from 25 countries shows the extent of the disorder. Scores range from 2% to as high as 27% for a given country's sample. The lowest results are recorded in China (2.1–2.5%) and Nigeria (2.6%), while the highest are in New Zealand (27.4%), Northern Ireland (24.4%) and Australia (21.5%). Surveys of the Polish population conducted on a sample of 10,081 yielded a figure of 5.9% (de Jonge et al. , 2018).

Panic attacks are characterized by intense symptoms. These include shortness of breath, accelerated heart rate, increased sweating, the sensation of dying, dissociation and many others (National Health Service, 2023). A panic attack can affect anyone, but not everyone knows how to recognize it. Its symptoms and course are not widely known. However, they are often associated with other anxiety disorders (Kircanski et al., 2017).

In the fight against anxiety disorders, psychological therapies are most often used, depending on their type and intensity. In addition, drug treatments are also used to help the brain function properly. Both modalities can be used together, increasing the effectiveness of treatment (Sadock et al., 2010). These types of solutions are not equally available to everyone. In many areas, the ability to find a specialist is difficult or completely unattainable. Another problem may be the cost of the therapy itself or the remedies, the effects of which are noticeable only with regular visits and medication. This is one of the reasons why mobile apps offering help to people struggling with anxiety disorders have begun to emerge. They were not created as a substitute for other forms of treatment. Their purpose is to bring relief and support, as well as to raise awareness and educate users about mental illness. In this way, they can enrich or, if necessary, replace psychotherapy (Diano et al., 2022; Lui et al., 2017).

The progressive digitalization of healthcare and psychotherapy around the world is bringing a great many benefits not only to doctors, but also to patients. The ability to control one's appointments, prescriptions, medical history without the need to contact a specialist has become our everyday life. This can be done incredibly easily and quickly by phone apps, taking into account that worldwide 5.31 billion people (67.1% of the population) have access to cell phones, while 4.95 billion (62.5% of the population) have access to the Internet (We Are Social, 2022).

According to statistics, more and more countries, institutions, enterprises are betting on creating health applications. According to a study by Grand View

Research (2022), the global market for mental health apps was worth about USD 4.2 billion in 2020. From 2022 to 2030, it is projected to grow by 14.6%. In the UK, from 2019 to 2020, app downloads increased by 200% (Grand View Research, 2022). From these forecasts, the demand for this type of solution will increase. The global COVID-19 pandemic, the effects of which are still being felt, has also contributed to this. Statistics from 2017 show that there are about 9 psychiatrists per 100,000 residents in Poland (Eurostat, 2020). This places Poland at the bottom of the list. There are only about 4,515 psychiatrists practicing their profession in this country (Kędzierski, 2022). There is a great need for additional patient support, including of a technological nature.

## RESEARCH CONTEXT. ANXIETY DISORDERS AND PANIC ATTACKS

According to Kroplewski et al. (2019),

> anxiety disorders, formerly called neurotic disorders, are a group of disorders associated with acute reactions to stress (...). They are marked by the individual's disproportionate defensive reaction to perceived reality, stemming from unrealistic judgment and not being a response to actual danger. These disorders are often accompanied by anticipation anxieties, which manifest themselves in a fear concerning everyday life and make the individual's adaptive functioning more difficult. (p. 314)

What distinguishes anxiety disorders is often an unreasonable fear, exaggerated and rarely sensible. However, this is too general term, so, the International Statistical Classification of Diseases and Health Problems ICD-11, created by the World Health Organization (2023), is helpful. According to it, anxiety disorders can be divided into:

- generalized anxiety disorder;
- panic disorder;
- agoraphobia;
- specific phobia;
- social anxiety disorder;
- separation anxiety disorder;
- selective mutism;
- other anxiety disorders or anxiety-related illnesses.

Some of these disorders are interconnected, intermingle, and influence each other. The concepts related to mental health are "fluid" and their classification is intended to help understand them. A symptom that often occurs with anxiety disorders are panic attacks. They can occur unexpectedly or be triggered by an external factor. They manifest themselves as a sudden, intense feeling of anxiety along with symptoms such as accelerated heartbeat, shortness of breath and difficulty breathing, convulsions, sweating, nausea, etc. In addition, they are accompanied by a sensation of losing control over oneself and one's

surroundings, a feeling of being outside of one's own body (depersonalization) or outside of reality (derealization) as well as a sensation of dying (Medical Subject Headings, 2023). Panic attacks usually last from a few to several tens of minutes but are very intense. Within 20–30 minutes, the symptoms should become weaker until they disappear completely (Medical Subject Headings, 2023).

According to statistics from the Anxiety and Depression Association of America, panic attacks usually occur in early adulthood and involve about 2–3% of the adult and adolescent population. In addition, it is women who are more likely to develop the disorder, up to twice as often as men (Anxiety and Depression Association of America, n.d.).

People with anxiety disorders are treated through the use of anxiolytic drugs, which are used to reduce anxiety and tension. Therapy is also one of the more popular practices in the treatment of anxiety disorders. Various forms of psychotherapy are used: cognitive, including prolonged exposure and graduated exposure; Acceptance and Commitment Therapy; Dialectical Behavior Therapy (Jennings et al., 2013).

Being able to externalize the concerns in front of a psychotherapist can become a big step toward improving the situation. However, this is not an easy decision for some patients. Many are afraid to share such private information or are ashamed of their situation. Paradoxically, for those suffering from social phobia, visiting a therapist is especially hard, as they are expected to overcome their fear of contact with another person when seeking help. Mobile apps come to their aid.

## MOBILE APPS FOR MENTAL HEALTH

Technological development of health apps tends to focus on introducing apps for controlling documents, categorizing information, facilitating access to tests, signing up for appointments with doctors (Aitken, Lyle, 2015). In addition to these, there are also many apps that focus on helping patients. Most often, they focus on physical health, fitness and lifestyle, but also on mental disorders and diseases. Between 2016 and 2018, interest in mHealth apps increased by 300%, with two-thirds of adults saying they would be interested in using such solutions to help themselves with their mental health (Marshall et al., 2019a). The biggest advantage of apps to help with various types of mental illnesses is that they are usually quite cheap or free. As many as 217 of the 293 apps surveyed (74.06%) were found to be free to download and use (Marshall et al., 2019b). Part of them do not require payment to download them and offer a limited number of features. Only after a subscription or single transactions can they be used in their entirety. However, even free options offer useful solutions.

