Received: 2 November 2022 | Revised: 24 March 2023 | Accepted: 27 March 2023

DOI: 10.1002/cpp.2851

RESEARCH ARTICLE

WILEY

Conceptualizing the digital therapeutic alliance in the context of fully automated mental health apps: A thematic analysis

Fangziyun Tong[1,2] | Reeva Lederman[1] | Simon D'Alfonso[1] | Katherine Berry[2,3] | Sandra Bucci[2,3]

[1]School of Computing and Information Systems, University of Melbourne, Parkville, Victoria, USA

[2]Division of Psychology and Mental Health, School of Health Sciences, Manchester Academic Health Sciences Centre, University of Manchester, Manchester, UK

[3]Complex Trauma and Resilience Research Unit, Greater Manchester Mental Health NHS Foundation Trust, Manchester, UK

Correspondence
Fangziyun Tong, School of Computing and Information Systems, University of Melbourne, Melbourne Connect, Carlton, Victoria, Australia.
Email: fangziyunt@student.unimelb.edu.au

Funding information
University of Melbourne; University of Manchester

Abstract

Fully automated mental health apps provide a promising opportunity for increasing access to mental health care and resources. Given this opportunity, continued research into the utility and effectiveness of mental health apps is crucial. Therapeutic alliance (TA) refers to the relationship between a client and a healthcare professional, and has been shown to be an important predictor of clinical outcomes in face-to-face therapy. Given the significance of TA in traditional therapy, it is important to explore whether the notion of a digital therapeutic alliance (DTA) in the context of fully automated mental health apps also plays an important role in clinical outcomes. Current evidence shows that the conceptualization of DTA in the context of fully automated mental health apps can be potentially different to TA in face-to-face therapy. Thus, a new DTA conceptual model is necessary for comprehensively understanding the mechanisms underpinning DTA for fully automated mental health apps. To the best of our knowledge, this is the first study that qualitatively explored the dimensions of a DTA in the context of fully automated mental health apps. We conducted interviews with 20 users of mental health apps to explore the key dimensions comprising DTA in the context of fully automated mental health apps. We found that although conceptualizations of DTA and TA have shared dimensions, flexibility and emotional experiences are unique domains in DTA. On the other hand, although agreement on goals between a therapist and a client is important in face to face therapy, we found that users can have an alliance with an app without a goal. The importance of goal needs further investigations.

KEYWORDS
digital mental health, digital therapeutic alliance, human–computer interaction, mhealth, smartphone apps, therapeutic alliance

1 | BACKGROUND

Digital mental health interventions are viable solutions for increasing access to mental health support (Australian Government, 2012; United Nations, 2020). Mental health apps are one of the most commonly used digital tools to deliver digitally-based mental health interventions due to their availability, scalability, relative low price, and potential efficacy (Bucci et al., 2018; Clarke et al., 2016; Ebert et al., 2018; Firth et al., 2017; Torous et al., 2020). In particular, fully automated mental health apps (apps without human support) can potentially support healthcare professionals' workloads (Richards et al., 2018). However, although some researchers suggested that smartphone apps are efficient in managing mental health problems (Ebert et al., 2018; Firth et al., 2017), other researchers pointed out that the effect sizes are relatively moderate and there is no convincing evidence of the efficacy of mental health apps related to the clinical outcomes (Denecke et al., 2022; Goldberg et al., 2022). Consequently, understanding how fully automated mental health apps can be designed to bring better clinical outcomes is critical to improving service delivery, clinical workflows and patient care.

Therapeutic alliance (TA) refers typically to the relationship between a client and a healthcare professional and has been shown to be an important predictor of outcome in psychological therapy. There are various scales to measure the TA, such as California Psychotherapy Alliance Scale (CALPAS; Marmar et al., 1986), Helping Alliance Questionnaire (HAQ; Alexander & Luborsky, 1986) and Vanderbilt Psychotherapy Process Scale (VPPS; Suh et al., 1986). The Working Alliance Inventory (WAI; Horvath & Greenberg, 1989) is one of the most well-known scales to measure TA. The WAI was developed based on the conceptual model of TA proposed by Bordin (1979) and comprises three subscales: *bonds* between healthcare professionals and clients, agreement on therapy *goals* and agreement *tasks* that need to be undertaken to achieve goals. The Agnew Relationship Measure (ARM; Agnew-Davies et al., 1998) is another important scale as it is commonly used in the digital context. The ARM comprises five subscales: *bond*, *partnership*, *confidence* in therapy, *client initiative* and *openness* (Agnew-Davies et al., 1998). Previous research has shown that TA has moderate but reliable correlations with clinical outcomes regardless of types of mental health problems and treatment approaches in both young people and adults (Flückiger et al., 2018; Karver et al., 2018; Mander et al., 2017).

According to Bordin (1979, p. 252), a TA 'between a person seeking change and a change agent can occur in many places besides the locale of psychotherapy'. If we are to interpret this statement in a sufficiently general way, it would imply that a digital therapeutic alliance (DTA) may exist between users, who seek changes, and a mental health app, which plays the role of a change agent. DTA in the context of fully automated mental health apps is nascent and under-researched. Only a handful of studies have examined the DTA with fully automated mental health apps using quantitative methods, and most studies have used alliance measures such as the WAI (Darcy et al., 2021; Prochaska et al., 2021) and the ARM (Clarke et al., 2016), both developed for use with a human therapist, with minimal adaptations. Two measures, the Mobile Agnew Relationship Measure (mARM; Berry et al., 2018) and the Digital Working Alliance Inventory (DWAI; Goldberg et al., 2021) have been specifically proposed to measure the DTA in the context of fully automated mental health apps. Both measurements were created by modifying face-to-face scales, the ARM and WAI respectively. The mARM was developed by changing the word 'therapist' to 'app', as well as adding, deleting and changing the wording of items based on feedback provided by both users and healthcare professionals. The DWAI was created by choosing two items from each subscale of the WAI, and then replacing the word 'therapist' with 'app'.

The mARM and DWAI assume that the conceptualization of DTA in the context of fully automated mental health apps is similar to TA in face-to-face therapy. However, there may be important differences between alliance in these different contexts. For example, bond is an important subscale of both the ARM and WAI and is considered crucial in face-to-face therapy, but whether a person can build a bond with an app is still unclear (Darcy et al., 2021; Tong et al., 2022). In addition, Clarke et al. (2016) suggest that flexibility in an app (in terms of location, time, and duration), although not part of any existing DTA scales, can potentially be important factors that influence the DTA in the context of fully automated mental health apps.

In addition, only a handful of studies have examined the relationships between DTA and clinical outcomes in the context of fully automated mental health apps, and their findings were mixed (Tong et al., 2022). For example, Clarke et al. (2016) argued that there was no significant correlation between ARM rating and clinical outcomes, while Goldberg et al. (2021) reported that week 3 and week 4 DWAI scores related to reductions in psychological distress. These mixed findings were inconsistent with findings in face-to-face therapy, which have found more consistent associations between TA and clinical outcomes. Tong et al. (2022) pointed out one possible explanation for less consistent associations in the DTA literature is that the existing DTA scales are not comprehensive enough for measuring DTA in the context of fully automated mental health apps.

Given the association between traditional TA and positive therapy outcomes, it is important to explore further the concept of DTA, and whether a digital analogue of the TA exists for mental health apps. However, current evidence showed that (1) existing DTA scales are not comprehensive enough for measuring DTA in the context of

Key Practitioner Message

- It is possible for users to build relationships with a fully automated mental health app.
- Flexibility and emotional experiences are unique dimensions in digital therapeutic alliance.
- Interactive elements in apps might be important to provide emotional support for users.
- Goal setting functions, such as a rewarding system, might be important in an app to help users find a concrete goal.

fully automated mental health apps and (2) the conceptual model of DTA may differ from the conceptualization of TA. Therefore, re-conceptualizing DTA is necessary to fully understand the DTA in fully automated apps, and its relationship with clinical outcomes. Thus, the objectives of this study are to (1) explore people's perceptions of the DTA in the context of fully automated mental health apps and (2) identify the key dimensions comprising DTA in the context of fully automated mental health apps.

