

Curing or triggering mental health challenges?

*A qualitative research study on consumer experience with the use of mHealth in the context of
mental health disorders*



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Master's Thesis in Marketing

Radboud University

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1. Introduction

In July 2023, the European Parliament issued a briefing, characterizing mental health as a major public, economic, and social concern, with over 84 million people potentially facing mental health challenges (European Parliament, 2023). Specifically, eating disorders are highlighted as a growing issue, with an estimated 20 million European individuals affected by the end of 2021. Studies report that requests for help in the context of anorexia are increasing (Zambelli, 2021). Mental health disorders have both individual and societal consequences, in particular disability and premature mortality (Rehm & Shield, 2019). Given the gravity of these consequences, it is crucial to address the needs of individuals facing mental health challenges. However, the demand for mental help is too high at this moment, and cannot be covered by the number of psychologists and psychiatrists, especially after the COVID-19 pandemic (Sheikh et al., 2023). Beyond issues of availability, financial barriers further impede individuals from obtaining the support they need (Bouckaert et al., 2023).¹

mHealth innovations offer tools to address (mental) health issues. The World Health Organization defines mHealth as “medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, Personal Digital Assistants (PDAs), and other wireless devices” (World Health Organization, n.d.). mHealth features range from passive (e.g., one-way SMS and messaging, electronic diary systems, bluetooth connectivity, and reminders) to interactive (e.g., prompts, treatment plans, personalized goals, two-way and/or tailored SMS and messaging, uploading data to healthcare providers, and clinical decision support systems) (Donevant et al., 2018). Examples include the heart rate monitor integrated into an Apple Watch, which presents data in the ‘Apple Health’ app on compatible iPhone devices and can be used for heart-rate monitoring both by users interested in general fitness and users interested in managing a cardiovascular and related diseases (Apple, 2022). Other mHealth innovations are designed specifically for managing health disorders, such as ‘Recovery Record’ for eating disorder recovery (Recovery Record, 2024). These advancements in technology provide a path forward in bringing the gap between demand and availability of (mental) health support.

The proliferation of mHealth applications (apps) is evident, with a continuous expansion in their numbers (IQVIA, n.d.). This trend is paralleled by an increase in global smartphone

¹ ChatGPT was employed to assess the writing style in this paragraph. The following prompt was applied, "Can you evaluate my writing style for my Master's Thesis, and can you give an example of how this text could be improved?" After critically reflecting on the answer, inspiration was drawn for tactics to shorten sentences, and adopt a more formal tone. These insights were utilized throughout the rest of the text.

ownership, projected to reach 6.84 billion by the close of 2023, and annual growth rate exceeding 5% over the preceding five years (Howarth, 2021). Increasing smartphone penetration and the expansion of mHealth apps suggests a shift towards enhanced accessibility and cost-effectiveness in healthcare delivery (Akter & Ray, 2010; Musiat & Tarrier, 2014).²

mHealth innovations have proven effective within various health sectors. A meta-analysis of studies on the efficacy of mental health apps has shown that apps designed for the management of depressive symptoms, anxiety, or substance use, contribute to a significant decrease in these symptoms (Donker et al., 2013). Studies comparing multiple research projects on the effectiveness of mHealth targeting obesity and diabetes, find that more than 50% report positive effects on blood glucose reduction, weight loss, and weight maintenance (Wang et al., 2017). Individual apps that fall under this heading also contribute to consumer adherence to a healthy diet in general (Laing et al., 2014; Partridge et al., 2016). On top of that, studies on mHealth addressing the effectiveness of apps supporting sedentary behavior show that mHealth can make an impact on this behavioral change and hence the cardiometabolic risk factors (Wang et al., 2021). Several areas of health care could thus be effectively addressed by mHealth apps.

Despite the positive health effects of using mHealth, it can produce negative psychological outcomes. Lindgreen and colleagues (2018) found that mHealth tailored for eating disorder recovery management, triggered obsessive activity logging. Furthermore, Levinson and colleagues (2017) found that 73% of eating disorder patients felt calorie tracking apps contributed somewhat to their eating disorder. In another study on how these patients engage with diet and fitness apps, Eikey (2021) found that users experienced both positive and negative emotions, such as accomplishment and guilt or embarrassment. Hence, using mHealth might also have negative effects on users.

These conflicting outcomes corresponds to the notion that technology use can trigger both positive and negative experiences. Within the research of consumer experience, Mick and Fournier (1998) have investigated the paradoxical nature of technology use, noting that consumers tend to have antithetical experiences when using technological devices. They found that these thoughts and emotions co-exist and that consumers must constantly navigate between them, which results in feelings of tensions: For example, by using technologies as computers or washing machines, consumers can simultaneously experience a sense of control as well as chaos, and of independence as well as dependence (Mick & Fournier, 1998). Consumers experiencing paradoxical tensions employ various strategies to cope with them (Mick &

² Idem

Fournier, 1998). For example, a study on the use of mHealth for physical health purposes has shown that consumers may decide to stop using mHealth apps in attempt to address the experience of tension between feeling in control while also feeling obsessed in using the app (Blazevic & Klintwort, 2019). Consumers thus have both positive and negative experiences when using technologies.

Despite research evidence showing that the use of mHealth in the context of mental health issues triggers both positive and negative outcomes, there is a lack of research on the experience of tension formed by such antithetical outcomes and on mental health patients using mHealth respond to it. To address this gap, this study draws upon literature on technology paradoxes (Mick & Fournier, 1998). More specifically, it draws upon the notion of antithetical, positive and negative outcomes co-existing and forming paradoxical tensions and the notion of coping responses elicited as an attempt to eliminate the tension (Blazevic & Klintwort, 2019; Jarvenpaa & Lang, 2005; Mick & Fournier, 1998; Wilson-Nash & Tinson, 2022). This research aims to contribute to the expanding body of knowledge and address this gap in understanding by focusing on the experience of using mHealth in the context of eating problems. The study will attempt to answer the following research questions:

RQ1: How do users with eating problems experience the use of mHealth apps?

RQ2: How do users with eating problems manage their experience of using mHealth apps?

Exploring patient's experience with the use of mHealth in the context of mental health issues is scientifically and socially relevant. Recent research on consumer experiences with digital technologies, such as personalized content, facial recognition technologies, and chatbots highlight the need for further exploration (Lambillotte & Poncin, 2023; Liu et al., 2022; Rajaobelina et al., 2021). Specifically, recent studies on consumer experiences with mHealth technologies call on further advancements in this technological area (Aboelmaged et al., 2022; Costa Figueiredo et al., 2018; Feng et al., 2021). However, understanding the conflicting experiences of users with mental issues, and how they use mHealth to cope with them, remains limited. This study aims to fill that gap. Moreover, the increasing number of smartphone users provides broader access to mHealth apps, which could help meet the growing demand for mental health support. However, current mHealth apps may not fully account for the unique needs and conflicting experiences of users with mental health challenges. Shortcomings in research make it challenging to understand whether mHealth apps are assisting users with mental health symptoms to improve their situation. This study aims to gain valuable insights on

this matter and provide practical implications to managers of mHealth apps. Therefore, conducting this study is of societal and scientific relevance.

The remaining of this paper is organized into four chapters. Chapter two provides a discussion of existing research on mHealth experiences, and the theoretical lens used to answer the research questions. More specifically, research findings about the outcomes of mHealth in the context of mental health, and specifically in the context of eating problems are discussed. Following this, the chapter will outline the paradox theory of Mick and Fournier (1998), extended by Blazevic and Klintwort (2019). Chapter three discusses the methodology that is applied to answer the research questions. It addresses which research method is applied, and answers which sample, and measures are used. The following sections cover the data analysis and procedure and address ethical considerations. The fourth chapter discusses the results of this study, supplemented with illustrative quotes from interviews. Initially, motives for using mHealth are examined, followed by a discussion of conflicting consumer experiences and strategies to cope with tension arising from them. The final chapter of this thesis includes a discussion of the findings, and practical and theoretical implications. Furthermore, this chapter critically examines the limitations of this study and provides avenues for future research.

2. Theoretical background

2.1. mHealth in the context of mental health challenges

The immense impact of mental health issues today can be partially addressed through mHealth innovations. The number of mHealth apps is growing rapidly. In 2017, approximately 200 new mHealth apps were introduced daily (IQVIA, n.d.). By 2022, there were an estimated 350,000 downloadable mHealth apps (Wells & Spry, 2022). Compared to traditional (mental) health care, mHealth innovations offer several operational benefits, including unlimited capacity, 24/7 availability, equity, immediate support, anonymity, tailored approaches, lower costs, and integration with other systems (Olf, 2015). Hence, advancements in mHealth technology could potentially address some requests for mental health support.

mHealth innovations can help users manage both physical and mental health, through interfaces such as wearable features or smartphone apps. For example, 'Fitbit' wearables enable passive activity tracking and transmit insights to one's smartphone. Consumers can see insights on sleep quality, calorie burn, and step count, for example (Fitbit, n.d.). 'StressFace' is another example of passive mHealth, tracking heart rate variability to assign stress scores and issue warnings (Yingchi Wang, n.d.). Additionally, there is mHealth apps that require users to provide information manually. An example of active mHealth is 'Recovery Record', facilitating the recovery management of eating disorders by enabling features such as emotion tracking and goal setting (Recovery Record, 2024). mHealth innovations can thus take shape in different forms.