After a preliminary selection of the applications studied based on a review of application directories, we can conclude that applications of this type are characterized by great diversity. We propose a division into applications of the following general types: 1) mindfulness, 2) mood tracking and 3) stress relief type. This is a conventional division, as often these solutions are combined and implemented into a single application. *The mindfulness-type* apps help a user to meditate and focus attention on the present and the moment. *Mood tracking* apps are used to record and track how moods change. Some also have a diary function where user can describe their emotions, the course of a day, etc. In this way, it is easy to look at one's mood in retrospect and assess in which situations and when one feels best or worst. *Stress relief* apps are designed to actively assist in controlling stress. There are number of apps that target people struggling mainly with illnesses such as depression, PTSD, eating disorders and so on.

The apps differ in the ways in which they offer help. What makes them readily downloadable is not only their price (or freeness), but also their very easy availability and most often simplicity of use (Garrido et al., 2019). They are characterized by the convenience of being able to use them at a time and place that suits them. The user can reach for the application at any time, which is a certain way of assistance. Such a method is used by people who do not have the opportunity to visit a psychologist or therapist, for example, due to the lack of them in their area. In hard-to-reach areas with small populations and underdeveloped infrastructure, one must not only have the time, but also be prepared for the cost. In addition, a certain part of the applications takes care of the anonymity of those who use them. This allows the user to feel more at ease, especially if they do not want to share information about their mental health with those around them. Some users view these apps as a substitute for therapy. They might feel ashamed or unsure of others' reactions if they choose to get professional help. Despite the progress, there is still stigmatization of sick people in many places around the world, which may be associated with even worse mental problems (Borghouts et al., 2021).

Apps for solving mental problems are specific. They deal with intimate and sensitive spheres, and thus should meet certain standards regarding their safety, but also inclusiveness. According to the study (Marshall et al., 2019b), only about 30% of the 293 apps studied were created with the help of experts, which raises questions about their sufficient security. Ten of the 293 apps studied (3.41%) had evidence of effectiveness in treatment (Marshall et al., 2019b). In contrast, only 3 of the 10 presented independent studies, i.e. studies whose authors had no connection with the creation of the app and derived no financial benefit from it (Marshall et al., 2019b). About 30% of the producers of the surveyed apps declared that mental health experts had input into the app's development, and about 20% of them had ties to universities, organizations, institutions, etc. According to these statistics, the

majority of apps is not developed based on proven expertise, but rather are created by people unrelated to the mental health field (Marshall et al., 2019b).

In addition, 70% of users have no way to access the privacy policy inside the app, and thus users are not sure who has access to their personal data. Meanwhile, according to users, the most important things for them are ease of use and understanding of the app, and data privacy issues (Marshall et al., 2019b).

The previous research indicates that most of the apps focus on helping people cope with their symptoms through specific information, tasks or techniques, such as psycho-education, relaxation audio recordings, a diary function, controlling breathing, etc. (Van Singer et al., 2015). More than half of the apps suggest contacting a psychiatric specialist if panic attacks occur (Van Singer et al., 2015). Previous studies have focused on analyzing a large number of apps, trying to note similarities and differences between them (Marshall et al, 2019b). Other studies have addressed how apps are perceived by users and what elements they consider most important (Schueller et al., 2018). A survey of young people's views on selected mental health apps provides insight into what kind of help techniques they use. Specific behavioral strategies used or focused on meditation and mindfulness. Some apps used CBT (Cognitive Behavioral Therapy) (Garrido et al., 2019); some also ACT (Acceptance Commitment Therapy) (Carrouel et al., 2022). Such functionalities as mood tracking, knowledge sources, diary or contact to a specialist are also appearing.

Although many applications are available on the market which might be rated differently (Neary, Schuller, 2013) and studied from different perspectives, e.g. quantitatively (Marshall et al., 2019b), there is still a lack of qualitative research based on practical use and critical, detailed observation of the tools, like analysis of the functional affordances of mental health applications by the usage of the walkthrough method.

## FUNCTIONAL AFFORDANCES

Affordances refer to attributes of an object that permits or enables potential behavior (Michaels, Carello, 1981). In other words, it is an offer provided by an object (Gibson, 2014) that is realized in the relationship with the object user, providing the opportunity for action (Hutchby, 2001). By combining user intent and technology capabilities, the potential for action emerges (Faraj, Azad, 2012).

Affordances can be technological. They involve design, development and use of technology (Norman, 1999). Their key type is functional affordances, that is, affordances that have the potential for a behavior that achieves a specific outcome derived from the user's goal (Volkoff, Strong, 2013), e.g., a user experiencing anxiety will use a specific function of a dedicated mobile app to assist in such situations to regain calm and serenity.

Cai et al. (2010), synthesizing knowledge of affordances, pointed to their four key constructs: existence, perception, actualization and effect. The first type is crucial and is the starting point for the others. Affordance existence arises from the design, for example, of a mobile app, and accounts for its potential effect, regardless of perception and actualization, which already largely depends on the situation, condition and capabilities of the individual user.

The affordance existence constitutes the interpretative frame of this study, while locating the analysis of the possibilities offered to sufferers by the studied apps between the capability of technology, the context of usage and the possibilities of action (Majchrzak et al., 2013). This study determines what features, capabilities and properties of mobile apps for panic attacks and anxiety disorders have the potential to generate a specific action of the user in their given situational context, i.e. anxiety, so that the user can achieve their goal, i.e. get support, peace, solace, etc.

The subject of the presented research was apps that offer help to people with anxiety disorders and panic attacks. The purpose of the study was to determine: 1) What functionalities do these apps offer users? 2) What is the premise of the applications and the context of their operation? 3) Which elements of the apps have the potential to have a positive and which have a negative impact on users? To this end, using the walkthrough method (Light et al., 2018), the operation and design of a selection of four apps were analyzed. The mechanisms of their functioning, available options were identified, and a comparative analysis was carried out, indicating similarities and differences between the analyzed applications.

## METHODS

The walkthrough method (Light et al., 2018) involves analyzing the assumptions, management, operational model of an app, and then mimicking its usage to determine many possible elements, such as the app's goals, ideal users, and hidden meanings. The essence of this research method is to be both researcher and user; analogous to an older research method, i.e. participant observation. In this study, four apps available on Google Play and Apple Store were analyzed: Rootd (n.d.), Dare: Anxiety & Panic Attacks (n.d.), Panic Shield (n.d.), Clear Fear (n.d.). The study was conducted in March–May 2023.