2 | METHODS

2.1 | Participants

Interviews were conducted with 20 participants who self-reported using fully automated mental health apps. The inclusion criteria of participants were (1) aged 18 or over; (2) English speaking; (3) agreed to the interview being audio-recorded (for transcription purposes); and (4) currently using or had ever used at least one fully automated mental health app.

The inclusion criteria of fully automated mental health apps were (1) could be used on smartphones; (2) mainly targeted helping with mental health and wellbeing; (3) could be used without human support.

Although all participants demonstrated English writing ability before their interviews, it became apparent during the course of one interview that one participant was not a proficient English speaker. Therefore, we excluded this participant's data, leaving 19 interviews available for analysis. Demographic information, provided by participants in the pre-screen survey before the interview, is presented in Table 1.

TABLE 1 Demographic information.

Demographics	Numbers	
	n	%
Gender		
Female	10	52.6
Male	8	42.1
Non-binary	1	5.3
Age range		
18–24	11	57.9
25–34	7	36.8
35–44	1	5.3
Occupation		
Student	15	78.9
IT support officer	1	5.3
Software engineer	1	5.3
Social worker	1	5.3
Lecturer	1	5.3

Nine participants had experiences with human therapists, and the other 10 people never saw therapists.

Participants used various types of apps, including meditation apps, chatbots, mood tracking apps, psychoeducation apps and apps with gamified tasks. The detailed app information is presented in Table 2. All apps in the table were used by at least one participant.

In addition, some participants also mentioned some non-mental health focused apps, such as Forest and life sum. When analysing data, we excluded data related to these apps.

2.2 | Procedure

Ethical approval was obtained from the Office of Research Ethics and Integrity, the University of Melbourne (Ethics number 2057887.1). The recruitment process involved posting advertisements for the study on the research recruitment page of the University website, LinkedIn, Twitter, and Reddit. To assess eligibility, people who expressed an interest in participating in this study were asked to complete an online pre-screen form. Author FT contacted those who met the inclusion criteria via email and sent them a consent form and a plain language statement explaining the purpose of interview, and the data and risk management strategies. Interviews were scheduled and conducted after receiving the signed consent form from participants.

Based on a literature review of previous TA and DTA studies, a semi-structured interview guide (Appendix A) was developed to explore users' experiences, interactions, and relationships with fully automated mental health apps. The topic guide included three sections. The first section explored basic information, such as the names of the app/s participants have used, frequency of use, and the features and functions of the app/s. We also asked participants if they had a goal when they started using the app/s, and whether the tasks helped them to achieve their goals since some previous studies suggested that goal and task are also necessary for building DTA (Gómez Penedo et al., 2020; Scherer et al., 2016). Section 2 of the topic guide invited participants to recall the use and experience of the app/s in detail. This section explored how helpful/unhelpful features and functions in the app/s were. Section 3 explored whether participants experienced any relational qualities with the app/s. Specifically, to help participants understand what is a relationship with an app, we first asked participants to think about their relationship with a therapist or to imagine this if they had never had a therapist (10/19 participants had never attended an in-person therapy or meditation session). We then asked participants whether they felt that they had a similar connection/relationship with the app/s. Finally, some questions in Section 3 were modified from Bachelor's (1995) qualitative study on TA (e.g., *What is, according to you, a good client-therapist relationship?*).

Interviews lasted between 26 to 61 min. Due to COVID-19 lockdown restrictions, all interviews were conducted via Zoom. Author FT conducted all interviews. Participants received an AUD 30 gift card upon completion of the interview.

TABLE 2 App information.

App name	Type	Main functions
Headspace	A meditation and mindfulness app for stress, anxiety, mood disorders and sleep problems.	Meditations, visual meditations, tracking, reminders, inviting friends.
Calm	A meditation and mindfulness app for stress, anxiety, mood disorders and sleep problems.	Meditations, music, sleep stories, customization programme, tracking, reminders.
Smiling Mind	A meditation and mindfulness app for stress, anxiety, mood disorders and sleep problems.	Survey and customization, meditations
Waking up	A meditation and mindfulness app for stress, anxiety and sleep problems.	Meditations, psychoeducation resources, reminder.
Insight timer	A meditation and mindfulness app for stress, anxiety, and sleep problems.	Meditations, customization, tracking, connecting with friends, online courses and events, one-to-one mentoring for a fee.
What's up	A Cognitive Behavioral Therapy (CBT) based app for mood disorders.	Psychoeducation, breathing and grounding exercises, diary/journaling, forum, tracking, quotes and articles.
Happify	A multi-function app for PTSD, chronic pain, mood disorders, sleep problems, stress and anxiety.	Survey for providing customized programme, gamified tasks, AI-Coach, forum.
Moodfit	A CBT based app for anxiety and stress, mood disorders and sleep.	Medications, journaling, goal-setting, survey, tracking, reminders.
myCompass	A web and smartphone based for depression, stress and anxiety and sleep problems.	Psychoeducation activities, tracking, customized programme.
Mindshift	A CBT-based app for anxiety in young adults.	Quotes, meditations, tracking, mental health tips and information, customized coping plan.
Mentemia (changed the name to groov)	A workplace mental health and wellbeing app.	Articles, psychoeducation courses, tracking, daily goal activities, meditations.
MoodPrism	A mood tracking app.	Tracking and feedback, notifications.
Woebot	An AI-powered and CBT-based chatbot for mood disorders, anxiety and stress.	Chatbot, mental health tips, psychoeducation resources, tracking.
Wysa	An AI-based chatbot for mood disorders, anxiety and stress and sleep problems.	Chatbot, self-care activities, breathing and meditation exercises, connecting to therapists for additional fee.
Replika	An AI-based embodied chatbot for mood disorders, anxiety and stress.	Chatbot, tracking and monitoring, psychoeducation resources, goal-setting.
Habitica	A behaviour change app for ADHD.	Tracking, gamified activities, goal setting function (earning point to level-up the avatar by achieving goals), social group and online forum.
Intellect	A CBT-informed app for stress and anxiety, emotion regulation and sleep problems.	Psychoeducation tasks and resources, tracking, journaling, customized plans, connecting to therapists.
eMoods	A mood tracking app for bipolar.	Tracking and recording.
Gratitude	A mental health and wellbeing journaling app.	Motivational content, journaling, music and voice, psychoeducation tips, visual board, life goal setting.
Curable	A mental health wellbeing app for chronic pain.	AI-based virtual coach, psychoeducation audios, customized plans, articles, breathing exercises and meditations, tracking.

2.3 | Data analysis

NVivo 12 (Edhlund & McDougall, 2019) was used to support data coding and analysis. All authors were involved in the data analysis process. A thematic analysis approach was used following the guidelines of Braun and Clarke (2006, 2019) and Clarke and Braun (2013); both inductive and deductive methods were used to identify themes. All transcripts were initially coded by author FT. A small number of transcripts ($n = 4$) were independently coded by authors KB and SB (academic clinical psychologists) as a means of facilitating discussion about potential themes and to aid the reflexive process: this is consistent with a reflexive thematic analysis approach which stipulates that dual-coding of select transcripts can be useful for ideas generation (Clarke & Braun, 2013). Authors discussed and refined the organization of codes until a stable thematic structure was developed. All authors contributed to developing the thematic structure to ensure: (1) all themes were relevant to the research question; (2) meaning of the codes in each theme were consistent; (3) all themes were distinguishable; (4) names of the themes were appropriate and understandable.

2.4 | Reflexivity

A phenomenological methodological approach to thematic analysis was used, and the research was underpinned by a critical realist epistemological position (Fletcher, 2017). This stance assumes that data cannot directly represent the reality, but rather, data need to be interpreted by researchers to reveal the underlying pattern and structure, and the interpretation is also affected by the researchers' own knowledge (Willig, 2012). The author FT, who administered and led all interviews, conducted this research as part of her PhD, and had 1 year of research experience on the topic of DTA. KB and SB are academic clinical psychologists with extensive experience both clinically and theoretically in the TA. RL is an academic researcher in digital health information systems. SD is a computing and information technology researcher in digital mental health. All authors (KB, SB, RL, SD) had extensive research experience in digital mental health and have previously carried out early work on DTA (Berry et al., 2018; D'Alfonso et al., 2020). It is critical to acknowledge that these experiences and context may influence the interview and data analysis. For example, research experiences in DTA led the authors to hold the idea that users can build relationships with fully automated mental health apps. Similarly, authors' knowledge about previous research in TA and DTA also influenced data interpretation. A reflective diary was kept after each interview and during the coding of interviews to document reflections about the process of the interview and analysis, including any reflections made about the potential influence of research bias/experience on the data. The authors met regularly to discuss the themes which emerged from the data and how information documented in the reflective diary may have affected the data interpretation.

