

Fachbereich Erziehungswissenschaft und Psychologie
der Freien Universität Berlin

**Mechanisms of Change and Facilitating Factors in
Blended Care**

Dissertation
zur Erlangung des akademischen Grades
Doktorin der Philosophie (Dr. phil.)

vorgelegt von
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Berlin, 2025

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Datum der Disputation: 20.02.2026

Danksagung

Wie ein Sprichwort sagt: „Wenn du schnell gehen willst, geh allein. Wenn du weit gehen willst, geh mit anderen.“ Schnell war ich nicht, aber ich durfte diesen Weg gemeinsam mit vielen großartigen Menschen gehen, denen ich an dieser Stelle danken möchte.

Mein erster Dank gilt meiner Betreuerin Carmen, deren erste Doktorandin ich sein durfte. Dein fachlicher Blick, dein präziser Input und deine Geduld haben jedes Manuskript, jede Präsentation und jede Idee unglaublich weitergebracht. Vieles von dem, was ich heute kann, und mir zutraue, verdanke ich dir.

Meiner Doktormutter Christine begegnete ich erstmals in einem Seminar zu PTBS während meiner Psychotherapieausbildung. Damals dachte ich: Für diese Frau möchte ich arbeiten. Dass dieser Wunsch Wirklichkeit wurde, empfinde ich bis heute als großes Glück. Vielen Dank für dein Vertrauen und die Freiheit, die du mir für meine Entwicklung gegeben hast. Ein herzlicher Dank gilt auch Johanna. Dein ansteckender Optimismus, auch in Bezug auf meine Promotion, hat mich oft gestärkt und du hast mir gezeigt, dass ein catchy Titel manchmal tatsächlich die halbe Miete ist.

Für ihre Bereitschaft, meine Promotionskommission zu vervollständigen und mich damit auf den letzten Schritten zu begleiten, danke ich herzlich Maria Böttche, Nina Knoll und Pavle Zagorscak.

Ganz besonders danke ich auch Friederike, meiner besseren Hälfte im Arbeitsalltag. Die spannende Interventionsentwicklung, endlose Corona-Meetings, und das Fantasieren über die Zukunft – all das hat mich durch die Promotionszeit getragen. Leona und Sophie danke ich für unsere zahlreichen Check-ins, für Motivation, gemeinsames Leiden und Erfolgefeiern. Ebenso danke ich dem IBI-Cluster, dem Promotionsforum und dem gesamten Team Knaevelsrud für Austausch, Unterstützung und Kongressreisen, die sich wie Klassenfahrten anfühlten.

Mein größter persönlicher Dank gilt Jonas, der mir über all die Jahre von Ausbildung und Promotion hinweg immer den Rücken freigehalten hat. Danke für Lieblingsessen nach langen Tagen, für Erinnerungen an Pausen, für Geduld während meines Forschungsaufenthalts in den USA und dafür, dass du alles, was ich angehen wollte, mit so viel Begeisterung unterstützt hast. Und ja: Ich bin jetzt wirklich fertig mit der Ausbildung.

Für emotionalen Halt, Zuspruch in vielen Momenten des Zweifels und das gemeinsame Meistern des Lebens danke ich Katrin, Marie, Katharina und meiner Schwester Jasmin. Zum Schluss

danke ich meinen Eltern, die immer an mich glauben, ohne je etwas anderes von mir zu erwarten, als dass ich glücklich bin.

Abstract

Blended care (BC) integrates digital components with face-to-face (f2f) psychotherapy and has been proposed as a promising approach to improve access, flexibility, and continuity of mental health care. While a growing body of research suggests that BC can achieve outcomes comparable to or better than traditional psychotherapy, considerably less is known about how therapeutic change unfolds in BC and which mechanisms are involved. Addressing this gap is essential for the informed development, implementation, and evaluation of blended interventions.

This dissertation investigates mechanisms of change and facilitating factors in BC, with a particular focus on therapeutic alliance, self-efficacy, therapeutic agency, and empowerment. Across four empirical studies, the dissertation combines different study designs: participatory intervention development, systematic review and meta-analysis, longitudinal modeling, and qualitative content analysis,

Study 1 used a participatory design approach to develop a blended intervention (TONI). Through interviews, focus groups, and iterative prototyping with patients and therapists, the study identified facilitators and barriers for BC implementation. Findings highlighted the importance of transparency, usability, and flexible alignment with patient needs, as well as concerns regarding workload, data security, and potential impacts on the therapeutic relationship. These insights informed the design of TONI, a transtheoretic and transdiagnostic BC intervention to be used in routine outpatient psychotherapy.

Study 2 synthesized existing evidence on self-efficacy as a mechanism of change in internet-based interventions, including blended formats, using a systematic review and meta-analysis. Across 41 randomized controlled trials, digital interventions showed small to moderate positive effects on self-efficacy. Evidence for self-efficacy as a predictor of outcomes was

mixed, while it emerged as a potential mediator. However, heterogeneity was high, and the methodological quality of mediator studies was largely insufficient.

Study 3 examined longitudinal associations between therapeutic alliance, self-efficacy, and therapeutic agency and outcomes in blended versus routine outpatient psychotherapy. All constructs were associated with better outcomes. Temporal effects showed that increases in alliance, mental health self-efficacy, and agency predicted subsequent improvements in outcomes across both treatment formats. Differences in processes between BC and f2f psychotherapy were only found for general self-efficacy, suggesting that BC primarily mobilizes established therapeutic processes rather than distinct, format-specific patterns.

Study 4 explored empowerment from the patient perspective using qualitative responses from a large outpatient sample. Patients described empowerment as a multidimensional experience encompassing increased everyday functioning, more effective coping strategies and a better self-concept. The factors patients perceived as contributing to empowerment, such as the therapeutic relationship, the structure of therapy and opportunities to apply strategies, partly overlapped with how empowerment itself was experienced. Digital components were rarely described as transformative but were perceived as supportive tools.

Taken together, the findings suggest that BC draws on established therapeutic mechanisms rather than introducing fundamentally new processes. Digital components appear to support mechanisms such as alliance, self-efficacy, agency, and empowerment, without substantially altering their function. At the same time, variability in engagement, implementation, and measurement are methodological challenges in identifying mechanisms in BC. Future research should focus on mechanism-sensitive designs, implementation challenges, personalization strategies, and the careful integration of emerging technologies within BC.

Zusammenfassung in deutscher Sprache

Blended Care (BC) integriert digitale Komponenten mit Face-to-Face-(F2F-)Psychotherapie und wird als vielversprechender Ansatz zur Verbesserung des Zugangs, der Flexibilität und der Kontinuität der psychischen Gesundheitsversorgung diskutiert. Zwar deutet eine wachsende Zahl von Studien darauf hin, dass BC vergleichbare oder teilweise bessere Behandlungsergebnisse als traditionelle Psychotherapie erzielen kann, jedoch ist bislang wenig darüber bekannt, wie therapeutische Veränderung in BC konkret zustande kommt und welche Wirkmechanismen dabei eine Rolle spielen. Die Schließung dieser Wissenslücke ist entscheidend für die fundierte Entwicklung, Implementierung und Evaluation von Blended-Care-Interventionen.

In dieser Dissertation werden Wirkmechanismen und förderliche Faktoren in BC untersucht, wobei der Fokus auf therapeutischer Allianz, Selbstwirksamkeit, therapeutischer Agency und Empowerment liegt. Über vier empirische Studien hinweg werden unterschiedliche Studiendesigns kombiniert: partizipative Interventionsentwicklung, systematisches Review mit Metaanalyse, longitudinale Modelle sowie qualitative Inhaltsanalyse.

Studie 1 nutzte einen partizipativen Designansatz zur Entwicklung einer Blended-Care-Intervention (TONI). Auf Basis von Interviews, Fokusgruppen und iterativem Prototyping mit Patient*innen und Therapeut*innen wurden förderliche Faktoren und Barrieren der BC-Implementierung identifiziert. Die Ergebnisse unterstrichen die Bedeutung von Transparenz, Benutzerfreundlichkeit und flexibler Anpassung an die Bedürfnisse von Patient*innen sowie Bedenken hinsichtlich Arbeitsbelastung, Datensicherheit und möglicher Auswirkungen auf die therapeutische Beziehung. Diese Erkenntnisse flossen in die Gestaltung von TONI ein, einer trans-theoretischen und transdiagnostischen BC-Intervention für die ambulante Routineversorgung.

In Studie 2 wurde die bestehende Evidenz zur Selbstwirksamkeit als Wirkmechanismus in internetbasierten Interventionen einschließlich Blended-Formaten mittels systematischem

Review und Metaanalyse synthetisiert. Über 41 randomisierte kontrollierte Studien hinweg zeigten digitale Interventionen kleine bis mittlere positive Effekte auf die Selbstwirksamkeit. Die Evidenz für Selbstwirksamkeit als Prädiktor von Behandlungsergebnissen war uneinheitlich, es gab jedoch Hinweise auf eine Rolle als Mediator. Allerdings war die Heterogenität hoch und die methodische Qualität der Mediationsstudien überwiegend unzureichend.

In Studie 3 wurden die longitudinalen Zusammenhänge zwischen therapeutischer Allianz, Selbstwirksamkeit, therapeutischer Agency und Behandlungsergebnissen in Blended Care im Vergleich zur ambulanten Routinepsychotherapie untersucht. Alle Konstrukte waren mit besseren Behandlungsergebnissen assoziiert. Zeitliche Analysen zeigten, dass Zunahmen in Allianz, psychischer Selbstwirksamkeit und Agency nachfolgende Verbesserungen der Ergebnisse in beiden Behandlungsformaten vorhersagten. Unterschiede zwischen BC und F2F-Psychotherapie zeigten sich lediglich für allgemeine Selbstwirksamkeit, was darauf hindeutet, dass BC primär etablierte therapeutische Prozesse mobilisiert und keine klar unterscheidbaren, dem Format spezifischen Muster aufweist.

In Studie 4 wurde Empowerment aus der Perspektive der Patient*innen anhand qualitativer Antworten aus einer großen ambulanten Stichprobe untersucht. Dabei wurde das Erleben von Empowerment auf verschiedenen Ebenen beschrieben: eine verbesserte Alltagsbewältigung, effektivere Bewältigungsstrategien und ein gestärktes Selbstkonzept. Die von den Patient*innen als förderlich wahrgenommenen Faktoren, wie beispielsweise die therapeutische Beziehung, die Struktur der Therapie und Möglichkeiten zur Anwendung von Strategien, überschneiden sich teilweise mit der Art und Weise, wie Empowerment selbst erlebt wurde. Digitale Komponenten wurden selten als transformativ beschrieben, jedoch als unterstützende Werkzeuge wahrgenommen.

Insgesamt legen die Ergebnisse nahe, dass BC auf etablierten therapeutischen Wirkmechanismen aufbaut, anstatt grundlegend neue Prozesse einzuführen. Digitale Komponenten

scheinen Mechanismen wie Allianz, Selbstwirksamkeit, Agency und Empowerment zu unterstützen, ohne deren Funktion substantiell zu verändern. Gleichzeitig stellen Variabilität in Nutzung, Implementierung und Messung zentrale methodische Herausforderungen bei der Untersuchung von Wirkmechanismen in BC dar. Zukünftige Forschung sollte daher mechanismensensitive Studiendesigns, Implementationshürden, Personalisierungsstrategien sowie die sorgfältige Integration neuer Technologien in Blended-Care-Formate in den Fokus nehmen.

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Chapter 1

Theoretical Background

1.1 Introduction

Mental disorders represent one of the leading causes of global disease burden. According to the Global Burden of Disease Study, approximately one in eight people worldwide lives with a mental disorder, with depression and anxiety disorders being the most prevalent (Fan et al., 2025). Mental health conditions are associated with considerable personal suffering, functional impairment, and societal costs. They are among the top contributors to years lived with disability (YLDs) globally and account for a significant proportion of disability-adjusted life years (DALYs), particularly in young to middle-aged populations (Vigo et al., 2016; World Health Organization, 2021). Beyond their direct impact, mental disorders are often chronic, recurrent, and interwoven with social, occupational, and physical health problems, making them a major public health concern (World Health Organization, 2021). In recent years, the global demand for mental health care has surged, driven by rising rates of psychological distress, growing public awareness, and the destigmatization of mental illness (Angermeyer et al., 2014; Patel et al., 2018; World Health Organization, 2021). Despite having a well-developed primary care system and specialized mental health services, Germany still experiences long waiting times (Bundespsychotherapeutenkammer, 2018), with up to 50% of individuals with mental health conditions not receiving any treatment (Jacobi et al., 2014). These challenges are not unique to Germany and have intensified the search for more scalable, efficient, and accessible treatment models globally (Andersson, 2018). Among the most promising innovations are digital mental health interventions, including internet-based interventions (IBI), which offer the potential to deliver evidence-based care to a wide population at relatively low cost (Löchner et al., 2025). While IBI have demonstrated efficacy for various mental disorders (Ebert et al., 2018; Karyotaki et al., 2018), they also face notable limitations. Low adherence and high dropout rates can reduce their effectiveness and undermine patient engagement (Cuijpers et al., 2019; Wright et al., 2019). Conversely, traditional face-to-face (f2f) psychotherapy remains the

gold standard in clinical practice, supported by a robust evidence base across diagnostic categories (Cuijpers et al., 2013). Yet f2f-therapy is not without its limitations: it is resource-intensive, time-consuming, and often inaccessible to those in rural areas or with limited mobility. This dual reality of benefits and limitations has paved the way for the development of blended care (BC) approaches. BC refers to the integration of digital components into f2f-psychotherapy. These formats aim to combine the best of both worlds: the flexibility, scalability, and standardization of digital tools with the tailoring and responsiveness of human therapeutic contact (Dech et al., 2022). Initial evidence suggests that BC is effective and acceptable to patients and therapists alike (Erbe et al., 2017). However, despite encouraging results, we still know relatively little about how BC leads to therapeutic change, or how the digital elements should be designed and implemented to optimally support such change processes.

This knowledge gap mirrors a broader issue in psychotherapy research: the limited understanding of the mechanisms of change that underlie effective treatment. Although outcome research has expanded substantially over the past decades, the overall effectiveness of psychotherapy has not increased to the same extent, and the processes that contribute to therapeutic change remain comparatively less well understood. As Kazdin (2007) has pointed out, identifying mechanisms is critical not only for theory development but also for the improvement and personalization of treatment. In the context of BC, understanding mechanisms is particularly important because the introduction of digital elements may potentially alter or even disrupt the pathways through which therapeutic change occurs in conventional therapy. This thesis aims to shed light on mechanisms of change in BC and facilitating factors that are important for the development of IBI for blended therapy settings through four empirical studies. The studies employ a multi-method approach, that combines different research designs and analytic strategies, including participatory intervention development, meta-analysis, longitudinal modeling, and qualitative content analysis. Together, they aim to advance our understanding of how

change occurs in BC, and of how interventions can best facilitate therapeutic mechanisms in this setting. The ultimate goal is to generate evidence that can improve the effectiveness, usability and real-world implementation of BC.

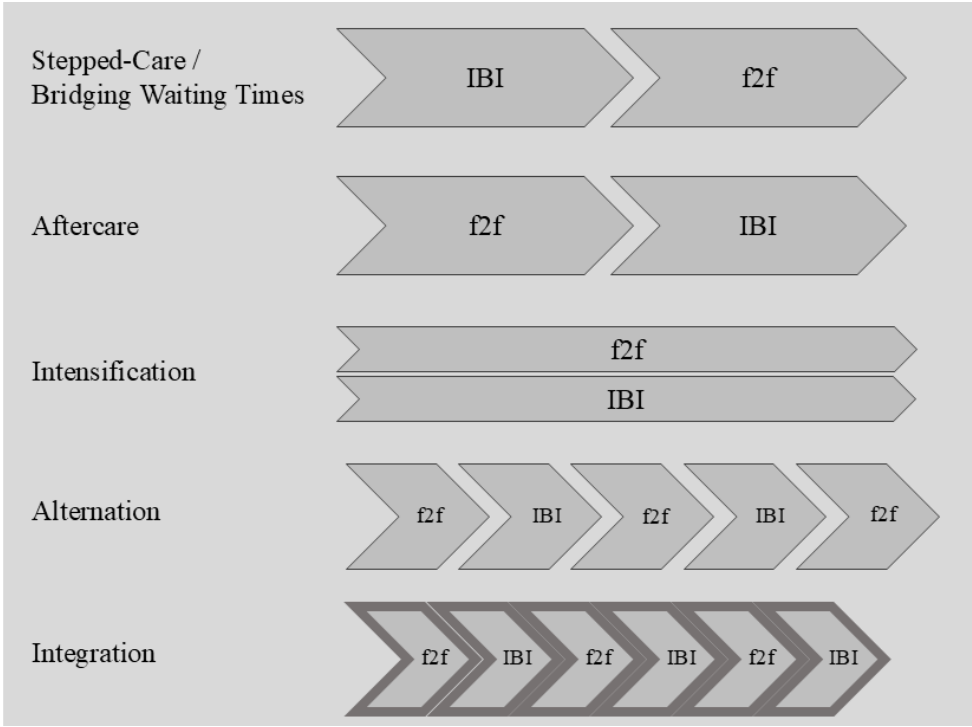
1.2 BC: The Best of Both Worlds?

1.2.1 Definition and Formats

BC refers to the integration of digital elements, such as online self-help modules, psychoeducational tools, or app-based exercises, into traditional f2f-psychotherapy. Rather than replacing human contact, BC aims to complement it by combining the flexibility and scalability of digital interventions with the personal engagement of therapist-led sessions (Erbe et al., 2017; Ferrao Nunes-Zlotkowski et al., 2024). BC is not a single intervention design but rather a flexible delivery format that can take on various forms. BC formats can differ substantially in their structure, timing, and degree of integration. These variations correspond to different therapeutic purposes. Figure 1 gives an overview of how BC can be used in clinical practice (Fenski et al., 2024). Digital components offered before therapy, such as waiting-list interventions or preparatory modules, aim to stabilize patients, reduce barriers and waiting times to treatment entry, or serve as an initial support within stepped-care approaches. When used alongside ongoing sessions, digital modules usually serve to deepen therapeutic work and improve practice between sessions, or to reduce f2f-sessions by outsourcing parts of the therapy to autonomous work. BC formats used after treatment (e.g. for relapse prevention) aim to consolidate gains and provide ongoing support with minimal therapist involvement. The extent to which these elements are integrated into the therapeutic process also varies. In some cases, digital tools are closely tied to in-session content and therapist guidance, while in others, they function more like optional supplements. BC is used frequently in outpatient therapy (Ferrao Nunes-Zlotkowski et al., 2024) but has also been studied in inpatient (Zwerenz et al., 2017) and even

in acute psychiatric settings (Bendig et al., 2021; Wälchli et al., 2025). To account for the heterogeneity BC interventions and provide clearer guidance for both reporting and development, Bielinski and colleagues (submitted) proposed the B-FIT framework, which distinguishes interventions across three core dimensions: Blend, Focus, Integration, and Timing. This framework enables the categorization of BC formats while emphasizing its flexibility. Each dimension can be tailored to align with individual patient needs and treatment trajectories, thus supporting a more adaptive and personalized approach to BC delivery.

Figure 1. Variations Of BC



1.2.2 Efficacy of BC

Research on BC is steadily expanding, with promising findings across various mental health conditions. Synthesized evidence from systematic and meta-analytic reviews suggests that BC can be as effective as f2f-psychotherapy, even with fewer in-person sessions, and is associated with lower dropout rates compared to standalone IBI (Erbe et al., 2017; Ferrao Nunes-Zlotkowski et al., 2024). Some studies even found that BC was more effective than f2f-

therapy alone (Berger et al., 2018; Erbe et al., 2017). However, results are very mixed and a recent large randomized controlled study investigating BC in routine psychotherapy in Germany did not find increased effectiveness (Schaeuffele, 2024). As mentioned in the previous section, BC formats differ substantially in timing and integration, and these variations are reflected in the evidence base.

Digital interventions used to prepare or stabilize patients before therapy yield mixed results (Fenski et al., 2024). Some studies report no clear advantage over waiting for treatment as usual, particularly given limited patient acceptance (Fuhr et al., 2018; Huang et al., 2024). Others find that patients who engage with preparatory IBIs show stronger symptom reductions than those who do not (Krämer et al., 2021), though these improvements often do not translate into reduced treatment need. When implemented following the end of psychotherapy, digital tools have demonstrated potential for sustaining therapeutic improvements and reducing relapse rates, especially in depression and anxiety (Hennemann et al., 2018; Petre et al., 2024)

Regarding the use of IBI alongside with f2f-sessions, some studies show that patients who complete IBI parallel with f2f-sessions achieve greater symptom reductions than those receiving psychotherapy alone, for example in depression and substance-use disorders (Berger et al., 2018; Boumparis et al., 2017). Other studies also show comparable efficacy with reduced f2f-sessions (Kemmeren et al., 2023; Kooistra et al., 2019; Mathiasen et al., 2022; Nakao et al., 2018). The most recent meta-analysis on BC for mental disorders found that interventions with fewer f2f-sessions, both in number (6 sessions or less) and proportion (less than 50% of sessions), were actually more effective for treating depression (Ferraio Nunes-Zlotkowski et al., 2024). In particular, blended formats that used digital components to support and extend the work introduced in f2f-sessions showed better outcomes than those where new therapeutic elements were delivered through the digital components (Ferraio Nunes-Zlotkowski et al., 2024).

Looking at the effect of apps as adjuncts for treatment, a meta-analysis found them to be effective for a number of mental health disorders, such as depression, anxiety, mania, and substance abuse (Fuhrmann et al., 2024).

On a disorder level, the most evidence exists for BC interventions targeting depression, anxiety, and substance abuse and a majority of interventions are designed disorder-specific and based on cognitive-behavioral therapy (Erbe et al., 2017; Ferrao Nunes-Zlotkowski et al., 2024). Beyond depression, anxiety, and substance abuse, BC has been applied in areas such as PTSD, chronic pain, psychosis, and somatic symptom disorders (Boeschoten et al., 2018; Cloitre et al., 2022; Cohen et al., 2024; Hadjistavropoulos et al., 2018), but the evidence base for these disorders remains limited.

Overall, the heterogeneity of blended approaches makes it difficult to draw conclusions about the effectiveness of BC in general.