## EXPLANATION OF THE RESEARCH PROCEDURE

According to Light et al. (2018), the first step in the study is to understand the context of each app's operation, paying attention to its software. Therefore, the focus was on the app's assumptions, operating model, and governance to determine how users could potentially use the app.

The analysis of the app's assumptions focuses on its main purpose, the target group and the circumstances under which it is used. The application's operating model refers to business strategies and revenue sources. Its analysis is used to determine the political and economic mechanisms of the application (Light et al., 2018).

The next step was to analyze how the app is managed and how it regulates and controls user activity to maintain the operating model and vision of the app established earlier (Light et al., 2018). The next stage of the study required the use of a walk-through method, which involves interacting with the application interface to collect data. The researcher as a tester stepped into the role of a regular user and mimicked the usage, still paying attention to elements such as subsequent screens, buttons, menus, functions but also text and symbols. In addition, it was important to monitor how the application works and what it requires of the user, and how users might perceive these actions, for example, whether as opportunities or limitations. The second researcher, through a critical evaluation of the collected material and its analysis in discussion with the tester researcher, made adjustments to the conclusions and interpretations. Both researchers specialised in the social aspects of new technologies, but had very different backgrounds, both in terms of research and user experience – making it possible to confront perspectives and formulate inter-subjective findings.

Both technical and cultural aspects determine how an app works (Light et al., 2018). This type of influence can be seen in the features offered by the app, which attempt to shape the relationship between users, including what they think of each other. This includes how the app encourages users to interact (or not) and how meanings are created. These are so-called mediating characteristics, influenced by cultural beliefs and ideas that are also shaped and used outside of apps (Light et al., 2018).

The testing researcher went through all of the above steps, starting with registration and ending with leaving the app. The apps were tested using a Motorola Edge 30 Fusion Android smartphone by one researcher; then, in the course of discussion with a second researcher, the results of the "passage" were evaluated and adjustments were made, allowing an inter-subjective view of the application to be reached. The study did not use the producers' reports on prototypes or final products, which enabled an objectified and non-suggestive examination of the application.

## SELECTION OF RESEARCH MATERIAL

The applications were selected according to the following criteria: 1) The application had to be specifically about anxiety disorders and/or panic attacks; 2) Its purpose had to be offering assistance to a user struggling with the symptoms

of these disorders;[1] 3) The apps had to be free (what means financial accessibility) and available on both Google Play and the Apple Store (as these are the two most popular platforms in the world (Iqbal, 2023), including Poland); 4) They should have either an English or Polish language version.

To get satisfactory search results, the search box used words in Polish and their equivalents in English: anxiety, panic attacks, anxiety disorder. Using two languages made it possible to broaden the search. In addition, quantitative indicators of the app's popularity were taken into account: its average rating and number of downloads[2] and the number of reviews obtained. The applications with the highest rates were selected (Table 1).

Table 1. Data on applications selected for the study (as of March 2023)

| | Rootd | Dare | Clear Fear | Panic Shield |
|---|---|---|---|---|
| raiting (Google Play) | 4.7/5 | 4.8/5 | 4.1/5 | 4.2/5 |
| raiting (Apple Store) | 4.8/5 | 4.9/5 | 4.0/5 | 4.9/5 |
| number of reviews (Google Play) | 29.7 thousands | 9.38 thousands | 396 | 173 |
| number of reviews (Apple Store) | 281 | 10 | 121 | 31 |
| number of downloads (Google Play) | 1+ million | 500+ thousands | 100+ thousands | 50+ thousands |
| language | Polish, English | English | English | English |
| app description | relief from anxiety and panic attacks, deep breathing exercises, lessons, scoring | help for anxiety and panic attacks and sleep disorders, audio recordings, meditation and nature sound recordings | based on cognitive-behavioral psychotherapy, monitoring of attack frequency and anxiety levels, support in dealing with emotions, responding to difficulties and somatic symptoms, calming exercises, education | guide on panic attacks and how to deal with them, breathing exercises, indoor exposure and outdoor exposure |

Source: Authors' own study.

[1] Selected applications provide active assistance, for example, through breathing exercises, audio, visual or audiovisual recordings.

[2] Not applicable to the App Store due to the lack of availability of such statistics there.

## DATA COLLECTION AND ANALYSIS

The data collection process was divided into six stages. The first three involved analysis of the assumptions, management and operating model, while the next three involved registration and entry, use of the application, and suspension as well as exit of the application. All applications were studied in this order.

The use of each app lasted about a week, but given the final phase, that of suspending and exiting the app, the process took longer. It was important to leave the apps on the device and not interact with them for a certain period of time, in order to then be able to delete the account or uninstall them.

Tracking of the study was done by keeping a sheet that described each stage. The spreadsheet coded the information according to the following categories: design (e.g. colors, animations, images), mechanisms of operation (e.g. user redirection, pop-ups), modes of management (e.g. medical disclaimers, terms of use), requirements (e.g. third-party application access). Further analysis was used to extract patterns and possible similarities and differences, as well as deficiencies or errors, to answer research questions.

## RESULTS

Research indicates that all apps share one main goal, which is to help the users with anxiety disorders and panic attacks. However, each app approaches this in a different way, even if certain features appear in all of them, as shown in Table 2.

Table 2. Comparative analysis of basic elements of the studied applications

| | Rootd | Dare | Clear Fear | Panic Shield |
|---|---|---|---|---|
| Application assumptions | | | | |
| educating | yes | yes | yes | yes |
| based on research methods | yes | yes | yes | yes |
| cooperation with a specialist | yes | yes | yes | yes |
| Operating model | | | | |
| premium version | yes | yes | no | no |
| subscription model | yes | yes | no | no |
| trial period | yes | yes | no | no |
| cooperation with third-party applications | yes, Google | yes, Google and Facebook | no | no |
| language | Polish, translated automatically | English | English | English |

| Management: | | | | |
|---|---|---|---|---|
| 18+ or supervision of a guardian | yes | 18+ only | no, under 11 years of age supervision of a guardian | lack of information |
| medical disclaimer | yes | yes | yes | yes |
| Registration | | | | |
| account required | yes | no, but you can put them on | no | no |
| Using the application | | | | |
| breathing exercises | yes | yes | yes | yes |
| audio recordings | yes | yes | no | no |
| log function | yes | yes | yes | no |
| statistics | yes | yes | yes | yes |
| alerts | yes | yes | no | no |
| Suspend use and exit the application | | | | |
| encouraging people to return to the application | no | no | no notifications | no notifications |
| account deletion | yes, via e-mail | yes, through the application | not applicable | not applicable |
| Other | | | | |
| use of characters/mascots | yes | yes | yes | no |
| colour | blue | violet | user-settable theme (initially purple-blue) | violet |
| personalization | dark mode (in the premium version) | no | yes | yes, with one of the functions (breathing) |

Source: Authors' own study.