3 | RESULTS

After the seventeenth interview, information from subsequent interviews did not add anything further to the research questions. Thus, saturation was deemed to be achieved (three more interviews were conducted to ensure that no new information was emerged). The following five themes were identified: (1) valuing flexibility; (2) the role of accountability; (3) the importance of emotional experiences for connections; (4) enhanced openness; and (5) lack of agreement upon goals. These themes and their relationships are represented in a thematic map (Figure 1), which will be further discussed in Section 4. Themes one to four are key components of building DTA.

3.1 | Valuing flexibility

Many participants described their relationships with apps as convenient. Apps could help users to build this type of convenient relationship in two ways. First, apps were available 24/7 and could be easily accessed whenever and wherever they were needed and could be easily fitted into a busy schedule. Participants felt these flexible characteristics were important for them to build a relationship with an app.

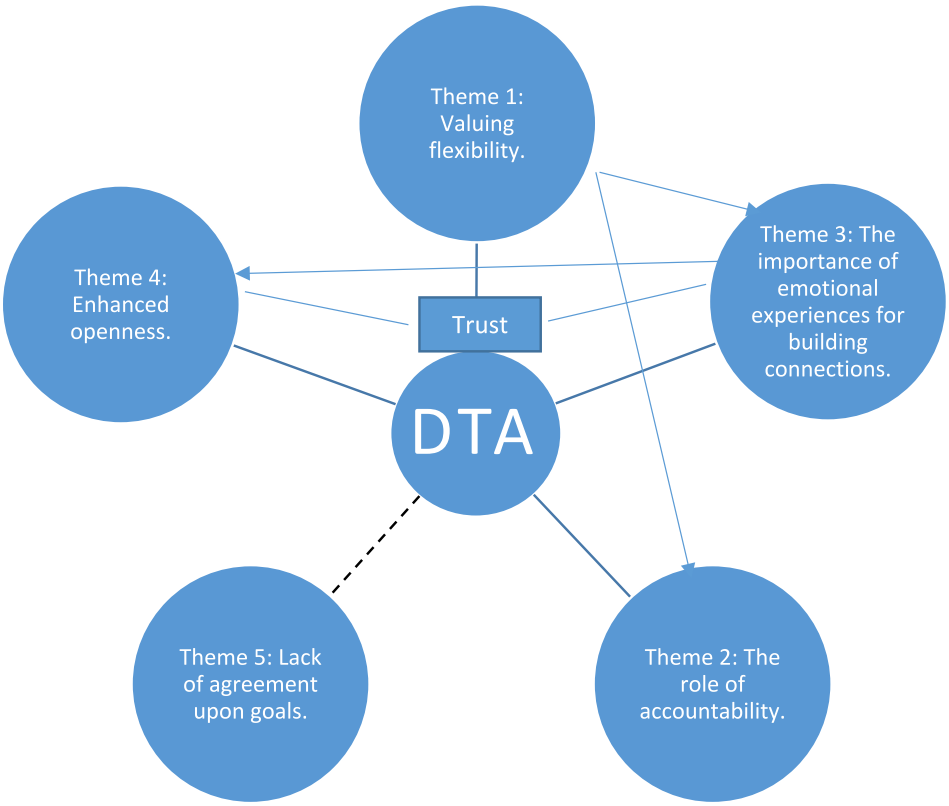

FIGURE 1 Thematic map.

> *…so it's always available. That mental health apps are always available, so that is the relationship. Whenever I need it, it's there, so I don't need to schedule an appointment or anything with it. That's the relationship…* [Participant A1]

These flexible characteristics in apps allowed users to get immediate solutions regardless of time and location, and thus, provided users with a feeling of security. Participants viewed apps as assistants who were always available for helping when there was nobody else for them.

> *To me, over the time it's been, it's like a little security blanket. So having a tool, having something like a support. It sounds strange, but a plan B. So, if you can't access that immediate psychology support, you've got something else you can use. Convenient, reliable. It's always there. It's also 24/7, you pretty much have access to these tools. Unlike a psychologist, where it can take a long time to get in to see someone, even if you are a client. And yeah, I guess there's some more control that you might have over an app in how you use it.* [Participant H2]

On the other hand, although technically most apps were available 24/7, depending on the app design, not all apps could give immediate solutions and provide the feeling of security.

> *Cause it (the app) doesn't tell you how… What exact solutions or things you can do to help improve your own mental health. So you're just putting your own mood in everyday, but it doesn't help you to improve your mood.* [Participant J2]

Second, apps gave users the freedom to browse different content and functions, and then allow users to choose the functions/activities they felt helped the most. Thus, different people may use the same app in different ways.

> *Like I'm using it for reading articles, someone else might use it for meditation or for calmness or for maybe playing the games, for some people, they may like the games only, some people might just scroll in and see what the community is posting, just some random stuff.* [Participant R1]

The flexibility in choosing functions/content provided users the opportunities to get the support that they were seeking whenever they needed, and can further enhance the relationship and the perception of convenience. For example, a meditation app can provide users with different functions, and allow users to choose the most helpful one based on their mood and situation.

> *(The helpful function) is a graphic (meditation function) and it's around breathing and it's got a visual representation that you can breathe in and then you breathe out and you follow a visual graphic. And I really like that. And I know my step son, who's eight, likes that too. So sometimes it is nice, particularly if you're really overwhelmed and you might not be able to go into that meditation space, you've got a visual, you can just be like, "Oh, okay. Let's take a few breaths and follow the graphic." So I did like that and that's not in the Insight Timer.* [Participant H2]

3.2 | The role of self-initiative and accountability

Clients and users needed to be self-motivated and have the willingness to start and maintain the connection with an app. Building relationships with fully automated mental health apps required a high level of self-initiative by users in the form of reading a lot of text, and using the app functions. Moreover, when people experienced distress or mental health problems, they tended to avoid using technology and found it difficult to work through the app content (e.g. reading long articles and instructions).

> *If you come to a stage where you're just at your deepest low, you wouldn't even be motivated to click on certain function that would be actually very useful for you.* [Participant R2]

In addition, since many fully automated mental health apps were relatively unrestricted in terms of availability (mentioned in Theme 1) and did not project expectations, users felt that there was no obligation to continue using the apps (or to engage with a certain time window), particularly when the apps lacked functions to provide accountability. Thus, users might lose motivation in using/engaging with fully automated mental health apps quickly and not stay connected with an app if they did not have enough self-determination and self-accountability.

> *Unless say they have a therapy session booked weekly and they'd have to go, then that's been helping them and the digital apps, they don't have the will to actually clicking and use.* [Participant C1]

On the other hand, although users could lose interests in apps quickly without enough self-determination, certain app functions, such as notifications, tracking functions, rewarding system (getting points by completing tasks) and social groups (an online space in an app that allow users to communicate with each other) were reported to encourage users take the initiative to engage with the app.

> *Let's say you're not a really social media type of person, but if you have seven other people in that group who are just chatting, providing advice, talking about their experience, providing a source of accountability, you're more*

likely to also do that, because you're the only person in the group who doesn't talk. [Participant A2]

However, it is worth noting that, although participants generally felt that while app functions, such as notification and tracking, could remind users to take their responsibility (for managing mental health problems), the experience was still not comparable to the sense of accountability (being accountable to another person) experienced within the context of face-to-face therapy.