1.2.3 Design and Implementation in Real-World Settings

While the efficacy of BC is increasingly supported by clinical trials, its implementation in routine practice remains a major challenge. In most settings, initiating a blended treatment depends on therapists or other key stakeholders, such as general practitioners or insurance providers. In this process, practitioners often serve as a bottleneck, as their willingness, training, and available resources influence whether and how BC is delivered. Studies show that therapists report barriers to BC adoption related to insufficient training, increased digital workload, and the lack of seamless integration into existing therapeutic workflows (Bielinski, submitted; Schuster et al., 2018; Titzler et al., 2018). Nevertheless, they see the potential in BC to enhance flexibility, support therapeutic engagement between sessions, and provide accessible, structured resources that can be revisited at the patient's own pace. Patients, meanwhile, vary in their

willingness to engage with digital content. Some express concerns about privacy, usability, or reduced personal connection (Urech et al., 2019). At the same time patients value constant availability and flexibility and seem to be motivated to engage with digital content when their need for relatedness are satisfied by the f2f contact (Bielinski et al., 2022; Urech et al., 2019) . This ambivalence underscores that successful BC interventions must not only be evidence-based but also carefully designed to align with the needs, preferences, and expectations of both patients and therapists.

A variety of frameworks have been proposed to guide the development of digital mental health interventions, such as the IDEAS framework (Mummah et al., 2016), which integrates behavioral theory with iterative design methods and emphasizes prototyping and user feedback at every stage; the Person-Based Approach (Yardley et al., 2015), which draws on in-depth qualitative insights to achieve acceptability, feasibility, and engagement from the user perspective; and the more recent DID framework (Mertens & Van Gelder, 2025), which highlights implementation and dissemination in routine care by explicitly considering contextual factors and scalability early in development. While these approaches differ in scope and emphasis, they share important principles: the need for iterative development, the integration of theoretical and empirical evidence, and the involvement of end users and stakeholders throughout the design process. Involving the actual users of the interventions is particularly important when it comes to therapeutic interventions. Schleider (2023) argues that the field of psychotherapy has too often sidelined people with lived experience, which limits both acceptability and public health impact. She highlights the need to embed experts by experience in all stages of intervention development, evaluation, and dissemination. Kushniruk and Nøhr (2016) likewise emphasized, from the health informatics perspective, that varying levels of user involvement, ranging from user-centered design to co-operative and user-driven approaches, are essential to ensure usability, adoption, and meaningful integration into clinical practice.

In addition to empirical studies and proposed frameworks for developing interventions, Löchner and colleagues (2025) recently published an overview that emphasizes the importance of considering implementation in broader terms. They highlight persistent barriers such as stigma, privacy concerns, digital literacy gaps and practitioner resistance. At the same time, they emphasize facilitators, including accessibility, professional guidance, and technological advances. To move beyond fragmented implementation efforts, they propose the TEQUILA framework as a set of guiding principles for the responsible integration of digital tools into mental health care. TEQUILA outlines seven dimensions that should be considered in evaluation and implementation: trust (ensuring transparency and data security), evidence (building on rigorous, long-term research), quality (maintaining clinical standards), usability (designing for accessibility and inclusivity), interest (ensuring interventions meet user needs and preferences), liability (clarifying accountability, especially when AI is involved), and accreditation (securing formal approval and oversight). By framing barriers and facilitators within these dimensions, Löchner and colleagues (2025) emphasize that successful implementation of digital care requires a combination of user-centered design, clinical validation, and structural support through policy, regulation, and ethical safeguards.

While these implementation frameworks clarify the conditions under which BC can be successfully adopted in practice, they do not explain how blended interventions actually bring about therapeutic change. Understanding the mechanisms of change is essential, not only to strengthen the evidence base of BC but also to inform its design and ensure that digital and f2f-elements complement each other effectively. The next section therefore turns to the processes through which psychotherapy and blended interventions exert their effects.

1.3 Mechanisms of Change

1.3.1 Mechanisms of Change in F2F-Psychotherapy

Understanding the mechanisms of change in psychotherapy is essential for explaining how and why interventions lead to positive outcomes, and for using this knowledge to refine and optimize treatments (Kazdin, 2007). Mechanisms of change can be defined as the processes or events responsible for therapeutic improvement, the reasons why change occurs, or how it comes about (Kazdin, 2007). Psychotherapies are demonstrably effective across a wide range of disorders, but the processes that drive these effects remain only partly understood (Cuijpers et al., 2019). While each therapeutic school builds on distinct theoretical assumptions, for example, CBT emphasizes cognitive restructuring, while psychodynamic therapy focuses on uncovering unconscious patterns, many bona fide approaches achieve broadly similar outcomes (Cuijpers et al., 2019; Cuijpers et al., 2013; Grenon et al., 2019). This “dodo bird verdict” was first raised by Saul Rosenzweig in 1936, who observed that different therapies lead to comparable results (Rosenzweig, 1936). This view has been challenged by some meta-analyses showing small differences favoring certain approaches (Cuijpers et al., 2018; Mayo-Wilson et al., 2014) but findings are mixed and researcher allegiance must be taken into consideration (Cuijpers et al., 2019). Thus, while psychotherapeutic approaches differ in their specific techniques and theoretical models, they appear to at least share a set of underlying processes often referred to as “common factors” (Cuijpers et al., 2019).

Among the most influential frameworks on change mechanisms in psychotherapy that considers both common and specific factors is Lambert’s four-factor model (1992), later refined by Miller and colleagues (2000). It distinguishes between extra-therapeutic influences, relational factors (e.g., alliance, empathy), client expectations, and specific therapeutic techniques. Empirical estimates suggest that a large share of improvement can be attributed to common

processes: approximately half to nonspecific factors such as alliance and expectations, one-third to extra-therapeutic factors, and only a smaller fraction to treatment-specific techniques (Cuijpers et al., 2012). Although the exact weightings are debated, findings suggest that therapeutic outcomes emerge from the interaction of these domains rather than from specific methods alone. In the German-speaking literature, Grawe (1997) proposed a complementary model of general mechanisms of psychotherapy: resource activation, problem mastery, clarification of meaning, and the therapeutic relationship. This model therefore adds the patient's active engagement in mobilizing resources, addressing problems, and integrating experiences. The most modern framework for common factors is the contextual model by Wampold & Imel (2015). The contextual model proposes three pathways through which psychotherapy leads to change. Before these pathways can be activated, an initial bond between the therapist and the patient needs to be established. The pathways then are: a) the real relationship, b) the creation of expectations through explanation of disorder and the treatment involved, and c) the enactment of health promoting actions (Wampold, 2015). The real relationship is defined as the genuine personal relationship between the therapist and the patient. This relationship is characterized empathy and care and is assumed to be healing in itself (Wampold & Imel, 2015). The second pathway brings about change through the patients' expectations or hope, which can be achieved through an explanation for their struggles or a comprehensive therapy rationale. This pathway entails the agreement of therapist and patient about the goals and tasks of therapy, but also the belief that one can do what is necessary to bring about the desired change in their life in a sense of mastery or self-efficacy (Wampold, 2015). Pathway three refers to specific ingredients of the respective therapy approach. The contextual model emphasized that these specific ingredients all lead to some sort of healthy actions, such as changing thinking patterns, accepting and expressing emotions, changing perspectives, and so forth.

Building on these theoretical accounts, empirical studies have sought to identify the specific mechanisms involved. A systematic review of 35 mediation studies by Lemmens et al. (2016) focused on psychotherapy for depression and found the strongest support for mediators such as dysfunctional attitudes, automatic negative thoughts, rumination, worry, and mindfulness skills. Yet, it is important to say that most mechanisms investigated were related to CBT and nearly half of the examined constructs failed to show mediational effects (Lemmens et al., 2016). Importantly, most studies did not meet core methodological requirements such as establishing temporality or experimentally manipulating the proposed mechanism. The conclusion by the author was that evidence for specific mediators remains mixed and often underpowered, and more rigorous longitudinal and experimental designs are needed. More recent synthesizing work has focused on either specific populations or specific dimensions of change processes. For instance, a review of adolescent psychotherapy with 106 included studies identified cognitive variables, family functioning, and engagement in therapy tasks as the most promising mediators, while noting that relational and emotional processes were largely neglected (Taubner et al., 2024). A meta-analysis of emotional change processes across 121 studies found robust links between fear habituation in exposure therapy for anxiety, emotion regulation in treatments for anxiety disorders, and the degree of experiential processing in psychotherapy for depression (Sønderland et al., 2024).

Taken together, the literature converges on two points: psychotherapy outcomes are shaped by a combination of common and specific processes, and there is no single “active ingredient” that accounts for therapeutic change. At the same time, our knowledge is constrained by methodological gaps. Much of the available research remains correlational, underpowered, or unable to disentangle between-person differences from within-person dynamics (Cuijpers et al., 2019).

1.3.2 Mechanisms of Change in Internet-based Interventions

The discussion of mechanisms of change in f2f psychotherapy raises the question of whether digital interventions operate through similar or distinct processes. Given that most IBI are grounded in CBT principles, one might expect their mechanisms to largely mirror those of traditional therapy. Indeed, systematic reviews and meta-analyses suggest that this is the case: the majority of identified mediators are cognitive in nature, paralleling findings from f2f-settings (Angerer et al., 2025; Matthias Domhardt, Lena Steubl, et al., 2021). Evidence for IBI in depression shows that cognitive variables such as perceived control, rumination, and interpretation biases are the most consistently supported mediators (Matthias Domhardt, Lena Steubl, et al., 2021). Self-related processes, particularly self-efficacy and perceived control, also emerge as robust mechanisms, showing strong associations with symptom change (Angerer et al., 2025). Regarding interventions for anxiety disorders, cognitive variables were found to be the largest group of examined change processes and also the variables with most significant results, followed by skills (Matthias Domhardt, Hannah Nowak, et al., 2021). Beyond depression and anxiety, mediation studies of IBIs for PTSD also point to cognitive and emotional variables, including self-efficacy, trauma disclosure, and perceived social acknowledgment as potential mechanisms (Steubl et al., 2021). Yet here too, evidence is limited.

Methodological considerations are similar to those in f2f-research. Most IBI mediation studies meet basic quality standards such as randomized design and theoretical grounding, and sufficient sample sizes (Angerer et al., 2025; Matthias Domhardt, Lena Steubl, et al., 2021). Encouragingly, recent reviews find that temporality - the requirement that mediator change precedes symptom change - was addressed in almost half of IBI studies, a higher proportion than in earlier psychotherapy process research (Angerer et al., 2025). Nevertheless, major gaps remain: few studies assess multiple mediators simultaneously and most lack experimental manipulation of proposed processes (Matthias Domhardt, Lena Steubl, et al., 2021).

Taken together, current evidence suggests that IBI work primarily through the same processes as f2f therapy, with self-efficacy and related self-beliefs being among the most robust mediators across conditions. However, the field has yet to identify delivery-specific mechanisms unique to digital formats. Future studies could systematically compare IBI and traditional psychotherapy to disentangle which mechanisms are common across delivery modes and which might be enhanced or hindered by digital delivery. Moreover, designs that incorporate temporality, multiple mediators, and experimental tests are needed to advance evidence and clarify the causal processes underlying change in IBI. So far, the evidence on mechanisms of change in IBI has excluded blended formats. Therefore, it is unclear whether combining digital and f2f-elements merely replicates the underlying processes observed in each format or if their integration modifies the dynamics of change in distinctive ways. In the next section, I will outline the evidence for mechanism of change in BC.

1.3.3 Mechanisms of Change in BC

Compared to f2f and purely digital formats, the evidence base on mechanisms of change in BC is still at a very early stage. To date, no systematic reviews or meta-analyses have been conducted, and available studies are limited to single trials investigating putative mediators. For example, Räsänen et al. (2020) examined a blended acceptance and commitment therapy (ACT) program for university students and found that changes in psychological flexibility mediated reductions in depressive symptoms, supporting ACT's theoretical model. Garety et al. (2021) evaluated the blended "SlowMo" intervention for psychosis and demonstrated that improvements in reasoning biases and paranoia were partly mediated by changes in metacognitive processes. Similarly, Paetzold et al. (2023) explored a hybrid compassion-focused ecological momentary intervention, reporting that increases in self-reassurance and decreases in self-criticism explained symptom improvements. Finally, Schuster et al. (2022) tested an internet- and tele-based blended treatment for depression and observed that both behavioral activation and

reductions in rumination acted as mediators of clinical change. In sum, first evidence suggests that mechanisms in BC are similar to those identified in f2f and digital interventions, such as cognitive restructuring, and self-related processes, but the evidence remains scarce and fragmented, with most findings emerging from single trials focused on mechanisms specific to the underlying therapeutic model.

A frequent concern about BC is that the addition of digital elements might weaken the therapeutic alliance, one of the most robust common factors in psychotherapy. As a result, several studies have examined the quality of the alliance in BC. Most of this research is descriptive or correlational, focusing on whether a solid alliance can be established in BC and whether it differs from f2f-psychotherapy (Askjer & Mathiasen, 2021; Doukani et al., 2024; Kooistra et al., 2020), rather than testing it as a causal mechanism of change. To date, only Vermark et al. (2019) have taken a longitudinal approach, using weekly symptom measurements combined with a single alliance assessment to examine whether alliance predicts subsequent change. Their findings showed that therapist-rated, but not patient-rated, alliance at week four predicted steeper symptom reduction over the remainder of treatment. While this offers preliminary evidence that alliance may contribute to therapeutic change in BC, no study to date has examined the temporal development of alliance and its dynamic relationship with outcomes in this context.

1.4 Proposed Mechanisms of Change in BC

The evidence reviewed above suggests that BC might mobilize many of the same processes observed in f2f and fully digital treatments, but systematic knowledge about which mechanisms matter most in BC, and how the digital and in-person elements jointly shape them, remains limited. The present thesis focuses on four interrelated mechanisms that could be

theoretically central in BC: the therapeutic alliance, self-efficacy, therapeutic agency, and empowerment. Below, I define each construct and explain its potential relevance for BC.

1.4.1 Therapeutic alliance

The therapeutic alliance (often called the working alliance) is the collaborative partnership and emotional bond between therapist and patient. The concept of the importance of the therapist-patient relationship dates back to work by Sigmund Freud (1927). Bordin's transtheoretical formulation introduced the term working alliance and distinguishes three components: agreement on goals, agreement on tasks, and the bond that supports working together toward those goals (Bordin, 1979). The alliance is not tied to any single modality. It is a common factor across approaches and a robust, though modest, predictor of outcome in psychotherapy research (Berger, 2017; Flückiger et al., 2018).

In BC, the therapeutic alliance must be co-constructed across two settings: the in-person session and the digital environment. The digital component can involve different forms of interaction, ranging from highly personalized therapist guidance to standardized support, or even fully autonomous use without human contact. Even in unguided interventions, users may develop a sense of alliance with the program itself, shaped by factors such as the perceived empathy, responsiveness, or credibility of the IBI (Berger, 2017). This dual context of alliance formation creates opportunities but also challenges for how the three dimensions of the alliance take shape. With respect to goals, digital modules can make therapeutic objectives more explicit by tracking progress and visualizing change. They can also support shared decision-making, for instance when therapists and patients select modules together in a way that clarifies what matters most and why. However, when digital content feels poorly matched to a patient's needs, or when goals embedded in modules diverge from those negotiated in therapy sessions, this can lead to misalignment and weaken goal consensus. Tasks are also affected by the blended format.

Digital tools such as exercises, diaries, and symptom trackers can help translate agreed-upon tasks into concrete actions between sessions. When these tasks are collaboratively chosen, appropriately tailored, and reviewed during f2f sessions, they reinforce the sense of working together. If, however, tasks appear generic, overly burdensome, or disconnected from the central focus of therapy, they risk undermining the shared commitment to therapeutic work. Finally, the bond component of the alliance may be both enriched and strained in BC. Personalized and timely therapist feedback on digital exercises, as well as warm and validating discussion of between-session efforts, can help maintain a strong relational connection. At the same time, automation that replaces personal contact, technical difficulties, increased strain or impersonal digital interfaces may create frustration and distance, potentially weakening the emotional bond.

1.4.2 Self-efficacy

Self-efficacy refers to an individual's belief in their capacity to execute behaviors necessary to achieve specific goals. Psychologist Albert Bandura introduced this concept in 1977, defining perceived self-efficacy as a personal judgment of how well one can execute courses of action required to deal with prospective situations. In simpler terms, it is the confidence one has in one's ability to succeed in particular situations or accomplish a task. High self-efficacy implies a strong belief that one can overcome challenges and achieve desired outcomes, whereas low self-efficacy involves self-doubt and expectation of failure (Bandura, 1977). Self-efficacy beliefs play a significant role in many common psychological issues and low self-efficacy expectations are a key feature of depression and anxiety (Maddux, 2012). Therapeutic approaches often aim to bolster clients' belief in their ability to cope and change. Patients who believe "I can handle my anxiety" or "I can learn to communicate better" are more likely to try new coping strategies and persist with therapy. Self-efficacy also helps to explain behavioral change: patients with higher self-efficacy are more likely to attempt difficult tasks, tolerate distress and

recover from setbacks, whereas those with low self-efficacy may avoid challenges and feel defeated more easily (Maddux, 2012). According to Bandura (1977), self-efficacy beliefs are shaped by four primary sources: mastery experiences (direct successful achievement), vicarious experiences (observing others' successes), verbal persuasion (encouragement from others), and physiological and emotional states (interpreting one's stress or arousal).

IBI might be inherently suited for enhancing self-efficacy. Active mastery experiences are facilitated by IBIs through the provision of tailored strategies, behavior training, activity planners, and structured daily or weekly tasks. IBI can enhance this process with interactive elements, reminders, documentation tools, and automated feedback, which motivate users and promote the application of learned skills in daily life. Vicarious learning and verbal persuasion can be facilitated by IBI for instance by using videos of personal testimonials and advice from known people with mental health issues, as well as interviews with experts or by implementing digital peer support. These elements allow users to observe others overcoming similar challenges and receive encouragement. Additionally, IBI can address the self-appraisal of affective and physiological responses through self-monitoring tools like trackers or diaries and by using the digital format to include mindfulness or relaxation exercises with audio instructions. Through these mechanisms, IBIs might provide a well-suitable setting for enhancing self-efficacy.

1.4.3 Therapeutic Agency

Another concept stemming from Bandura's work is agency, which he defined as an individual's intentional influence over their own behavior and life circumstances (Bandura, 1989; Bandura, 2001). In his Social Cognitive Theory, he described agency as the capacity to act deliberately and purposefully based on four dimensions: intentionality, forethought, self-reactiveness and self-reflectiveness (Bandura, 1989; Bandura, 2001). Huber (2018) focused on the

concept of therapeutic agency, which is defined as a patient's intentional influence over the process of psychotherapeutic change. This construct means that patients are active co-creators of change, not merely recipients of therapeutic input. Patients with high therapeutic agency are typically engaged and participatory in sessions, take the initiative, reflect on therapy outside of sessions and take responsibility for their progress. Conversely, low therapeutic agency may manifest as passivity, dependence on the therapist, limited engagement with tasks, or a lack of reflection outside sessions (Huber, 2018). First empirical findings seem to support these patterns: in early therapy sessions, higher levels of agency have been associated with a stronger therapeutic alliance, greater participation and a more affiliative than hostile interpersonal impact (Huber et al., 2019). Similarly to self-efficacy, BC increases opportunities and demands for agency. Digital modules could encourage clients to independently initiate work, select exercises, monitor symptoms and goals, and reflect between sessions. This could strengthen patients' sense of agency in psychotherapy. At the same time, BC often requires greater levels of autonomous engagement than traditional f2f-therapy. For some patients, especially those experiencing low energy or high levels of distress, this increased requirement may feel overwhelming. This could potentially constrain the experience of agency rather than foster it.

1.4.4 Empowerment

Another concept that is closely related to the proposed mechanisms above but broader in its definition is empowerment. Empowerment is widely recognized as a central principle in health and psychotherapy, reflecting the process by which individuals regain autonomy, confidence, and control over their broader life circumstances. The concept of empowerment gained traction within community psychology, social work, and feminist/liberation movements in the 1970s and 1980s. Julian Rappaport (1987) introduced the concept of empowerment in social work and psychiatry and framed it as the means through which individuals and communities gain mastery over their lives. He emphasized both personal dimensions, such as personal

control and self-efficacy, and systemic dimensions, such as political power and access to resources. Empowerment-oriented therapists take a collaborative approach, encouraging shared decision-making and supporting clients in developing independent coping strategies (Cardoso Barbosa et al., 2021; Varela et al., 2025). In BC, empowerment shares several dimensions with self-efficacy and agency, such as fostering initiative and confidence through active digital engagement, but takes these to a broader level of participation. Transparent access to information and feedback on progress, as well as the ability to adjust modules or pacing according to personal needs, could give patients a more equal role in therapy. When these elements are implemented collaboratively, BC can foster empowerment as both a mechanism of change - by enhancing engagement and ownership during treatment - and an outcome, reflected in a sustained sense of autonomy beyond therapy. However, when digital interventions constrain choice or impose standardized processes, they risk reproducing power imbalances and reducing patients' sense of influence.

1.5 Gaps in Research

1.5.1 General Gaps

Despite substantial progress in outcome research, our understanding of mechanisms of change in psychotherapy - and in BC in particular - remains limited. Conceptually, it is unclear whether BC simply mobilizes the same processes as f2f or stand-alone digital treatments, or whether the integration of digital and in-person elements generates delivery-specific mechanisms. The current evidence base is fragmented, with most studies tied to specific therapeutic approaches and diagnostic groups. This leaves the question of which mechanisms are shared and which are unique as well as what a BC interventions need to include to activate them, unanswered. Research has further concentrated on symptom reduction as the primary outcome,

while patient-valued outcomes such as empowerment or quality of life are understudied and qualitative studies are scarce.

1.5.2 Methodological Gaps

Alongside these conceptual limitations, important methodological challenges constrain the evidence base. Much of the existing process research, both in f2f and digital therapy, relies on cross-sectional or correlational designs that cannot establish causal pathways. Core requirements for research on mechanisms of change, such as demonstrating temporality, testing multiple competing mediators, or experimentally manipulating putative mechanisms, are rarely met. Sample sizes are sometimes small and underpowered for complex models. In the digital domain, mediation studies have improved on some criteria, such as randomized design and theoretical grounding and large sample sizes but often still fall short on temporality and multi-mediator testing. In BC, the methodological landscape is even more sparse, with evidence scattered across single trials, no systematic reviews, and little use of advanced longitudinal modeling.