The efficacy of mental health apps can be evaluated through their impact on users' psychological outcomes. In their pilot trial on an mHealth app aimed at stress reductions, Lee and Jung (2018) found that short-term use of mHealth for stress reductions, led to lower stress, reduced trait anxiety, and increased energy and productivity. Similarly, O'Dea et al. (2020) found that the use of an app designed to address depression and other mental health challenges, positively impacted wellbeing, reduced depressive symptoms and psychological distress, and increased wellbeing and belongingness. Meta-analyses of studies on individual mental health apps also report significant positive effects on health conditions, with moderate effects on stress, insomnia and burnout, and minor treatment effects on reducing depression and anxiety, and on increasing well-being, and mindfulness (Phillips et al., 2019). Several studies have therefore proven the potential effectiveness of mHealth apps.³

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However, direct negative psychological outcomes for consumers with mental health issues have also been associated with mHealth apps. Lindgreen and colleagues (2018) found that some eating disorder patients felt that recovery apps were obstructive to daily life, causing feelings of surveillance and obsessive activity logging. Furthermore, negative psychological outcomes are also observed with the use of generic mHealth apps. Activity and nutrition tracking can “trigger, maintain, or exacerbate eating disorder symptomatology” (Simpson & Mazzeo, 2017, p. 89). In a study on the effects of diet and fitness apps on eating disorder patients, Eikey (2021) conceptualized eight negative consequences, namely: fixation on numbers, rigid diet, obsession, app dependency, high sense of achievement, extreme negative emotions, motivation from ‘negative’ messages, excess competition. Simpson and Mazzeo (2017) suggest that this negative impact on eating disorder patients might result from the fact that trackers in these types of interfaces are always on and never imply rest. Therefore, in the context of mental health problems, studies find that mHealth might also have negative effects on these users.⁴

2.2. Paradoxical tensions of (mHealth) technologies

The positive and negative effects of mHealth apps on patients with mental health challenges, such as eating problems, align with findings about other users’ experience with mHealth technologies and other technologies. Mick and Fournier (1998) were the first to apply the paradox concept to understand consumer experiences with technology. A paradox is defined as: “something is both X and not-X at the same time” (Mick & Fournier, 1998, p. 125). Their study suggests that household technologies can simultaneously trigger both positive and negative feelings. For example, while using laptops or answering machines, consumers experience both positive feelings of control and the ability to successfully delegate tasks, as well as fear of being overtaken by technologies (Mick & Fournier, 1998). Mick and Fournier (1998) set out eight different paradoxes in customer experiences with household technology, which are outlined in Table 1 below.

improved?" After critically reflecting on the answer, inspiration was drawn for tactics to shorten sentences, and adopt a more formal tone. These insights were utilized throughout the rest of the text.

⁴ Idem

Table 1.*Paradoxes of technology outlined by Mick and Fournier (1998, p. 126)*

Paradox	Definition	Vs.	Paradox	Definition
Control	“Technology can facilitate regulation or order”	Vs.	Chaos	“Technology can lead to upheaval or disorder”
Freedom	“Technology can facilitate independence or fewer restrictions”	Vs.	Enslavement	“Technology can lead to dependence or more restrictions”
New	“New technologies provide the user with the most recently developed benefits of scientific knowledge”	Vs.	Obsolete	“New technologies are already or soon to be outmoded as they reach the marketplace”
Competence	“Technology can facilitate feelings of intelligence or efficacy”	Vs.	Incompetence	“Technology can lead to feelings of ignorance or ineptitude”
Efficiency	“Technology can facilitate less effort or time spent in certain activities”	Vs.	Inefficiency	“Technology can lead to more effort or time in certain activities”
Fulfills needs	“Technology can facilitate the fulfillment of needs or desires”	Vs.	Creates needs	“Technology can lead to the development or awareness of needs or desires previously unrealized”
Assimilation	“Technology can facilitate human togetherness”	Vs.	Isolation	“Technology can lead to human separation”
Engaging	“Technology can facilitate involvement, flow, or activity”	Vs.	Disengaging	“Technology can lead to disconnection, disruption, or passivity”

This study has inspired further research into paradoxes in different technology domains (e.g. Jarvenpaa & Lang, 2005; Johnson et al., 2008; San Pascual, 2016; Wilson-Nash & Tinson, 2022). Studies in marketing literature, integrating this lens in various technology contexts, define new paradoxes and highlight different sets out of the eight outlined by Mick and Fournier (1998). For example, research consumer experiences with self-service technology highlights control/chaos, fulfill needs/creates needs, and freedom/enslavement (Johnson et al., 2008). Meanwhile research on mobile parenting experiences of Filipino mothers highlight independence/dependence, competence/incompetence, and empowerment/enslavement (San Pascual, 2016). These differences are consistent with Mick and Fournier’s (1998) assertion that experiences may vary depending on the consumer’s context.

Jarvenpaa and Lang (2005) incorporated the technology, personal, organizational and cultural context, in exploring consumer experience with mobile technology. They mostly identified similar paradoxes as Mick and Fournier (1998), but found two new paradoxes as well: public/private and illusion/disillusion (Jarvenpaa & Lang, 2005). Public/private relates to private conversations taking place in public spaces, disturbing others (Jarvenpaa & Lang, 2005).

Illusion/disillusion refers to the anticlimax consumers feel when new mobile devices do not meet expectations (Jarvenpaa & Lang, 2005). They observed that consumers experience paradoxical tensions more intensely with mobile phones due to deep bonds they form with these devices.

An initial exploration of customer experience with mHealth through a paradox lens was conducted by Blazevic and Klintwort (2019). Using diary methods and semi-structured interviews, they explored the impact mHealth apps, primarily activity trackers, on users. They identified five paradoxes in these experiences: integration/disintegration, self-control/external control, confirmation/disconfirmation, individual/community, motivating/demotivating (Blazevic & Klintwort, 2019). For example, integration/disintegration refers to the experience that mHealth is easily integrated in the consumer’s life, but that it can also be difficult to integrate it in their life at the same time (Blazevic & Klintwort, 2019). Table 2 shows how the five paradoxes are set forth.

Table 2.

Paradoxes and definitions by Blazevic and Klintwort (2019, p. 24)

Paradox	Definition		Paradox	Definition
Integration	“The app is easily integrated into the user's life since it is easy to use.”	Vs.	Disintegration	“The app is not easily integrated into the user's everyday life.”
Self-Control	“Users use the app to control themselves and their performance.”	Vs.	External Control	“Users feel controlled and influenced by the app to some extent.”
Confirmation	“The app is used to confirm the users’ positive or negative feeling or behaviour by providing them with information.”	Vs.	Disconfirmation	“The app's results can also disconfirm the users’ feeling or behaviour. This can lead to either positive or negative sentiments.”
Individual	“Users use the app for themselves and not to share results or to connect with others within the app.”	Vs.	Community	“Users value the aspect that the app allows them to connect with friends and peers in the app and to share their experiences.”
Motivating	“The app motivates users to achieve a higher performance or to improve their lives.”	Vs.	Demotivating	“Users can feel demotivated by using the app especially if they did not achieve the performance they wanted.”

2.3 Coping with paradoxical tensions

Research on paradoxical tensions experienced with technology shows that consumers face anxiety or distress, and employ coping strategies to manage these feelings (e.g. Blazevic & Klintwort, 2019; Jarvenpaa & Lang, 2005; Mick & Fournier, 1998; Wilson-Nash & Tinson,

2022). Coping is defined as “the set of cognitive and behavioral processes initiated by consumers in response to emotionally arousing, stress-inducing interactions with the environment aimed at bringing forth more desirable emotional states and reduced levels of stress” (Duhachek, 2005, p. 42). Consumers of technologies thus employ management strategies to manage tension.

Initially emerged in psychological research on stress management, Lazarus and Folkman (1984) proposed a distinction between problem- and emotion-focused coping responses. Problem-focused coping involves taking action to alter the situation that is perceived as stressful (Lazarus & Folkman, 1984). For instance, if an individual perceives weight gain while standing on a scale, a problem-focused coping strategy might involve reducing calorie intake to address the perceived cause of stress. Emotion-focused coping, on the other hand, focuses on addressing negative feelings associated with the situation (Lazarus & Folkman, 1984). In the above scenario, an emotion-focused coping strategy might involve reassuring themselves by attributing the weight gain to natural factors such as hormonal fluctuations. This approach mitigates their emotional response to the situation rather than attempting to change the situation itself.⁵

Similar typologies have been proposed, such as approach and avoidance systems. According to this typology, the first system activates when individuals want to achieve a positive outcome; the second system activates when individuals want to stay away from negative outcomes (Carver & Scheier, 2012; Carver & White, 1994; Han et al., 2015). Duhachek (2005) investigated how consumers manage distressing events in consumption, such as negative interactions with banks or hotels, suggesting that these stressors can evoke feelings of threat, anger, sadness or challenge, prompting consumers to manage these experiences through active coping, expressive support seeking, or avoidance. Consumers employing active coping strategies attempt to control their own thoughts, whereas those employing expressive support seek assistance from others (Duhachek, 2005). Avoidance involves denying that the event took place (Duhachek, 2005).

While these typologies help understand coping responses in general consumer experiences, Mick and Fournier (1998) found that paradoxical experiences in technology consumption lead to anxiety and stress and consumers employ coping strategies to manage these tensions. More specifically, they suggest that technology consumers can apply two types of coping responses: avoidance mechanisms or confrontative mechanisms (Mick & Fournier,

⁵ Idem

1998). Avoidance strategies involve reducing technology-use or discontinue it altogether, while confrontative strategies involve making adjustments in the user’s own life (Mick & Fournier, 1998). Mick and Fournier (1998) elaborate on coping strategies for paradoxical tensions in the pre-acquisition stage, as well as in the consumption-stage. Given the focus of this study, the coping strategies applied in the consumption-stage will be discussed further. Table 3 below shows these six coping strategies, along with the emotional effects.