And the tracking is what would take place as a daily log, when you log in your experience with that. It does force you to be somewhat accountable, but it's not like there's another person. [Participant A2]

3.3 | The importance of emotional experiences for building connections

Although meeting others' expectations can provide better accountability than some app functions (mentioned in Theme 2), some participants felt it could give them pressure (particularly when they have anxiety). It could also induce participants' guilt of being a burden to other people. On the other hand, participants thought apps were more considerate since they would not bring this kind of pressure and guilt.

Obviously, it's not a real human. But I think it can help you. It's not rude. The app is very helpful. You can do it at your own pace, it's very considerate… It's very helpful. The language isn't rude or pressuring you to use the app… It's just with real-life meditation movement, sometimes it's a bit rude. Like, Oh, you should do meditation, it's so good for your health … I've never articulated this, but the movements can be very pressuring. Do this for your mental health. If you don't do this, you're not focusing… [Participant J1]

The feeling of being cared for and understood could also help users emotionally connect with apps. Many participants indicated that apps could be friendly and provide emotional support, even though they were aware that apps were not human. They used various words, such as caring, understanding, listening, friendly, warmth, comforting, thoughtful, compassionate, considerate and patient, to describe this kind of emotional connection.

(The app) like a virtual friend. The way it was talking, just gentle, friendly, care and show he's actually care about you. [Participant A4]

People behind the apps, such as designers and developers, played an important role in helping users build connections with the apps. Several participants specifically referred to people who designed and developed apps. They said that people behind apps showed their empathy and care through the design and content in the app. As a result, the feeling of being cared for and understood by an app (and developers) facilitated a sense of connection with the app.

Both (an app name) and (an app name) are made by mental health professionals. You can really feel that it's (the app) very scientific, but caring and they (mental health professionals) know what they're doing. [Participant J1]

However, not all participants thought apps could provide enough emotional support and they could not build a connection with the app due to a lack of emotional factors. This kind of connection could be harmed by a lack of perceived genuineness within the apps. For example, some participants said that apps which appeared to only want to make money through regular push notifications to subscribe to services gave a sense that the developers/apps did not care about the users' emotional well-being. In particular, when users could not personally relate to the app content, they tend to feel easily annoyed by advertisements.

Not (having a relationship) with [app name] because [app name] makes me feel like they just want to earn money from you because a lot of the features are not free and they would promote the paid features. I get annoyed at that and I just think that it's just a tool that I can't use. [Participant C1]

A lack of interactivity was another reason that users failed to perceive emotional supports and develop a connection with a fully automated mental health app. To connect with apps, participants said they needed to have two-way communication, immediate responses, or continuous conversations. They further argued that app features, such as chatbots, video and voice responses, and customization would increase interactivity, allow them to share their emotions (in-depth feelings), and then further build relationships with apps.

The only reason why I say it's not relationship is only because I don't think it's a two-way interaction. So it's more like a consumption of something. I consume it rather than it being both ways … … I feel like a lot of people, when they're comparing apps and actual therapists and stuff, it's that factor of reciprocating, there's a conversation between two entities, two people or whatever. So if there was a customized version for the apps where I can go more in-depth with my feelings and then have advice that's catered to my personal context, then yeah, I would definitely go for the apps. [Participant J2]

Scepticism and fear of technology, including distrust of algorithms and fear of phone addiction was also one of the reasons that users were afraid of building a connection with an app. In particular, participants with a technology background and understanding of algorithms

showed less trust in apps and did not believe that an app can understand personal problems.

> *So it's like the chatbot is trained on pre-fed data and they actually get a key keyword from the user and use the solution that's being taught to that bot. So, if I have the same keyword on two different scenarios, it will give the same answer.* [Participant N1]

Some other participants feared that using mental health apps has the potential to lead to phone addiction, which could prevent them from developing relationships or engaging in social activities with others. The fear of phone addiction also stopped users from engaging and connecting with apps.

> *I think it's a type of relationship, but I do think at the end of the day, an app is still an app. And if you're becoming addicted to an app or if you're becoming addicted to your phone, then balance is important and you still need to see people. You still need to interact with people. You still need to socialize and even seeing a therapist is good in that way, because at least you're talking to a real human, for now. I don't think you should spend all your time on mental health apps…* [Participant H1]

3.4 | Enhanced openness

Apps were perceived as being able to hold a non-judgmental stance seeing as they are inanimate objects. Participants said that openness, which was permitted by the non-judgmental nature of apps, helped users to build a relationship with an app.

> *So one of the benefits of using this app in terms of relationship with the end indicated, maybe … So you get a little confident that whatever you are doing is going to be… it's taken as a different person. I think that's one of the main advantage of using this app because I can express anything I want. So I don't need to really think about what other…* [Participant N1]

Some participants said that compared with healthcare professionals, they were more willing to share personal issues with apps. They explained that due to social etiquette and respect towards healthcare professionals in face-to-face therapy, they were cautious about the information they provided and the language they used. On the other hand, when dealing with an unpleasant situation or a difficult person in their life, the non-judgmental nature of an app made it a safe space for participants to freely express their feelings.

> *So I would type in, using any language, maybe it be abusive or anything not safe for work. So, I might write it on there, which I can't really express to a person who I'm dealing with. And I don't think any specialists will be happy to hear such conversations.* [Participant N1]

However, this type of openness needs to be balanced with people's distrust of technology (distrust in Theme 3), which could inhibit people from being open and honest with their difficulties.

> *I didn't feel safe… it just looks like a chat box, like you're messaging somebody. As soon as I figured out it wasn't a real person, I didn't feel as though talking about my own personal problems would help. I didn't think that they would be able to help me. Well, even if they did, I probably wouldn't want to make it open. Because it's digital. I don't know. I'm always a bit skeptical about everything that's online, that's digital. I don't want to be too open about things, especially when it comes to my personal problems.* [Participant H1]

The distrust of apps was possibly caused by concerns of privacy and data security. Some participants considered apps as being less an invasion of privacy. They said that they chose to use the private mode (a mode which allowed people to use the app on their own without sharing information or joining an online community), even though the apps had public mode which allowed users to anonymously communicate with others in the community. They further expressed their worries about privacy and data security, such as tracking information without permission, automatically linking accounts with other users, asking for too much personal information, and automatically accessing contacts' information. The worries of data security and privacy largely came from participants' previous experiences with other types of apps.

> *Because I thought that they would track my activities, all my activities on the app. Not just sharing my experiences and stuff. But no, I just thought that it would be public to anybody, and I didn't want my phone to automatically link my account to people that also had [app name]. Phones often use… yeah, it just automatically uses your contacts to suggest these people that are also using the app.* [Participant H1]

A lack of connections and emotional support could also stop users being open to apps. When users did not feel understood by the app, they had less willingness to share personal problems with the app. However, on the other hand, there was no evidence to show that more openness can lead to better connections.

> *So I still feel like, because it's (openness and relationship) emotional thing, is really a human personal thing. So, for the robot chats, they're kind of on the opposite side of this emotional thing because they're not real person. So, it's not what I want. What I want is really talking to someone or to experience something more real.* [Participant L1]

3.5 | Lack of agreement upon goals

Participants started using apps for various reasons. Multiple participants mentioned that they started using the app only because their friends or their workplace recommended it. A few participants used apps as an alternative to getting help from a healthcare professional, since they could not meet their therapists in person during the COVID-19 pandemic. Several people said that they used apps mainly for avoiding feelings of loneliness and boredom. Some participants mentioned that they started using an app with the hope of managing stress, anxiety, sleep problems and chronic pain. However, regardless of the reasons, most participants did not have or develop a concrete goal (a goal or change that can be measured) when using the app.

> *It was recommended by one of my friends, and I just tried to see what it can offer. Yeah, and also because I was in a very anxious stage at that moment. Yeah. So, I was thinking, why not?… I actually did not. Yeah. Because when I use that app, it has a function button to let me set a goal, but I did not really use that. I haven't.* [Participant L1]

Whether participants had an agreed upon goal in mind when using the app may not influence their views on whether they could build a relationship with the app. Participants who did not identify a clear goal or purpose or reason for using the app still developed a relationship with an app.