1.6 Aims of this thesis

This thesis aims to advance our understanding of mechanisms of change and facilitating factors in BC. It does so through four empirical studies:

Paper 1 investigates facilitating factors for the participatory development of BC interventions from the perspectives of patients and therapists.

Paper 2 synthesizes the existing evidence on self-efficacy as a mechanism of change in internet-based interventions (IBI) including BC through a systematic review with meta-analysis.

Paper 3 examines mechanisms of change in BC and psychotherapy, using longitudinal modeling, including therapeutic alliance, self-efficacy, and therapeutic agency, as putative processes.

Paper 4 takes a qualitative approach to exploring empowerment in BC, analyzing patient narratives to capture subjective dimensions that are difficult to access using quantitative methods.

Chapter 2

Study 1: TONI - One for All? Participatory Development of a Transtheoretic and Transdiagnostic Online Intervention for Blended Care

The following paper was published as:

Behr, S.* , Fenski, F.* , Boettcher, J., Knaevelsrud, C., Hammelrath, L., Kovacs, G., Schirmer, W., Petrick, H., Becker, P., & Schaeuffele, C. (2024). TONI - One for all? Participatory development of a transtheoretic and transdiagnostic online intervention for blended care. *Internet interventions*, 35, 100723. <https://doi.org/10.1016/j.invent.2024.100723>

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TONI - One for All? Participatory Development of a Transtheoretic and Transdiagnostic Online Intervention for Blended Care

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Abstract for study 1

Background: Internet-based interventions offer a way to meet the high demand for psychological support. However, this setting also has disadvantages, such as the lack of personal contact and the limited ability to respond to crises. Blended care combines Internet-based interventions with face-to-face psychotherapy and merges the benefits of both settings. To ensure the uptake of blended care in routine care, Internet-based interventions need to be suitable for different therapeutic approaches and mental disorders.

Objective: This paper describes the participatory development process of the Internet-based intervention “TONI” using a common therapeutic language and content on various transdiagnostic topics to be integrated into routine outpatient psychotherapy.

Methods: To develop this intervention in a participatory manner, we followed the Integrate, Design, Assess, and Share (IDEAS) framework. In a multilevel development process, we used a combination of interviews, focus groups, and proofreading to optimally tailor online modules to routine outpatient psychotherapy. Building on well-established cognitive-behavioral online content, we included expert interviews with psychodynamic ($n = 20$) and systemic psychotherapists ($n = 9$) as well as focus groups with psychotherapists of different approaches ($n = 10$) and persons with lived experience of mental illness (PWLE; $n = 10$).

Results: We describe the development process of TONI step-by-step, outlining the specific requirements that therapists from different therapeutic approaches as well as PWLE have and how we implemented them in our intervention. This includes the content and specific exercises in the online modules, aspects of data protection, language, design, and usability.

Conclusion: Online interventions that use a common therapeutic language and address therapeutic principles across different approaches have the potential to advance digitalization

in psychotherapy. Involving psychotherapists and PWLE in intervention development may positively impact acceptance and usage in practice. This study shows how participatory intervention development involving both psychotherapists and PWLE can be carried out.

2.1 Introduction

2.1.1 Health Care Situation

Mental disorders, including depression and anxiety disorders, occur just as frequently as other widespread diseases, such as high blood pressure or diabetes¹. They have an impact on quality of life, social functioning, and even physical health and are among the most common causes of sick leave at work and early retirement². The demand for psychotherapy already clearly exceeds treatment capacities, which has led to long waiting times. Furthermore, not all people benefit from psychotherapy to the same extent. Substantial improvements in symptoms can only be achieved for about 63% of patients through psychotherapy³. Given the substantial personal and societal burden of mental illnesses⁴, there is an urgent need to optimize the effectiveness and provision of outpatient psychotherapy. The digitalization of mental health treatments may provide a promising route.

2.1.2 Internet-based interventions

Internet-based interventions (IBIs) encompass a range of different approaches. Some of these interventions include personal contact with a counselor; others are purely stand-alone. The most researched form of IBIs are guided or unguided self-help programs for desktop computers. The vast majority of interventions are based on cognitive behavioral therapy (CBT). However, IBIs based on different theoretical models such as acceptance and commitment therapy⁵, psychodynamic approaches⁶, interpersonal psychotherapy⁷, mindfulness⁸, and programs based on physical activity⁹, exist. In recent years, numerous meta-analyses have shown the effectiveness of IBIs in treating various mental illnesses such as depression, anxiety, eating disorders, and substance abuse¹⁰. Therefore, IBIs are one way to meet the high demand for psychological care. They are available even in remote areas and patients can work at their own pace and in anonymity.

Still, IBIs may also involve some disadvantages and risks. Negative effects such as frustration due to comprehension problems or time pressure may be associated with the Internet treatment format and could lead to low treatment adherence^{11,12}. Further drawbacks may include the lack of personal contact and the lack of individual adaptability of the treatment. Most of the IBIs offered have been developed for a specific diagnosis like panic disorder or mild depression. In routine care however, comorbidity of two or more diagnoses is the rule rather than the exception¹³. To address comorbidity, transdiagnostic approaches that target shared mechanisms across different mental disorders have emerged. Transdiagnostic interventions are unified, broadband interventions with a linear, fixed sequence of modules ("one size fits all") or they can be adapted to individual needs by selecting specific modules and providing them in a personalized way ("my size fits me")¹⁴. This modularity allows to move beyond emotional disorders with modules corresponding to processes and symptoms relevant for the whole spectrum of mental health¹⁴. Although there is first evidence for transdiagnostic and tailored cognitive-behavioral IBIs to be effective¹⁵, the interventions are mainly focused on anxiety and depression. The limitations often lead to IBIs being regarded as low-threshold interventions for milder cases of mental disorders. In contrast, psychotherapy in the face-to-face (f2f) setting and pharmacotherapy are often viewed as treatments of choice for more severe symptoms¹⁶ and IBIs are, despite convincing evidence, often recommended as addition to more traditional treatment formats¹⁷.

A more recent approach combines f2f-psychotherapy with internet-based content to create an integrated treatment. This approach is usually referred to as "blended care" (BC) and attempts to maintain the positive aspects of both settings while mitigating the disadvantages.

2.1.3 Blended Care

The term BC refers to the combination of f2f-psychotherapy with online resources, resulting in an intensified therapy setting. By supplementing f2f-sessions with independent self-

study, patients can benefit from additional materials on relevant topics, enhancing the overall treatment. This method also allows psychotherapists the opportunity to delegate certain aspects of therapy to online resources, while maintaining a personalized relationship and flexibly adapting the treatment to the patient's needs. The content can be integrated into therapy in various different ways. It can be embedded as part of the therapy, used as a separate add-on, or as a preparation or aftercare to therapy.

Advantages of BC compared to classical f2f-psychotherapy include the increase of the treatment dose, promoting patient cooperation, and improving the transfer of learned contents into everyday life¹⁸. Another frequently mentioned benefit is that BC could save clinicians time, whilst maintaining therapy outcomes and reducing drop-out rates¹⁶. Thus, BC could be more cost-effective than traditional psychotherapy and would contribute to making mental health care available for a larger number of people. With an IBI following the f2f-psychotherapy, BC might also help maintain and even increase effects. In a study using an online survey to assess experience with IBI and BC, Schuster et. al.¹⁹ found that psychotherapists perceived disadvantages of IBI especially related to aspects of the therapeutic process (e.g., missing important information, increase in avoidance of difficult topics, and the lack of non-verbal signals), which could be mitigated in BC. Overall, psychotherapists considered BC to have fewer disadvantages than stand-alone IBIs.

Several studies investigated the effectiveness of BC based on CBT. In a systematic review, Erbe et al.¹⁶ concluded that studies suggest CBT-BC interventions to be feasible and comparable to the efficacy of stand-alone f2f-psychotherapy. Despite the promising data on BC efficacy, the uptake in routine care is limited. The focus on CBT does not reflect the therapeutic orientation of psychotherapists practicing in routine care in Germany. To ensure the uptake of a BC intervention, it seems necessary to think about specific requirements psychotherapists of all therapeutic approaches have for an IBI that they can optimally integrate into their practice.

Results of a systematic review by Dech et al.²⁰ showed that the incorporation of online content into routine psychotherapeutic care requires a restructuring of the way psychotherapists work and is often initially associated with an increased workload. They concluded that barriers for BC should be assessed and addressed, and psychotherapists should be involved in the implementation process to increase acceptability and feasibility. They also highlighted that BC should not be applied in a standardized way, but rather adapted to the individual patient to allow psychotherapists flexibility in their work.

2.1.4 Participatory development

To sum up, a BC intervention used in routine care needs to be applicable to the whole spectrum of mental disorders and suitable to be used for different therapeutic approaches. To achieve a transdiagnostic intervention, we follow a modular “my-size-fits-me”-approach¹⁴, allowing psychotherapists to tailor the content to the needs of their individual patients. In routine care, most psychotherapists work integrative and use techniques or theoretical background from different approaches²¹. Despite varying theoretical rationales of different therapeutic approaches, they lead to similar outcomes²². This is in line with evidence for common factors of therapy such as alliance, expectations, and empathy, which are crucial for an effective therapy and not specific to a certain therapeutic approach²³. To our knowledge, today there are no IBIs that are suitable for various therapeutic approaches. To generate a common language and develop content suitable for all therapeutic approaches, stakeholders with different therapeutic backgrounds need to be involved. Furthermore, involving people with lived experience of mental illness (PWLE) is viewed as crucial for improving mental health care and could increase engagement and inform best-practices²⁴. A participatory research approach involving future users enables researchers to understand and take into account the diverse challenges and opportunities for the people whom the treatment aims to support and is especially important for our goal to develop a novel transdiagnostic modular intervention. The participatory research

approach however, creates the challenge of deciding how and when to involve psychotherapists and PWLE in our development process.

To optimally incorporate theory-based strategies with a user-centered approach we used a framework for a systematic intervention development. The Integrate, Design, Assess, and Share (IDEAS) framework by Mummah et al.²⁵ entails guidelines for an iterative eHealth development and evaluation process. It emphasizes the importance of evidence-based implementation strategies, user-centered design, elements of design thinking, and evaluation. The framework encourages user-centered solutions that are based on an in-depth assessment of the actual needs and wishes of future users and is therefore well-suited for the development of an IBI for routine care. By including psychotherapists as well as PWLE in the process of the intervention's development, the requirements of psychotherapists using different therapeutic approaches as well as of patients with different needs can be met. In this paper, we explain our approach to developing a transtheoretical and transdiagnostic IBI for BC settings covering phases 1-8 of the IDEAS framework.

2.2 Materials and methods

2.2.1 Development process following the IDEAS Framework

The data for this study was collected as part of the formative research phase of a larger project, which has the goal to increase the effectiveness of routine **psychotherapy** through blended therapy with **transdiagnostic online modules**²⁶ (PsyTOM; trial registration: German Clinical Trials Register (DRKS) DRKS00028536. Registered on 07.06.2022.). The overall goal of the project is twofold: 1) To develop a transtheoretical and transdiagnostic IBI for BC settings (as described in this paper), and 2) To conduct a randomized controlled trial (RCT) that evaluates whether BC with this IBI benefits patients and psychotherapists (for more information see the study protocol of the ongoing RCT²⁶). The Research Ethics Committee of the Psychologische

Hochschule Berlin approved the protocol (EK2021/21). The qualitative research was conducted following the Consolidated Criteria for Reporting Qualitative Research²⁷ (COREQ; see Multimedia Appendix 1).

In a multilevel development process following phases 1-8 of the IDEAS framework²⁵, we used a participatory and iterative design approach to develop a therapeutic **online** intervention (TONI) optimally designed for future users in practice. The IDEAS framework suggests 10 phases of intervention development: (1) empathize with target users, (2) specify target behavior, (3) ground in behavioral theory, (4) ideate creative implementation strategies, (5) prototype potential products, (6) gather user feedback, (7) build a minimum viable product (MVP, i.e., the first fully-functioning version of the program that includes all core features), (8) pilot test, (9) evaluate efficacy, and (10) share widely. The phases are thereby intended to be recurring and interwoven. By involving PWLE with different psychological diagnoses and psychotherapists with different therapeutic approaches, we wanted to ensure that our theoretical concept (step 3) corresponds to the actual conditions of psychotherapeutic practice. For an overview of our process according to the framework, see Figure 1. The data collection period was from February 2021 to March 2022 and proceeded through interviews, focus groups, and final proof-reading. A total of $N = 41$ psychotherapists of different therapeutic approaches, $N = 12$ PWLE, and one diversity expert participated. Detailed information about the research team and participant selection can be found in Multimedia Appendix 2.

2.2.2 Interviews

Our intervention ought to be both transdiagnostic and suitable for use across different therapeutic approaches. While there is research on BC treatments based on CBT, little is known for other therapeutic approaches. As psychodynamic and systemic psychotherapy are, next to CBT, the largest evidence-based approaches in Germany, our interviews focused on psychodynamic

and systemic psychotherapists' requirements for online content that they would integrate into their outpatient psychotherapy (Phase 1a, see Figure 1). The overall aim of the interviews was to gain knowledge about a common therapeutic language and joint content requirements that would help to develop the initial version of the intervention's content.

2.2.2.1 Participants.

We interviewed $n = 9$ systemic and $n = 20$ psychodynamic psychotherapists. We planned for a sample size of $n = 10$ systemic and $n = 20$ psychodynamic psychotherapists. Due to a lower than expected response rate during the recruitment process, only nine systemic psychotherapists were included in our interview study. The planned sample sizes are based on empirical results that show that most new information in a data set is obtained in the first five to six interviews, that 92% data saturation occurs after 10 interviews and negligible new information is obtained after 20 interviews at the latest²⁸.

Data collection was conducted from February 2021 to August 2021. We recruited participants via mailing lists of different systemic and psychodynamic training institutes as well as systemic associations in Germany and through personal contacts. Apart from being a licensed and practicing psychotherapist in either the systemic or psychodynamic approach, there were no other inclusion or exclusion criteria. At this stage, no attempt was made to get a variety of respondents in terms of any sociodemographic characteristics. The mean age was 49.5 years ($SD = 14.0$) for psychodynamic psychotherapists and 49.0 years ($SD = 13.0$) for systemic psychotherapists. The majority of participants were female (74% of the psychodynamic psychotherapists and 67% of the systemic psychotherapists). Systemic therapists on average practiced psychotherapy for 12.5 years ($SD = 11.6$, range 2 to 32 years). One therapist was still in training and two therapists did not provide this information. Psychodynamic therapists on average practiced psychotherapy for 12.7 years ($SD = 13.8$, range 1 to 44 years).

2.2.2.2 Topics.

We conducted semi-structured interviews via video-conferencing that lasted 25-40 minutes. All interviewees were informed beforehand and signed informed consent. In addition to open-ended questions about the use of materials or exercises in their outpatient work (“As part of your therapy, do you already use exercises that you want your patients to do outside of the therapy session? If yes, what do these look like? If no, what is the reason for this?”), we showed psychotherapists a list of ten typical transdiagnostic online modules we have used in previous studies. These included mindfulness, understanding emotions, cognitive flexibility, and countering emotional avoidance²⁹ as well as behavioral activation and cognitive restructuring³⁰. Based on these modules, we asked the interviewees to describe possible module content that they would find useful, focusing on its psychodynamic or respectively systemic significance. The complete interview schedules can be found in Multimedia Appendix 3 (see also Fenski et al.³¹, for a more detailed analysis of the interviews with psychodynamic psychotherapists).

2.2.3 Focus Groups

Based on the collection of transdiagnostic online modules and the interviews, we developed an initial version of TONI’s content, including ideas about possible functionalities. In addition to transdiagnostic modules such as understanding and coping with emotions, we included content on communication, sexuality, and strengths. We presented these ideas to participants in four focus groups, two with psychotherapists and two with PWLE in summer of 2021 (Phase 1b, see Figure 1). Based on these focus groups, we adapted the intervention’s content and included various functionalities according to users’ needs. A prototype was developed which we then tested within a second round of the same participants in autumn 2021 (Phase 6a, see Figure 1).

2.2.3.1 Participants.

We recruited $N = 10$ psychotherapists of different therapeutic approaches through mailing lists of professional organizations and chambers of psychotherapists. All psychotherapists who took part in the interviews were also asked to take part in the focus groups. One psychodynamic and one systemic psychotherapist agreed to participate. $N = 10$ PWLE were recruited through diverse mailing lists of patients' associations and patients' online forums. Participants were informed about study goals and data security regulations and gave written informed consent. They completed an online questionnaire on age, gender, and living situation. PWLE also indicated their diagnosis and time since the last psychotherapy. Psychotherapists stated their therapeutic approach. An overview of participants' sociodemographics can be found in Table 1. We reimbursed all participants financially for their time with 200€ each.

Table 1

Sociodemographic Characteristics Of The Focus Group

	Psychotherapists ($N = 10$)	PWLE ($N = 10$)
Female gender	90%	70%
Age		
<25	-	-
25-40	30%	50%
41-65	60%	50%
>65	10%	-
Years since practicing (M)	10.8	
Residency		
≤ 20.000 inhabitants	10%	20%
20.000 - 100.00 inhabitants	30%	20%
> 100.000 inhabitants	60%	60%
Therapeutic approach^a		
Systemic	2	

Cognitive-behavioral	5	
Psychodynamic	4	
Years practicing as psychotherapist		
<5	3	
5-10	3	
11-20	1	
>20	3	
Time since last psychotherapy		
Currently in psychotherapy		30%
≤ five years		50%
> five years		20%
Diagnosis^a		
Depressive disorders		7
Anxiety disorders		5
Eating disorders		1
Reactions to severe traumatic stresses adjustment disorders		5
Somatoform disorders		2
Sleep disorders		1

^amultiple answers possible

2.2.3.2 Topics.

We conducted semi-structured and audio-recorded focus groups via video-conferencing with $n = 5$ participants each. All focus group sessions were 4 hours long. In summer 2021, the first round of focus groups was used to gather feedback on general “dos and don’ts” of IBIs for BC as well as specific feedback on the content we already compiled. We also presented participants with a mock-up of one specific content module to discuss general ideas about the design and functionality. An additional focus for psychotherapists was placed on their view of the content with regard to the respective therapeutic approach and their requirements on usability. PWLE were asked to talk about the intervention’s content in terms of comprehensibility and usability. Based on the first focus groups, we adapted the content, and a TONI prototype was developed. This prototype was discussed with the same participants in autumn 2021. We first presented the

participants with the prototype by the interviewer via shared screen. The prototype included the onboarding and introduction session of TONI for psychotherapists in which users receive information on the intervention, answer screening questionnaires, create an account, and invite patients. PWLE's view of the prototype included the onboarding and introduction session of TONI as well as an overview of specific functions, like tracking of symptoms or a diary function. After discussing the process, participants had the opportunity to test the interactive prototype. Lastly, we collected user experience through the German Version of the System Usability Scale (SUS) by Gao et al.³². The SUS measures the subjective usability of products and systems, with each of the 10 items scoring from "strongly disagree" to "strongly agree". The SUS score ranges from 0 to 100, with higher scores showing a higher subjective usability of the product rated. The focus group schedules can be found in Multimedia Appendix 4.

2.2.4 Analyses

We recorded, anonymized, and transcribed all interviews and focus groups in line with the transcription rules for content semantic transcription according to Dresing and Pehl³³. Using a combination of inductive and deductive qualitative content analysis³⁴ we analyzed participants' responses to the open-ended questions using MAXQDA 2020.

We calculated inter-rater reliability in MAXQDA through reciprocally re-coding approx. 22% of the already coded focus groups and the longest interview with a psychodynamic and systemic psychotherapist, respectively. Criterion was the occurrence or absence of a code in the material. We calculated kappa according to Brennan and Prediger and achieved very good inter-rater reliabilities ($\kappa = .91-.98$).

2.2.5 Proofreading

Following the focus groups, we adjusted the modules according to the general feedback. We tailored the content to the needs of psychotherapists and PWLE and finalized the texts.

Whilst in previous steps we targeted the intervention's development in general, we used proof-reading to gather specific feedback on all texts and exercises (Phase 6b, see Figure 1).

2.2.5.1 Participants.

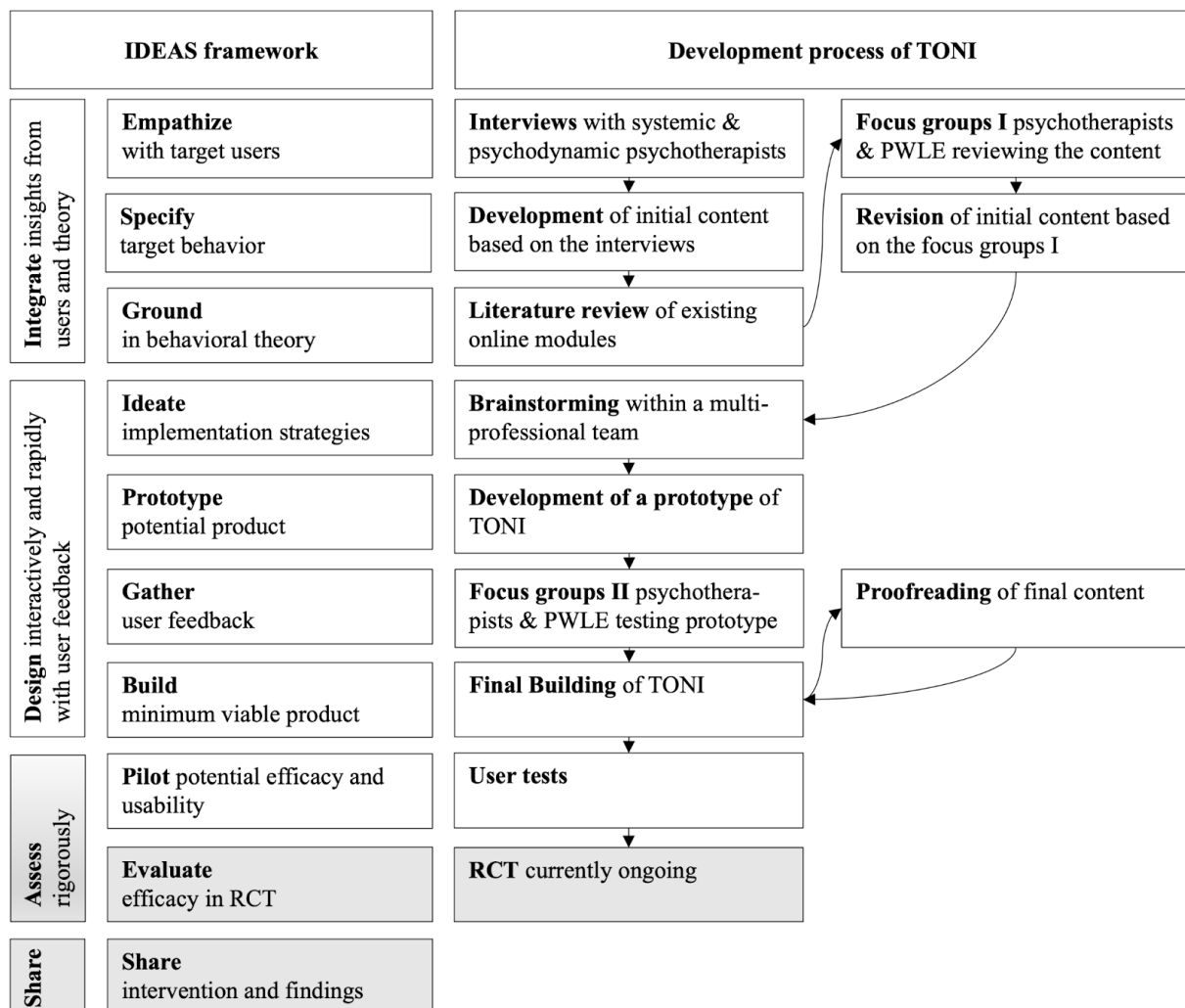
The final texts for the intervention were proofread by three psychotherapists of different therapeutic approaches, two PWLE with different educational backgrounds and gender, and one diversity expert. Whilst we recruited psychotherapists and PWLE initially interested in participating in the focus groups directly by email, we reached for the diversity expert through a mailing list of an association for LGBTQIA+ rights. We reimbursed all participants financially for their time with 500€ each.