Table 3.

Consumption coping strategies by Mick and Fournier (1998, p. 133)

	Coping strategy	Definition
Consumption avoidance strategies	Neglect	“Showing temporary indifference toward a technological possession”
	Abandonment	“(1) Declining or discontinuing the use of a technological possession or (2) leaving a technological possession unrepaired if it has malfunctioned”
	Distancing	“(1) Developing restrictive rules for when or how a technological possession will or will not be used or (2) physically placing a technological possession in an unobservable or remote site”
Consumption confrontative strategies	Accommodation	“Changing tendencies, preferences, routines, etc., according to the perceived requirements, abilities, or inabilities of a technological possession”
	Partnering	“Establishing with a technological possession a close, committed relationship of heartfelt attachment
	Mastering	“Dominating a technological possession by thoroughly learning its operations, strengths, and weaknesses”

In their study on the paradoxical tensions in the domain of technology use by older consumers, Wilson-Nash and Tinson (2022) found that adjusting and accepting are also two coping strategies that consumers can employ to manage paradoxical tension. They define ‘adjusting’ as “Altering a technological possession in order to resemble familiar devices, software and past experiences” (Wilson-Nash & Tinson, 2022, p. 260). ‘Acceptance’ is defined as “Using previous experience and knowledge to accept the issues associated with using technological devices” (Wilson-Nash & Tinson, 2022, p. 260).

When we turn to coping strategies found in an exploration of customer experiences with mHealth, Blazevic and Klintwort (2019) identify the following strategies: discontinuing, adjusting, assuming responsibility, emotionally distancing and ignoring. The findings suggested that discontinuing was the most frequently employed coping strategy for managing paradoxical tensions arising from mHealth. This strategy involves stopping mHealth use, such as by deleting an app (Blazevic & Klintwort, 2019). Adjusting involves consumers “adjusting behaviors, mind-sets or habits” (Blazevic & Klintwort, 2019, p. 32) to manage paradoxical tension. Assuming responsibility involves users reminding themselves that users control their own actions, not the app (Blazevic & Klintwort, 2019). Emotionally distancing, represents a passive coping response where consumers consciously opt to abstain from (certain features of) the app (Blazevic & Klintwort, 2019). Lastly, ignoring is characterized by neglecting information that is communicated by the app. These coping strategies and their definitions are shown in Table 4 below.

Table 4.

Coping strategies in mHealth’s paradoxical tensions by Blazevic and Klintwort (2019, p. 32)

Coping strategy	Definition
Discontinuing	“Users stop using the app or turn off some of its functions.”
Adjusting	“Users adapt their behaviour, habits or mind-sets according to the perceived requirements of the app.”
Assuming responsibility	“Users assume responsibility for themselves and thereby stay in control.”
Emotionally distancing	“Users keep emotionally distant to the app and its functions.”
Ignoring	“Users ignore the app or avoid information provided by the app.”

3. Methodology

3.1 Research method

The objective of this study was to explore how users with mental health challenges experienced the use of mHealth apps and how they managed this experience. Qualitative empirical research deemed appropriate given the relatively limited body of knowledge on consumer experiences with mHealth (Dresing & Pehl, 2015). This method aims to gain insights into social phenomena by conducting interviews with individuals, allowing for the exploration and interpretation of real-world experiences and perspectives (Bleijenbergh et al., 2022). Conducting qualitative research does not require the formulation of hypotheses but does necessitate a clear objective beforehand (Cropley, 2002).

This study specifically focused on the experiences of mHealth of users with eating problems, a group whose understanding of their experiences are of significant social relevance. The COVID-19 pandemic has had its share of accelerating the impact of mental challenges, including eating problems. Furthermore, this group of mHealth consumers may consume both generic apps, such as Strava and MyFitnessPal, and apps specifically designed for eating problems. Hence, a focus on this consumer context is of societal relevance.

The research question was addressed through semi-structured interviews, a suitable research method for understanding consumer experiences as it allows analysis in the consumer's own words (Bleijenbergh et al., 2022). Semi-structured interviews offer flexibility, enabling the interviewer to deviate from predetermined questions and orders (Bleijenbergh et al., 2022; Myers, 2019). This approach facilitated the discovery of relevant insights that emerged during conversations while ensuring that the same topics were covered with all respondents (Bleijenbergh et al., 2022). The interview guide is provided in Appendix A (EN) and B (NL).⁶

3.2 Respondent recruitment and sampling

This study employed a non-probability, convenience sampling approach to recruit respondents with relevant knowledge and experience related to the phenomenon under study (Adeoye-Olatunde & Olenik, 2021; Flick, 2007). The targeted sample consisted of individuals diagnosed with an eating disorder or, if not diagnosed, experience severe eating problems. Whether the respondents had received treatment was not a criterion for participation, as

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treatment does not guarantee successful recovery (Troscianko & Leon, 2020). An additional criterion was the use of mHealth in managing eating behavior challenges. Basic knowledge of mHealth app use was sufficient for participation; expert knowledge was not required.

The sample size was determined based on the criterion of information saturation (Glaser & Strauss, 2017; Hennink & Kaiser, 2022; Malterud et al., 2016). Saturation refers to “the point in data collection when all important issues or insights are exhausted from data, which signifies that the conceptual categories that comprise the theory are ‘saturated’, so that the emerging theory is comprehensive and well-grounded in data” (Hennink & Kaiser, 2022, p. 1). Qualitative research scholars suggest that the sample size should be determined by the ‘information power’ of the sample rather than a mathematical formula (Malterud and colleagues, 2016). Conclusions about saturation are determined by conducting n+1 interviews (Islam & Aldaihani, 2022), but it is impractical not being able to schedule interviews in advance (Guest et al., 2006). Guest and colleagues (2006) suggest that that fundamental elements for meta-themes may already be apparent within the first six interviews, and full saturation can be obtained within the first twelve interviews.

Respondents were recruited from the researcher’s personal network. A recruitment announcement was also posted in the researcher’s online social network and eating disorder patients with ‘recovery-accounts’ on Instagram were directly approached through private messages on Instagram. Recovery-accounts refer to social media accounts patients use to share their recovery journeys. Additionally, a snowballing method was applied to recruit additional respondents. A sample consisting of twelve mHealth users who met the participation criteria was eventually obtained. Table 5 outlines the demographic characteristics of respondents, their type of eating behavior problems and affinity with mobile technology. Table 6 outlines the types of mHealth technologies they used.

Table 5.

Demographics Qualitative Research

Category	Sub-Category	Frequency (N)	Percent	
Sex	Female	10	83,3%	
	Male	2	16,7%	
Age	18 to 24	8	66,7%	
	25 to 34	4	33,3%	
Highest level of education	High school	3	25%	
	Intermediate	Vocational	2	16,7%
	Education (MBO)			

	Higher Professional Education (HBO)	4	33,3%
	Bachelor's degree	2	16,7%
	Master's degree	1	8,3%
Mental challenge	Anorexia	9	75%
	Bulimia	1	8,3%
	Binge Eating Disorder	1	8,3%
	Severe eating problems	1	8,3%
Current impact eating problems	Strong impact	3	25%
	Diminished impact, triggers in moments of stress	9	75%
Affinity with mobile technology	Neutral	5	41,7%
	Strong	4	33,3%
	Very strong	3	25%

Table 5.
mHealth use

Category	Sub-Category	Frequency (N)	Percent
Calorie tracking	MyFitnessPal	6	50%
	(Of whom had a paid version)	(1)	(8,3%)
	Fatsecret	2	16,7%
	Food	2	16,7%
	Mijn Eetmeter	1	8,3%
Distance tracking	Strava	5	41,7%
	(Of whom had a paid version)	(1)	(8,3%)
	Apple Health (no wearable)	4	33,3%
	Steps	1	8,3%
	Wearable (and corresponding app)	4	33,3%
	General caloric burn	Wearable (and corresponding app)	3
Weight tracking	BMI tracker	1	8,3%
Mental health	Iamsober	1	8,3%

3.3 Data collection procedure

Data necessary to address the research question was collected through semi-structured interviews, each lasting approximately 45 minutes. Respondents were given the option to choose between an online or face-to-face interview. For those who selected the latter, they were asked to specify their preferred setting. Upon joining the meeting, the interviewee received a short explanation of the study's purpose. Although basic knowledge of mHealth was required

for participation, the definition was set out at the beginning of the interview to ensure that all respondents had the same understanding of mHealth. The interviewees were also asked for their consent to record the interview and notes being taken.

The interview questions were inspired by earlier research on paradoxical experiences with mHealth technologies (Blazevic & Klintwort, 2019) and adapted to fit the topic of the present study. These questions were pretested with another researcher of mHealth in consumer contexts, and an mHealth consumer uninvolved in the research. The themes covered by the questions included respondents' usage characteristics of mHealth apps, their experience and management of these experiences.

Interviews were audio-recorded, facilitating accurate recall of the interviewee's exact words (Myers, 2019). Conversations were transcribed verbatim, excluding filler to transcribe interviews in a running order. Additionally, notes were also taken during the interview so that nonverbal cues could be documented (Harrell & Bradley, 2009). Transcriptions were uploaded in an online coding tool called 'Delve' (n.d.).

3.4 Data analysis procedure

An abductive approach was used to analyze the data. While previous theories guided the analysis, they were not binding (Bleijenbergh et al., 2022). This study remained open to establish new theories and discovering findings insights that might differ from what theory previously established (Vila-Henninger et al., 2022). The aim was to understand the social phenomenon by revealing patterns and themes in the codes (Ho & Limpaecher, 2023; Vila-Henninger et al., 2022).