> *I just wanted to de-stress and stuff, but no specific goals or things… I feel like the (relationship with an) app is similar (to the relationship with therapists). Obviously, it's not a real human. But I think it can help you. It's not rude. The app is very helpful. You can do it at your own pace, it's very considerate.* [Participant J1]

However, goal-setting functions, such as earning points to achieve a certain goal, may help users to articulate and find a concrete goal. One participant said that an ADHD behavioural change app helped him to set a goal by rewarding points for his achievements.

> *What it does is a sort of gamifies your achievements. So say you have a goal of, I want to go to bed at 10:30 each night, you get a certain amount of points every time you do that and you can level up and it's a bit like an RPG sort of thing…. There's a lot of things in your life that often you might just forget about completely, and if you don't have a plan, sometimes those things can get left behind… It was more the app that sort of gave me those goals.* [Participant H1]

4 | DISCUSSION

Five themes were identified from the data: (1) valuing flexibility; (2) the role of self-initiative accountability; (3) the importance of emotional experiences for building connections; (4) enhanced openness; and (5) lack of agreement upon goals. Depending on a participant's background and an app's functionality, participants held mixed ideas towards DTA in the context of fully automated mental health apps. In general, the degree of flexibility, accountability, openness and emotional experiences and connections were core components for building and determining the quality of a DTA. The necessity of agreed upon goals to forming DTA needs to be further studied. These themes are interrelated and their relationships are displayed in the thematic map in Figure 1.

The solid line refers to the suggested relationships. The dash line means that the relationship needs further investigation. The squares refer to the common factors between the themes. Emotional experiences and connections (Theme 3) may influence openness (Theme 4). Trust (in the square) probably play a role in both openness (Theme 4) and emotional experiences and connections (Theme 3). In addition, since apps are flexible (Theme 1), it was hard to help users remain accountable (in the square). Thus, using apps may require a high level of self-initiative and accountability (Theme 2). A lack of accountability may also influence emotional experiences and connections (Theme 3). Although most participants did not build an agreed upon goal (Theme 5), goal may still be an important factor of DTA, and the role of goal needs further investigation.

Previous studies suggested that flexibility (in terms of time, duration, location and functions) could contribute to high engagement and user satisfaction with smartphone health apps (Lancaster et al., 2020; Stawarz et al., 2018; Werner-Seidler et al., 2017). Clarke et al. (2016) argued that the flexible nature of apps could possibly influence how DTA is built in the context of fully automated mental health apps. Our study supports this idea. Many participants found that apps were more flexible than face-to-face therapy, and thus, more accessible. The flexibility helped them to build a relationship with an app which was more convenient than the one that could be formed in face-to-face therapy. In addition, it is worth noting that although flexibility in choosing functions could provide users with opportunities to get the support they were seeking whenever they needed, more functions might not always be better. Some researchers have found that too many features in one product could be overwhelming and confusing (Thompson et al., 2005). Thus, how to balance flexibility and user experience requires further consideration and investigation.

To build a DTA, users needed to have self-initiative/accountability (the willingness to actively start and maintain the relationship). The theme accountability is also a subscale of the ARM (where it is termed client-initiative) and is considered essential in face-to-face therapy (Agnew-Davies et al., 1998). However, although certain app functions, such as tracking and notifications, could help users to take the initiative, users still felt that the experience was not comparable to the sense of accountability. Therefore, more studies on

encouraging users to take the initiative may need to be conducted in the future.

Bond as a subscale of both WAI and ARM is critical in face-to-face therapy. Some researchers argued that bond could also be established in DTA in the context of fully automated mental health apps since the rating of goal (in modified WAI scale) was comparable to face-to-face therapy (Darcy et al., 2021). However, it was not a theme that emerged in our study. Bond in face-to-face therapy refers to the human relationship between clients and healthcare professionals, and involves qualities such as friendliness, understanding, and acceptance, which are created by mutual trust and respect (Agnew-Davies et al., 1998; Bordin, 1979). This kind of bond is thought to be shaped and influenced by the life experiences of both clients and healthcare professionals, and requires bidirectional connections (Bordin, 1979). However, in the context of fully automated mental health apps, although users could have the feeling of being cared for and supported by apps, apps cannot actually experience and express genuine trust and respect to their users. Therefore, instead of using the word 'bond' in this study, we used the terms emotional experiences and connection to describe users' feeling of relaxation and being comforted and cared for.

It is worth noting that not all participants developed a connection with an app. This kind of connection appeared to be influenced by an app's perceived lack of genuineness. Genuineness is one of the core components in building TA in face-to-face therapy (Rogers, 2007). It means that within relationships between clients and healthcare professionals, the healthcare professionals truly represent themselves (Rogers, 2007). This concept of genuineness, transferred to the context of fully automated mental health apps, could represent whether an app does what it claims to. For example, some apps might make users feel that they only want to earn money despite their claims to help users with their mental health problems.

A lack of interactivity could also harm connections. Compared to face-to-face therapy, most apps could not provide enough two-way communication, continuous conversations (even with chatting functions), voice and facial expressions. This might result in a lack of interactivity between users and apps, and potentially became a barrier for users to establish deep connections with apps. Clarke et al. (2016) suggested that although interactivity is not part of any existing DTA scales, interactive elements, such as providing feedback and using graphs, in apps are important for building DTA. Kim and Baek (2018) also reported that interactivity could influence users' relationships with smartphone apps. Our study supports their idea. Interactivity could have an impact not only on DTA, but also on engagement. Cao et al. (2022) have built framework for digital health apps that suggests that interactivity could influence engagement, which could further impact effectiveness of the apps. However, it is important to note that not all interactive elements could promote DTA and well-designed interactive features need to incorporate human-computer interaction theories. Simon and colleagues (D'Alfonso et al., 2020) pointed out that persuasive system design and positive psychology needs to be incorporated to design responsive dialogue support and conversional agents, which may provide emotional support to users and foster trust.

Openness, the willingness of opening up to apps, was important for building DTA with fully automated mental health apps. It is another shared dimension between DTA and TA (Agnew-Davies et al., 1998). However, although some participants were more willing to share personal experiences with apps since apps were perceived to be non-judgemental, this type of openness could be damaged by a lack of trust. Privacy and data security were barriers which prevent people from openly expressing themselves to an app. This finding is consistent with a study of AI-driven health chatbot apps, which showed that cybersecurity influenced trust and further damaged the acceptability of the app (Nadarzynski et al., 2019).

It is worth noting that trust/distrust played an important role in building both openness and connections in DTA. The distrust of technology could be shaped by external information. For example, concerns around data security and confidentiality, which could influence openness, largely came from peoples' previous experiences with other types of apps. The distrust of technology (algorithms), which might influence connections, partially came from the nature of people's familiarity with technology. Previous research suggested that a lack of accurate information (unknown) and transparency could create a sense of fear around technology (Graham, 2020; Li & Huang, 2020; Nestik et al., 2018; Thielsch et al., 2018). Thus, it is important that users can trust mental health apps and that the public is provided with reliable and accurate information regarding mental health apps. However, many other factors, such as social-cultural background, personality, political beliefs (Hsiao, 2003; Nimrod, 2018; Randall et al., 2021) can influence trust in the technology. Therefore, understanding how to promote trust in mental health apps would be vital.

Agreement on goals is a subscale of the WAI (Bordin, 1979). Previous research suggested that agreed upon goals are also critical in building DTA in the context of fully automated mental health apps (Goldberg et al., 2021; Prochaska et al., 2021). However, our qualitative data showed that even if someone did not have an agreed upon goal in mind when using an app, they could still feel connected with the app. Moreover, while it is the case that in face-to-face therapy establishing goals and tasks requires agreement from both clients and healthcare professionals, apps may not be able to actively agree on goals and tasks with users. However, this study finding might be limited since most apps that the participants used did not have goal building functions. If an app requires users to select a goal when the app is being configured, then it is likely that users and the app can build an agreement on goals. In addition, in face-to-face therapy, healthcare professionals can help users to select a goal during the process of therapy. Therefore, functions in apps which help users to find goals may also be useful. For example, earning points by completing tasks may help users to find a goal during the process of using the apps. It is worth noting that although participants did not feel it necessary to establish agreed upon goals to use a mental health app, this does not necessarily mean that an app offering goal functionality is not relevant to the formation of alliance. Even though users can build an alliance with an app without a goal, it is may be possible for them

to build a stronger alliance with a more concrete goal. On the other hand, although most users did not explicitly state that they had a concrete goal in mind when using the app, almost all users had reasons for using them. This suggests that the definition of goal in the context of fully automated mental health apps may need to be redefined. Instead of defining goal as agreed upon goals, goals in the digital context may be more broadly considered as reasons/goals for using an app. It is possible that users may loosely agree on goals when they actively browse the content in a mental health app or when they adopt an app feature However, we think the role of goals needs to be further studied in the future. Finally, fortuitous match in goals, where users' goals happen to fit well with what the app has to offer, may foster a stronger alliance between users and a mental health app. Therefore, a mental health app guide, which assists users to select their best fit app, may help users to develop a DTA with the app.