2.2.5.2 Topics.

We gave the participants a test account to the platform as well as individual evaluation sheets via email. All participants provided written feedback on the general comprehensibility of the texts of each module (Are the texts too long or too short, full of technical terms, incomprehensible, etc?). We also asked psychotherapists for feedback on the respective modules' contents from the point of view of their individual therapeutic approach (Are there certain "NoGos" with regard to language or content?). Moreover, we asked PWLE for feedback on the comprehensibility of the exercises (Are the instructions appropriate, would you know what to do, and could you imagine doing the exercises on your own?). We asked the diversity expert for feedback on three modules with especially sensitive content (e.g. sexuality) as well as case examples we provide within the intervention.

After we incorporated all feedback, various people within our network tested TONI (Phase 8, see Figure 1). Through extensive testing, we ensured that not only all texts were understandable, but that there were no bugs within our application potentially reducing user experience.

Figure 1. Development Process Of TONI Based On The IDEAS Framework



2.3. Results

2.3.1 Interviews

2.3.1.1 Psychodynamic Requirements.

Psychotherapists were asked whether they work with exercises or materials that they want their patients to do or use outside of the therapy session. Qualitative content analysis showed that some psychodynamic psychotherapists already use exercises ($n = 9$) or materials ($n = 5$) that could be transferred into the online format, like mindfulness, relaxation and imagination exercises, questionnaires, diaries, weekly plans, skills, and psychoeducation. In addition, two main categories emerged: psychodynamic requirements and psychodynamic field of application. All

categories, subcategories, and number of psychotherapists that mentioned the subcategories (frequencies) can be found in Table 2.

The category psychodynamic requirements summarizes statements made by the interviewees in which wishes and needs for the content of the online modules to be used in combination with f2f-psychodynamic psychotherapy became clear. Five subcategories were formed. First of all, patients' autonomy should be promoted by encouraging them to work independently within the intervention (subcategory: autonomy). Therefore, two subcategories showed that individual modules should be easy to handle while having a playful character. The online treatment should also present a range of different content types (subcategory: variation). Moreover, the use of a common therapeutic language was important for the psychotherapists, not only relying on typical cognitive-behavioral vocabulary (subcategory: language).

Next, it became clear under what circumstances online modules would be integrated into psychodynamic psychotherapy, forming the category psychodynamic field of application. Within this category, four subcategories emerged. The interviewees emphasized the importance of not merely using IBIs but rather thinking about how to integrate the online material into f2f-psychotherapy (subcategory: integration with f2f-sessions). Psychotherapists thought about suitable time points within the f2f-psychotherapy where online modules could be usefully applied (subcategory: timing). It also became clear that the interviewees felt it was essential to keep asking themselves why they felt the need to use online modules with certain patients and why they might not with others (subcategory: reflecting usage). Lastly, the subcategory called patient groups illustrates that psychodynamic psychotherapists would rather include online modules with patients of certain characteristics than others.

Table 2*Categories And Subcategories: Psychodynamic Requirements And Field Of Application*

Categories	Subcategories	Frequencies	Statements
Psychodynamic Requirements	Autonomy	$n = 7$	"So more in the sense of encouraging independence and kind of taking responsibility for the therapy." (PT12)
	Easy handling	$n = 6$	"So it has to be short, it has to be quick to understand." (PT15)
	Playful Character	$n = 5$	„If you could perhaps play in a small film sequence, which then really only works via such a medium, I think I would find that quite interesting." (PT1)
	Variation	$n = 6$	“That you can somehow, in the sense of a cookbook, provide quite a lot of content, as heterogeneous as possible, what people have already found helpful.” (PT12)
	Language	$n = 6$	"Psychodynamics and the word “training” somehow don't go together." (PT13)
Psychodynamic Field of Application	Integration with f2f-sessions	$n = 4$	"If that runs in parallel, so that when those processes start in therapy, patients can then continue to practice them at home if they want." (PT4)
	Timing	$n = 9$	"Well, I could imagine using it more in situations of crisis, when one works in a more direct, stabilizing, and strength-oriented way." (PT5)
	Reflecting Usage	$n = 4$	"I think I would use it very mindfully and moderately, like everything in psychodynamic therapy, and always ask what it's like to still use that, so to always include it in therapy or not and

			also to consider it as part of therapy and relationship building." (PT20)
	Patient Groups	<i>n</i> = 10	"It totally depends on the patients, so for patients with a low structural level, who need a lot of structure anyway, I can imagine that it might be helpful." (PT14)

2.3.1.2 Systemic Requirements.

Findings from the interviews with systemic psychotherapists showed an overall open attitude toward using online content. All nine interviewed systemic psychotherapists use exercises in between sessions regularly - such as behavioral experiments, worksheets, or finding symbols or artistic expression for specific issues. One main category emerged: systemic requirements. Within the category systemic requirements, nine subcategories were formed. All subcategories and numbers of psychotherapists that mentioned the subcategories (frequencies) can be found in Table 3.

The subcategory strengths-based included statements from therapists who wished for the content to be geared toward finding and enhancing individual strengths. Autonomy (subcategory: autonomy) should be promoted, for example, through transparent communication about the purpose of the modules and the freedom to decide what content patients want to work on. From a systemic point of view, the content should reflect a diversity of perspectives (subcategory: constructivism) and thus attributions to diagnostic systems and one-sided descriptions should be avoided. In addition, the promotion of the expression through symbolism and imagery should be encouraged (subcategory: symbols). To include systemic interventions, exercises containing scaling and paradoxical interventions should be implemented (subcategories: scaling and paradoxical interventions), and a focus on social interaction should be promoted (subcategory: interaction). Overall, the intervention should contain a language that is strengths-

based, nonjudgmental, and encouraging (subcategory: language). Systemic psychotherapists wanted an adaptable intervention to meet the individuality of patients, their systems, and their life situations and to promote new experiences (subcategory: experiencing). The systemic psychotherapists advocated a simple and playful design for the intervention which could promote a positive emotional experience for the patients (subcategory: positive emotions). Main findings of psychodynamic and systemic interviews can be found in textbox 1.

Table 3

Categories And Subcategories: Systemic Requirements For Implementation

Categories	Subcategories	Frequencies	Statements
Systemic requirements	Strengths-based	$n = 8$	“I would ask: Where do you want to go? (...) I would not focus on the problem, but the goal. And via the goal, I would get to the strengths.” (PT5)
	Autonomy	$n = 8$	“As for the effect, the client should feel that it helps her.” (PT2)
	Constructivism	$n = 5$	“The more different perspectives there are on a topic, a problem, a diagnosis, the more helpful it is.” (PT1)
	Symbols	$n = 6$	“In a systemic therapy we work a lot with symbols, with substitutes, with representatives, with genograms.” (PT1)
	Scaling and paradoxical interventions	$n = 3$	“For example, by creating a paradoxical guide. 10 things I need to do or how I can contribute to the chronicity of my problem.” (PT6)
	Interaction	$n = 5$	“So I have no idea what kind of tools there might be. But

			from my point of view, they would certainly have a lot to do with perspective taking, i.e. in the sense of circular questions and mentalizing.” (PT6)
	Language	<i>n</i> = 7	“I wouldn't use the term homework, but in systemic therapy we would rather say a suggestion, are you interested in a suggestion?” (PT1)
	Experiencing	<i>n</i> = 9	“And if I then see myself as something like a waiter, so to speak, who offers possibilities on a tray, it is then exciting to see which glass (...) the client (...) reaches for - why not have some online modules on there as well?” (PT2)
	Positive Emotions	<i>n</i> = 3	“It should invite, inspire and encourage. And indeed, the possibilities of such online modules are fascinatingly vast. So using visual material or using sensory.... so image and sound and things like that to inspire and stimulate.” (PT2)

Textbox 1. *Main Findings Of Psychodynamic And Systemic Interviews*

- TONI should use a common therapeutic language and exercises
- TONI should be playful and interactive
- TONI should be transparent about which data can be viewed by the therapists in order to promote patient autonomy
- TONI should offer connections to the face-to-face sessions
- There should be no indication of how the online content should be used in psychotherapy

2.3.2 Focus groups

2.3.2.1 Psychotherapist Perspective.

Across both groups and rounds of focus groups with psychotherapists, we deductively formed three main categories based on our focus group guidelines: specific barriers and facilitators according to the therapeutic approach, general barriers and facilitators, and user experience. For all main categories, several subcategories emerged inductively.

2.3.2.1.1 Specific barriers and facilitators according to the therapeutic approach.

As psychotherapists from different therapeutic approaches were part of the focus groups, specific barriers and facilitators according to their respective approach became visible. In three subcategories, psychodynamic psychotherapists emphasized how BC will affect the *therapeutic relationship*, the importance to keep in mind the *personality functioning* of the patients as well as the opportunity to use the *structured procedure* of the intervention for f2f-sessions. Two subcategories emerged for systemic requirements: the urgency to consider the *social context* of patients as well as the wish to keep a *strengths-based focus*. For cognitive-behavioral psychotherapists, two subcategories were formed: the wish for content that is grounded on cognitive-behavioral theories (subcategory: *theoretical categorization*) and that the intervention might help patients to *change their behavior*. Table 4 shows barriers and facilitators from psychotherapists with different therapeutic approaches.

Table 4*Barriers And Facilitators From Psychotherapists With Different Therapeutic Approaches*

Categories	Subcategories	Statements
Psychodynamic barriers and facilitators	Therapeutic relationship and process	“I wonder how I can connect TONI to the therapy session?” (PT4.2)
	Personality functioning	“So if there was another module in there (...) where assistance is given - what do I actually have to pay attention to in contact with others, in relation to my own self-awareness?” (PT4.2)
	Structured procedure	“The older I get, the more I realize how important it is, even as a psychodynamic psychotherapist, to work in a structured way. And this is excellent for that.” (PT4.1)
Systemic barriers and facilitators	Social context	“So, from a systemic perspective, it's even a must [to involve relatives].” (PT2.2)
	Strengths-based focus	“When it comes to making problems conscious and immersing ourselves in them, that's something we don't want to do from a systemic perspective. Because then we are immediately caught in this problem-trance again.” (PT2.2)
Cognitive-behavioral barriers and facilitators	Theoretical categorization	“Such classics, where I, as a behavioral therapist, at least think that when I see the headline, I already know what it's about.” (PT3.1)
	Behavior change	“That the patient somehow sets (...) concrete goals for the day.” (PT3.1)

2.3.2.1.2 General Barriers and Facilitators.

The category *general barriers and facilitators* combines general requirements regarding a BC intervention across therapeutic approaches and consists of six subcategories, which can be found in Table 5. Psychotherapists of all therapeutic approaches wished for the intervention to

be transparent in terms of use and data protection (subcategory: *transparency*). It should be scientifically sound (subcategory: *scientific background*) and reduce psychotherapists' workload, instead of increasing it (subcategory: *workload*). The intervention should help patients cope with emotional distress when working on the online modules by themselves (subcategory: *dealing with emotional stress*). However, TONI should not be used as a stand-alone tool (subcategory: *psychotherapeutic support*), but rather support f2f-psychotherapy. Moreover, psychotherapists should not be able to see everything patients work on within the application (subcategory: *access to patient data*).

2.3.2.1.3 User Experience.

For patients to smoothly use TONI, psychotherapists named the importance that processing the online modules should not be too cognitively demanding, e.g. by using simple language and a small amount of text (subcategory: *comprehension*). The design should be engaging, making TONI fun to use (subcategory: *design*). At the same time, TONI should be easy to handle (subcategory: *usability*) and flexible to use on different devices (subcategory: *compatibility*). While aiming at a diverse target group by offering a broad range of content (subcategory: *diversity*), psychotherapists wished for TONI to be customizable so that patients could choose different options regarding content as well as functionality (subcategory: *customization*). Using the SUS³² the practicability and usability of an early TONI prototype achieved excellent results (85,2 of a total score of 100 points). All subcategories with matching statements can be found in table 5.

Table 5*General Barriers And Facilitators Shared By Psychotherapists And User Experience*

Categories	Subcategories	Statements
General barriers and facilitators	Transparency	“That means I don't have to worry about privacy, that it's 100 percent waterproof. That would be important for me.” (PT1.1)
	Scientific background	“That would be super important to me. So, a scientific foundation and a quick insight, that you really know what's in there.” (PT3.1)
	Workload	“So, it's just a matter of knowing what I'm kind of recommending to patients (...). And that I know that without it costing me another 3 or 4 or 5 hours of work.” (PT3.1)
	Dealing with emotional stress	“Emergency tool, three steps to calm down quickly.” (PT1.1)
	Psychotherapeutic support	"That's what makes this program so attractive to me, that I don't leave my patient alone with anything, but that I can accompany them therapeutically the whole time, can debrief them, can give explanations. And I would use that individually. " (PT5.1)
	Access to patient data	“I would actually prefer it if the patient could somehow enable me to look at his data. Just as I unlock his module, he can unlock his tracker for me.” (PT3.2)
User experience	Comprehension	"I think [the language] is way too technical, so if we look at my patients, I'd say half would be put off by it, and a third simply wouldn't understand it." (PT1.2)
	Design	"The whole thing needs to be much lighter and playful overall. These pages kill me." (PT1.2)
	Usability	“That the installation of the app is possible at all, especially for patients with less technically sophisticated know-how. In other words, to make it low-threshold.” (PT2.2)

	Compatibility	“That it is really compatible with cheap phones and simple systems and not only runs on the newest and fanciest devices.” (PT2.1)
	Diversity	“Now if you could kind of use the same thing directly again, and just have the same thing again in English, it would also be super convenient.” (PT3.1)
	Customization	“So agree on the language with the help of alternating dialogs. Simple language, more sophisticated language, ..., and you could also decide whether you wanted less text or more depth.” (PT1.2)

2.3.2.2 PWLE Perspective.

Across both groups and rounds of focus groups with PWLE, we formed two main categories: barriers and facilitators and user experience (see table 6 for an overview of categories, subcategories, and corresponding statements).

2.3.2.2.1 General Barriers and Facilitators.

PWLE highlighted the importance of having f2f-support by psychotherapists in combination with the use of TONI (subcategory: *psychotherapeutic support*). Transparent data management and security were named as crucial to feeling engaged and safe to share intimate thoughts (subcategory: *transparency*). Participants favored a high level of autonomy (subcategory: *autonomy*) and personalization realized by choosing modules oneself or in agreement with one’s psychotherapists and through the possibility to upload personal content (subcategory: *customization*). Participants wished for an emergency tool to use TONI in crisis situations (subcategory: *crisis management*). Overall PWLE wanted an intervention that focuses on a mindful and compassionate approach renouncing pressure for self-optimization (subcategory: *pressure to perform*).

2.3.2.2.2 User Experience.

The suggestions and wishes from the first focus groups were considered in building a prototype of TONI, which was presented in the second focus groups. The focus of the second session was on specific functions and content as well as a suitable implementation of TONI into practice. Feedback was overall positive. PWLE found the prototype largely intuitive and comprehensible. It was positively noted that the content was conveyed through both text, video, and audio as this appeals to individuals with different preferences (subcategory: *implementation*). The design was viewed as rather clinical, and most participants were in favor of warm or pastel colors (subcategory: *design*). Some texts were perceived as too long or too complex (subcategory: *comprehension*). PWLE mentioned that a broad variety of people should feel addressed by using inclusive images as well as by accessibility concerning different languages and impairments (subcategory: *diversity*). PWLE named a smooth and intuitive technical realization as an important factor for regularly using the intervention (subcategory: *usability*). Using the SUS³², participants also evaluated an early TONI prototype according to its practicability and usability. The prototype achieved excellent results (83,3 of a total score of 100 points). Main findings of the focus groups with psychotherapists and PWLE can be found in textbox 2.

Table 6

General Barriers And Facilitators Shared By PWLE And User Experience

Categories	Subcategories	Statements
General barriers and facilitators	Data Security and Transparency	“While we're on the subject of information, I might also ask myself: What information do I share with my therapist? Or where does that information go? Or does it really just stay with me." (P5.2)
	Autonomy	„I find it problematic if only the therapist chooses that. So, I find that a little bit not at eye level, simply. (P3.2)“

	Psychotherapeutic Support	“So, that's more what I would see the therapist giving me feedback on that directly and motivating me even further to work on it in certain ways.” (P1.2)
	Crisis Management	“For example, if I’m feeling bad now or I’m pretty desperate at the moment. That maybe there are suggestions of what I can do.” (P1.2)
	Pressure to Perform	“I find it difficult when it’s too focused on this, on functioning. Because then you quickly find yourself under pressure to perform. (...) That the app rather asks you to be positive with yourself. Like mindful, loving, tender rather than to build pressure.” (P3.2)
	Customization	“That you can simply upload a picture that you saw by chance on the Internet or a beautiful scene that you captured on your cell phone that triggered something meaningful in you. That you can upload it and then say: ‘I would like to discuss this with my therapist in the next session.’” (P4.1)
User experience	Usability	“First of all, it would be important to me that this application is easy to use. That is sometimes a bit tricky” (P2.2)
	Comprehension	“Yes, well, I think it’s okay, but I also think that for some it would be better shorter. And maybe to go over that extra again in simple language. That it’s kept simple.” (P3.2)
	Design	“And this is just white and dark blue. It doesn’t look so pleasant. But it looks more like as if you logically built it. But not kind of a space where my personal room is and I want to put my most intimate thoughts in.” (P5.2)
	Implementation	“I really like the two-pronged nature of the explanations. So both in writing and with the video. With this, one should actually be able to address all those who can find their way around the program in ways that are appropriate.” (P2.2)
	Diversity	“And I noticed that there were no people of color. And that there were only standard-looking, very slim people. There would be a bit of diversity or maybe

		someone in a wheelchair or something. I think it would be nice to represent all people.” (P2.1)
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Textbox 2. Main findings from focus groups.

- | |
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| <ul style="list-style-type: none"> • TONI should ensure data privacy and security • TONI should be flexible and customizable for different patients’ needs • A warm yet professional design promotes sharing one’s thoughts in TONI • Patients should be able to choose modules in TONI • TONI should have a simple and inclusive language • TONI should address people of all characteristics and with different (dis-)abilities. |
|--|

2.3.3 Proofreading

According to the psychotherapists, we succeeded in using a common therapeutic language and addressing principles that overlap in different therapeutic approaches. Shared principles included factors such as fostering the therapeutic alliance, promoting self-efficacy and self-management, and a strengths-based approach. They gave us some specific requests for changes to individual phrases and instructions. PWLE noted that, overall, the texts were easy to understand and fit well into outpatient psychotherapy. The diversity expert gave us feedback on more sensitive language, such as gender (e.g., “trans*” instead of “transgender”). In addition, our case examples seemed too heteronormative, a person with disabilities was missing, and the fact that some people are denied opportunities because of their background was only vaguely addressed. We incorporated all comments into the final version of TONI.

2.4 Discussion

2.4.1 Principal Results

The aim of this study was to determine the requirements of psychotherapists and PWLE on an IBI to be used in BC in German routine care. Previous studies emphasized the involvement of users in the development of IBIs³⁵. We followed the IDEAS framework²⁵ to develop our intervention in a participatory manner. This was especially important for our undertaking, as the planned intervention was not only supposed to be suitable for all mental disorders but also use a common language of psychotherapy. Whilst there are studies about barriers and facilitators for psychotherapists in the implementation of BC, to our knowledge, this is the first study to analyze the requirements of PWLE as well as psychotherapists of cognitive-behavioral, systemic, and psychodynamic approaches alike.

Integrating the results of the qualitative data of all steps of the development process including interviews, focus groups, proofreading, and user tests pointed to important considerations on required content and practical implementation of the intervention. We then merged our results with the existing research evidence and clinical guidelines to identify components to optimally shape our intervention.

Interviews and focus groups with psychotherapists revealed implications for developing transtheoretical content compatible with different therapeutic approaches. Unsurprisingly, depending on psychotherapists' therapeutic approach, they placed particular emphasis on key elements of their respective approach. Psychodynamic psychotherapists emphasized the role of the therapeutic relationship and the need to ask oneself with what kind of patients and in what way they would use the intervention. Systemic psychotherapists especially mentioned the importance of patients' social contexts as well as a rather strengths- than deficit-oriented approach.

Lastly, cognitive-behavioral psychotherapists identified the theoretical background of the intervention as important and the need to support behavior change in their patients.

However, although these different emphases became apparent, most of the barriers and facilitators cited by psychotherapists were independent of their therapeutic approach. In the interviews, a variety of exercises and materials were mentioned that both psychodynamic and systemic psychotherapists already use in outpatient practice, and which could be transferred to the online format, such as mindfulness, imagination, or relaxation exercises. Although the use of exercises or homework is usually considered a distinguishing feature between behavioral therapy and systemic therapy on the one hand and psychodynamic approaches on the other hand, the majority of psychodynamic psychotherapists reported that they encourage their patients to perform certain tasks between sessions as well. This is consistent with general findings from the literature, showing that similar techniques and exercises might be used in different therapeutic approaches although the specific language and the theoretical embedding might differ^{36,37,38}. Through interviews and focus groups, possibilities to offer content used by all therapeutic approaches became visible as well as the need for a common language.