## ASSUMPTIONS

An analysis of the app's objectives shows that all of them have set user education on topics related to the disorders they experience as one of their goals. Each provides knowledge in a different way: through guides, lessons or audio recordings. Two apps were based on research methods. Dare uses therapies such as Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Therapy and Acceptance and Commitment Therapy; while Clear Fear: Cognitive Behavioral Therapy. The developers of all the analyzed apps have partnered with mental health specialists.

## OPERATING MODEL

When it comes to the operating model the applications can be divided into two groups. Rootd and Dare have premium versions, use a subscription model and offer a trial period. Both work with a third-party application such as Google. Dare additionally works with the Facebook platform.

The language of the applications differs, as the former is in Polish, but translated automatically, while the latter is entirely in English. Both apps offer a limited number of features in the free version, but enough to use freely. Rootd, is the more affordable option offering a monthly fee of about PLN 25.15, while Dare is PLN 75.99. Annually, Rootd requires about PLN 251.83, while Dare requires PLN 344.99. The one-time fee for Rootd is about PLN 625.48.[3] Dare offers more features in its package. Both apps stand out because of two specific solutions. Rootd gives a user the option of a one-time subscription, which is much more cost-effective – a single payment of about PLN 600 – is less than 3 years of use of the application buying a subscription for a year. At the same time, for Polish conditions, this amount is very high. Dare, on the other hand, offers to pay for the subscription to people in need who do not have the funds to buy it themselves. Such an offer may positively affect the perception of the application and reassure the user that it puts the welfare of its users first.

It should also be noted that both applications use third-party application services. This is important because third-party platforms have their own privacy policies as well as terms and conditions, so they can collect, store and use much more information than the target app itself. Clear Fear and Panic Shield, on the other hand, are completely free of charge and free from the influence of third-party platforms.

The Rootd application is translated into Polish automatically, which on the one hand allows non-English speaking Poles to use it, while on the other hand it contains language errors. These are usually minor and easy to decipher, but there is a danger that the text can be mistranslated, which can change the meaning of a sentence. This is risky, given the nature of this type of application. Other applications are available in English.

## MANAGEMENT

Each app has different requirements for the age of the user. Rootd allows people over 18 or younger to use it under the supervision of a guardian. Dare gives access only to adults and older people. Clear Fear makes the app available to people 11+. Below that age, supervision is required. Panic Shield, on the other

[3] Course as of 22 April 2023.

hand, contains no information on this subject. The reason for such varied results may be due to the Children's Online Privacy Protection Act enacted in the USA (Federal Trade Commission, 1998).

The unifying element of all apps is the inclusion of medical disclaimers. They indicate that the app is only a tool to help but does not serve as a substitute for medical treatment. The warning serves the function of making the user aware and encouraging them to consult a doctor if they have any doubts.

The next issue concerns in-app registration. Clear Fear and Panic Shield function without the need to create an account. Dare allows this option for those who want to view their statistics, but this does not affect the functioning of the app. A user without a profile can use the same features. Rootd, on the other hand, is only available to registered users. Each of these solutions has its pros and cons. On the one hand, by having a possible account, one might obtain the ability to store one's data and log in on various devices.[4] On the other hand, requiring registration can be a deterrent to potential users, due to the need to provide users' e-mail, especially if they create an account without fully knowing whether the application is suitable. If it turns out not to be, a user is expected to go through the process of deleting an account, which is not always easy.

## USING THE APPLICATION

Certain features appear in each of the applications, which may indicate not only the popularity of certain solutions, but also their effectiveness. Panic Shield is quite minimalist in the number of features, while Clear Fear offers a great deal of capabilities, comparable to Rootd and Dare.

Firstly, a recurring feature is breathing exercises. They usually involve similar principles, i.e. helping the user to breathe evenly, often with the support of animation. Using it may help the person to focus on their breathing and calm down faster. This function corresponds to a category of applications that we have named stress relief. Secondly, all apps offer an option to monitor statistics and history of exercise. Some of them show time summaries of anxiety levels, stress, emotions felt. Others focus on noting how often specific functions were used. These functions, in turn, correspond to a category of applications that we have named mood tracking.

All of the apps, except Panic Shield, provide the ability to keep a diary, which also corresponds to mood tracking. Rootd encourages the user to use it through prompts and questions, such as listing things that were accomplished today. Dare works on a similar principle and asks about today's successes or to reflect on what

[4] However, this does not apply to Rootd, as an attempt to use it on a smartphone other than the original one failed. The information entered was not transferred.

could have been done differently. Clear Fear, on the other hand, allows users to add diary entries after performing an activity, such as breathing exercises. A journal is a solution that gives the user a reflection of how they are feeling. It helps organize thoughts and emotions in such a way that they can be written down. Thus, it may allow to discharge of negative feelings, as well as to be able to look at all entries from a different perspective. Both statistics and a diary can perform similar functions of keeping track of one's well-being.

Audio recordings are available in two apps: Rootd and Dare, with the difference being that Dare offers materials that are more varied depending on what the user needs at the time (e.g. to stay calm before a plane trip). They take the form of guides or meditations. Rootd provides calming recordings in the form of melodies, nature sounds, etc., but also offers recordings to help the user focus on their body. These functions correspond to the mindfulness category.

Another issue is notifications,[5] which only appear with two apps: Rootd and Dare. They are similar in form, with motivational overtones and inspirational quotes. They may serve not only to uplift the user, but also as a reminder about the app and usage. In all apps, the user can set reminders themselves for specific activities, such as a journal entry, but these are notifications that appear with the user's permission. In addition, they are only of a signaling nature. These functions play a supportive role to the core functions, providing comprehensive solutions to counteract or relieve symptoms, and the symptom catalogue may be different for each user.