In conclusion, DTA and TA have both similarities and differences. Self-initiative and openness play important roles in both DTA and TA. On the other hand, although emotional factors are core components of both DTA and TA, app users are more likely to have a connection, rather than a bond, with fully automated mental health apps. In addition, flexibility is a unique dimension that only exists in the DTA.

In the end, our study revealed that certain functions might be able to elicit some factors of DTA, and may further enhance the relationship of an app and an app user. First, real-time responses could provide better flexibility and therefore enhance the DTA. This finding aligns with Szameitat et al. (2009) which revealed that a delay in response would harm emotional effects. Similarly, D'Alfonso et al. (2020) also pointed out that affectively and effectively responsiveness are essential for mental health apps to build an alliance with users. Second, functionality, such as tracking, reminders, and a reward system can provide some accountability and encourage users to engage with the app. Third, users may have a variety of emotional experiences which may influence their relationships with apps, and two-way communication, immediate responses, and continuous conversations are important for apps to provide these emotional experiences. Therefore, interactive elements, such as well-designed games, chatbots, video and voice responses, and customization could increase emotional support and further help users build relationships with apps. Fourth, clear statements and guidelines of data security would provide users a sense of security and further help them to be more open to apps and therefore have a better alliance. Fifth, goal setting functions, such as a rewarding system, might be able to help users to articulate and concretize their goal and further build a better alliance with the app.

5 | LIMITATIONS

First, there are reportedly at least 10,000 mental health apps on the market (Lagan et al., 2021) and each of them has a different design. Our study was only able to cover a small number of apps available. However, we interviewed people who had used a range of apps, such as chatbots, tracking apps, meditation apps and apps with gamified tasks. Second, since we posted our study advertisement on a university website, most participants were university students and the study was fairly homogenous in terms of age. Therefore, future studies could target other sectors or a broader spectrum of the community. Third, all interviews were conducted during the COVID-19 pandemic and participants' behaviour and views on mental health might be influenced by the lockdown and pandemic. In particular, it is worth noting that the location in which the study was taken had one of the longest lockdown in the world (Zandt, 2021). Since many in-person activities were restricted during lockdown, digital mental health might become more favourable, and this might have influenced our data. For example, people were social isolated during lockdown and thus may tend to seek help from mental health apps more often. Fourth, this study only represented the views of people with mild mental health problems and might not account for the views of people with more severe mental health difficulties. Fifth although participants with various cultural background were involved in this study, we did not record participants' ethnicity/nationality information and views of people from a wide cultural background were not captured. Sixth, although authors made efforts to ensure rigour of the data, we acknowledge that additional steps, such as member checking the thematic structure of the data, could also have been taken. However, due to time and funding limitations, this method was not feasible or possible. Seventh, to help participants better understand the meaning of a relationship with an app, we first asked them about their relationships with therapists, but many participants had not experienced in-person therapy. As such, some participant's views on differences between digital and face-to-face therapies were hypothetical rather than views. Eighth, the information of the lengths of time seeing a therapist and using mental health apps is not available.

6 | FUTURE DIRECTIONS

To further understand DTA in the context of fully automated mental health apps, more qualitative studies can be conducted with people with diverse backgrounds, such as people with serious mental health problems, and people from more diverse cultural and ethnic backgrounds. Studies with a broader range of apps can also be carried out in the future to explore the concept further. In addition, although we found that it was not necessary to establish agreed upon goals to use a mental health app, this does not necessarily mean that an app offering goal functionality is not relevant to the formation of DTA. Thus, the role of goals and tasks requires further investigation. For example, studies with users who have used apps with goal setting functions can be conducted to explore whether building a goal can lead to better clinical outcomes. Further mixed-methods studies may also need to be carried out to redefine goal in the context of fully automated mental health apps. Moreover, how to build an app to provide better DTA needs to be further studied. For example, how should user guidelines be designed to provide users with a sense of security. Similarly, how to balance is another area that needs to be further studied.

Development and psychometric evaluation and validation of a DTA scale that is easy to use and incorporates themes identified through qualitative exploration of the TA concept in the context of digital mental health is also warranted. Quantitative studies need to be conducted to further investigate the associations between DTA, engagement and clinical outcomes. Beyond establishing conceptualizations and corresponding measures of the DTA, further research might examine app characteristics and functions that are conducive to DTA formation. Questions related to this endeavour include the following: (1) what kind of language and voice should be used to enhance emotional experiences and connections? (2) What functions can be added to increase interactions? (3) How can users be motivated to take the lead? And (4) How can guidelines be designed to help users trust the app?

7 | CONCLUSION

Understanding the DTA in the context of fully automated mental health apps is an important research endeavour which may lead to improvements in how to develop effective apps. However, DTA in the context of fully automated mental health apps is under-researched. Our study aimed to conceptualize DTA in the context of fully automated mental health apps, and found DTA can be built through users' accountability, openness to apps, emotional experiences and connections with apps, and flexible interactions with apps. To the best of our knowledge, this is the first study that qualitatively explored the dimensions of a DTA in the context of fully automated mental health apps.

ACKNOWLEDGEMENTS

Fangziyun Tong is supported by a University of Melbourne and University of Manchester Graduate Research Group PhD Scholarship. Open access publishing facilitated by The University of Melbourne, as part of the Wiley - The University of Melbourne agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST STATEMENT

SB is Director and shareholder of CareLoop Health Ltd, a University of Manchester start-up to develop and market digital solutions for mental health problems, currently schizophrenia and postnatal depression. SB also reports research funding from the National Institute for Health and Care Research (NIHR) and The Wellcome Trust.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Katherine Berry https://orcid.org/0000-0002-7399-5462
Sandra Bucci https://orcid.org/0000-0002-6197-5333

REFERENCES

Agnew-Davies, R., Stiles, W. B., Hardy, G. E., Barkham, M., & Shapiro, D. A. (1998). Alliance structure assessed by the Agnew relationship measure (ARM). *British Journal of Clinical Psychology*, *37*(2), 155–172. https://doi.org/10.1111/j.2044-8260.1998.tb01291.x

Alexander, L. B., & Luborsky, L. (1986). *The Penn helping alliance scales*.

Australian Government. (2012). *E-mental health strategy for Australia* (p. 22).

Bachelor, A. (1995). Clients' perception of the therapeutic alliance: A qualitative analysis. *Journal of Counseling Psychology*, *42*(3), 323–337. https://doi.org/10.1037/0022-0167.42.3.323

Berry, K., Salter, A., Morris, R., James, S., & Bucci, S. (2018). Assessing therapeutic Alliance in the context of mHealth interventions for mental health problems: Development of the Mobile Agnew relationship measure (mARM) questionnaire. *Journal of Medical Internet Research*, *20*(4), e90. https://doi.org/10.2196/jmir.8252

Bordin, E. S. (1979). The generalizability of the psychoanalytic concept of the working alliance. *Psychotherapy: Theory, Research & Practice*, *16*(3), 252–260. https://doi.org/10.1037/h0085885

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, *11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Bucci, S., Barrowclough, C., Ainsworth, J., Machin, M., Morris, R., Berry, K., Emsley, R., Lewis, S., Edge, D., Buchan, I., & Haddock, G. (2018). Actissist: Proof-of-concept trial of a theory-driven digital intervention for psychosis. *Schizophrenia Bulletin*, *44*(5), 1070–1080. https://doi.org/10.1093/schbul/sby032

Cao, W., Milks, M. W., Liu, X., Gregory, M. E., Addison, D., Zhang, P., & Li, L. (2022). mHealth interventions for self-management of hypertension: Framework and systematic review on engagement, interactivity, and tailoring. *JMIR mHealth and uHealth*, *10*(3), e29415. https://doi.org/10.2196/29415

Clarke, J., Proudfoot, J., Whitton, A., Birch, M.-R., Boyd, M., Parker, G., Manicavasagar, V., Hadzi-Pavlovic, D., & Fogarty, A. (2016). Therapeutic alliance with a fully automated mobile phone and web-based intervention: Secondary analysis of a randomized controlled trial. *JMIR Mental Health*, *3*(1), e10. https://doi.org/10.2196/mental.4656

Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, *26*(2).