Psychotherapists and PWLE seemed to be on the same page, as both groups shared views on important barriers and facilitators. The barriers and facilitators are also in line with findings from the literature, such as concerns about data security and potential difficulties with technical implementation if users are not tech-savvy^{39,12}. Both PWLE and psychotherapists emphasized that TONI should promote patient autonomy. Shared requirements also included the possibility to individualize treatment according to the needs of the patients, offering a diverse space for the patients to customize with the possibility to use a crisis kit and get in touch with the psychotherapist if necessary. In addition to the greatest possible individuality and flexibility, all participants wished for the intervention to be as short, simple, and playful as possible.

2.4.2 Translating our Findings into Practice: The Intervention “TONI”

The development of the intervention “TONI” resulted in 12 transdiagnostic modules and additional functions like a diary, a crisis kit, and trackers to protocol one’s mood. A list of all the modules can be found in the study protocol of the RCT²⁶. We used a common therapeutic language, avoiding technical terms and terms specific to one of the therapeutic approaches, resulting in a language close to the patients’ perspective. We kept the texts as simple and short as possible. Much of the content was conveyed through other media such as videos, audios, or interactive exercises. The interactive exercises also added value compared to other resources like worksheets or self-help books. We included seven testimonials with different symptoms and living conditions that help users with completing the exercises. Concerning the testimonials and the illustrations within TONI, we wanted every person to feel addressed and paid attention to diversity in terms of ethnicity, sexual orientation, age, and educational background. Within the intervention, references to the f2f-sessions are made repeatedly, e.g. with reflective questions at the end of each chapter and suggestions to observe things in session, to integrate the online content with the f2f-session closely.

2.4.3 Limitations

A number of limitations should be mentioned. First, our recruitment is likely subject to a selection bias. In the context of recruitment, three psychotherapists refused to take part in the study due to the fact that they rejected IBIs in psychotherapy on principle. Thus, we have to assume that we recruited therapists as well as PWLE with a mostly positive general attitude toward IBIs. As there are more licensed psychodynamic and cognitive-behavioral psychotherapists in Germany than systemic psychotherapists, the recruitment of systemic psychotherapists proved to be more difficult. We therefore believe that the systemic perspective could have been given greater consideration overall. Furthermore, there are limitations inherent to qualitative methodology. Within the focus groups, aspects were mentioned that did not necessarily reflect

the opinion of all participants. We must assume that not all non-agreements to the presented ideas were expressed. Moreover, psychotherapists and PWLE at times expressed opposing opinions and wishes and it was then left to our decision which aspects to focus on. However, the qualitative approach is also a strength of our study, as it allowed us to gain in-depth insights and understand the nuanced perspectives and experiences of both PLWE and psychotherapists, which are essential for tailoring the intervention to effectively meet their specific needs and preferences. While we were not able to implement all the ideas mentioned, we tried to find a balance between customizability and usability. We presented an early prototype, which was helpful in gathering user feedback early on. Although associated members of the research and developer team have tested the intervention for usability, we have not collected feedback on the final product through extensive usability testing or a pilot study with future users. We only involved two PWLE, three psychotherapists, and one diversity expert to offer their opinions on the final content. Notwithstanding the named limitations, we consider it a strength of our study, that we included future users early on and continuously throughout the process and achieved an in-depth insight into their needs and wishes through the interviews and focus groups. This helped us to adapt our intervention according to the feedback gathered. Later feedback through proofreading also allowed us to check whether we had implemented the requirements well.

Based on the literature and the participatory development, we propose a comprehensive approach for organizing transdiagnostic content into modules that balances the practical requirements for ease of use and time savings of clinicians with the possibility for more granular tailoring at the chapter level. However, it is an open question of how exactly the relevant modules or chapters should be selected. In our routine care project, the focus is on clinician judgment and shared decision-making with patients based on their requests for modules. Beyond that, other tailoring strategies⁴⁰ could be explored in future studies and applications, such as

basing the tailoring decisions on the strengths and weaknesses in the transdiagnostic processes to which the modules correspond^{41, 42}, or on AI algorithms.

2.4.4 Conclusions

The results offer direct implications for the development of a transtheoretical and transdiagnostic IBI for use in outpatient psychotherapeutic care. Based on the literature, interviews, and focus groups, we developed various transdiagnostic modules such as mindfulness and understanding of emotions, which were discussed and adopted by psychotherapists with different theoretical approaches. The psychotherapists identified common factors such as fostering the therapeutic alliance, promoting self-efficacy and self-management as well as a strength-based approach as particularly important for such an intervention. Common requirements of psychotherapists and PWLE also included the ability to individualize treatment according to patients' needs and to promote their autonomy by allowing them to work on content independently. This is an important step in advancing the development of interventions for various therapeutic approaches in routine care. Following steps nine to ten of the IDEAS framework, analyses of the currently ongoing RCT²⁵ will show to what extent the intervention will be accepted and used by psychotherapists and patients in practice and if the use of TONI in addition to f2f-sessions is beneficial.

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2.6 Appendix for study 1

Multimedia Appendix 1

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal Characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	Appendix 2
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	Appendix 2
Occupation	3	What was their occupation at the time of the study?	Appendix 2
Gender	4	Was the researcher male or female?	Appendix 2
Experience and training	5	What experience or training did the researcher have?	Appendix 2
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	Appendix 2
Participant knowledge of the interviewer	7	What did participants know about the researcher? e.g. personal goals, reasons for doing the research	Appendix 2
Interviewer characteristics	8	What characteristics were reported about interviewer/facilitator? E.g. Bias, assumptions, reasons and interests in the research topic	Appendix 2
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	14
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	10-12
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	10, 13
Sample size	12	How many participants were in the study?	10-12
Non-participation	13	How many people refused to participate or dropped out? Reasons?	Appendix 2
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	10-12
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	Appendix 2

Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	10-13
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	10-11, 13
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	N/A
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	10, 13
Field notes	20	Were field notes made during and/or after the interview or focus group?	Appendix 2
Duration	21	What was the duration of the interviews or focus group?	10, 13
Data saturation	22	Was data saturation discussed?	10
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	Appendix 2
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	14
Description of the coding tree	25	Did authors provide a description of the coding tree?	17-30
Derivation of themes	26	Were themes identified in advance or derived from the data?	14
Software	27	What software, if applicable, was used to manage the data?	14
Participant checking	28	Did participants provide feedback on the findings?	N/A
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	18-30
Data and findings consistent	30	Was there consistency between the data presented and the findings?	18-30
Clarity of major themes	31	Were major themes clearly presented in the findings?	23, 29
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	N/A

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

Multimedia Appendix 2

Detailed information on the research team and participant selection

	Interviews	Focus Groups
<p>Research team (Which authors conducted the interviews / focus groups? What were their credentials & occupation at the time of the interviews / focus groups?)</p>	<p>Psychodynamic interviews: FF, a female Ph.D. student with advanced training in psychotherapy</p> <p>Systemic interviews: WS, a female master's student</p>	<p>SB and FF, both PhD students with advanced training in psychotherapy, moderated the focus groups.</p> <p>Either PB or WS (female master students) were present in each group to document the occurring topics.</p>
<p>Participant selection (Was a relationship established prior to study commencement? What did the participants know about the researcher?)</p>	<p>All interviews started with a short introduction by the interviewers about themselves and their role in the study.</p> <p>Psychodynamic interviews: Interested psychotherapists got back to us directly via e-mail. We did not receive feedback from the other psychotherapists on reasons to not participate in the interviews.</p> <p>Systemic interviews: Of $n = 42$ systemic psychotherapists that we contacted directly via email, $n = 3$ refused to take part in the study because they rejected online interventions in psychotherapy on principle, $n = 1$ because of the timing, and the rest did not get back to us at all.</p>	<p>All 29 psychotherapists that previously took part in the interviews were contacted. Of these, $n = 3$ (2 psychodynamic and 1 systemic) psychotherapists took part in the focus groups.</p> <p>The focus groups started with a short introduction by the moderators about themselves and their role in the study.</p>
<p>Analysis and findings (Did participants provide feedback on the findings?)</p>	<p>Psychodynamic interviews: Participants were asked at the end of the interview about open questions or further comments. No feedback on the findings was assessed.</p> <p>Systemic interviews: A summary of each interview was shared with each participant respectively for potential feedback on misunderstandings or missing aspects. Of the 9 interviewees, $n = 2$ sent back annotated versions, $n = 7$ sent back confirmation that the summary accurately depicted what was said.</p>	<p>A protocol of each focus group was shared with the participants for potential feedback on misunderstandings or missing aspects. No one got back to us.</p>

Multimedia Appendix 3

Interview schedule: Systemic psychotherapists

Subject	Questions
1. Introduction	<p>Short introduction of the interviewer</p> <p>Thank you for your willingness and time</p> <p>Expected duration: 30-40 min</p> <p>Brief presentation of the main project "PsyTOM"; definition of "blended care"</p> <p>Main question to be clarified: As a systemic therapist, which online modules do you consider to be valuable and useful for your own outpatient work?</p> <p>Overview of the interview schedule</p> <p>Possibility to ask questions</p>
2. Sociodemographics	<p>How old are you?</p> <p>Gender: How do you identify?</p> <p>Do you have a systemic license or further education?</p> <p>Do you work in an outpatient or inpatient setting?</p> <p>Do you work full or part time?</p> <p>Do you already have experience with online interventions?</p>
3. Exercises	<p>As part of your therapy, do you already use exercises that you want your clients to do outside of the therapy session?</p> <p>[If yes:] What do these look like?</p> <p>[If no:] What is the reason for this?</p>
4. Materials	<p>As part of your therapy, do you provide your clients with material to take home?</p> <p>[If yes:] What does such material consist of and in which situations do you usually give it to your clients?</p> <p>[If no:] What is the reason for this?</p>
5. Modules	<p>In the following I will show you some examples of possible content for online modules. I would like to start by just telling you the module and ask you to tell me how useful you consider it, on a four-point scale from "not at all useful", "rather not", "rather useful" to "fully useful". After that, I would like to know how it should be designed so you would like to use it and find it beneficial.</p> <p> Diagnostics Development of mental disorders Homework Mood or thought protocols Emotion regulation Evaluation of therapy Etiology Mindfulness and relaxation Self-esteem and strengths Social skills Including relatives </p> <p>[If "rather useful" or "fully useful":] How should this module be designed to be beneficial to you?</p>

6. Further ideas	Are there any other open points / modules that you can think of that could benefit your therapeutic work / your clients could benefit from?
7. Advantages and barriers of online modules	<p>You have heard our ideas for possible modules as well as generated ideas for content yourself. If you imagine that there was already a completed catalog of online modules from which you could choose: What would be an incentive to use the modules? Is there anything that would prevent you from using the modules?</p> <p>[Supplemental question if named benefits and barriers are not specific to the approach]: What about benefits / barriers if you think specifically about the systemic approach? Are there any specifics?</p>
8. Conclusion	<p><i>Thanks for the time, input; recording device now off</i></p> <p><i>Further procedure</i></p> <p><i>Question, whether therapists want to participate in main study</i></p> <p><i>Questions / suggestions: Email / phone number</i></p>

Note: The italicized content serves as a memory aid and was freely formulated during the interview. The decision rules for in-depth questions are recorded in square brackets

Interview schedule: Psychodynamic psychotherapists

Subject	Questions
1. Introduction	<p><i>Short introduction of the interviewer</i> <i>Thank you for your willingness and time</i> <i>Expected duration: 30-40 min</i> <i>Brief presentation of the main project "PsyTOM";</i> <i>definition of "blended care"</i> <i>Main question to be clarified:</i> <i>As a psychodynamic psychotherapist, which online modules do you consider to be valuable and useful for your own outpatient work?</i> <i>Overview of the interview schedule</i> <i>Possibility to ask questions</i></p>
2. Sociodemographics	<p>How old are you? Gender: How do you identify? When did you receive your psychodynamic license? Which is your therapeutic approach (multiple answers possible)? Do you work with adults or children and adolescents? Do you work full or part time? What is your profession (psychologist, physician, or social worker)?</p>
3. Exercises	<p>As part of your therapy, do you already use exercises that you want your patients to do outside of the therapy session? <i>[If yes:] What do these look like?</i> <i>[If no:] What is the reason for this?</i></p>
4. Materials	<p>As part of your therapy, do you provide your patients with material to take home? <i>[If yes:] What does such material consist of and in which situations do you usually give it to your patients?</i> <i>[If no:] What is the reason for this?</i></p>
5. Modules	<p>In the following I will show you some examples of possible content. I would like to start by just telling you the module and ask you to tell me how useful you consider it, on a four-point scale from "not at all useful", "rather not", "rather useful" to "fully useful". After that, I would like to know how it should be designed so you would like to use it and find it beneficial. <i>Focus on psychodynamic aspects.</i></p> <p> Diagnostics Development of mental disorders Homework Mood or thought protocols Emotion regulation Evaluation of therapy Etiology Mindfulness and relaxation Self-esteem and strengths Social skills </p> <p>[If "rather useful" or "fully useful":] How should this module be designed to be beneficial to you?</p>

6. Further ideas	Are there any other open points / modules that you can think of that could benefit your therapeutic work / your patients could benefit from?
7. Conclusion	<i>Thanks for the time, input; recording device now off</i> <i>Further procedure</i> <i>Question, whether therapist want to receive further information on the main study</i> <i>Questions / suggestions: Email / phone number</i>

Note: The italicized content serves as a memory aid and was freely formulated during the interview. The decision rules for in-depth questions are recorded in square brackets

Multimedia Appendix 4

Focus group schedule: PWLE I

I. Welcome and introduction (10.00 a.m.)

Who are we? What will be the topic of today? Why is your input so important to us?

Framework: Consent forms, confidentiality, and communicating in the digital space

II. Overview of the modules

What is already planned?

III. Mock-up: Module "Values and Goals"

First impression of an exemplary module; design of video content

IV. Presentation of possible content I

Modules: "Development of Mental Disorders", "Mindfulness"

Break (approx. 11:30 a.m. to 11:45 a.m.)

V. Presentation of possible content II

Modules: "Understanding Thoughts and Feelings", "Strengths", "Involvement of Relatives"

VI. Functionality

Chat, Reminders, Module Selection, Dos & Don'ts

Break (approx. 12:45 p.m. to 1:00 p.m.)

VII. Brainstorming for further content and functions

What is still missing? Suggestions and ideas

VIII. Conclusion and scheduling the next session

Focus group schedule: PWLE II

I. Welcome and introduction (10.00 a.m.)

What will be the topic of today? Short summary of the last session.

Framework: Consent forms, confidentiality, and discussing in the digital space

II. Update

Implementation of the results from the last meeting - what happened since then?

III. Presentation of the TONI prototype

Impressions of the dashboard, tracker, selected exercises and discussion

Break (approx. 11:30 a.m. to 11:45 a.m.)

IV. Now it's your turn!

Testing the TONI prototype: What works? What needs to change?

Break (approx. 12:45 p.m. to 1:00 p.m.)

V. TONI how to?

Discussion of necessary training for patients using TONI

VI. Anything missing?

Further wishes and ideas for the final product

VII. Conclusion

Focus group schedule: Psychotherapists I

I. Welcome and introduction (10.00 a.m.)

Who are we? What will be the topic of today? Why is your input so important to us?

Framework: Consent forms, confidentiality, and communicating in the digital space

II. General Dos and Don'ts of Internet-based Interventions

What do we have to keep in mind? What should we avoid at all costs?

IV. Mock-up: Module "Values and Goals"

First impression of an exemplary module; possible content and functionalities

III. Overview of the modules

Short overview of possible content; Discussion of usefulness of modules; Choosing of three modules which can be discussed in more detail

Break (approx. 11:30 a.m. to 11:45 a.m.)

V. Discussion of the three chosen modules

Discussion of possible content

VI. Specific questions

Discussion of content regarding different therapeutic approaches, module selection

Break (approx. 12:45 p.m. to 1:00 p.m.)

VII. Brainstorming for further content and functions

What is still missing? Suggestions and ideas

VIII. Conclusion and scheduling the next session

Focus group schedule: Psychotherapists II

I. Welcome and introduction (10.00 a.m.)

What will be the topic of today? Short summary of the last session.

Framework: Consent forms, confidentiality, and discussing in the digital space

II. Update

Implementation of the results from the last meeting - what happened since then?

III. Presentation of the TONI prototype

Impressions of the dashboard; invitation of patients; selected exercises and discussion

Break (approx. 11:30 a.m. to 11:45 a.m.)

IV. Now it's your turn!

Testing the TONI prototype: What works? What needs to change?

Break (approx. 12:45 p.m. to 1:00 p.m.)

V. TONI how to?

Discussion of necessary training for psychotherapists using TONI

VI. Anything missing?

Further wishes and ideas for the final product

VII. Conclusion

Chapter 3

Study 2: The Role of Self-efficacy in Internet-based Interventions for Mental Health: A Systematic Review and Meta-analysis

The following paper was published as:

Behr, S., Martinez Garcia, L., Lucas, J., Kohlhase, E., Puetz, M., Boettcher, J., Schaeuffele, C.°, & Knaevelsrud, C.° (2025). The role of self-efficacy in internet-based interventions for mental health: A systematic review and meta-analysis. *Internet interventions*, 40, 100821.

<https://doi.org/10.1016/j.invent.2025.100821>

°shared last-authorship

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The Role of Self-efficacy in Internet-based Interventions for Mental Health: A Systematic Review and Meta-analysis

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Abstract for study 2

Introduction: Internet-based interventions (IBI) increase access to evidence-based treatments for mental disorders, but knowledge of their mechanisms of change is limited. Self-efficacy, a key factor in psychotherapy, is especially relevant in IBI due to its self-help focus. We investigated self-efficacy and related constructs as outcomes, predictors/moderators, and mediators in randomized controlled trials.

Methods: A systematic search was conducted across PsycINFO, PubMed, CINAHL, and Web of Science. Two reviewers selected studies, extracted data, and assessed bias. Effects were quantified using random effect models and supplemented by narrative syntheses and box score visualizations.

Results: 70 studies (N = 17407 participants) were included. IBI showed moderate effects on self-efficacy in within ($d = 0.47$) and between ($d = 0.46$) comparisons, with guided interventions having the largest effect ($d = 0.66$). Findings on self-efficacy as a predictor/moderator were mixed, though some studies suggested individuals with lower self-efficacy benefit more. Self-efficacy emerged as a mediator through which IBI affected treatment outcomes.

Conclusion: Self-efficacy appears influential in IBI efficacy and may itself be a valuable treatment target. However, mixed results and methodological limitations in mediator studies highlight the need for further research, particularly on long-term effects.

3.1 Introduction

Mental disorders have high prevalence and comorbidity rates and are associated with significant individual, societal, and economic costs (Vigo et al., 2016). Psychotherapy is an effective treatment for mental disorders, but the demand already clearly exceeds treatment capacities (e.g., American Psychological Association, 2022). Internet-based interventions (IBI) are one way to meet the high demand for evidence-based treatment (Ebert et al., 2018). Terminology in the field of digital interventions is inconsistent, with various terms such as „e-mental health“, „web-based interventions“, and „internet-delivered therapy“ used interchangeably (Smoktunowicz et al., 2020). While no universal consensus exists on a single preferred term, for the purposes of this manuscript, we adopt the term „IBI“. IBI predominantly function as self-help programs, accessible through websites or mobile applications, that help affected individuals cope with their mental health. They can be either guided with some degree of contact between professionals and participants, unguided without any human support, or an integrated element of a face-to-face treatment in blended approaches (Ebert et al., 2018). IBI offer several advantages over traditional face-to-face treatment, including ease of access (provided the individual has internet access and a compatible device), low cost, anonymity, time- and location-independent delivery, empowerment to manage one's health care, and flexibility of use (Donker et al., 2015; Ebert et al., 2018). Recent meta-analyses have found that IBI are effective in treating mental disorders and stress (Domhardt et al., 2020; Heber et al., 2017; Taylor et al., 2021) with guided interventions seeming more beneficial than those without guidance (Werntz et al., 2023). However, little is known about the underlying processes that influence the treatment success of IBI for mental disorders.

Given the self-help focus of IBI which aims to empower patients to take their treatment into their own hands, Bandura's social learning theory provides a promising framework to examine mechanisms of change in the context of IBI (Bandura, 1977). Bandura (1977) assumes

that therapeutic change derives from a common transdiagnostic cognitive mechanism, namely perceived self-efficacy, which is defined as the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). In the context of IBI, this could imply that a patient's belief in their ability to effectively engage with and complete the IBI can influence the outcome of the intervention regarding symptom reduction. The construct strongly overlaps with a number of related psychological constructs that similarly focus on an individual's beliefs about their capacity to influence outcomes in their environment and the significance of these beliefs in navigating challenges and achieving goals. These concepts are locus of control (Rotter, 1966), mastery (Pearlin & Schooler, 1978), and attribution (Weiner, 1986). Another related but distinct construct is empowerment. While both concepts involve an individual's sense of agency, empowerment involves a broader sense of control over one's life, including social, political, and economic dimensions whereas self-efficacy is more centered on personal capabilities (Cattaneo & Chapman, 2010). In this, self-efficacy is often seen as an antecedent to empowerment (Rawlett, 2014). Self-efficacy can be measured on a general level or in specific domains. General self-efficacy refers to an individual's belief in their overall ability to succeed in a wide range of situations, reflecting a broad sense of confidence in handling life's challenges. In contrast, specific self-efficacy measures relate to the confidence an individual has in specific abilities or situations. Self-efficacy is considered a dynamic construct and, accordingly, also a possible target for interventions (Bandura, 1997). The hypothesized impact of self-efficacy on therapeutic outcomes is explained by its influence on thought processes, on the extent and duration of motivation, and affective states. Low levels of perceived self-efficacy are likely to lead to avoidance, pessimistic thoughts, low motivation, a tendency to give up quickly, and weak commitment to goals. High levels of perceived self-efficacy promote an individual’s commitment to change one's behavior, as well as the setting of challenging goals and a high level of effort to achieve them despite obstacles and challenges

(Bandura, 1997). Given the inherent nature of IBI in fostering autonomy and self-management, it is of interest to further explore the role of self-efficacy in the context of IBI. IBI require self-efficacy-related competencies, such as taking an active role in the treatment (Domhardt et al., 2018), meeting self-imposed goals (Zarski et al., 2023), and practicing and applying psychotherapeutic techniques on their own responsibility (Sextl-Plötz et al., 2023). They also require appropriate handling of stress and frustration that may arise from a tight treatment schedule or technical difficulties (Fenski et al., 2021; Rozentel et al., 2015). Individuals with high self-efficacy could therefore more effectively utilize and benefit from such autonomous and self-guided interventions due to their belief in their ability to manage their mental health independently. Concurrently, the experience of working on one's mental health problems autonomously in IBI could enhance participants' self-efficacy which then positively influences the outcome of the intervention. Thus, self-efficacy in regard to psychotherapeutic interventions can be seen as a potential treatment target (outcome), a variable that predicts or influences the magnitude or direction of the effect (predictor/moderator), as well as a mechanism of how and why change appears (mediator).