## SUSPEND USE AND EXIT THE APPLICATION

Neither app tries to directly prompt the user to re-enter. Rootd and Dare do send notifications, but they appear whether the app is used or not. Since Clear Fear and Panic Shield don't require registration, leaving simply involves uninstalling from the smartphone's home screen or the Google Play/App Store. When deleting an account on Rootd, user needs to send an email to the appropriate person and then wait for a response. However, before proceeding to this step, the app tries to stop the user by showing a notification: "Are you sure? We're sorry to see you go", using the language's impressive function. By alluding to the emotional realm, it suggests to the user that they should reconsider their choice. Dare similarly asks the user to confirm the deletion of the account, but with less emotional tone. It notifies the user that the process is irreversible, which might make the message more powerful.

[5] Notifications appearing while not using an application in the notifications window.

## OTHER ELEMENTS

There are a few more distinctive elements that can have a significant impact on the app's reception. For example, Rootd, Dare and Clear Fear use colorful silhouettes, resembling neither human nor animal. Clear Fear includes the most of them, with each feature having a corresponding figure. A possible reason for this is the app's accessibility to young audiences. This type of solution might deprive them of the austere, medical character that medical apps often have.

Rootd and Dare require users to be of legal age. Both nevertheless remain with the use of colorful graphics. Even if they are not aimed at children, adults can also appreciate this treatment, which can make using the app more enjoyable. In the basic versions of the app, their color scheme oscillates between different shades of blue and purple. Although the meaning of colors varies according to culture or one's own experience, there are some common elements. Generally, the findings revealed a significant correlation between color blue and positive emotions, which may be attributed to the association with experiences of a clear sky or cleanliness. However, blue also exhibit for a connection with sadness (27% of the participants indicated this) what can be understood in the context of color expressions such as "feeling blue" in English (Jonauskaite et al., 2020). It is possible that this color of the app was chosen because of the associations it evokes. A person using an app intended to help with anxiety disorders uses it most often when they feel the need to do so. This is usually precisely when they feel depressed, hence color blue is more in line with their emotions.

The second color, purple, is unique in terms of how it is associated. Empirical studies have suggested that purple carries idiosyncratic emotion and purple does not carry widely shared associations with emotion concepts. Therefore, it is possible that purple is the most affectively neutral or the most affectively ambiguous color (Jonauskaite et al., 2020). Purple does not evoke specific feelings or specific associations. Its use does not carry much risk and seems a safe choice for this type of application.

Color personalization was available in three apps, in different forms. Rootd only offers to change the theme to a dark one, but only for premium users. Panic Shield allows to change the color in one of its functions, which is respawning. Clear Fear, on the other hand, gives a choice of three themes: blue turning to purple, red turning to blue, and orange turning to blue. This is not a particularly important option in apps, but knowing how color can affect emotional perception, the ability to personalize the look can be a positive element. The user gains the ability to tailor the app to their own preferences.

## DISCUSSION

The conducted research allowed to answer three questions: 1) What functionalities do mental health apps offer users?; 2) What is the premise of the applications and the context of their operation?; 3) Which elements of the apps have the potential to have a positive and which have a negative impact on users? For this purpose, the operation and design of a selection of four apps were analyzed using the walkthrough method: Rootd – Relief from Anxiety & Panic; Dare: Anxiety and Panic Attacks; Clear Fear; and Panic Shield.

According to analysis basic feature offerings included built-in breathing exercises, journaling, statistical analysis, and in some cases notifications. The apps used proven methods of psychotherapy, i.e. Cognitive Behavioral Therapy (Drissi et al., 2020), mindfulness techniques and mood tracking and provided immediate help in a moment. These elements can positively respond to the needs of users based on their problems and accompanying symptoms. What we have observed as a negative is luck of long-term support. In addition, the analyzed applications raise data protection concerns, which, in the case of applications serving such sensitive issues, can be objectionable.

The results indicate that the studied apps try to help users both during a panic attack or anxiety state, and care about education that can help counteract such disorders, having both medical, psychological and pedagogical qualities. With a proper knowledge, the user can recognize symptoms and respond accordingly. In doing so, the apps mostly use proven tactics, including psychotherapy methods, and their ability to be effective depends on the designed affordances.

The mobile apps studied aim precisely to educate the user, relying on knowledge and experts as an important context of use. Situating the application in a specialized context is more likely to convince the user to use and increase the effectiveness of the application. Capabilities of technology are presented as scientifically grounded and can inspire greater trust and commitment.

The manufacturers of the third one have included on their websites information about the studies conducted or introduced the specialists who collaborated in the development of the application. The Rootd efficacy study was conducted by the Theoretical and Applied Neuroscience Laboratory and the Krigolson Lab at the University of Victoria. Dare also introduces on its website the consultants who worked on the application. They included a cardiology specialist, an integrative psychotherapy and sleep specialist, a licensed clinical social worker and a licensed therapist.[6] Clear Fear, in its FAQ section, provides a brief description of the study conducted on 14 young people and reports on another ongoing study.[7] Only

[6] https://www.dareresponse.com/advisory-board/

[7] https://www.clearfear.co.uk/faqs/

the Panic Shield application does not provide any evidence of either collaboration with professionals or research conducted on it.

Functions that can have a positive effect on the user relate to recording their thoughts and emotions or answering the questions posed what confirmed previous studies (Bakker et al., 2016). This is a way to actively track one's experiences and notice certain patterns. Through descriptions, explanations and/or audio recordings, the user is instructed and encouraged to use a specific method to combat anxiety. Among the primary techniques used are breathing techniques. It is worth noting that the ease of following specific instructions may depend on the preferred style of perception and learning (visual, auditory). This does not change the fact that providing the user with step-by-step explanations and direction has the potential for strong affordance – an incentive to follow instructions.

The basis for affordance is often an animation illustrating the method. This can facilitate understanding of the technique, speed up implementation, and, thus, achieve a calming effect. There are not only instructions, meditations, but also recordings of sounds or music. Audio recordings also allow reception during other activities, which is an affordance to be used in different circumstances.

Another technique used is the user diary. In case of two apps affordances in the form of notifications appear via prompts and questions. The user is "pushed" toward self-reflection and increasing self-awareness. By stimulating comparisons – before and after; observing change; appreciating successes, the app can support the user's progress against anxiety.

An important functionality is statistics, which may provide an affordance for more long-term use and observing one's trends. Visualizing the history and current situation contextualizes the user's condition, which can help understand and progress in therapy. It can indicate the effectiveness or otherwise of techniques used and their frequency and quality of application.