D'Alfonso, S., Lederman, R., Bucci, S., & Berry, K. (2020). The digital therapeutic Alliance and human-computer interaction. *JMIR Mental Health*, *7*(12), e21895. https://doi.org/10.2196/21895

Darcy, A., Daniels, J., Salinger, D., Wicks, P., & Robinson, A. (2021). Evidence of human-level bonds established with a digital conversational agent: Cross-sectional, retrospective observational study. *JMIR Formative Research*, *5*(5), e27868. https://doi.org/10.2196/27868

Denecke, K., Schmid, N., & Nüssli, S. (2022). Implementation of cognitive behavioral therapy in e–mental health apps: Literature review. *Journal of Medical Internet Research*, *24*(3), e27791. https://doi.org/10.2196/27791

Ebert, D. D., Van Daele, T., Nordgreen, T., Karekla, M., Compare, A., Zarbo, C., Brugnera, A., Øverland, S., Trebbi, G., Jensen, K. L., Kaehlke, F., & Baumeister, H. (2018). Internet- and Mobile-based psychological interventions: Applications, efficacy, and potential for improving mental health. *European Psychologist*, *23*(2), 167–187. https://doi.org/10.1027/1016-9040/a000318

Edhlund, B., & McDougall, A. (2019). *NVivo 12 essentials*. Lulu.com.

Firth, J., Torous, J., Nicholas, J., Carney, R., Rosenbaum, S., & Sarris, J. (2017). Can smartphone mental health interventions reduce symptoms of anxiety? A meta-analysis of randomized controlled trials. *Journal of*

Affective Disorders, *218*, 15–22. https://doi.org/10.1016/j.jad.2017.04.046

Fletcher, A. J. (2017). Applying critical realism in qualitative research: Methodology meets method. *International Journal of Social Research Methodology*, *20*(2), 181–194. https://doi.org/10.1080/13645579.2016.1144401

Flückiger, C., Del Re, A. C., Wampold, B. E., & Horvath, A. O. (2018). The alliance in adult psychotherapy: A meta-analytic synthesis. *Psychotherapy*, *55*(4), 316–340. https://doi.org/10.1037/pst0000172

Goldberg, S. B., Baldwin, S. A., Riordan, K. M., Torous, J., Dahl, C. J., Davidson, R. J., & Hirshberg, M. J. (2021). Alliance with an unguided smartphone app: Validation of the digital working Alliance inventory. *Assessment*, 10731911211015310.

Goldberg, S. B., Lam, S. U., Simonsson, O., Torous, J., & Sun, S. (2022). Mobile phone-based interventions for mental health: A systematic meta-review of 14 meta-analyses of randomized controlled trials. *PLOS Digital Health*, *1*(1), e0000002. https://doi.org/10.1371/journal.pdig.0000002

Gómez Penedo, J. M., Babl, A. M., Holtforth, M., Grosse, Hohagen, F., Krieger, T., Lutz, W., Meyer, B., Moritz, S., Klein, J. P., & Berger, T. (2020). The Association of Therapeutic Alliance with Long-Term Outcome in a guided internet intervention for depression: Secondary analysis from a randomized control trial. *Journal of Medical Internet Research*, *22*(3), e15824. https://doi.org/10.2196/15824

Graham, C. (2020). Fear of the unknown with healthcare IoT devices: An exploratory study. *Information Security Journal: A Global Perspective*, *30*, 1–11. https://doi.org/10.1080/19393555.2020.1810369

Horvath, A. O., & Greenberg, L. S. (1989). Development and validation of the working Alliance inventory. *Journal of Counseling Psychology*, *36*(2), 223–233. https://doi.org/10.1037/0022-0167.36.2.223

Hsiao, R. (2003). Technology fears: Distrust and cultural persistence in electronic marketplace adoption. *The Journal of Strategic Information Systems*, *12*, 169–199. https://doi.org/10.1016/S0963-8687(03)00034-9

Karver, M. S., De Nadai, A. S., Monahan, M., & Shirk, S. R. (2018). Meta-analysis of the prospective relation between alliance and outcome in child and adolescent psychotherapy. *Psychotherapy*, *55*(4), 341–355. https://doi.org/10.1037/pst0000176

Kim, S., & Baek, T. H. (2018). Examining the antecedents and consequences of mobile app engagement. *Telematics and Informatics*, *35*(1), 148–158. https://doi.org/10.1016/j.tele.2017.10.008

Lagan, S., D'Mello, R., Vaidyam, A., Bilden, R., & Torous, J. (2021). Assessing mental health apps marketplaces with objective metrics from 29,190 data points from 278 apps. *Acta Psychiatrica Scandinavica*, *144*(2), 201–210. https://doi.org/10.1111/acps.13306

Lancaster, C., Koychev, I., Blane, J., Chinner, A., Wolters, L., & Hinds, C. (2020). Evaluating the feasibility of frequent cognitive assessment using the Mezurio smartphone app: Observational and interview study in adults with elevated dementia risk. *JMIR mHealth and uHealth*, *8*(4), e16142. https://doi.org/10.2196/16142

Li, J., & Huang, J.-S. (2020). Dimensions of artificial intelligence anxiety based on the integrated fear acquisition theory. *Technology in Society*, *63*, 101410. https://doi.org/10.1016/j.techsoc.2020.101410

Mander, J., Neubauer, A. B., Schlarb, A., Teufel, M., Bents, H., Hautzinger, M., Zipfel, S., Wittorf, A., & Sammet, I. (2017). The therapeutic alliance in different mental disorders: A comparison of patients with depression, somatoform, and eating disorders. *Psychology and Psychotherapy: Theory, Research and Practice*, *90*(4), 649–667. https://doi.org/10.1111/papt.12131

Marmar, C. R., Horowitz, M. J., Weiss, D. S., & Marziali, E. (1986). *The development of the therapeutic Alliance rating system*.

Nadarzynski, T., Miles, O., Cowie, A., & Ridge, D. (2019). Acceptability of artificial intelligence (AI)-led chatbot services in healthcare: A mixed-methods study. *Digital Health*, *5*, 2055207619871808. https://doi.org/10.1177/2055207619871808

Nestik, T., Zhuravlev, A., Eduard, P., Marianna, S. C., Lioudmila, B., Piurcosky, F. P., & Ferreira, J. V. (2018). Technophobia as a cultural and psychological phenomenon: Theoretical analysis. *Interação-Revista De Ensino, Pesquisa E Extensão*, *20*(1), 266–281.

Nimrod, G. (2018). Technophobia among older internet users. *Educational Gerontology*, *44*(2–3), 148–162. https://doi.org/10.1080/03601277.2018.1428145

Prochaska, J. J., Vogel, E. A., Chieng, A., Baiocchi, M., Maglalang, D. D., Pajarito, S., Weingardt, K. R., Darcy, A., & Robinson, A. (2021). A randomized controlled trial of a therapeutic relational agent for reducing substance misuse during the COVID-19 pandemic. *Drug and Alcohol Dependence*, 108986. https://doi.org/10.1016/j.drugalcdep.2021.108986

Randall, J. G., Dalal, D., & Dowden, A. (2021). *Improving contact tracing in minority communities by combating misinformation and distrust*.