Several studies investigated the role of self-efficacy in the context of mental health. Self-efficacy beliefs are negatively associated with symptoms of mental disorders, such as depression, anxiety, and stress (Iancu et al., 2015; Tahmassian & Jalali Moghadam, 2011; Wicke et al., 2022). A review of IBI for health behavior change with 20 included studies showed that the interventions had a small positive effect of $\bar{g} = 0.190$ on self-efficacy as an outcome (Newby et al., 2021). Samoocha et al. (2010) found in a meta-analysis that IBI have a small positive effect of a Standardized Mean Difference = 0.23 on self-efficacy measured with disease-specific self-efficacy scales ($k = 9$), while no effects were found for self-efficacy measured with general self-efficacy scales ($k = 3$). In a recent review of predictors of therapy outcome in guided IBI by Haller et al. (2023) six studies that examined self-efficacy as a predictor of outcome were

identified and yielded inconsistent results. Self-efficacy is considered to be an important common factor of psychotherapy (Pfammatter & Tschacher, 2016). A recent meta-analysis on mechanisms of change in digital interventions for depression with 25 included trials (Angerer et al., 2025) identified self-related factors, including self-efficacy and perceived control (measured by the Pearlin Mastery Scale), as the most robust mediators of symptom improvement. Previous systematic reviews on mechanisms of change in IBI for depression with 26 included studies (Domhardt et al., 2021) and PTSD with 33 included studies (Steubl et al., 2021) partially supported a mediating role of cognitive variables, including self-efficacy, mastery and perceived control.

Despite the crucial role that self-efficacy may play in therapeutic change, little systematic research has been done, especially in the context of IBI. Understanding factors contributing to change in mental disorders is crucial for the development of more effective, engaging, and personalized IBI. To our knowledge, there has been no comprehensive review or meta-analysis of the role of self-efficacy in IBI for mental disorders. The aim of this review is to provide insight into the role of self-efficacy and related constructs in IBI. To provide a comprehensive analysis and to account for conceptual overlap between constructs, we include closely related constructs. Subgroup analyses tested our assumption that these constructs should be considered together. We will explore the role of self-efficacy and related constructs as an outcome, predictor or moderator, and mediator in IBI that are applied stand-alone (guided and unguided) as well as in conjunction with face-to-face therapy as blended care. Our systematic review and meta-analysis aim at answering the following questions:

1. Are IBI efficacious in increasing self-efficacy and related constructs (self-efficacy as an outcome)?
 - 1.a Does the effect remain consistent across short-, mid-, and long-term follow-up periods?

1.b Are there differences in the efficacy regarding different treatment settings, mental disorders, or control groups?

1.c Do the effects differ when considering related constructs collectively compared to self-efficacy alone?

2. Are self-efficacy and related constructs predictors/moderators of treatment outcome? Do individuals with higher or lower levels of self-efficacy and related constructs benefit more or less from treatment?

3. Do self-efficacy and related outcomes account for all or part of the effect of the intervention outcomes? (self-efficacy as a mediator)?

To conclude: In adults (Population), what is the effect of IBI aiming at improving symptoms of mental disorders (Intervention) on self-efficacy and related constructs (Outcome) compared with a waitlist, treatment-as-usual (TAU), and active interventions (Comparison) at post-treatment and short-, mid- and long-term follow-up? Is there evidence that self-efficacy and related outcomes act as a predictor, moderator, or mediator in IBI?

3.2 Methods

This review and meta-analysis was registered with PROSPERO (CRD42023405543) and is reported according to the PRISMA guidelines (Page et al., 2021). Differing from the original preregistration, we included only RCTs to elevate the quality of our findings, after it became clear that this would still result in a sufficient body of studies. No separate review study protocol was published.

3.2.1 Search Strategy:

We conducted a systematic literature search with a predefined set of search strings via the following databases: PsycINFO, PubMed/MEDLINE, CINAHL, and Web of Science. The electronic database search was completed on the 29th of April 2024 without restrictions on the publication date. In a second step, we manually searched the reference lists of all eligible studies, to identify other relevant studies. In a third step, we searched the registries ISRCTN and clinicaltrials for eligible studies. The search terms included a combination of keywords concerning treatment, setting, and key psychological constructs. Two members of the review team met with experts of the field at their respective institutions to refine the search. The predefined set of search strings optimized for each database can be found in the appendix (Table A).

3.2.2 Inclusion Criteria:

Studies published in English were eligible for inclusion if the intervention was delivered to adults. We included studies in which IBI (stand-alone, guided, unguided, or combined with face-to-face sessions) were applied to improve mental health problems, such as depression, anxiety, and stress. IBI were defined as psychological interventions delivered via digital platforms, including web-based programs, mobile applications (apps), and other online self-help tools. Synchronous teletherapy sessions conducted via video or phone calls were excluded. We included clinical samples as well as non-clinical samples. Randomized controlled trials with any kind of control group were included. Studies were eligible if they quantitatively assessed (1) self-efficacy, defined as the belief in one's ability to exercise control over events that affect one's life, or over one's own mental states or to successfully perform behavior required to achieve certain results (Bandura, 1997); or related constructs including perceived control, defined as the belief in one's ability to determine one's internal states and behavior, influence one's environment, or bring about desired outcomes (Wallston et al., 1987); mastery, defined as a global feeling to have control over one's life situations (Pearlin & Schooler, 1978); or

attribution, defined as an individual's causal attributions of achievement, which affects behaviors and motivation (Weiner, 1986); and (2) quantitatively assessed symptoms of mental disorders (e.g., depression, stress, anxiety) through an established instrument (e.g., self-report or clinical interview).

3.2.3 Exclusion Criteria

We excluded studies that were aimed (1) specifically at a population with somatic diseases or somatic conditions (e.g., pregnancy) and (2) at other outcomes, besides symptoms of mental health (e.g., parental skills, weight loss).

3.2.4 Data Extraction

We conducted the study selection using the Rayyan tool (Ouzzani et al., 2016). Two reviewers (EK, JL) screened all titles and abstracts and excluded irrelevant articles. Afterward, the full texts of the remaining references were screened according to the eligibility criteria by pairs of two independent reviewers (EK, JL, SB, LMG, MP). The inter-rater reliability across all studies of the fulltext-screening resulted in a Cohen's Kappa of 0.92, which is an almost perfect agreement (Landis & Koch, 1977). Disagreements were resolved through discussion with the study lead (SB). Pairs of two independent reviewers extracted the data of the included study and discussed any differences that may have occurred (JL, EK, SB, LMG, MP). If not reported in the publication, study authors were contacted twice and asked for the missing data. We extracted study characteristics, means and standard deviations of self-reported self-efficacy and of symptoms of mental disorders at all available time points and saved them in an excel spreadsheet. When studies reported more than one outcome measure for one construct, we used the primary outcome measure defined by the study authors or, if this was unclear, the most used measure across studies.

3.2.5 Quality Assessment

We used the Cochrane Collaboration's tool for assessing risk of bias in RCTs (RoB 2.0) (Sterne et al., 2019). The methodological quality of the included studies was assessed independently by pairs of two reviewers (SB, LMG, JL, EK), who independently rated each study for bias and coded the criteria. Final assessments were crosschecked, and disagreements were resolved through discussion. We rated each study on the five domains: (1) bias arising from the randomization process, (2) bias due to deviations from intended interventions, (3) bias due to missing outcome data, (4) bias in the measurement of the outcome, (5) bias in the selection of the reported result, leading to a judgment of either "low risk of bias", "some concerns", or "high risk of bias".

3.2.6 Data Analysis

All quantitative analyses were conducted in R (R Core Team, 2017), using the metafor (Viechtbauer, 2010), meta (Balduzzi et al., 2019), and dmetar package (Harrer et al., 2019). In this meta-analysis, we opted for a random effects model to pool effect sizes as we anticipated considerable between-study heterogeneity among the included studies based on previous work (Moshe et al., 2021; Taylor et al., 2021). Statistical heterogeneity was evaluated with the I²- and Cochran's Q-Statistics, and by visual inspection of forest plots. A p-value of the Q-statistic below 0.05 indicates heterogeneity (Cochran, 1954). I² up to 25% represents low, 50% moderate and 75% high heterogeneity (Higgins & Thompson, 2002). We addressed heterogeneous effect sizes by conducting subgroup analyses when at least three studies per subgroup were available. In studies with multiple intervention arms, we analyzed each intervention separately while using the same control group for comparison. This approach allowed us to retain distinct intervention effects and conduct more detailed subgroup analyses.

The following analysis methods were applied for the different study aims: To evaluate the effect of IBIs on self-efficacy and related constructs as outcome, we calculated uncontrolled effect sizes from pre- to post-treatment, and from pre-treatment to follow-up assessments, as well as controlled effect sizes for the difference between the IBI and the control conditions at post-treatment and follow-up assessments. Results for self-efficacy and related constructs (attribution, perceived control, and mastery) were analyzed together. Follow-up assessments were grouped into short-term (FU1, 4-23 weeks), mid-term (FU2, 24-51 weeks), and long-term (FU3, 52 and more weeks). For uncontrolled effects, the re-test correlation between time points was set at 0.5 (Borenstein, 2009). To investigate the influence of different re-test correlations sensitivity analyses were conducted for a correlation of 0.3 and 0.7. We further conducted sensitivity analyses investigating whether excluding outliers impacted effect sizes and heterogeneity. Subgroup analyses were performed for the type of assessed self-efficacy (general or specific), the type of control group, the type of guidance, and the type of disorder or population the intervention targeted. For the metanalytic pooling, disorders were grouped into mood disorders (depression and bipolar), substance abuse (including nicotine), trauma (Post-Traumatic Stress Disorder (PTSD) and grief), transdiagnostic, non-clinical (e.g. students, workers, or community samples without a formal diagnosis), and other (including stress, insomnia, and anxiety). Self-efficacy measures were grouped into general self-efficacy (including general self-efficacy, perceived control, mastery, attribution) and specific self-efficacy (e.g., mental health self-efficacy, caregiver mastery, coping self-efficacy). To test our assumption that the related constructs should be considered together, we conducted a subgroup analysis regarding only studies that applied self-efficacy measures (General: General Self-Efficacy Scale, New General Self-Efficacy Scale and the General Self-Efficacy Subscale of the Self-Efficacy Scale; Specific: e.g. Coping Self-Efficacy Scale, Mental Health Self-Efficacy Scale, Emotional Self-Efficacy). Hereafter, the term "self-efficacy" will refer to both self-efficacy and included related constructs unless

specified otherwise. As for the type of control group, we categorized enhanced care and enhanced treatment as usual as TAU, and for the type of guidance, we categorized contact on demand as unguided. Publication bias was assessed by inspecting the funnel plot on the self-efficacy measures as well as calculating rank correlations and Egger's tests. Additionally, Duval and Tweedie's Trim and Fill procedure was applied (Duval & Tweedie, 2004).

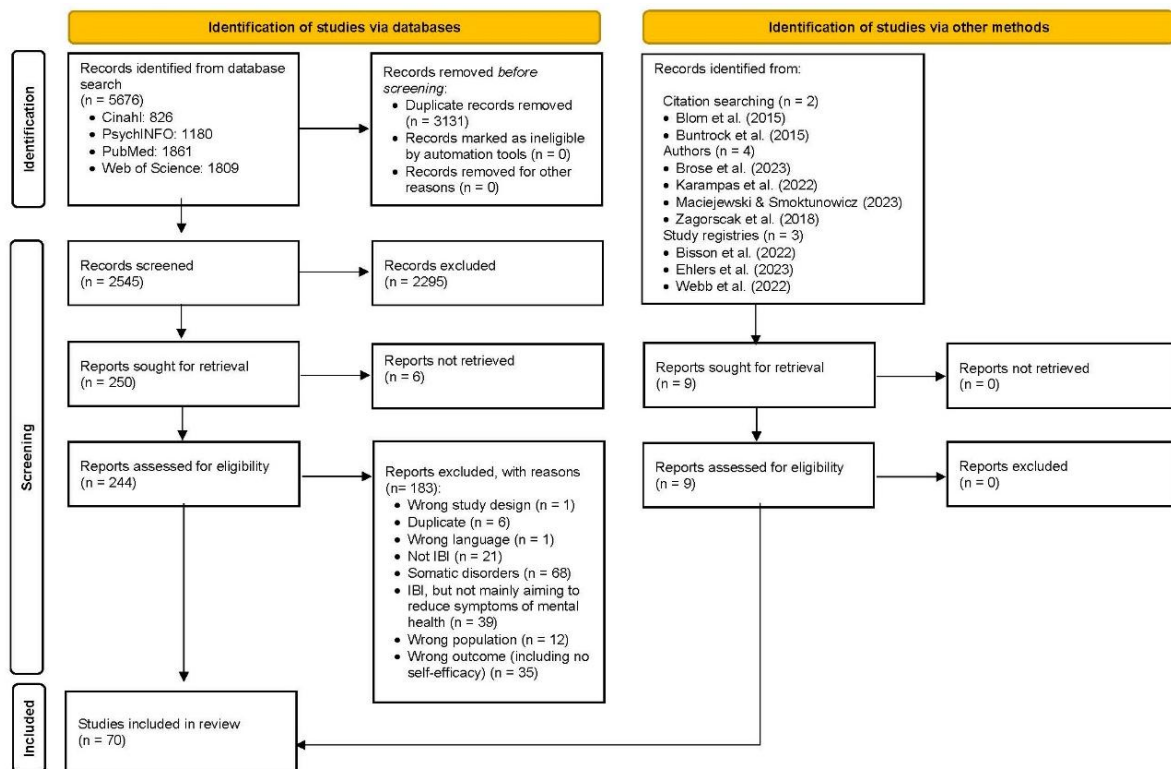
The results for self-efficacy as a predictor or moderator are synthesized narratively due to a limited number of studies and heterogeneous outcomes. To determine the role of self-efficacy as a mediator in IBI, we aggregated the reported statistical significance in the primary studies following a box score approach with the three categories yes, mixed, and no for those studies that performed a mediator analysis with a self-efficacy measure. In these, we aggregated the results as subgroup-analyses when three or more studies were available. We extracted a measure of explained variance (R^2) wherever possible as recommended by the Cochrane Handbook (Higgins et al., 2011). Given the large heterogeneity of the studies, this can only serve as a rough estimate. Additionally, we rated mediation studies in reference to their quality applying the criteria originally proposed by Kazdin (2007), which were adapted to psychotherapy research by Lemmens et al. (2016) and have been utilized in IBI research (Domhardt et al., 2021; Steubl et al., 2021). The criteria are rated as fulfilled (+) or not fulfilled (-) and include: (1) a theoretical foundation, (2) RCT as the study design, (3) inclusion of a control group, (4) a sample size of at least 40 per group, (5) the inclusion of multiple mediators, (6) evaluation of temporality (two or more assessments of mediators and outcome variables during the treatment phase), and (7) the direct experimental manipulation of the mediator. Given the significant heterogeneity among the included studies, alongside varied analyses and outcome measures, pooling effect sizes from the mediator studies was not feasible.

3.2.7 Data Availability

All data for this project, including the data extraction sheet and relevant R code, have been made publicly available and can be accessed at: https://osf.io/5qz4e/?view_only=2b6c48d99ca448fba9b6ab7e9731ef25.

3.3 Results

Figure 1. PRISMA Flow Chart



3.3.1 Study Characteristics

The systematic database search yielded 5676 initial hits. Two additional records were identified through backward search, three studies were identified through clinical trial registries, and four studies were sent to us directly by the authors. After screening of titles and abstracts, 244 studies were assessed for eligibility in full-text review. Of those, 70 studies met the criteria for inclusion. The corresponding flow chart is presented in Figure 1. The included studies were published between 2001 and 2024. Half of the studies were carried out in Europe (k =

35; 50.00%). Regarding the other half, most were conducted in North America (k = 18; 25.71%) and Australia (k = 12; 17.14%), while the remaining were conducted in Asia (k = 4; 5.71%) and South America (k = 1; 1.43%). In total, N = 17407 participants were included in this review. Sample sizes ranged between 21 and 2304 participants, with a mean sample size of n = 248 participants (SD = 349).

Regarding the sample's characteristics, the mean percentage of women was 70.72% (SD= 17.49) and the mean age of participants ranged from 18.7 to 71.4 (M = 38.25; SD = 12.39). Most of the included studies assessed an Internet-based intervention (k = 59; 84.29%) while the remaining evaluated a mobile app-based intervention (k = 9; 12.86%), a Chat-Bot (k = 1; 1.43%) or an ecological momentary intervention (k = 1; 1.43%). Regarding the treatment setting, most of the included studies evaluated unguided interventions (k = 44; 62.86%), about one third evaluated guided interventions (k = 19; 27.14%), a small proportion focused on blended approaches (k = 5; 7.14%) and two studies investigated multiple treatment groups with both guided and unguided interventions (k = 2; 2.86%). Most of the included studies compared IBI against an active control condition (k = 29; 41.43%) or a waiting list (k = 26; 37.14%). The remaining studies compared IBI against (enhanced) TAU (k = 15; 21.43%). Three studies included two control conditions. In one of them, it was two active control conditions, in another, it was an active condition and waiting list and in the third, it was an active condition and TAU. Regarding the type of population and symptomatology evaluated in the included studies, 17 studies (24.29%) examined non-clinical samples (e.g., students, workers, community samples), evaluating mainly anxious, depressive and/or stress symptomatology. Eight studies (11.43%) focused specifically on non-professional caregivers or relatives of individuals with somatic or mental disorders. The majority of studies focused on clinical populations with mood disorders (k = 12; 17.14%), trauma or grief symptoms (k = 9; 12.86%), transdiagnostic symptoms (k = 7; 10%), substance abuse problems (k = 6; 8.57%) and anxiety disorders (k = 5; 7.14%). Other

studies ($k = 6$; 8.57%) focused on elevated stress symptoms, insomnia, or suicidal ideation. The majority of assessed interventions are based on a CBT approach (including Acceptance and Commitment Therapy, Dialectical Behavior Therapy, Problem Solving, and Stress Management) or on CBT combined with other approaches (e.g., Mindfulness, Self-compassion, Positive Psychology) ($k = 48$; 68.57%). Few interventions were based on Psychoeducation ($k = 4$; 5.71%). Other studies investigated interventions based on other or mixed approaches (e.g., interpersonal therapy, narrative therapy, resilience, emotion regulation through music; $k = 20$; 28.57%). Two studies (2.86%) did not specify the approach on which the applied intervention was based. The duration of the intervention ranged from a single 45-minute session to 52 weeks. A detailed overview of the studies characteristics is outlined in Table 1.

For the meta-analytic analysis of self-efficacy as an outcome, we excluded 14 studies because the data was not available or because self-efficacy was not assessed at post-measurement time points, which resulted in a total $N = 10297$ individuals in 56 publications for the meta-analytic calculations.