The first phase involved becoming familiar with the data (Vila-Henninger et al., 2022). This phase began as soon as the first interviews were being transcribed, with extra attention paid to the research context, themes and patterns (Vila-Henninger et al., 2022). In this way, possible gaps in the data could immediately be identified and addressed in following interviews. The complete transcripts were uploaded into the 'Delve' program to keep an overview of the data and codes.

Hereinafter, the development of the codebook began. The initial phase of this stage entailed a deductive search for codes deriving from earlier research (Vila-Henninger et al., 2022). Concepts from the theoretical framework of technology paradoxes by Mick and Fournier (1998), Blazevic and Klintwort (2019), and Jarvenpaa and Lang (2005) were used, serving as a starting point. An initial round of coding followed, revealing new insights that were not yet fully captured by the initial codebook. New codes were identified, and existing codes and

subcodes were redefined and restructured to better reflect the data. The finalized abductive codebook was then applied to the entire data corpus and revisited to ensure consistency.

3.5 Research ethics

This study addressed several ethical considerations (Appendix A). First, respondents were informed of the interview's purpose and the themes of the questions to be addressed. They were notified that the interview would last approximately 45 minutes and assured that it would not cause any major discomfort or risk. Additionally, it was emphasized that participation is voluntary and that respondents had the option to withdraw at any time, even if they had already consented to partake in the interview. Respondents were not reimbursed for their participation.

Moreover, respondents were assured of their anonymity. Data was anonymized by suppressing personally identifiable information (Murthy et al., 2019). Demographic information of the respondent was not retained, and audio recording were removed after transcription. To ensure scientific integrity, the consent form specified who had access to the data, and for what purposes. This access was limited to the members of the research team, solely consulting the data for scientific purposes. Respondents were informed that their data would not be used for other studies without explicit permission.

Before the interview, respondents were given the opportunity to ask questions about the study and provided with contact information in case they had further inquiries. They were notified that they could contact the researcher until one month after the study's conclusion, and that the outcomes of this research will be shared with them once obtained. When the interviewee was informed of all considerations, they were explicitly asked if they gave permission to participate in the interview. The interview began once permission was given.

4. Results

This chapter presents the results from analyzing the interview transcripts with users facing eating problems regarding their experiences with mHealth and how they manage these experiences. Three key themes emerged from the interviews: motives for mHealth use, paradoxical tensions, and coping mechanisms. The coding scheme used for the analysis of the interviews can be found in Appendix C.

4.1 Motives for using mHealth

4.1.1 Learning about mHealth

Before discussing the motives for using mHealth, it will first be understood how respondents learned of it. The data shows that respondents may have learned of mHealth through multiple channels. Five respondents learned of mHealth through social media, and seven through acquaintances already familiar with mHealth. Notably, two respondents learned about mHealth through other eating disorder patients. Such interactions took place either offline in a clinic where they were/are being hospitalized to recover from the eating disorder, or in online group chats, such as ‘Pro-Ana’ groups on Telegram.

4.1.2 Regulating eating behavior motive for mHealth use

The first motive for using mHealth is regulating food intake. The respondents of this study all desired to consume as few calories as possible and manage this by setting caloric goals. mHealth apps provide means to regulate these preset goals: “These are tools to maintain your eating disorder and to have even more control over what you eat...” (R9, 25, male). Moreover, calorie trackers provide detailed information relevant to users facing eating problems, such as the number of calories and nutritional values. For example, when respondent 12 (21, female) was treated for her eating disorder, she used a calorie tracker to find the number of calories in meals and variations prescribed in a meal plan by her doctor. This enabled her to choose the option with the lowest number of calories. This therefore shows that the first motive for mHealth use is to regulate eating behavior.

Contrary to the majority of the respondents, one respondent reported that he used mHealth for increasing caloric intake. Because he is transgender, he dealt with gender dysphoria being the main reason for his eating disorder at the time. Beforehand, his motive for using mHealth resembled the examples discussed above. Suddenly, mHealth became a tool to regulate

an increase in caloric intake, because he had to gain weight to meet the requirements for a medical transition.

4.1.3 Regulating physical exercise motive for mHealth use

Regulating physical exercise is the second motive for mHealth use. All respondents indicate managing exercise is important for those facing eating problems. mHealth apps, such as Apple Health, enable movement tracking in an orderly manner, even in passive ways. Counting steps by built-in pedometers is a popular habit of the respondents, allowing for users to see how many steps they have taken throughout the day, just by having their phones with them: “I could have gone for a walk’, but then, in my mind, I was always thinking: “How much have I really walked?”” (R9, 25, male). This shows that this group of users also begin using mHealth to track their physical movement.

4.2 Paradoxical tensions experienced when using mHealth

4.2.1 Self-regulation/Exacerbating mental health issues

The paradox of self-regulation/exacerbating mental health issues involves users experiencing a simultaneous sense of empowerment through mHealth tools to manage their eating behavior and physical exercise, while also being conscious of growing problematic behaviors. This paradoxical tension results in obsession, which is experienced in a conscious way and is the most apparent of all experiences.

Self-regulation is the positive pole of this paradox, providing control of eating behavior and exercise through long-term self-comparison, detailed information, and graphical presentation. Respondents perceive using mHealth to “get a grip” on their eating problems: “At that time, you want control. High on life, you know: I get to stay in control! That feels safe, really safe” (R8, 25, male). Long-term self-comparison involves comparing past results to understand performance. mHealth apps generally store results so users can look back at them. Respondents do so regularly for they feel in control of their eating challenges seeing progression in these results, mainly in mHealth apps dedicated to sports. Users also gain detailed information about their behavior, such as nutrition scores or specific details about their workout. Respondents feel in control by seeing exactly how much fat, carbohydrate and protein they are consuming, or how their workouts go. For example, one respondent indicated she wants to implement a specific strategy for her runs. Through receiving detailed real-time information on her wearable, she knows when to speed up, or to slow down. Another respondent notes the

graphical presentation of the results on her Apple Watch, which help her to self-regulate. On her Apple Watch, she likes her ‘rings’ to be full. In short, mHealth apps give respondents a positive feeling that they can control and manage their behavior through results and visualizations in the app.

Although respondents reported that while using mHealth, they have a feeling that they self-regulate their behavior, they are aware that doing so is taking a problematic form and worsens their mental health issues: “It’s fake control. I am fully aware that it is not good” (R3, 25, female), “It’s a bit of a secret you have with yourself because you know darn well that that kind of thing (mHealth usage) is not normal at all. So, I was always, or at least almost always, aware that those things were not good at all” (R2, 25, female). This pole of the paradox is further characterized by entanglement between app and activity, addiction, and perfectionism. Entanglement between app and activity refers to “activities being closely connected with using the app to an extreme where users would not carry out the activity without the app” (Blazevic & Klintwort, 2019, p. 87). For example, patients often pre-logged their meals in calorie trackers before actually consuming them. At times where they could not find certain products, they would not eat them, or feel a high sense of panic. One respondent also indicated that she did not want to run on a treadmill in the gym, for example. She preferred to run a physical distance, because otherwise it was not documented in Strava. If her runs were not documented, it felt as if they never took place at all. Another respondent used to wear her Apple Watch while swimming to regulate her performance, but at some point, her wearable broke. During the time where her watch got fixed, she did not swim.⁷

Respondents also described signs of perfectionism in terms of logging behavior: “If I had eaten out, and I didn’t know it (calories), exactly then I could endlessly search on Google to find out what exactly I should enter. I was very focused on ensuring that by the end of the day, everything was accurately logged in MyFitnessPal and matched with my Fitbit data” (R9, 25, male). Six respondents stated that an obsession with nutritional values was intensified by calorie trackers. Before using mHealth, they already engaged in unhealthy behavior in terms of calories. However, since detailed information was now provided, they developed an obsession with nutritional values as well: “Before, I never actually looked that up ... In that app, it also indicated: this many carbs is normal ... so that feeling really came with the app” (R11, 20,

⁷ ChatGPT was employed to assess the writing style in this paragraph. The following prompt was applied, "Can you evaluate my writing style for my Master's Thesis, and can you give an example of how this text could be improved?" After critically reflecting on the answer, inspiration was drawn for tactics to shorten sentences, and adopt a more formal tone. These insights were utilized throughout the rest of the text.

female). Moreover, respondents show feeling that they became addicted to mHealth apps and feel that they are not able to think for themselves anymore. mHealth takes a prominent role in these users' lives, making them feel that they could not possibly live without it: "Yes, it is a tool, but at some point, you have implemented it so bad" (R8, 25, male). Conscious addiction resulted in a desire to discontinue mHealth in obsessive ways, but not being able to do so because the urge for control and confirmation is too great.

However, respondents refer to the different stages of eating problems, and that users might be more sensitive to becoming obsessed with mHealth during the peak of the challenges. Seven respondents indicated that they began to reuse calorie and movement trackers once the impact of their eating problems diminished. They reported no longer experiencing the same level of obsession because their urge to control their eating behavior had decreased. Thus, due to this paradoxical tension, users become obsessed with tracking, controlling, and improving themselves, but that depends on what stage of the eating problems they are in.

4.2.2 Confirmation/Disconfirmation

The second paradox of confirmation/disconfirmation refers to mHealth being able to confirm the users' thoughts, expectations, and perceptions of one's behavior, as well as disconfirming this. This paradoxical tension is the second most reported experience and results in feelings of obsession.