Richards, P., Simpson, S., Bastiampillai, T., Pietrabissa, G., & Castelnuovo, G. (2018). The impact of technology on therapeutic alliance and engagement in psychotherapy: The therapist's perspective. *Clinical Psychologist*, *22*(2), 171–181. https://doi.org/10.1111/cp.12102

Rogers, C. R. (2007). The necessary and sufficient conditions of therapeutic personality change. *Psychotherapy: Theory, Research, Practice, Training*, *44*(3), 240–248. https://doi.org/10.1037/0033-3204.44.3.240

Scherer, S., Alder, J., Gaab, J., Berger, T., Ihde, K., & Urech, C. (2016). Patient satisfaction and psychological well-being after internet-based cognitive behavioral stress management (IB-CBSM) for women with preterm labor: A randomized controlled trial. *Journal of Psychosomatic Research*, *80*, 37–43. https://doi.org/10.1016/j.jpsychores.2015.10.011

Stawarz, K., Preist, C., Tallon, D., Wiles, N., & Coyle, D. (2018). User experience of cognitive behavioral therapy apps for depression: An analysis of app functionality and user reviews. *Journal of Medical Internet Research*, *20*(6), e10120. https://doi.org/10.2196/10120

Suh, C. S., Strupp, H. H., & O'Malley, S. S. (1986). *The Vanderbilt process measures: The psychotherapy process scale (VPPS) and the negative indicators scale (VNIS)*.

Szameitat, A. J., Rummel, J., Szameitat, D. P., & Sterr, A. (2009). Behavioral and emotional consequences of brief delays in human–computer interaction. *International Journal of Human-Computer Studies*, *67*(7), 561–570. https://doi.org/10.1016/j.ijhcs.2009.02.004

Thielsch, M. T., Meeßen, S. M., & Hertel, G. (2018). Trust and distrust in information systems at the workplace. *PeerJ*, *6*, e5483. https://doi.org/10.7717/peerj.5483

Thompson, D. V., Hamilton, R. W., & Rust, R. T. (2005). Feature fatigue: When product capabilities become too much of a good thing. *Journal of Marketing Research*, *42*(4), 431–442. https://doi.org/10.1509/jmkr.2005.42.4.431

Tong, F., Lederman, R., D'Alfonso, S., Berry, K., & Bucci, S. (2022). Digital therapeutic Alliance with fully automated mental health smartphone apps: A narrative review. *Frontiers in Psychiatry*, *13*, 819623. https://doi.org/10.3389/fpsyt.2022.819623

Torous, J., Myrick, K. J., Rauseo-Ricupero, N., & Firth, J. (2020). Digital mental health and COVID-19: Using technology today to accelerate the curve on access and quality tomorrow. *JMIR Mental Health*, *7*(3), e18848. https://doi.org/10.2196/18848

United Nations. (2020). *COVID-19 and the need for action on mental health*.

Werner-Seidler, A., O'Dea, B., Shand, F., Johnston, L., Frayne, A., Fogarty, A. S., & Christensen, H. (2017). A smartphone app for adolescents with sleep disturbance: Development of the sleep ninja. *JMIR Mental Health*, *4*(3), e7614. https://doi.org/10.2196/mental.7614

Willig, C. (2012). *Perspectives on the epistemological bases for qualitative research*. https://doi.org/10.1037/13619-002

Zandt, F. (2021, October). *Infographic: The lost months of the coronavirus pandemic*. Statista Infographics. https://www.statista.com/chart/26023/areas-with-the-longest-cumulative-pandemic-lockdowns/

How to cite this article: Tong, F., Lederman, R., D'Alfonso, S., Berry, K., & Bucci, S. (2023). Conceptualizing the digital therapeutic alliance in the context of fully automated mental health apps: A thematic analysis. *Clinical Psychology & Psychotherapy*, *30*(5), 998–1012. https://doi.org/10.1002/cpp.2851

APPENDIX A: TOPIC GUIDE

A1 | General experiences with mental health apps

First, I would like to ask a couple of questions about your general experiences with mental health apps.

- Are you currently using any apps to help with your mental health or well-being?
  (If yes) Which apps are you currently using?
- Except for this one/these ones, have you ever used any other mental health apps?
  (if no) then which apps have you used?
- (If have used/are using only one):
- How would you describe your experience with the app?
- (Goal) What were your goals in using the app?
- (Task) Do you think the tasks/modules/activities provided by the app were meaningful and helped you to achieve your goals?
- What expectations did you have about using the app? Are you satisfied with the help the app gave you?

(If using or used more than one):

- Which app did you use most frequently?

Let us talk about this app then,

- Can you describe the app to me? (e.g., features and functions)
- (Goal) What were your goals in using the app?
- (Task) Do you think the tasks/modules/activities provided by the app were meaningful and helped you to achieve your goals?
- What expectations did you have about using the app? Are you satisfied with the help the app gave you?
- Are you ok to share your experiences of other apps?
- (If yes) repeat previous questions (no more than three apps due to time limitation)
- (If no) jump to the next section

A2 | Helpfulness of functions and features

Let us talk more about this app (if talked about more than one app in the previous section, starting with the most frequent one. Deciding if I need to discuss the others depends on time).

- How helpful have you found the app?

If people find the app helpful/somewhat helpful:

- What is helpful about the app? In what ways? (The answer could be app features, activities, events, or anything else they think are important)
- Why? Can you give me some examples?
- Asking if there is anything else helpful. For example, what about app features/activities/tasks/modules/functions?
- Is there anything that you think is unhelpful about the app?

If people find the app unhelpful/somewhat unhelpful:

- What is unhelpful about the app? In what ways (The answer could be app features, activities, events, or anything else they think are important)
- Why? Can you give me some examples?
- Asking if there is something else unhelpful. For example, what about app features/activities/tasks/modules/functions?
- Is there anything that you think is helpful about the app?

A3 | Exploring DTA

- Have you ever tried face-to-face therapy, such as cognitive therapy, behaviour therapy, family therapy, group counselling?

(If yes)

- ❑ How do you feel about face-to-face therapy?
- ❑ What do you think are the differences between face-to-face therapy and mental health apps?
- ❑ What do you think are the similarities between face-to-face therapy and mental health apps?
- ❑ Do you have a preference? If yes, apps or therapists? Why?
- ❑ Are you still seeing the therapist?
- ❑ (if yes) so you are doing face-to-face therapy and using the mental health apps at the same time? How do you find this combination?
- ❑ (if no) jump to the next question

(if no)

- ❑ Why did you choose mental health apps instead of seeing therapists? What do you think are the differences?
- ❑ Do you think you will try face-to-face therapy at some point in the future? If yes, why? If no, why not?

Ideally the interviewees will bring up the connectedness topics when answer the above questions. However, if the interviewees did not bring up the topic, I will ask the below questions. How will you describe your relationship with your therapists?

❑ Do you think you have a similar relationship or connection with the app?

(If yes)- In what ways? Can you give me some examples?

- If let you choose a word or a phrase to describe your connectedness or interaction with the app, what would it be?

- What is according to you, a good user-mental health app relationship?

- What does it consist of? What are its main characteristics?

- Have you ever experienced the good relationship you described?

(If yes) Can you give me an example of the time that you experienced a good relationship. (What was the function/module/activity? What you felt?)

(If no) Can you give me an example of the time that you found the relationship to be unsuitable. (What was the function/module/activity? What you felt?)

(If no) In what ways are they different? Can you give me some examples?

- How will you describe your interactions with the mental health apps?
- What is according to you, a good or effective or meaningful user–mental health app interaction?
- What does it consist of? What are its main characteristics?
- Have you ever experienced the good relationship you described?

(If yes) Can you give me an example of the time that you experienced a good interaction? (What was the function/module/activity? What you felt?)

(If no) Can you give me an example of the time that you found the interaction to be unsuitable? (What was the function/module/activity? What you felt?)

To everyone:

- In which ways do you think mental health apps can substitute for face-to-face therapy?

Sum up

- Is there anything else that you think is important for us to know?
- Are there any questions you think I should ask in other interviews?
- How did you find this interview? What can I improve on for the next one?
- Do you have any questions for me?