Notifications are not a common functionality of the studied apps. However, when they do occur, they are inspirational rather and results from a choice made by the user. It is important to consider whether it would be appropriate to solicit a user suffering from anxiety, especially at a time when anxiety is not present. Therefore, the lack of such notifications can be seen as an affordance to mute, to temporarily disconnect from the problem when it is not occurring.

The apps studied use of humanized characters who, by accompanying the user, were expected to make the process of using the app easier, more enjoyable and more emphatic but the personalization of the studied applications is very limited. Meanwhile, users often face barriers to sustained use, and request enhanced, personalized experiences (Balaskas et al., 2021). Most mental health apps are commonly free (Marshall et al., 2019b), which is also partially confirmed by our study. The four apps studied offered free features and only some items appeared to be paid. However, this did not limit the user, allowing them to use the apps

without having to pay what makes apps financially available and inclusive. Despite the different business models, some applications can be used free of charge in the basic version. This is a big incentive to use; and if satisfied, to use the premium version, which offers more. In terms of their accessibility, simplicity and ease of use, the apps studied were not difficult to navigate and had a clear interface. At times, Rootd and Dare could prove to be quite overwhelming due to the numerous notifications or pop-up windows.

It was also confirmed that challenges such as data security need to be addressed (Marley, Farooq, 2015). What can be inhibiting is the need to create an account (provide data) for some of the apps studied. The user may be concerned about cooperation with third-party applications. Privacy in a special issue as intimate and personal as mental health can be compromised, or at the very least, be unclear, which can raise user concerns or discourage regular use.

## CONCLUSIONS

In summary, the basic functional affordances of the studied apps are pedagogical in nature, by educating the user, instructing in support techniques, e.g. breathing, stimulating their self-reflection, stimulating their use of the app, which are functionalities of the app and at the same time possibilities of action, mainly temporary. However, there are very few affordances of long-term support.

The context of use is related to disorder, but at the same time, due to the operational model of the application, it concerns the risk of data protection and privacy violations. Capabilities of technology emerge from the intersection of function and design (including colors, animated characters), which generally meet the needs of the person suffering from anxiety disorders.

Noteworthy is the cooperation declared by the creators with specialists in psychiatry, psychology or related fields. The designers of the studied apps declared that they were created under the supervision of qualified people. The techniques described in the previous research mostly overlap with those used in the applications analyzed (Drissi et al., 2020). Cognitive Behavioral Therapy (CBT), mindfulness techniques, mood tracking or diary keeping appear. Assuming that all the apps were created with the participation of specialists or subjected to research, it is possible to identify these techniques as the most popular or showing high effectiveness.

Apps to help with anxiety disorders and panic attacks had both many similarities and many differences. Most often, they coincided in terms of the app's functions. Their assumptions were based on the opinions of specialists and recognized methods of psychotherapy. Visually, they also had similar color schemes and used characters that were similar in shape and color. On the other hand, they differed in terms of the operating model, registration or suspend use/drop application. In

addition, they had a varying number of options, e.g. Panic Shield offered only four functions, while the rest had many more.

Issues such as security, data sharing, privacy, etc. are just as important as the features offered by the apps, and the former can sometimes be objectionable (Marshall et al., 2019b). It can be important for people struggling with anxiety disorders to remain anonymous and protect the information they provide. However, not all apps take this into account. Rootd works with third parties (including vendors, service providers, advertisers), sharing some data with them. Dare, on the other hand, has a brief privacy policy that applies to many apps at once. It assures that user information is not collected but lacks specifics. Most of the apps did not have a privacy policy or terms of agreement despite the obligation to make them available on online store platforms (Robillard et al., 2019). Our study shows similar results in this respect.

Finally, it is worth mentioning the limitations of this study, which included the single method adopted, which can be supplemented by other qualitative (individual interviews, focus group interviews, experiments) or quantitative research methods (statistical surveys of users). The corpus was also limited. Comparative research on a wider corpus of apps could have revealed many more similarities, differences, potentials, but also dangers of using the applications. It is worthwhile to develop different aspects of research into mental health applications. Due to legal considerations, each app should have its own privacy policy and terms and conditions that clearly define the requirements and responsibilities of both developers and users. In the case of apps dealing with such sensitive and complex issues, it is important to take care of the security of the users. The data they transmit should be properly protected and give the user the opportunity to decide whether they want to save it. It is also important to consider the ethical issues surrounding app design and sharing. An analysis of privacy policies or terms and conditions of use can illuminate practices regarding possible liability or lack thereof in the event of unexpected consequences of app use. That sphere requires further research and supervision by relevant institutions. To better understand users, it would be beneficial to study what their preferences are: whether they care about anonymity, what their ideas about privacy are, whether they are willing to spend money in exchange for more features, etc. Another study that could prove beneficial in this field would be an analysis to answer the question of whether apps could become an adjunct to traditional psychotherapy, and whether and what their functions would be most effective in this case.

This study has expanded knowledge of the mental health app market, providing information on what their main goals and objectives are, and by what means they are pursued. It identified which elements of the apps can affect the user negatively and which positively, indicating the potential for complementing or replacing psychotherapy, as well as defining therapeutic as well as educational

elements, providing knowledge at the intersection of IT, psychology, pedagogy, medicine and communication studies. The research also provided practical information useful for developers of mental health-related applications. The development of such an app should be supervised by a qualified professional and be based on proven methods of therapy and user education. The apps studied mostly manifested all of these elements.

## REFERENCES


Aitken, M., Lyle, J. (2015). *Patient Adoption of Health*. IMS Institute. Retrieved from: https://www.iqvia.com/-/media/iqvia/pdfs/institute-reports/patient-adoption-of-mhealth.pdf (access: 18.09.2023).

Anxiety and Depression Association of America. (n.d.). *Panic Disorder*. Silver Spring. Retrieved from: https://adaa.org/sites/default/files/panic-brochure.pdf (access: 15.11.2022).

Bakker, D., Kazantzis, N., Rickwood, D., Rickard, N. (2016). Mental health smartphone apps: Review and evidence-based recommendations for future developments. *JMIR Mental Health*, *3*(1), e7.

Balaskas, A., Schueller, S.M., Cox, A.L., Doherty, G. (2021). The functionality of mobile apps for anxiety: Systematic search and analysis of engagement and tailoring features. *JMIR mHealth and uHealth*, *9*(10).