All respondents argued that they used mHealth apps to confirm users' positive or negative feelings or perceptions of behavior: "Of course, such an app confirms that and you see everything you did in that week, or if you stuck to your goals in terms of calories in MyFitnessPal or something like that" (R2, 25, female). Confirmation is further characterized by relief and pride. Four respondents note that positive confirmations can make them feel as if they are good at something: "Well, it made me really feel like I was good at something, like, now I am really kicking it. It is exactly right. It is right." (R11, 20, female). Five respondents, however, revealed they felt relief rather than pride when they got positive confirmations. They described that the only way to calm themselves down is to see that positive expectations are met. Thus, these users need their positive perceptions to be confirmed and mHealth apps are tools that can provide this.

Conversely, could also disconfirm these perceptions. This occurred, for example, at moments when users found out they had eaten more calories than they had pre-calculated in their head. The moment mHealth expectations and perceptions are not met, this could often lead

to panic and a sense of failure: “Yes, those moments were really panicking, then I got really stressed” (R7, 23, female).

This paradoxical tension would result in an obsession with mHealth. Respondents wanted to be absolutely certain that their perceptions were confirmed and would often doubt themselves, whether they had logged information correctly: “It’s going to mess with your head, like: Oh, did I do it right, did I log it correctly, am I really able to eat this?” (R11, 20, female). Information in mHealth apps would then answer these questions. So, the confirmation/disconfirmation paradox results in feelings of stress and fear, and obsession.

4.2.3 Hiding eating problems/Exposing eating problems

The third paradoxical tension revealed in this study is hiding eating problems/exposing eating problems. mHealth is perceived as a means to perform private calorie, weight, and movement tracking, while also potentially revealing mental challenges to others.

The positive pole of this paradox consists of hiding eating problems. Respondents do not want anyone in their close circle to find out about their eating problems, because acquaintances might feel alarmed or get mad at them. Respondents preferred apps without public sharing features, or they avoided sharing results: “I used to keep all my actions to myself as much as possible, so that no one suspected anything” (R7, 23, female). Users with eating problems therefore appreciate that private mHealth apps provide a medium to keep their behavior hidden: “It’s very easy to track your food, because no one really notices” (R1, 23, female). Thus, the private aspect is positively assessed by users with eating problems, because it hides their mental challenges.

Despite the private nature of some mHealth apps, their use can still expose eating problems. Public actions, such as wearing wearables or scanning barcodes in MyFitnessPal, could draw attention, which lead to embarrassment and discomfort. Respondent 10 (19, female) emphasizes this when she mentions barcode scanning in calorie trackers to find food products faster: “Kind of shameful when you’re standing there scanning with your phone, with your parents also asking: “What are you doing now?””. Furthermore, some apps allow sharing in-app results with others, making user’s mHealth usage public as well. Contrary to the majority, one respondent noted this degree of visibility to others in Strava and assessed this positively, explaining that it feels like a community. In general, however, sharing in-app results with others mainly results in peer pressure: “Everything I upload on Strava has to be Strava-worthy ... They will be able to see that I ran at this exact speed and this exact distance. I must run faster, I must

run harder, I must run more” (R6, 24, female). Overall, public mHealth use equals exposing eating problems, which is generally negatively assessed by users.

4.2.4 Competence/Incompetence

The last paradoxical tension consists of competence/incompetence. By using mHealth, users feel as if they have the right knowledge and tools to perform actions efficiently and successfully. Simultaneously, the non-desirable operation of mHealth apps does not allow users to perform actions efficiently and successfully.

The positive pole of this paradox refers to mHealth apps helping users to efficiently perform actions related to their eating problems. Respondents mention that apps are easy to use, especially when they enable passive usage: “It’s where results are tracked that a phone measures, because it’s with you” (R7, 23, female). Apps requiring active engagement require little effort to understand, but respondents report that this understanding comes quickly. Several respondents compare calorie trackers to traditional notetaking. In calorie trackers this process is conducted a lot faster: “So in my notes, I had a whole list of recipes ... A lot of work and time goes into that. In MyFitnessPal, you just look it up and everything is already there” (R7, 23, female). Barcode scanning features and customizable home screens on wearables further enhance competence. Additionally, the Apple Watch has a feature that detects a certain level of intensity in case the user has forgotten to activate the fitness mode. The wearable activates this mode automatically and ensures no information gets lost. Thus, mHealth helps users perform self-regulatory behavior.

In contrast, undesired mHealth performance evokes feelings of incompetence. Incompetence is further characterized by unfindable products, technical issues, and doubts about validity. Two respondents stated that their eating disorder made them doubt whether mHealth apps were providing the right information: “It sounds very strange, but at some point, your eating disorder doesn’t trust an app like that anymore” (R11, 20, female). Four respondents negatively assessed the inability to find certain food products, because this hindered them to regulate their food intake. Additionally, four respondents indicated technical issues, such as broken wearables or low batteries, also hinder users from self-regulate: “I find it really annoying when it (Apple Watch) is not charged, and I need to wait for another two hours before I can wear it” (R1, 23, female). At the same time, therefore, mHealth is characterized by elements that hinder self-regulation for these users, resulting in a negative experience.

4.3 Managing paradoxical tensions from mHealth use

4.3.1 *Compensating*

All respondents stated that they compensated to manage paradoxical tensions from mHealth use. Compensating involves performing certain actions to counterbalance past behavior. For example, when users perceived that they had not taken enough steps, they would start exercising to ensure they had not done too little: “If I eventually saw: Oh, I have taken very few steps, then I could also just start taking steps on the spot, to still get those steps in. At night, I would walk laps around the house or run to get those steps in” (R9, 25, male), “I would put on some music and start walking laps around the dinner table” (R7, 23, female). One respondent indicated that if she forgot to turn on the fitness mode on her wearable, she extended her workout to compensate for the missed minutes, but only to a certain extent: “If I forget to turn on my fitness mode and say, I have only been at it for 15 minutes, I might continue working out for 15 minutes longer. If I’ve been working out for an hour, I am not going to keep working out for an hour longer, so it depends on the situation” (R1, 23, female). Compensation in the form of exercise also occurred when the respondent perceived that they ingested an undesirable number of calories or a certain nutrient. When this strategy failed, users often felt sadness, panic and/or fear.⁸

4.3.2 *Pushing boundaries*

Almost all respondents reported that during their eating problems, they continually pushed their boundaries. Respondents felt obsessed with controlling and confirming their behavior. Exposure to their accomplishments subsequently triggered them to test their limits: “Today, it’s 10.000 steps, tomorrow it’s 12.000 steps. This gets encouraged by those apps” (R8, 25, male). “But in your head, it is never good enough. ... If you see it again, it has to be more” (R3, 25, female). Therefore, users pushed their boundaries in ways that would not have happened without the app.

4.3.3 *Accommodation*

Accommodation is another coping strategy, characterized by a shift in how reality is perceived, based on what the mHealth app deems ‘good’ or ‘bad’. One respondent describes a calorie tracker setting up a nutrition plan, showing that the food products he normally ate did

⁸ Idem

not fit in. This resulted in him convincing himself that he disliked those products, even though he secretly did.

Respondents also changed daily routines to influence future mHealth results. For example, one respondent indicated that he insisted on being the one in the household to walk the dog every day. He knew that this walk contained a certain number of steps which would affect his mHealth results desirably. Lastly, users avoided places where they might be served food, they could not accurately log in their calorie trackers. Besides a shift in perception, users therefore cope with paradoxical tension by altering daily routines to accommodate with the app.

4.3.4 Abandonment

Abandonment is also a widely discussed coping mechanism. This refers to discontinuing mHealth apps because the negative impact on one's mental health outweighs the benefits. This process unfolds in multiple phases rather than abruptly. At first, users may recognize the detrimental effects on their mental health, but still feel dependent on it: "My first thought was: When am I going to let it (mHealth) go? Tomorrow morning? Oh, wait tomorrow morning I have this and this planned, then I must know it (calorie intake). So you just stay in that loop and you cannot come out of it ..." (R10, 19, female). Eventually, users reach a turning point and prioritize their mental health: "At a certain point in time, I just knew the negative stuff dominated, hence why I thought I would best get rid of it, just for my own sanity." (R9, 25, male). Patients indicate that it is difficult to get rid of mHealth, as it means a lot to them. They report that at the beginning, it is very uncomfortable to not obsess about logging anymore, but after a while, they experience peace of mind.

One condition affecting whether a user can proceed with discontinuing, is whether the app can be removed or not. One respondent explained that deleting apps is different from leaving them on the device and not using them anymore: "When it's gone, it's gone ... (If you delete them) you still have that motivational tool to not download that app again" (R10, 19, female). However, some apps cannot be removed. One respondent explained that he purposefully removed the pedometer from their home screen and made sure it was hidden. This therefore shows that there is a difference in managing this tension, depending on whether or not an app can be removed.

4.3.5 Avoiding triggering features

Several respondents indicated that they revisited mHealth again, after a period of abandonment. This occurred at times when the impact of their eating disorder was reduced. Patients reported that they avoid certain features because these can be triggering to them. For example, patients might follow users on Strava, but this can be triggering: “If I notice someone performing triggering behavior, or if I see that someone isn’t doing well or that person is really starting to show obsessive behavior, I will just unfollow them or restrict their account” (R2, 25, female). Thus, revisiting users of mHealth are cautious and make sure they are not exposed to triggering features.

4.3.6 Effective disengagement

Although stopping using mHealth is a coping strategy to deal with obsession, it is also associated with a saturation of knowledge. In their obsession with mHealth, users might reach a point where no new information can be obtained due to their familiarity with the data: “I know that if I eat this and this, then we’re good” (R10, 19, female). Patients might temporarily disengage from mHealth, until they change something about their eating habits, inducing them to obtain new valuable information.