Table 1
Study Characteristics

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
Acosta et al. / 2017 / United States	162 (81 IG, 81 CG), 32, 7%	Veterans; Substance abuse and Trauma	Unguided, 12weeks, CBT	TAU: Medical, behavioral health, pharmacy, weight management, and social work services.	Brief Situational Confidence Questionnaire (BSCQ)	Mediator	pre, 4w, 8w, post, 16wFU, 24wFU	IG: 32.1% CG: 14.8%
Bakker at al.* /2018/ Australia	312 (78 IG1, 78 IG2, 78 IG3, 78 CG), 34.2, 81%	Non-clinical sample; Depression and Anxiety	IG1: Unguided, 4weeks, CBT IG2: Unguided, 4weeks, CBT IG3: Unguided, 4weeks, CBT	WL	Coping Self-Efficacy Scale (CSES)	Mediator	pre, post	IG1: 50% IG2: 66,7% IG3: 70,5% CG: 32,1%
Bastien et al.* / 2022 / Canada	217 (69 IG1, 73 IG2, 75 CG), 20.44, 78.8%	Non-clinical sample of university students; Stress	IG1: Unguided, 4weeks, mental health resilience-building (provider-presented) IG2: Unguided, 4weeks, mental health resilience-building (peer-presented)	WL	Coping Self-efficacy Scale (CSES)	Outcome	pre, post, 10wFU	IG1: 12.2% IG2: 12.2% CG: 8.9%
Bijker et al.* / 2017 / Netherlands	80 (41 IG, 39 CG), 49.9, 77.45%	Caregivers of depressed patients; assessment of GAD	Guided, 6weeks, CBT	WL	Pearlin Mastery Scale (PMS)	Outcome	pre, post	IG: 34.1% CG: 12.8%
Bisson et al.* / 2022 / United Kingdom	196 (99 IG, 97 CG), 36.5, 63.8%	Trauma	Blended, 8weeks, CBT	AC: up to 12 f2f sessions individual CBT	General Self-Efficacy Scale (GSE)	Outcome	pre, post, 52wFU	IG: 20.6% CG: 16.2%
Blom et al. / 2015 / Netherlands	245 (149 IG, 96 CG), 61.2, 69.4%	Caregivers of people with dementia; Depression and Anxiety	Guided, 24weeks, CBT	AC: minimal intervention consisting of e-bulletins	Pearlin Mastery Scale (PMS; abbreviated 5-item version)	Outcome	pre, post	IG: 39.6% CG: 11.5%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
Boele et al.* / 2022 / United Kingdom	120 (40 IG1, 40 IG2, 40 CG), 52.2, 70.7%	Caregivers of adult cancer patients; Depression	IG1: Guided, 8weeks, Representational Approach IG2: Guided, 8weeks, CBT	Enhanced care as usual (ECAU): attention-control emails every 2 weeks, and access to a psychoeducational webpage	Mastery Scale	Outcome	pre, 8wFU, 16wFU	IG: 36% CG: 13%
Boots et al.* / 2018 / Netherlands	81 (41 IG, 40 CG), 69, 65.4%	Caregivers of People with Early-Stage Dementia; Stress, Depression and Anxiety	Blended, 8weeks, CBT-SM	TAU: Waitlist receiving usual care consisting of nonfrequent counseling	Caregiver Self-Efficacy Scale (CSES)	Outcome	pre, post	IG: 24.39% CG: 7.5%
Brindal et al.* / 2023 / Australia	166 (81 IG, 85 CG), 38.48, 67.5%	Healthy adults aged 25 to 50 years; Stress	Unguided, 4 weeks, Conservation of Resource theory	AC: Mood monitoring	Coping Self-Efficacy Scale (CSE)	Outcome	Pre, 2w, post	IG: 23.46% CG: 25.88%
Brodbeck et al.* / 2022 / Switzerland	110 (69 IG, 41 CG), 51.11, 69%	Prolonged grief	Guided, 23weeks, Dual Process Model of Coping	WL	3 Self-developed items	Mediator	pre, post	IG: 34.1% CG: 12.8%
Brog et al.* / 2022b / Switzerland	107 (53 IG, 54 CG), 40.36, 81.3%	Depression	Unguided, 3weeks, CBT	TAU: can range from no treatment at all to psychotherapy and/or drug therapy	General Self-Efficacy Scale (GSE)	Outcome	pre, post, 6wFU (only IG)	IG: 15.1% CG: 3.7%
Brose et al.* / 2023 / Germany	2304 (1113 IG, 1191 CG), 42.3, 59.2%	Depression	Guided, 6weeks, CBT	AC: The same intervention with a different order of modules	General Self-Efficacy Scale (GSE)	Outcome	pre, post, 12wFU, 24wFU, 52wFU	IG: 27% CG: 26%
Buntrock et al.* / 2015 / Germany	406 (202 IG, 204 CG), 45,	Depression	Guided, 3-6weeks, CBT	eTAU: care-as-usual + a web-based psycho-educational intervention	Pearlin Mastery Scale (PMS)	Outcome	pre, post, 24wFU	IG: 9.9% CG: 9.9%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
	73.9%							
Bush et al.* / 2017 / United States	118 (58 IG, 60 CG), 47.59, 31.5%	Veterans; Suicidal ideation	Blended, 12-weeks, CBT	eTAU: active mental health treatment + printed materials about coping with suicidality	Coping Self-Efficacy Scale (CSE)	Outcome	pre, 3w, 6w, 12w	IG: 9.9% CG: 9.9%
Cieslak et al.* / 2016 / Poland	168 (87 IG, 81 CG), 37.49, 78%	Health and human services professionals; Trauma	Contact on demand, 4weeks, CBT	AC: read-only educational materials	Secondary Trauma Self-Efficacy Scale (STSE)	Outcome; Mediator	pre, post, 4wFU	IG: 52.87% CG: 49.38%
Clarke et al. / 2014 / Australia	720 (242 IG, 248 CG1, 230 CG2), 38.9, 69.6%	Mild-to severe symptoms of Depression, Anxiety and/or Stress	Unguided, 7weeks, CBT+Interpersonal Psychotherapy+Problem-solving Therapy+Positive Psychology	CG1: AC - fact sheet of information about depression, anxiety or stress via email + weekly SMS with brief factual statements CG2: WL	Mental Health Self-Efficacy Scale (MHSES)	Mediator; Moderator	pre, 7 post, 19 FU	IG: 47.9% CG1: 21.4% CG2: 13.9%
Dingle & Carter* / 2017 / Australia	55 (19 IG1, 18 IG2, 18 CG), 40.61, 45%	Substance abuse	IG1: Guided, 6weeks, Emotion Regulation through Music IG2: Guided, 6weeks, CBT	TAU: Telephone CBT program without IBI	Three self-report questions	Outcome; Mediator	pre, post	IG1: 42.11% IG2: 22.2% CG: 27.78%
Dominick et al.* / 2009 / United States	67 (33 IG, 34 CG), 47, 86.6%	Recently bereaved; Grief	Unguided, 1week, Psychoeducation	TAU: usual care	3 items to assess self-efficacy	Outcome	pre, post	IG: 0% CG: 0%
Donker et al. / 2013 / Australia & Netherlands	1843 (620 IG1, 610 IG2, 613 CG), N.I., 72.4%	Non-clinical sample; Depression and Anxiety	IG1: Unguided, 4weeks, Interpersonal therapy IG2: Unguided, 4week, CBT	AC: short-version CBT-based IBI	Pearlin Mastery Scale (PMS)	Predictor; Moderator	pre, 4 post, 28 FU	IG1: 66.8% IG2: 70.3% CG: 73.6%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
Ebert et al.* / 2014 /	150 (75 IG, 75 CG), 47.1, 83.3%	Teachers; Depression	Guided, 4weeks, Problem solving training	WL	General Self-Efficacy Scale (GSE)	Outcome	pre, post, 12wFU, 24wFU	IG: 14.66% CG: 8%
Ehlers et al.* / 2023 / United Kingdom	217 (92 IG1, 93 IG2, 32 CG), 36.36 73%	Trauma	IG1: Guided, 13weeks (26 incl. booster phase), CBT IG2: Guided, 13 weeks (26 incl. booster phase), Stress management	WL: Waiting list with usual clinical care	General Self-Efficacy Scale (GSES)	Mediator	pre, 6w, 13w (post), 26w, 39w, and 65w	IG1: 5.43% IG2: 1.08% CG: 3.13%
Farrer et al.* / 2019 / Australia	200 (102 IG, 98 CG), 22.10, 77.5%	University students with clinically significant mental distress; Depression, GAD, SAD and psychological distress	Contact on demand, 6weeks, CBT+mindfulness	WL	General Self Efficacy (GSE-10); College Self-Efficacy Inventory (CSEI)	Outcome	pre, post, 18wFU	IG: 39.2% CG: 16.3%
Fiol -DeRoque et al.* / 2021 / Spain	482 (248 IG, 234 CG), 41.37, 83.2%	Health care providers of COVID-19 patients; Depression, Anxiety, Stress	Unguided, 2weeks, CBT+mindfulness	AC: App with brief information about the mental health care of health care workers during COVID-19	General self-efficacy scale (GSE)	Outcome	pre, post	IG: 10.9% CG: 8.1%
Gleeson et al.* / 2023 / Australia	164 (82 IG, 82 CG), 51.04, 75%	Family carers of first-episode psychosis patients; Stress	Guided, 52weeks, Psychoeducational family intervention	eTAU: Specialized treatment as usual	Parental Self-Efficacy (Me as a Parent, MaaP)	Outcome	pre, 24w, post	IG: 25.61% CG: 18.29%
Hirai et al.* / 2005 / United States	27 (13 IG, 14 CG), 20.40, 77.8%	Individuals who had experienced a traumatic event: Trauma, Anxiety and Depression	Unguided, 8weeks, CBT	WL	Self-Efficacy Scale (SES); General self-efficacy subscale of the Active coping With Trauma Scale (ACTS)	Outcome	pre, post	IG: 27.8% CG: 22.2%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
Isbasoiu et al.* / 2021 / Romania	284 (142 IG, 142 CG), 33.2, 84.5%	Depression and/or Anxiety	Guided, 9weeks, Unified Protocol with added self-enhancement strategies	AC: guided IBI, standard Unified Protocol	New General Self-Efficacy Scale (NGSE)	Outcome	pre, post, 33wFU	IG: 45.1% CG: 45.8%
Jin et al.* / 2017 / United States	21 (11 IG, 10 CG), 20.14, 42.9%	Asian international students in the US; Depression	Unguided, 7weeks, CBT+Interpersonal Psychotherapy+Problem-solving Therapy+Positive Psychology with culturally tailored messages	AC: IBI based on CBT+Interpersonal Psychotherapy+Problem-solving Therapy+Positive Psychology without culturally tailored messages	Mental Health Self-Efficacy Scale (MHSES)	Outcome	pre, 3w, post	IG: 36.4% CG: 40%
Karampas et al.* / 2022/ Greece	26 (12 IG, 14 CG), 24.46, 96.2%	Non-clinical sample of undergraduate Psychology students; Depression, Anxiety and Stress	Unguided, 5weeks, CBT+ACT	WL	Perceived Stress Scale (PSS): Self-efficacy against stress	Outcome	pre, post, 17wFU	IG: 0% CG: 0%
Karampas et al.b* / 2022 / Greece	35 (17 IG, 18 CG), 22.68, 91.7%	Non-clinical sample of undergraduate psychology students; Depression, Anxiety and Stress	Unguided, 5weeks, CBT+ACT	WL	Perceived Stress Scale (PSS): Self-efficacy against stress	Outcome	pre, post	N.I.
Klein et al. / 2001 / Australia	23 (11 IG, 12 CG), 43, 86.36%	Panic disorder	Unguided, 1week, CBT	AC: Self-monitoring	Self Efficacy Questionnaire composed by six pairs of statements.	Outcome	pre, post	N.I.
Knaevelsrud et al.* / 2017 / Germany	94 (47 IG, 47 CG), 71.4, 64.9%	World War II survivors; Trauma	Guided, 6weeks, CBT	WL	General Self-efficacy Scale (GSES)	Outcome	pre, post, 12wFU, 24wFU, 48wFU	IG: 12.8% CG: 6.4%
Koehle et al.* / 2021/ Netherlands	103 (67 IG1, 60 IG2, 66	Partners of cancer patients/survivors; Anxiety and Depression	IG1: Guided, 6-12weeks, ACT+Self-compassion IG2: Unguided, 6-12weeks,	WL	Pearlin Mastery Scale (PMS - abbreviated 5-item version)	Outcome	pre, post	IG1: 28.36% IG2: 44.29% CG: 21.21%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
	CG.), 55.89, 70.4%		ACT+Self-compassion					
Kuhn et al.* / 2017 / United States	120 (62 IG, 58 CG), 39, 69.2%	Trauma	Unguided, 12weeks, CBT	WL	9-item self-report measure developed for the study: PTSD symptom coping self-efficacy	Outcome	pre, post, 24wFU	IG: 17.7% CG: 10.3%
Lauder et al.* / 2015 / Australia	129 (71 IG, 58 CG), 40.61, 74,5%	Bipolar I & II	Unguided, 10weeks, CBT	AC: unguided IBI, Psychoeducation	Levenson's Internal, Powerful Others and Chance Locus of Control scale	Outcome	pre, post, 24wFU, 52wFU	IG: 64.79% CG: 47.46%
Lee et al.* / 2023 / United States	131 (66 IG, 65 CG), NI, 80.9%	Non-clinical sample of college students; Depression, Anxiety and Stress	Unguided, 45-minute single session, DBT-informed stress and anxiety management	WL	Anxiety Self-Efficacy (ASE): 2-item self-report measure created for the study	Outcome	pre, post	IG: 24.67% CG: 27.3%
Lin et al.* / 2023 / China	84 (40 IG, 44 CG), 30.82, 62%	Depression	Unguided, 8weeks, CBT	WL	General Self-Efficacy Scale (GSES)	Outcome	pre, post	IG: 7.5% CG: 2.27%
Lopes et al.* / 2023 / Brazil	189 (94 IG, 95 CG), 36.44, 79%	Depression	Unguided, 13weeks, CBT	TAU: other psychological or psychopharmacological treatments	General Self-Efficacy Scale (GSES)	Outcome	pre, post	IG: 53.19% CG: 30.53%
Maciejewski et al.* / 2023 / Poland	372 (186 IG, 186 CG), 20.98, 85%	Non-clinical sample of university students; Stress	Unguided, chatbot, 1week, Conservation of Resources theory	WL	Coping Self-Efficacy Scale (CSES)	Outcome	pre, post, 4wFU	IG: 47.31% CG: 21.51%
Maybery et al.* / 2022 / Australia	41 (22 IG, 19 CG), 21.83, 92.7%	Young adults with parents with a mental illness; Depression, Anxiety, and Stress	Guided, 6weeks, CBT	WL	General Self-efficacy Scale (GSES)	Outcome	pre, post, 6wFU	IG: 8.33% CG: 4.76%
Moberg et	500 (253	Depression and	Unguided, 4weeks,	WL	General Self-efficacy	Outcome	pre, post,	IG: 68.8%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
al. / 2019 / United States	IG, 247 CG), 30.2, 75%	Anxiety	CBT+mindfulness		Scale (GSES)		12wFU	CG: 59.1%
Mullarkey et al. / 2022 / United States	522 (261 IG, 261 CG), 46.11, 48.5%	GAD	Unguided, 1 single session, NI	AC: 1 single session containing scientific information about how soap kills the SARS-CoV-2	Anxiety Control Questionnaire-Emotion Control (ACQ-EC)	Outcome	pre, post, 2wFU	IG: 6.9% CG: 9.6%
Nixon et al.* / 2022 / Germany	262 (130 IG, 132 CG), 42.20, 69.5%	Stress	Contact-on-demand, 4-7weeks, Stress management and problem solving training	WL	Occupational Self-efficacy Scale (OSS-SF)	Mediator	pre, post	IG: 12% CG: 8%
Orbach et al.* / 2007 / United Kingdom	90 (47 IG, 43 CG), 23.63, 73%	College students; Test anxiety	Unguided, 6weeks, CBT	AC: IBI with relaxation, diary, and puzzles	General Self-efficacy Scale (GSES)	Outcome	pre, post, 16wFU	IG: 27.66% CG: 34.88%
Proudfoot et al. / 2012 / Australia	407 (139 IG1, 134 IG2, 134 CG), NI, 69%	Bipolar Disorder	IG1: Unguided, 8weeks, Psychoeducation IG2: Guided (peer support), 8weeks, Psychoeducation	AC: weekly emails containing links to simple information about bipolar disorder	Health Locus of Control (MHLC)	Outcome	pre, post, 20Wfu, 32wFU	IG1: 38.3% IG2: 35.3% CG: 35.3%
Rogers & Sicouri* / 2022 / Australia	45 (23 IG, 22 CG), 19.67, 55%	College students with mild symptoms of Anxiety, Stress or Depression	Unguided, 1 single session, CBT	AC: online session without CBT elements	Attribution Style Questionnaire (ASQ)	Outcome	pre, post, 1wFU	IG: 0% CG: 4.5%
Rohde et al.* / 2023 / Switzerland	93 (54 IG, 39 CG), 23.72, 78.49%	College students; Stress	Unguided, 1week, Ecological momentary intervention training self-efficacy	WL	General Self-efficacy Scale (GSES)	Outcome	pre, post	IG: 11.48% CG: 15.22%
Romijn et al.* / 2021 / Netherlands	114 (52 IG, 62 CG), 36.3, 60.5%	Panic disorder (with or without agoraphobia), SAD and GAD	Blended, 15weeks, CBT	TAU: f2f sessions with standard disorder specific CBT	Mastery Scale (5-item version)	Outcome	pre, 7w, post, 52wFU	IG: 34.62% CG: 30.65%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
Rose et al.* / 2013 / United States	66 (34 IG, 32 CG), 27.32, 50%	Graduate students; Stress	Unguided, 6weeks, CBT (Stress management training)	AC: 6 weekly sessions where they receive material on stress and stress management	Stress and Perception of Control Scale	Outcome	pre, post	IG: 11.76% CG: 9.38%
Schmidt et al. / 2022 / Germany	59 (30 IG, 28 CG), 44.47, 86%	Prolonged grief	Guided, 5weeks, CBT	WL	General Self-Efficacy Scale (GSES)	Predictor	pre, post	IG: 13.33% CG: 3.57%
Schwob & Newman* / 2023 / United States	82 (39 IG, 43 CG), 19.40, 53.65%	Social Anxiety	Unguided, 1week, CBT	AC: Self-monitoring	General Self-Efficacy Scale (GSES)	Outcome	pre, post, 4wFU	IG: 2.54% CG: 4.65%
Shimazu et al.* / 2005 / Japan	225 (112 IG, 113 CG), 42.95, 16.91%	Non-clinical sample of workers; Stress	Unguided, 4weeks, Psychoeducation	WL	Self-efficacy scale (17 items)	Outcome	pre, post, 6wFU	IG: 8.26% CG: 5.45%
Shuai et al.* / 2022 / United Kingdom	52 (24 IG, 28 CG), 42.95, 16.91%	Students; Alcohol use disorder	Unguided, 2weeks, functional imagery training	AC: PowerPoint Video containing binge drinking risk information	Controlled Drinking Self-Efficacy Scale	Outcome	pre, post	IG: 36.8% CG: 26.3%
Shuai et al.* / 2024 / United Kingdom	120 (59 IG, 61 CG),	Students in South Africa; Alcohol use disorder	Unguided, 2weeks, functional imagery training	AC: PowerPoint Video containing binge drinking risk information	Controlled Drinking Self-Efficacy Scale	Outcome	pre, post	IG: 32.43% CG: 21.87%
Slade et al.* / 2024 / United Kingdom	1,023 (507 IG, 516 CG), 38.4, 79.3%	Depression, Anxiety, Stress	Unguided, NI, Recorded recovery narratives	TAU: usual care	Mental Health Confidence Scale	Outcome	pre, 1w, 12w, 52w (post)	
Smok-tunowicz et al.* / 2021/ Poland	1240 (311 IG1, 311 IG2, 309 CG1, 309 CG2), 36.2,	Non-clinical sample of medical professionals; Depression, Job related traumatic stress, Job burnout and Job stress	IG1: Unguided, 6weeks, self-efficacy and social support sequential enhancement IG2: Unguided, 6weeks, social support and self-efficacy sequential enhancement	AC (CG1): unguided IBI with self-efficacy enhancement AC (CG2): unguided IBI with social support enhancement	Work Stress and Job Burnout Self-Efficacy Scale	Outcome	pre, post, 30wFU	IG1: 89.3% IG2: 83.6% CG1: 77.7% CG2: 79%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
	86.61%							
Steinmetz et al.* / 2012 / United States	56 (18 IG, 19 CG1, 19, CG2), 43, 85.7%	Hurricane Ike survivors; Depression, Stress and Trauma	Unguided, 4weeks, Social Cognitive Theory and Human Agency	AC (CG1): Information-only intervention TAU (CG2)	Coping Self-Efficacy Scale for Trauma (CSE)	Outcome	pre, post	IG: 22% CG1: 32% CG2: 5.3%
Suffoletto et al.* / 2021 / United States	52 (34 IG, 18 CG), 18.7, 85%	Young adults with a current mental health diagnosis; Anxiety and Depression	Unguided, 12weeks, positive psychology+CBT+DBT	eTAU: TAU + web link with psychoeducational videos	Mental Health Self-Efficacy Scale (MHSES)	Outcome	pre, 4w, 8w, 12w (post)	IG: 5.9% CG: 5.6%
Takano et al.* / 2020 / Japan	48 (23 IG, 25 CG), 38.25, 31.55%	Substance abuse	Guided, 8weeks, NI	AC: limited content of the IG IBI	Self-efficacy Scale for Drug Dependence (SSDD)	Outcome	pre, post, 20wFU, 32wFU	IG: 17.4% CG: 4%
Teles et al.* / 2022 / Portugal	42 (21 IG, 21 CG), 53.6, 78.6%	Caregivers of people with dementia; Depression and Anxiety	Unguided, 12weeks, CBT+problem solving	AC: education-only ebook	Self-efficacy Scale for Drug Dependence (SSDD)	Outcome	pre, post, 36wFU	IG: 28.6% CG: 4.8%
Toh et al. / 2022 / Singapore	321 (162 IG, 159 CG), 22.5, 71.2%	Undergraduate university students; Depression, Anxiety and Stress	Unguided, 1week, CBT	AC: Psychoeducation IBI	Coping Self-Efficacy Scale (CSES)	Moderator	pre, post, 5wFU	IG: 1.9% CG: 3.1%
Van Gelder et al.* / 2023 / Netherlands	198 (99 IG, 99 CG), 35, 100%	Women experiencing Intimate Partner Violence and Abuse; Anxiety, Depression	Unguided, 4modules, NI	AC: minimal intervention with only the most essential static information	General Self-Efficacy Scale (GSES)	Outcome	pre, 12w, post, 52wFU	IG: 0% CG: 2.02%
Van Stolk-Cooke et al.* / 2023 / United States	200 (104 IG, 96 CG), 39, 97%	Veteran Family Members; Stress	Unguided, 4weeks, CBT	AC: the psychoeducation and support resources from PTSD Family Coach 1.0	Partner Self-Efficacy scale (PSE)	Outcome	pre, post	IG: 33.65% CG: 43.75%
Vincent et al. / 2010 / Canada	118 (59 IG, 59 CG), 51.1, 71%	Insomnia	Unguided, 5weeks, CBT	WL	Sleep Locus of Control Scale (SLOC)	Mediator	pre, post, 4wFU	IG: 24.6% CG: 24.6%

Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
Watson-Singleton & Pennefather al.* / 2024 / United States	212 (106 IG, 106 CG), 36.06, 54,1%	Non-clinical sample of Black/African American individuals; Stress, Depression, and Anxiety	Unguided, 12weeks, Mindfulness	WL	Mindfulness Self Efficacy Scale (MSES)	Outcome	pre, post	IG: 20.75% CG: 18.87
Warmerdam et al. / 2010 / Netherlands	263 (88 IG1, 88 IG2, 87 CG), 45, 71%	Depression	IG1: Guided, 8weeks, CBT IG2: Guided, 5weeks, problem-solving therapy	WL	Pearlin Mastery Scale (PMS)	Mediator	pre, post, 8wFU	IG1: 19.32% IG2: 29.55% CG: 18.39%
Webb et al. / 2022 / United States	556 (277 IG, 279 CG), 41, 45.1%	Non-clinical sample; Tobacco use	Guided, 52weeks, CBT	AC: A very brief advice (VBA) to stop smoking, an evidence-based intervention designed to facilitate quit attempts + referral to a cessation service	Smoking Abstinence Self-Efficacy Questionnaire	Outcome	pre, post, 26wFU, 52wFU	IG: 15% CG: 13%
Welten et al. / 2024 / Netherlands	120 (59 IG, 61 CG), 59.3, 74.2%	Partners of patients with aquired brain injury; Stress, Depression, and Anxiety	Blended, 20weeks, CBT	TAU: education and counseling tailored to individual needs. This could involve individual consultation(s) with a social worker or psychologist, or a peer support group.	Caregiver Mastery Scale (CMS)	Outcome	pre, post, 40wFU	IG: 28.81% CG: 18.03%
Westerhof et al.* / 2019 / Netherlands	58 (19 IG1, 20 IG2, 19 CG), 53.8, 77.6%	Sub-clinical sample of 40 years or older; Depression	IG1: Guided, 12weeks, Narrative therapy IG2: Guided (peer support), 12weeks, Narrative therapy	WL	Pearlin Mastery Scale (PMS)	Outcome	pre, post, 24wFU, 48wFU	IG1: 31.6% IG2: 30% CG: 38.8%
Wild et al.* ¹ / 2020 / United Kingdom	430 (317 IG, 113 CG), 41.4, 58.1%	Non-clinical sample of emergency workers; Depression, Anxiety, and Trauma	IG: Unguided, 6weeks, Psychoeducation+mindfulness	AC: f2f sessions in group format	General Self-Efficacy Scale (GSES)	Outcome	pre, post, 18wFU	IG: 18.6% CG: 19.2%