Borghouts, J.E. Elizabeth, V., Mark, G., De Leon, C., Schueller, S.M., Schneider, M., Stadnick, N., Zheng, K., Mukamel, D.B., Sorkin, D.H. (2021). Understanding mental health app use among community college students: Web-based survey study. *Journal of Medical Internet Research*, *23*(9). Retrieved from: https://www.jmir.org/2021/9/e27745 (access: 18.09.2023).

Cai, W., McKenna, B., Waizenegger, L. (2010). Turning it off: Emotions in digital-free travel. *Journal of Travel Research*, *59*(5), 909–927. DOI: 10.1177/0047287519868314

Carrouel, F., du Sartz de Vigneulles, B., Bourgeois, D., Kabuth, B., Baltenneck, N., Nusbaum, F., Burge, V., Roy, S., Buchheit, S., Carrion-Martinaud, M.L., Massoubre, C., Fraticelli, L., Dussart, C. (2022). Mental health mobile apps in the French app store: Assessment study of functionality and quality. *JMIR mHealth uHealth*, *10*(10). Retrieved from: https://mhealth.jmir.org/2022/10/e41282 (access: 13.10.2023). DOI: 10.2196/41282

Clear Fear. (n.d.). *Frequently Asked Questions*. Retrieved from: https://www.clearfear.co.uk/faqs/ (access: 14.10.2023).

Clear Fear. (n.d.). *Google Play*. Retrieved from: https://play.google.com/store/apps/details?id=uk.org.stem4.clearfear (access: 22.03.2023).

Dare: Anxiety & Panic Attacks. (n.d.). *Google Play*. Retrieved from: https://play.google.com/store/apps/details?id=ie.armour.dare2 (access: 22.03.2023).

Diano, F., Ponticorvo, M., Sica, L.S. (2022, October). Mental health mobile apps to empower psychotherapy: A narrative review. In: *2022 IEEE International Conference on Metrology for Extended Reality, Artificial Intelligence and Neural Engineering (MetroXRAINE)* (pp. 306–311).

Drissi, N., Ouhbi, S., Idrissi, M.A.J., Ghogho, M. (2020). An Analysis on self-management and treatment-related functionality and characteristics of highly rated anxiety apps. *International Journal of Medical Informatics*, *141*. DOI: 10.1016/j.ijmedinf.2020.104243

Eurostat. (2020). *Number of Psychiatrists: How Do Countries Compare?* Retrieved from: https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/ddn-20200506-1 (access: 11.06.2022).

Faraj, S., Azad, B. (2012). The materiality of technology: An affordance perspective. In: P.M. Leonardi et al. (Eds.), *Materiality and Organizing: Social Interaction in a Technological World* (pp. 237–258). Oxford Academic. DOI: 10.1093/acprof:oso/9780199664054.003.0012

Federal Trade Commission. (1998). *Statute of Children's Online Privacy Protection Rule*. USA. Retrieved from: https://www.ftc.gov/legal-library/browse/rules/childrens-online-privacy-protection-rule-coppa (access: 22.04.2023).

Garrido, S., Cheers, D., Boydell, K., Nguyen, Q.V., Schubert, E., Dunne, L., Meade, T. (2019) Young people's response to six smartphone apps for anxiety and depression: Focus group study. *JMIR Mental Health*, *6*(10). Retrieved from: https://mental.jmir.org/2019/10/e14385 (access: 18.09.2023). DOI: 10.2196/14385

Gibson, J.J. (2014). *The Ecological Approach to Visual Perception: Classic Edition*. New York: Psychology Press. DOI: 10.4324/9781315740218

Grand View Research. (2022). *Mental Health Apps Market Size Report, 2022–2030*. Retrieved from: https://www.grandviewresearch.com/industry-analysis/mental-health-apps-market-report (access: 11.06.2022).

Hull, M., Jenni, J. (2022). *Anxiety Disorders Facts and Statistics*. The Recovery Village. Retrieved from: https://www.therecoveryvillage.com/mental-health/anxiety/anxiety-disorder-statistics/ (access: 30.04.2023).

Hutchby, I. (2001). Technologies, texts and affordances. *Sociology*, *35*(2), 441–456. DOI: 10.1177/S0038038501000219

Iqbal, M. (2023). *App Revenue Data (2023)*. Business of Apps. Retrieved from: https://www.businessofapps.com/data/app-revenues/ (access: 30.03.2023).

Jennings J.L., Apsche J.A., Blossom, P., Bayles, C. (2013). Using mindfulness in the treatment of adolescent sexual abusers: Contributing common factor or a primary modality? *International Journal of Behavioral Consultation and Therapy, 8*(3–4), 17–22. DOI: 10.1037/h0100978

Jonauskaite, D., Parraga, C.A., Quiblier, M., Mohr, C. (2020). Feeling blue or seeing red? similar patterns of emotion associations with colour patches and colour terms. *I-Perception*, *11*(1). DOI: 10.1177/2041669520902484

Jonge, P., de Roest, A.M., Lim, C.C.W., Levinson, D., Scott, K.M. (2018). Panic disorder and panic attacks. In: K.M. Scott et al. (Eds.), *Mental Disorders Around the World: Facts and Figures from the WHO World Mental Health Surveys* (pp. 93–105). Cambridge: Cambridge University Press. Retrieved from: https://www.cambridge.org/core/books/mental-disorders-around-the-world/panic-disorder-and-panic-attacks/7D831D9449353B153BD6818BFEE958F2 (access: 21.09.2023). DOI: 10.1017/9781316336168.007

Kędzierski, M. (2022). *Zestawienie liczbowe lekarzy i lekarzy dentystów wg dziedziny i stopnia specjalizacji*. Warszawa: Naczelna Izba Lekarska. Retrieved from: https://nil.org.pl/uploaded_files/1667386027_zestawienie-nr-4-za-pazdziernik-2022.pdf (access: 17.11.2022).

Kircanski, K., LeMoult, J., Ordaz, S., Gotlib Ian, H. (2017). Investigating the nature of co-occurring depression and anxiety: Comparing diagnostic and dimensional research approaches. *Journal of Affective Disorders*, *216*. Retrieved from: https://www.sciencedirect.com/science/article/abs/pii/S0165032716303962 (access: 15.09.2023). DOI: 10.1016/j.jad.2016.08.006

Kroplewski, Z., Serocka, A., Szcześniak, M. (2019). *Wsparcie społeczne a poczucie sensu życia u osób z zaburzeniami lękowymi – doniesienie wstępne*. *Psychiatria Polska*, *53*(2), 313–324. Retrieved from: https://www.psychiatriapolska.pl/Social-support-and-sense-of-life-in-patients-with-anxiety-disorders-preliminary-report,81447,0,1.html (access: 21.10.2022). DOI: 10.12740/PP/81447

Light, B.A., Burgess, J.E., Duguay, S. (2018). The walkthrough method: An approach to the study of apps. *New Media and Society*, *20*(3), 881–900.