4.3.7 Verifying Information

Respondents explained to deal with paradoxical tension arising from confirmation/disconfirmation by verifying information in an obsessive way. Respondents would check the app multiple times a day to ensure that they logged and interpreted the information correctly: “You check it 30 times a day, because you really want to make sure you made that certain number of steps” (R8, 25, male). Additionally, this management strategy could extend to obsessively weighing food to ensure the data was logged right.

4.3.8 Cheating

Some users resort to cheating mHealth to manage paradoxical tensions. One respondent explained that she maintained “streak” on her Apple Watch, encouraging her to reach daily pre-set goals. At times when she would not accomplish her goal, she would temporarily decrease it so her wearable would still register that it was met. Additionally, one respondent explained she might resort to cheating when she doubts calorie trackers’ validity by logging more calories

than consumed to make sure that positive perceptions are not falsely confirmed. It becomes evident that some users resort to deceptive strategies to manage tension.

4.4 Risks of mHealth for users with eating problems

From exploring patients' attitudes toward mHealth apps and their willingness to recommend them, certain risks have been identified. Overall, respondents do not recommend mHealth to others with eating problems, viewing these tools as perpetuating and exacerbating their challenges. Respondents stated that users with eating problems tend to become obsessed with mHealth, because they make them feel in control of their eating challenges, whilst simultaneously worsening mental health issues. This often results in an inability to live without mHealth, making it difficult to break free from the obsession. Additionally, obsessive mHealth usage has a lasting impact on those facing eating problems. This group of (ex-)users is unable to unlearn the information and knowledge about calories and other data. Using mHealth hinders users with eating problems to understand the root cause of their mental challenges. An eating disorder, respondents say, is a manifestation of an underlying problem. Instead of relying on mHealth, patients need room to address where their need for control comes from.

This negative attitude towards mHealth is reduced to calorie and fitness trackers. Only a single respondent used mental health apps recommending them to others. This respondent hoped for the arrival of more mental health apps on the market, which other respondents also agreed would be beneficial, despite not having used them themselves.

5. Discussion & Conclusion

The objective of this study was to explore the experiences of users of mHealth apps facing mental challenges. By examining their motives for using mHealth, their paradoxical experiences and strategies to manage them, an attempt was made to understand their experiences with mHealth. The research questions were: “How do users with eating problems experience the use of mHealth apps?” and “How do users with eating problems manage their experience of using mHealth apps?” To answer these questions, a qualitative study was conducted using abductive analysis of semi-structured interviews with individuals who had eating disorders or eating problems and used mHealth during their challenges.

5.1 Interpretation of the results

5.1.1 Motives for mHealth use

The data reveals that this group of consumers primarily uses mHealth to regulate food intake and physical exercise. These motives differ from previous research, which found that consumer engage with mobile technology for communication, coordination, efficiency, mobility or sociability, and that their motives for using mHealth technology are receiving factual knowledge and seeking help through the apps (Blazevic & Klintwort, 2019; Jarvenpaa & Lang, 2005). However, self-regulating motives found in this study specify in two crucial themes for users facing eating problems, namely: food intake and physical exercise.

5.1.2 Paradoxical tensions experienced with mHealth

Respondents indicated to simultaneously have positive and negative experiences when using mHealth technology, which resulted in tensions in the form of stress, anxiety or obsession. Four main paradoxical tensions were identified: self-regulation/exacerbating mental health issues, confirmation/disconfirmation, hiding eating problems/exposing eating problems, and competence/incompetence.

Self-regulation/exacerbating mental health issues is the most apparent experience. To some extent, this paradoxical tension mirrors the empowerment/enslavement paradox (Jarvenpaa & Lang, 2005), and the self-control/external control paradox (Blazevic & Klintwort, 2019). However, in this definition, a sense of control revolves around the results and visual cues in mHealth making users feel as if they are successfully managing their eating behavior. On the other hand, they are aware that continuing these apps can exacerbate their mental issues,

resulting from obsession. The degree of this tension depends on the severity of the eating problems.

Confirmation/disconfirmation is the second most apparent paradoxical tension found in the analysis. Similar to findings by Blazevic and Klintwort (2019), confirmation of positive perceptions involve feelings of pride. However, this study shows that this feeling occurs occasionally as confirmation is more likely to be associated with relief, and disconfirmation with feelings of panic and failure. These conflicting experiences result in obsession.

The hiding eating problems/exposing eating problems paradox shares similar characteristics to the public/private paradox by Jarvenpaa and Lang (2005). However, this paradox has not yet been found in previous studies. Users positively assess the secrecy of private mHealth to prevent others from discovering their challenges, but negatively assess the ability to expose them through required public actions.

The last paradox identified is competence/incompetence. Reflecting Mick and Fournier's (1998) and Jarvenpaa and Lang's (2005) homonymous paradox, users find mHealth efficiently provides resources and knowledge for successful self-regulation. In contrast, they state that at the same time there are issues that hinder self-regulation, such as doubts about mHealth's validity, or technical problems.

5.1.3 Managing paradoxical tensions from mHealth use

In line with previous studies on consumer experiences with digital technologies, users manage paradoxical tensions deploying various strategies. For those facing eating problems and using mHealth, eight key management strategies were identified: compensating, pushing boundaries, accommodation, abandonment, avoiding certain features, effective disengagement, verifying information, and cheating.

The most prevalent coping strategy is compensating, when users perform actions to counterbalance past behavior. This strategy is related to the adjusting strategy by Blazevic and Klintwort (2019) and Jarvenpaa and Lang (2005), as users adapt their behavior according to what the app tells them. In cases of obsession, compensating often manifests in increased physical activity, when the consumer perceives undesirable mHealth results.

The second coping strategy is pushing boundaries. Because users voluntarily adapt their behavior by setting new mHealth goals, this strategy does not relate to adjusting nor has it been found in prior research. The obsession consumers with eating problems have with mHealth manifests in them continuously testing their limits.

The third management strategy is accommodation. Although an homonymous strategy was found (Mick & Fournier, 1998), the strategy found in this study is limited to a shift in perspective and daily routines. To cope with obsession, the user's judgement of reality becomes founded by the app's definitions of 'good' and 'bad'.

The fourth coping strategy refers to abandonment involving a discontinuation of mHealth due to its noticeable negative impact on mental health. The presence of this coping strategy confirms previous findings by Mick and Fournier (1998) and Blazevic and Klintwort (2019) who found similar strategies in their studies. However, this study reveals that abandoning typically consists of two phases: recognizing the problem, and eventually discontinuing the app.

Avoiding triggering features occurs when users engage with mHealth again after a period of abandonment. When the severity of the eating challenges has diminished, users may reuse mHealth. In doing so, they may choose to turn off features to avoid triggers.

Effective disengagement occurs when users know enough information by heart, so they no longer need mHealth's support. Effective disengagement is based on a study by Burns et al. (2020), on user engagement with mHealth. This term has not previously been associated as a coping strategy to deal with paradoxical tensions stemming from mHealth use.

The second-to-last management strategy is verifying information and has also not previously been found in research on consumer experiences with digital technologies. This strategy involves reassurance-seeking behavior by frequently checking mHealth apps to (re)confirm positive perceptions of behavior.

Finally, cheating involves manipulating mHealth data to achieve desired outcomes. This strategy is again related to the adjusting-strategy, outlined by Blazevic and Klintwort (2019) and Jarvenpaa and Lang (2005).

5.2 Theoretical contributions

This study contributes to the growing body of knowledge on consumer experiences with digital technologies, as recent studies suggested further exploration of this subject (Lambillotte & Poncin, 2023; Liu et al., 2022; Rajaobelina et al., 2021). Recent studies have specifically called for deeper insights into mHealth technologies (Aboelmaged et al., 2022; Costa Figueiredo et al., 2018; Feng et al., 2021). Building on Mick and Fournier's (1998) paradox lens and subsequent interpretations by Blazevic and Klintwort (2019), this study reinterprets prior definitions and introduces new dimensions to motives for mHealth use, paradoxical tensions, and coping strategies. Regulating food intake and physical exercise are the two

primary motives identified in this study. Additionally, this reaffirmed the presence of paradoxical experiences with mHealth, as four paradoxes were identified: self-regulation/exacerbating mental health issues, confirmation/disconfirmation, hiding eating problems/exposing eating problems and competence/incompetence. Moreover, this study reconfirms the notion that consumers of digital technology cope with paradoxical tensions, by identifying eight coping strategies: compensating, pushing boundaries, accommodation, abandonment, avoiding triggering features, effective disengagement, verifying information, cheating. While some findings align with previous research on consumer experiences with technology (Blazevic & Klintwort, 2019; Jarvenpaa & Lang, 2005; Mick & Fournier, 1998), this study offers insights into the unique experiences of mHealth users with eating problems. It reveals new paradoxical tensions and coping strategies, demonstrating how these tensions and strategies for these consumers manifest uniquely under specific conditions.⁹

5.3 Managerial implications

This study provides practical implications for mHealth managers. Consumers with eating problems may fall outside the app's target group and might suffer from consequences that negatively impact their mental health: "Yes, I think everyone with an eating disorder began with MyFitnessPal. I don't know anyone with an eating disorder who has not hit rock bottom with that app" (R1, 23, female). This information is valuable to managers, because they can shape mHealth in ways that will be less harmful to these users.

Users with eating problems are driven by the need to regulate food intake and physical exercise, feeling in control when using mHealth. Managers should be aware that visual cues and results in mHealth apps exerts feelings of control over managing eating problems. With these consumers in mind, thoughtful design of these elements can reduce potential harm. These users are aware that mHealth use can perpetuate and exacerbate mental issues. Managers could react on this awareness, by asking the users questions about their mental health to detect deterioration since they started using the app. The moment this is the case, the app can provide avenues to seek help.