Lui, J.H., Marcus, D.K., Barry, C.T. (2017). Evidence-based apps? A review of mental health mobile applications in a psychotherapy context. *Professional Psychology: Research and Practice*, *48*(3), 199–210.

Majchrzak, A., Faraj, S., Kane, G.C., Azad, B. (2013). The contradictory influence of social media affordances on online communal knowledge sharing. *Journal of Computer-Mediated Communication*, *19*(1), 38–55. DOI: 10.1111/jcc4.12030

Marley, J., Farooq, S. (2015). Mobile telephone apps in mental health practice: Uses, opportunities and challenges. *The Psychiatric Bulletin*, *39*(6), 288–290. DOI: 10.1192/pb.bp.114.050005

Marshall, J.M., Dunstan, D.A., Bartik, W. (2019a). Clinical or gimmickal: The use and effectiveness of mobile mental health apps for treating anxiety and depression. *Australian & New Zealand Journal of Psychiatry*, *54*(1), 20–28, DOI: 10.1177/0004867419876700

Marshall, J.M., Dunstan, D.A., Bartik, W. (2019b). The digital psychiatrist: In search of evidence-based apps for anxiety and depression. *Frontiers in Psychiatry*, *10*. DOI: 10.3389/fpsyt.2019.00831

Medical Subject Headings. (2023). *Panic disorder*. National Library of Medicine. Retrieved from https://meshb.nlm.nih.gov/record/ui?ui=D016584 (access: 22.08.2023).

Michaels, C., Carello, C. (1981). *Direct Perception*. New Jersey: Prentice-Hall.

National Health Service. (2023). *Panic disorder*. Retrieved from: https://www.nhs.uk/mental-health/conditions/panic-disorder/ (access: 14.09.2023).

Neary, M., Schueller, S.M. (2013). State of the field of mental health apps. *Cognitive and Behavioral Practice*, *25*(4), 531–537. DOI: 10.1016/j.cbpra.2018.01.002

Norman, D.A. (1999). Affordance, conventions, and design. *Interactions*, *6*(3), 38–43. DOI: 10.1145/301153.301168.

Panic Shield. (n.d.). *Google Play*. Retrieved from https://play.google.com/store/apps/details?id=com.panic.shield (access: 22.03.2023).

Robillard, J.M., Feng, T.L., Sporn, A.B., Lai, J., Lo, C., Ta, M., Nadler, R. (2019). Availability, readability, and content of privacy policies and terms of agreements of mental health apps. *Internet Interventions*, *17*. DOI: 10.1016/j.invent.2019.100243

Rootd – Relief from Anxiety and Panic. (n.d.). *Google Play*. Retrieved from: https://play.google.com/store/apps/details?id=com.rootd (access: 22.03 2023).

Sadock, B.J., Sadock, V.A., Belkin, G.S. (2010). *Kaplan & Sadock's Pocket Handbook of Clinical Psychiatry*. Philadelphia: Williams & Wilkins Co.

Schueller, S.M., Neary, M., O'Loughlin, K., Adkins, E.C. (2018). Discovery of and interest in health apps among those with mental health needs: Survey and focus group study. *Journal of Medical Internet Research*, *20*(6), e10141.

Van Singer, M., Chatton, A., Khazaal, Y. (2015). Quality of smartphone apps related to panic disorder. *Frontiers in Psychiatry*, *6*. DOI: 10.3389/fpsyt.2015.00096

Volkoff, O., Strong, D.M. (2013). Critical realism and affordances: Theorizing it-associated organizational change processes. *Management Information Systems Quarterly*, *37*(3), 819–834. DOI: 10.25300/MISQ/2013/37.3.07

We Are Social. (2022). *Digital 2022: Another Year of Bumper Growth*. Retrieved from: https://wearesocial.com/uk/blog/2022/01/digital-2022-another-year-of-bumper-growth-2/ (access: 11.06.2022).

World Health Organization. (2023). *International Statistical Classification of Diseases and Health Problems ICD-11*. Geneva. Retrieved from: https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/1336943699 (access: 15.11.2023).

## ABSTRAKT

Biorąc pod uwagę rosnącą liczbę osób cierpiących na zaburzenia lękowe oraz zwiększające się zainteresowanie technologiami w obszarze zdrowia psychicznego, przedmiotem badania była analiza aplikacji mobilnych wspierających użytkowników z zaburzeniami lękowymi, w szczególności z napadami paniki. Celem badania było określenie funkcjonalnych afordancji wybranych aplikacji mobilnych poprzez analizę ich trzech wymiarów: możliwości technologicznych, kontekstu użycia i możliwości działania użytkownika. Analiza została wykorzystana do odpowiedzi na trzy pytania: 1) Jakie funkcjonalności oferują użytkownikom te aplikacje?; 2) Jakie jest założenie aplikacji i kontekst ich działania?; 3) Które elementy aplikacji mogą mieć pozytywny, a które negatywny wpływ na użytkowników? W tym celu przeanalizowano działanie i *design* wybranych czterech aplikacji z zastosowaniem metody *walkthrough*: Rootd – Relief from Anxiety & Panic; Dare: Anxiety and Panic Attacks; Clear Fear oraz Panic Shield. Stwierdzono, że podstawowe funkcje aplikacji obejmowały wbudowane ćwiczenia oddechowe, prowadzenie dziennika, analizę statystyczną, a w niektórych przypadkach także powiadomienia. Badane aplikacje wykorzystywały sprawdzone metody psychoterapii, tj. terapię poznawczo-behawioralną, techniki uważności i śledzenie nastroju. Aplikacje zapewniały natychmiastową pomoc w danej chwili, ale nie długoterminowe wsparcie. Ponadto analizowane aplikacje budziły obawy związane z ochroną danych osobowych.


**Słowa kluczowe:** aplikacje mobilne; ataki paniki; lęk; zaburzenia lękowe; metoda *walkthrough*