Consumers with eating problems manage confirmation/disconfirmation tension by repeatedly checking the app. Managers of mHealth apps could respond to this, by tracking

⁹ ChatGPT was employed to assess the writing style in this paragraph. The following prompt was applied, "Can you evaluate my writing style for my Master's Thesis, and can you give an example of how this text could be improved?" After critically reflecting on the answer, inspiration was drawn for tactics to shorten sentences, and adopt a more formal tone. These insights were utilized throughout the rest of the text.

abnormal usage patterns and push notifications checking on the user's well-being, offering avenues to seek help when issues are detected.

To cope with obsession, these consumers might adjust their perspective on reality to what is defined 'good' or 'bad' by mHealth apps. Managers could respond to the sensitivity of users with mental challenges by considering a more neutral stance and possibly including more positive affirmations.

It is also valuable for managers to understand that consumers might abandon mHealth to heal from their mental challenge. This cannot be generalized to other reasons why users abandon the app. Managers could ask consumers why they are deleting the app, so that improvement opportunities remain insightful.

5.4 Limitations and recommendations for future research

While this study contributed new findings to the growing body of knowledge, there are limitations to address. Although mental health issues vary widely, this study specifically explored consumer experiences in the context of eating problems, which also manifest in different forms such as Anorexia, Bulimia, and Binge Eating Disorder. The study's sample predominantly consisted of individuals with Anorexia, with fewer participants suffering from Bulimia or Binge Eating Disorder. Although mostly common experiences were identified, there were differences as well. For example, when the Binge Eating Disorder patient experienced a purge-episode and lost control, this temporarily diminished her obsession with mHealth. There were no participants with other eating disorders, such as Orthorexia or PICA Eating Disorder, which could have provided additional insights. PICA Eating Disorder patients, for example, might be less inclined to use mHealth for control and self-regulation, as they are not necessarily drawn to gain information about nutritional values. Further research could be done to explore how mHealth experiences differ in the context of different eating disorders and other mental health disorders.

Additionally, mHealth users with eating problems can be consumers of both generic mHealth apps and mental health apps. Only one respondent consumed both, limiting most results to activity and calorie trackers. Future research could explore consumer experiences with mental health apps and whether these differ from generic mHealth.

Moreover, one of the respondents indicated to have suffered from gender dysphoria whilst he had Anorexia. He reported that the eating disorder was a way to avoid developing female characteristics and that his perspective on mHealth changed when he aimed to gain weight for transitioning. These findings shed light on the possibility that transgender

individuals, and specifically transgenders with eating problems, might have different experiences with mHealth technology. Future research could provide valuable insights on this matter.

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Appendices

Appendix A: English Consent Form & Interview Guide

Thank you in advance for participating in this Master Thesis on experiences with mobile health (mHealth) applications among eating disorder patients. mHealth apps refer to medical and public health practices supported by applications on mobile devices, such as MyFitnessPal, Apple Health, Maya, NOCD or Strava.

This study is being conducted by Claudia Passon under supervision of Olga Tsoumani. The procedure involves being interviewed and the questions concern your usage characteristics of mHealth apps, your experience with mHealth and how you manage this experience.

The interview will take approximately one hour and will be audiotaped. Notes will also be taken during the interview. Your participation will not incur any major discomfort or risk.

Your participation in this research is voluntary. This means that you can withdraw your participation and consent at any time during the data collection period, without giving reasons.

Your participation is also anonymous. All personally identifiable information will be deleted as soon as possible. Audio recordings will be deleted as soon as this interview is transcribed.

Only the members of the research team (Claudia Passon and Olga Tsoumani), have access to the data which will be used for academic publications and presentations. The data will not be used for other studies, unless the researchers receive your explicit permission to do so. Once this study has finished, it will be shared with you.

If you wish to have more information about this research study, now or in the future, please contact Claudia Passon (claudia.passon@ru.nl) within one month after this study has finished. If you have any complaints regarding this research, please contact the researcher or Olga Tsoumani (olga.tsoumani@ru.nl).

Do you have any questions regarding the interview at this moment?

In case you agree to participate:

- you have taken note of, and you understand this information

- you voluntarily agree to participate
- you agree that audio recordings are being made
- you are at least 18 years of age

If you do not wish to participate in the research study, please decline participation by indicating so right now.

Context eating disorder:

1. Can you tell me something about the condition you have been diagnosed with?
 - What type of eating disorder do you have?
 - How long ago have you been diagnosed?
 - Does this eating disorder currently affect your daily life? If yes, to what extent and how?
2. How do you try to manage your eating disorder in your daily life?
 - Are there things that facilitate you to perform actions related to your condition?

Context mHealth usage:

3. Which of mHealth applications do you use?
 - How did you find these applications?
 - Are these applications upon payment or free?
 - Why do you use these applications?
 - Is this app designed specifically for users with this condition?
 - How do these applications work?
 - What features do these applications contain?
4. Do you share results in these mHealth applications with others?
 - How does that make you feel?
5. Have you used other mHealth applications in the past?
 - How did these applications work?
 - Why did you stop using them?

Experience at the beginning of mHealth usage:

6. How was your experience with using these applications at the first times when you started using it?
 - Was it easy or difficult to integrate this app in your daily life?

- Did you face any obstacles with it at the beginning?
- What were the first changes you noticed in managing your condition with this app?

Experience over time:

7. Can you describe the experience you have when you use the mHealth application nowadays?
 - What made X (experience reported) positive/negative?
 - Can you tell more details about that?
 - What were your feelings/thoughts at that moment?
8. What did you do after you had that experience?
 - How did you continue with using the app after you had that experience?
 - Did anything change?

-in case only positive/negative emotions/thoughts are recalled-

9. Do you also experience something contrasting to these thoughts/emotions?
 - What made X (experience reported) positive/negative?
 - Can you tell more details about that?
 - What were your feelings/thoughts at that moment?
10. What did you do after you had that experience?
 - How did you continue with using the app after you had that experience?
 - Did anything change?

-in case positive/negative emotions/thoughts are both recalled (eventually)-

11. How do you feel about having both positive and negative experiences with the application?
12. How do you manage/adapt to having both positive and negative experiences with the application?

mHealth as a management tool:

13. How far would you argue that mHealth serves as a management tool for eating disorders?
14. What changes would you like to see in mHealth?
15. Would you recommend mHealth applications to other eating disorder patients?
16. Is there anything you would like to add?

Appendix B: Dutch Consent Form & Interview Guide

Dankuwel voor uw deelname aan deze Master Thesis over ervaringen met mobiele gezondheidsapplicaties (mHealth) onder patiënten met eetstoornissen. mHealth-apps ondersteunen het managen van gezondheid in mobiele applicaties. Voorbeelden hiervan zijn MyFitnessPal, Apple Health, Maya, NOCD of Strava.

Dit onderzoek wordt uitgevoerd door Claudia Passon, onder supervisie van Olga Tsoumani. Het proces omvat een interview waarbij de vragen betrekking hebben op uw gebruikspatronen van mHealth-apps, uw ervaring met mHealth en hoe u met deze ervaringen omgaat.

Het interview duurt ongeveer 45 minuten en wordt opgenomen. Er zullen ook aantekeningen worden gemaakt tijdens het interview. Uw deelname zal geen aanzienlijk ongemak of risico teweegbrengen.

Uw deelname aan dit onderzoek is vrijwillig. Dit betekent dat u op elk moment tijdens de dataverzamelingsperiode kunt besluiten om niet meer deel te nemen en uw toestemming in te trekken, zonder opgaaf van reden.

Uw deelname is ook anoniem. Alle persoonlijk identificeerbare informatie zal zo snel mogelijk worden verwijderd. De audioregistraties worden verwijderd zodra het interview is getranscribeerd.

Alleen de leden van het onderzoeksteam (Claudia Passon en Olga Tsoumani) hebben toegang tot de gegevens, die zullen worden gebruikt voor academische publicaties en presentaties. De gegevens zullen niet worden gebruikt voor andere studies, tenzij de onderzoekers uw expliciete toestemming hiervoor hebben ontvangen. Zodra dit onderzoek is afgerond, zal het met u worden gedeeld.

Als u meer informatie wilt ontvangen over de procedures van onderzoek, nu of in de toekomst, neem dan binnen een maand na afronding van het onderzoek contact op met Claudia Passon (claudia.passon@ru.nl). Als u klachten heeft over dit onderzoek, neem dan contact op met de onderzoeker of Olga Tsoumani (olga.tsoumani@ru.nl).

Heeft u op dit moment nog vragen over het interview?

Wanneer u akkoord bent met uw deelname:

- Heeft u deze informatie doorgenomen en begrepen
- Neemt u vrijwillig deel aan dit onderzoek
- Gaat u ermee akkoord dat het interview zal worden opgenomen
- Bent u minstens 18 jaar oud

Als u niet wenst deel te nemen aan dit onderzoek, geef dit dan nu aan alstublieft.

Context eetstoornis:

1. Kunt u me iets vertellen over het type eetstoornis waarmee u bent gediagnostiseerd?
 - Welk type eetstoornis heeft u?
 - Hoe lang is het geleden dat u gediagnostiseerd bent?
 - Heeft deze eetstoornis momenteel een invloed op uw dagelijks leven? Zo ja, tot op welke hoogte en hoe?
2. Hoe probeert u om te gaan met uw eetstoornis in het dagelijks leven?
 - Zijn er bepaalde zaken die het uitvoeren van handelingen die verband hebben met uw eetstoornis, vergemakkelijken?

Context mHealth gebruik:

3. Welke soort mHealth applicaties gebruikt u?
 - Hoe heeft u deze applicaties gevonden?
 - Gebruikt u deze applicaties gratis, of betaalt u hier geld voor?
 - Waarom gebruikt u deze applicaties?
 - Is deze applicatie ontwikkeld voor gebruikers die deze aandoening hebben?
 - Hoe werken deze applicaties?
 - Welke kenmerken bevatten deze applicaties?
4. Deelt u de resultaten in deze applicaties ook met anderen?
 - Hoe voelt u zich daarbij?
5. Heeft u in het verleden ook andere applicaties gebruikt?
 - Hoe werkten deze applicaties?
 - Waarom bent u gestopt om deze te gebruiken?

Experience aan het begin van mHealth gebruik:

6. Hoe was uw ervaring met betrekking tot mHealth aan het begin van uw gebruik ervan?

- Was het gemakkelijk of moeilijk om deze apps in uw dagelijks leven te integreren?
- Ervaarde u obstakels hiermee aan het begin?
- Wat waren de eerste veranderingen die u waarnam in het managen van uw aandoening met deze applicatie?

Experience na verloop van tijd:

7. Kunt u uw ervaring beschrijven die u vandaag de dag met mHealth applicaties heeft?
 - Wat maakte X (aangekaarte ervaring) positief/negatief?
 - Kunt u daar meer details over vertellen?
 - Wat was uw gevoel/waren uw gedachtes op dat moment?
8. Wat deed u na deze ervaring?
 - Hoe zette u uw gebruik voort nadat u deze ervaring had gehad?
 - Veranderde er iets?

-op het moment dat alleen positieve/negatieve gevoelens/gedachten worden aangekaart-

9. Ervaart u ook iets contrasterend ten opzichte van deze gedachten/emoties?
 - Wat maakte X (aangekaarte ervaring) positief/negatief?
 - Kunt u daar meer details over vertellen?
 - Wat was uw gevoel/waren uw gedachtes op dat moment?
10. Wat deed u na deze ervaring?
 - Hoe zette u uw gebruik voort nadat u deze ervaring had gehad?
 - Veranderde er iets?

-op het moment dat zowel positieve als negatieve gevoelens/gedachten (uiteindelijk) worden aangekaart-

11. Hoe voelt u zich tegenover het feit dat u zowel positieve als negatieve ervaringen heeft met de applicatie?
12. How gaat u ermee om dat u zowel positieve als negatieve ervaringen heeft met de applicatie?

mHealth als een management-middel:

13. Tot in hoeverre zou u zeggen dat mHealth is een middel om eetstoornissen te managen?
14. Welke veranderingen zou u in mHealth willen zien?
15. Zou u mHealth aanraden aan andere eetstoornis patiënten?

16. Is er iets dat u nog zou willen toevoegen?

Appendix C: Coding scheme

Theme	Code	Sub-code	Definition	Example quote
Motives for using mHealth	Regulating eating behavior	n/a	Individuals start using mHealth to manage food intake.	“Sometimes I want to make a plan for the day, in terms of what I want to eat that day” (R6, 24, female).
Motives for using mHealth	Regulating physical exercise	n/a	Individuals start using mHealth to manage physical exercise.	“The things I think are chill, is when I swim, I get to see how many lanes I have swum” (R1, 23, female).
Positive experiences	Self-regulation		mHealth users feel a sense of empowerment through managing food intake and physical exercise.	“At that time, you want control. High on life, you know: I get to stay in control! That feels safe, really safe” (R8, 25, male).
		Long-term self-comparison	Users feel empowered by seeing progression over time.	“I just liked to put that on Strava, to track my progression” (R6, 24, female).
		Detailed information	Users feel in control of their mental challenge by understanding detailed information about food or exercise.	“It is convenient, because you get to see how much protein and carbohydrates you consume” (R5, 24, female).

		Graphical presentation	Visual mHealth presentations help users self-regulate.	“I like to see that my rings are full” (R5, 24, female)
Positive experiences	Confirmation		mHealth apps can confirm positive thoughts expectations, and perceptions of one’s behavior.	“I got to see whether I did right, and whether I was below minimum. That was good of course” (R4, 24, female).
		Relief	Users are calmed down when they see positive expectations are confirmed.	“It was kind of a relief, like: “Okay, we have taken enough steps” (R7, 23, female).
		Pride	Users feel good about themselves when they see positive expectations are confirmed.	“It makes me feel proud, like: “Look when I can do!, Look how disciplined I am!”” (R2, 25, female).
Positive experiences	Hiding eating problems	n/a	Users value the possibility to keep their mHealth usage and results to themselves.	“It’s very easy to track your food, because no one really notices” (R1, 23, female).
Positive experiences	Competence		mHealth tools and knowledge to perform actions efficiently.	“It is actually very convenient that there is an app for that, because then I can just log it and I don’t have to think

			about it anymore” (R2, 25, female).
	Effortless	The app is easy to use and makes life easier	“That was actually pretty easy. Yeah, and Strava, too. Once you get the hang of that, that’s pretty easy, too (R11, 20, female).
	Helpful reminders	The application sends notifications to remind users of logging information.	“If you don’t turn that on yourself, then your Apple Watch notifies you whether you want to start a workout” (R1, 23, female).
Negative experiences	Exacerbating mental health issues	Users are aware that using mHealth takes problematic forms and worsens their mental health.	“It’s fake control. I am fully aware that it is not good” (R3, 25, female).
	Addiction	Users have a feeling that they cannot live without mHealth apps.	“You know you’re better off without it, but you can’t do without it” (R10, 19, female).
	Perfectionism	Users are very cautious to ensure that information actively logged in mHealth apps is accurate.	“You are so fixated on that that you start weighing everything down to every once to get it right” (R9, 25, male).

	Entanglement between app and activity	<p>“Activities are being closely connected with using the app to an extreme where users would not carry out the activity without the app” (Blazevic & Klintwort, 2019, p. 87).</p>	<p>“There is no way I’m going swimming without that Apple Watch” (R1, 23, female).</p>
Negative experiences	Disconfirmation	<p>mHealth apps can disconfirm positive thoughts and expectations, and perceptions of one’s behavior.</p> <p>Panic</p> <p>Users feel very anxious when they see positive expectations are disconfirmed.</p> <p>Failure</p> <p>Users feel as if they are a failure when they see positive expectations are disconfirmed.</p>	<p>“I kind of got the jitters from that, because then I thought: what if I see that I am eating way too much fat in a day?” (R7, 23, female).</p> <p>“Yes, those moments were really panicking, then I got really stressed” (R7, 23, female).</p> <p>“If I were to sit right now and had a really high heart rate, that would also kind of feel like failure or something” (R6, 24, female).</p>

Negative experiences	Exposing eating problems	Users devalue the fact that mHealth requires public actions which might expose eating problems.	“They notice that you turn it on for everything” (R1, 23, female).
	Shame	Exposure of mHealth users feel embarrassed.	“Kind of shameful when you’re standing there scanning with your phone, with your parents also asking: “What are you doing now?”” (R10, 19, female).
	Peer-comparison	Users compare personal mHealth results to others.	“If I saw that they had walked more, I was like: “Oh shit, see, I only walk so little”” (R11, 20, female).
Negative experiences	Incompetence	Non-desirable operation mHealth hinders to complete actions.	“Still, at times, you cannot find products. Then I just wouldn’t eat it” (R9, 25, male).
	Unfindable products	Users cannot find food products in calorie trackers, hindering them to log food intake.	“That hindered me at times, that I couldn’t quite find it” (R4, 24, female).
	Technical issues	Low batteries and malfunctioning	“I find it really annoying when it

			hinder users to self-regulate.	(Apple Watch) is not charged, and I need to wait for another two hours before I can wear it” (R1, 23, female).
	Doubts about validity		Users sometimes doubt whether mHealth apps provide correct information.	“It sounds very strange, but at some point, your eating disorder doesn’t trust an app like that anymore” (R11, 20, female).
Coping strategies	Compensating	n/a	Users perform actions to counterbalance past behavior.	“Then in the evening, you would compensate again. You go for another walk, you go down the stairs one more time” (R8, 25, male).
Coping strategies	Pushing boundaries	n/a	Users exceed establish limits or boundaries.	“If you see it again, it has to be more” (R3, 25, female).
Coping strategies	Accommodation	n/a	Users change their perception of reality based on what the app deems ‘good’ or ‘bad’.	“It said: “you better shouldn’t eat this”. My brain would then think: “Don’t eat it, stop, it is dangerous.”” (R8, 25, male).
Coping strategies	Abandonment	n/a	Users discontinue the app because	“I thought: “If I really want to get

			negative impact outweighs the benefits.	better, I need to wind-down gradually and not keep track of everything anymore” (R4, 24, female).
Coping strategies	Avoiding triggering features	n/a	Users turn of triggering features in times of revisiting the app again.	“If I notice someone performing triggering behavior, or if I see that someone isn’t doing well or that person is really starting to show obsessive behavior, I will just unfollow them or restrict their account” (R2, 25, female).
Coping strategies	Effective disengagement	n/a	Users discontinue the app because their knowledge is saturated, and they cannot gain new insights from the app anymore.	“Really tracking calories in an app is something I do not do anymore, because I know that information of so many foods by heart, so that is not applicable to me anymore” (R1, 23, female).

Coping strategies	Verifying information	n/a	Users open the app multiple times to ensure that they interpreted results in the right way.	“You check it 30 times a day, because you really want to make sure you made that certain number of steps” (R8, 25, male).
Coping strategies	Cheating	n/a	Users resort to cheat the app.	“If I see that I am not meeting my exercise goal on a day, then I actually lower it so I do meet it that day. Because, otherwise my streak also goes to shit, and that would be a real shame” (R1, 23, female).