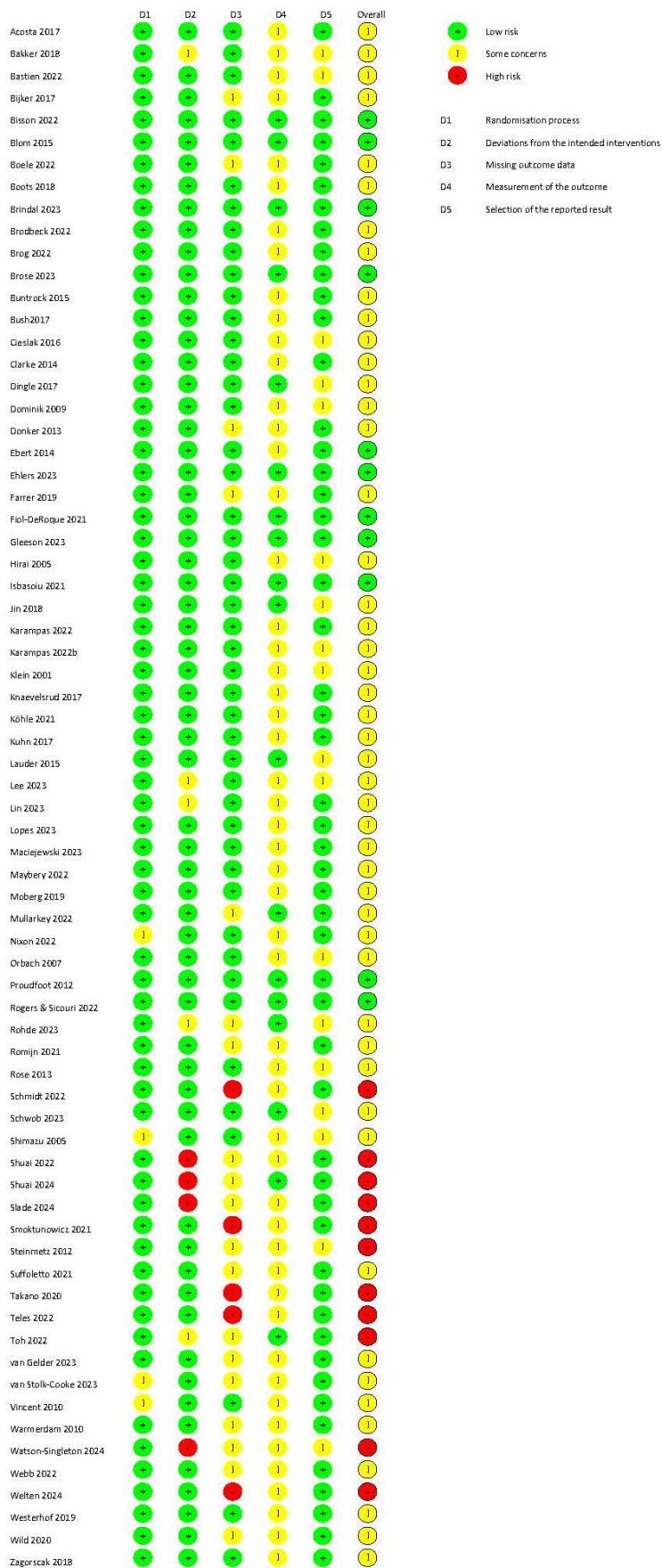
Authors / Year / Country	Sample N, mean age, % female	Population and assessed symptoms	Intervention(s) description (setting, duration, approach)	Control group(s)	Self-Efficacy measure	Role of self-efficacy in the study	Assessment times	Attrition
Zagorscak et al. */ 2018 / Germany	1089 (555 IG, 534 CG), 45.7, 65.6%	Depression	Guided, 6weeks, CBT	AC: Contact on Demand version of the same intervention	General Self-Efficacy Scale (GSE)	Outcome	pre, post, 12wFU, 24wFU, 52wFU	IG: 18.40% CG: 21.20%

Note: *included in the meta-analytic pooling; ¹In the original study, experimental and control group are reversed; AC: Active Control; ACT: Acceptance and Commitment Therapy; CBT: Cognitive Behavioral Therapy; CBT-SM: Cognitive Behavioral Therapy - Self-Management; CG: Control Group; DBT: Dialectical Behaviour Therapy; f2f: face-to-face; FU: Follow Up; GAD: Generalized Anxiety Disorder; IG: Intervention Group; NI: No Information; PTSD: Post Traumatic Stress Disorder; SAD: Social Anxiety Disorder; (e)TAU: (enhanced) treatment as usual; w: weeks; WL: Waitlist

3.3.2 Risk of Bias Assessment

An overview of the results of the risk of bias assessments is provided in Figure 2. In summary, the quality of the included studies can be considered satisfactory, with 59 studies (84.29%) having low or moderate overall risk of bias. The domains with the lowest risk of bias across studies were the “randomization process” and “selection of the reported result”, whereas the criteria least met were “missing outcome data” and “measurement of the outcome”.

Figure 2. Risk Of Bias Assessment



+ Low risk
1 Some concerns
+ High risk

D1 Randomisation process
 D2 Deviations from the intended interventions
 D3 Missing outcome data
 D4 Measurement of the outcome
 D5 Selection of the reported result

3.3.3 Role of Self-Efficacy

3.3.3.1 Self-efficacy as an outcome.

Our meta-analysis reviewed 67 comparisons from 56 publications focusing on the effect of IBI on self-efficacy compared to various controls.

Between group effect sizes.

Table 2 shows the between effect sizes and heterogeneity (Q-statistic, I^2) for the overall and subgroup analyses from post-assessment, short-, mid-, and long-term follow-up for IBI on self-efficacy compared to control groups. The forest plot (Figure 3) additionally visualizes the effect sizes and confidence intervals comparing IBI with the different settings to control groups. The overall comparison of IBI with control groups at post assessment yielded a moderate effect on self-efficacy ($k = 67$, $d = 0.46$, 95% CI = 0.27 - 0.65) with high heterogeneity between studies ($I^2 = 95.13\%$, $Q = 504.72$). There was a large effect on general self-efficacy ($k = 29$, $d = 0.75$, CI = 0.31 - 1.20) and a small effect on specific self-efficacy ($k = 38$, $d = 0.21$, CI = 0.12 - 0.30). The heterogeneity for general self-efficacy was very high ($I^2 = 98.05\%$, $Q = 416.17$) while it was moderate ($I^2 = 48.1\%$, $Q = 81.01$) for specific self-efficacy. We conducted subgroup analyses without related constructs, which yielded similar patterns in effects and heterogeneity (general: $k = 20$, $d = 0.65$, CI = 0.06 - 1.23, $I^2 = 98.58\%$, $Q = 288.52$; specific: $k = 30$, $d = 0.20$, CI = 0.00 - 0.10, $I^2 = 53.12\%$, $Q = 73.40$). The overall effect decreased in the follow-up assessments leading to non-significant effects in the short- and long-term follow-ups (FU1: $k = 13$, $d = 0.16$, 95% CI = -0.00 - 0.33; FU3: $k = 6$, $d = 0.12$, 95% CI = -0.09 - 0.33) and a small effect in the mid-term follow-up (FU2: $k = 14$, $d = 0.16$, 95% CI = 0.03 - 0.29). All effect sizes reported for the subgroup analyses in the next section refer to post-assessment results. Follow-up results can be found in Table 2. In a subgroup of 28 studies comparing IBI to waitlist controls, a moderate effect was observed ($d = 0.64$, 95% CI = 0.40 - 0.89). However, the heterogeneity remained high ($I^2 = 89.53\%$), suggesting variability in the effect sizes within this

subgroup. No significant advantage was found for IBI compared to TAU ($k = 15$, $d = 0.66$, 95% CI = $-0.08 - 1.39$), and active controls ($k = 24$, $d = 0.10$, 95% CI = $-0.03 - 0.23$). Guided interventions showed higher effect sizes ($k = 19$, $d = 0.61$, 95% CI = $0.24 - 0.97$) than unguided ($k = 44$, $d = 0.42$, 95% CI = $0.17 - 0.68$) and blended approaches ($k = 4$, $d = 0.19$, 95% CI = $-0.15 - 0.52$). As for what kind of symptoms or populations the interventions targeted, there was a large effect for interventions targeting mood disorders ($k = 11$, $d = 1.17$, 95% CI = $0.09 - 2.26$), moderate effects for IBI targeting caregivers of relatives ($k = 8$, $d = 0.68$, 95% CI = $0.08 - 1.29$) and for interventions targeting trauma and grief ($k = 9$, $d = 0.64$, 95% CI = $0.16 - 1.12$). A small effect was found for interventions aiming at non-clinical populations ($k = 20$, $d = 0.14$, 95% CI = $0.06 - 0.23$) and other symptoms (e.g., stress and insomnia; $k = 9$, $d = 0.37$, 95% CI = $0.18 - 0.56$). Non-significant effects were found for transdiagnostic interventions ($k = 5$, $d = 0.33$, 95% CI = $-0.03 - 0.69$), and interventions aiming at substance abuse ($k = 5$, $d = 0.03$, 95% CI = $-0.38 - 0.45$). Removing outliers in the sensitivity analyses (Appendix Table D) lowered heterogeneity and showed overall smaller effect sizes ($k = 55$, $d = 0.29$, 95% CI = $0.22 - 0.36$). Within group effect sizes can be found in the appendix (Table B & Figure A)

Publication bias.

The Egger's test and the Rank Correlation Test indicated the presence of funnel plot asymmetry both for uncontrolled effects (Kendall's tau = 0.22, $p < 0.01$; Egger's test: $Z = 5.81$, $p < 0.0001$) as well as controlled effects (Kendall's tau = 0.27, $p = 0.001$; Egger's test: $Z = 4.57$, $p < 0.0001$), suggesting potential publication bias. However, when applying the trim and fill method, it estimated no missing studies, indicating that the observed effect sizes might not be substantially influenced by unreported studies.

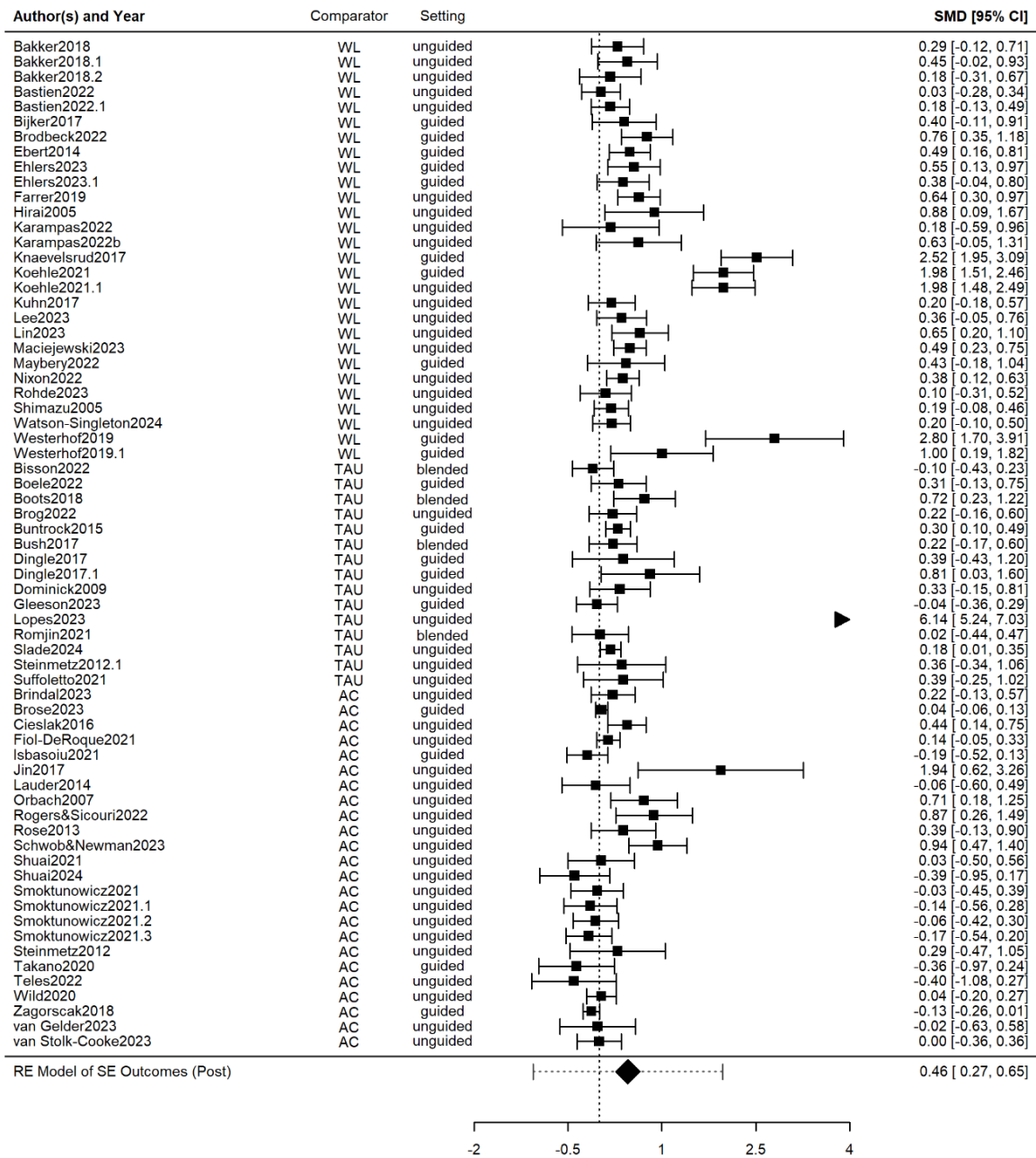
Table 2

Between-Group Effect Sizes For IBI On Self-Efficacy At Baseline Compared To The End Of Treatment And Follow-Up (FU)

Post	FU1						FU2						FU3												
	k	d _{SM}	LL	UL	I ²	Q	k	d _{SMC}	LL	UL	I ²	Q	k	d _{SMC}	LL	UL	I ²	Q	k	d _{SMC}	LL	UL	I ²	Q	
IBI (all)	67	0.46	0.27	0.65	95.13	504.72	13	0.16	-0.00	0.33	76.19	35.48	14	0.16	0.03	0.29	43.17	27.27	6	0.12	-0.09	0.33	40.46	8.07	
Type of Self-Efficacy Measure																									
General	29	0.75	0.31	1.20	98.05	416.17	6	0.25	-0.11	0.61	88.86	24.79	8	0.31	0.02	0.60	78.86	22.80							
Specific	38	0.21	0.12	0.30	48.10	81.01	7	0.11	-0.06	0.28	47.31	10.57	6	0.07	-0.08	0.20	9.55	4.07							
Type of Control																									
Waitlist	28	0.64	0.40	0.89	89.53	173.31	7	0.15	-0.13	0.43	72.42	19.91	3	0.97	0.22	1.73	71.16	7.87							
TAU	15	0.66	-0.08	1.39	98.27	180.93																			
Active Control	24	0.10	-0.03	0.23	71.40	62.78	6	0.17	-0.04	0.39	78.78	14.98	10	0.02	-0.07	0.11	0.00	4.99							
Type of Setting																									
Unguided	44	0.42	0.17	0.68	94.71	285.41	8	0.16	-0.09	0.42	76.51	24.26	6	0.15	-0.05	0.36	0.00	2.34							
Guided	19	0.61	0.24	0.97	96.21	204.13	5	0.15	-0.07	0.36	70.61	9.74	8	0.28	0.00	0.55	85.62	24.34							
Blended	4	0.19	-0.15	0.52	63.02	7.90																			
Type of Disorder																									
Mood	11	1.17	0.09	2.26	99.46	237.86																			
Trauma	9	0.64	0.16	1.12	91.38	66.90																			
Transdiagnostic	5	0.33	-0.03	0.69	80.25	16.83																			
Substance	5	0.03	-0.38	0.45	52.26	8.25																			
Relationship	8	0.68	0.08	1.29	91.67	82.46																			
Non-clinical	20	0.14	0.06	0.23	15.36	21.63																			
Other	9	0.37	0.18	0.56	35.95	11.90																			

FU1 = short-term follow-up between 1 and 5 months, FU2 = mid-term follow-up between 6 and 12 months, and FU3 = long-term follow-up over 12 months, *d_{SMC}* = standardized mean changes, LL = lower limit of 95% confidence interval, UL = upper limit of 95% confidence interval. *I*² values are reported in percent (%). *k* = number of comparisons. Comparisons with *k* < 3 studies are not reported.

Figure 3. Forest Plot Between Effects



3.3.3.2 Self-efficacy as a predictor or moderator.

Six studies were identified examining self-efficacy as a predictor or moderator with mixed results. Three studies provide evidence that low self-efficacy pre-treatment is predictive of better outcomes while one study shows the opposite effect and two studies finding no significant effect. Clarke et al. (2014) examined the effects of mental health self-efficacy on outcomes of an IBI relative to an active control and a waitlist in a transdiagnostic clinical sample. They observed a significant moderation effect of self-efficacy: people with low pretreatment mental health self-efficacy reported the greatest post-intervention improvements in depression, anxiety, and stress ($p = 0.013$). Donker et al. (2013) conducted a noninferiority trial comparing two IBI to an active control condition in a non-clinical community sample. They found that lower mastery predicted better outcomes at post-test regardless of intervention ($p < 0.001$; i.e., predictor), while they found no significant interaction effect of mastery on depression (i.e., moderator). The third study by Toh et al. (2022) examined the potential efficacy of an IBI compared to an active control in a non-clinical student sample and found that participants with lower coping self-efficacy experienced the fastest post-test decline in perceived stress levels ($p = 0.005$). This moderation effect was found only for the outcome stress and not for depression and anxiety. In contrast, the study by Schmidt et al. (2022) investigated self-efficacy as a predictor in internet-based grief therapy for people bereaved by suicide compared to a waitlist. They found that higher self-efficacy was associated with a greater reduction in grief ($p = 0.001$). A study by Brog et al. (2022a) examined predictors of treatment outcome of an unguided IBI for COVID-19 related psychological distress and found no significant effect from pre-treatment self-efficacy on the outcome. Similar findings were shown by Boettche et al. (2016) in a study investigating predictors for treatment outcomes of an IBI for PTSD in older adults, that showed non-significance for self-efficacy as a predictor.

3.3.3.3 Self-efficacy as a mediator.

Ten mediator studies with a total of twelve investigated IBI were identified. As visualized in Table 3 seven comparisons (58.33%) reported overall support for self-efficacy as a mediator, although it is important to note that three of them came from the same study. Four studies yielded mixed results (33.33%). In three of those studies, self-efficacy was only found to be a significant mediator for some of the primary outcomes but not all (Brodbeck et al., 2022; Clarke et al., 2014; Vincent et al., 2010). In one study, self-efficacy only partially mediated the effect (Acosta et al., 2017). One study (8.33%) showed no significant evidence for self-efficacy as a mediator (Ehlers et al., 2023). Five studies provided sufficient data to calculate an estimate of variance explained by self-efficacy as a mediator, with a mean R² of 0.32 (SD = 0.15). Table 4 gives an overview of to which extent the studies met quality criteria for investigating mediators as proposed by Kazdin (2007) and Lemmens et al. (2016).

Table 3

Box Score Results And Mean R² For Self-Efficacy As A Mediator

Subgroups	SE as a mediator	Mean R ² effect size estimate
Overall	+2 ^a +2 ^a +2 ^a +4 ^a +6 ^a +8+10 ^a ?1?3 ?5 ?9 ^a -7	0.32 (SD=0.15, k= 5)
Unguided	+2 +2 +2 +4 +8 ?1?5 ?9	
Guided	+6+10 ?3 -7	

¹Acosta2017, ²Bakker2018 (all 3 intervention groups), ³Brodbeck2022, ⁴Cieslak2016, ⁵Clarke2014, ⁶Dingle2017, ⁷Ehlers2023, ⁸Nixon2022, ⁹Vincent2010, ¹⁰Warmerdam2010; + significant mediator effect, ? mixed results, - no significant mediator effect; ^astudies included in the calculation of the mean R² effect size estimate.

Table 4

Quality Assessment Mediator Studies

	Theory	RCT	Control	Sample size ≥ 40 ¹	Multiple mediators	Temporality ²	Manipulation
Acosta2017	+	+	+	+	+	+	-
Bakker2018	+	+	+	+	+	-	-
Brodbeck2022	+	+	+	+	-	-	-
Cieslak2016	+	+	+	+	-	-	-
Clarke2014	+	+	+	+	-	-	-
Dingle2017	+	+	+	-	-	-	-
Ehlers2023	+	+	+	-	+	+	-
Nixon2022	+	+	+	+	+	-	-
Vincent2010	+	+	+	+	-	-	-

Warmerdam2010	+	+	+	+	+	-	-
¹ per group; ² Temporality is defined as >2 assessments during the treatment phase; - = requirement is not met; + = requirement is met.							

3.4 Discussion

The use and research of IBI have grown rapidly in the past years, offering a new way for people to access mental health treatment. To our knowledge, this is the first systematic review and meta-analysis specifically addressing the role of self-efficacy in IBI for mental disorders. In this review, a total of 70 RCTs with N = 17407 participants were included. Notably, 16 (over 20%) of these studies were published in 2023 or 2024, highlighting the recent surge in interest and research activity in this area. The included studies investigated self-efficacy as an outcome, a predictor or moderator, or as a mediator in IBI aiming at reducing symptoms of mental disorders in adults.

Findings addressing the first research question concerning the impact of IBI on self-efficacy as an outcome showed overall moderate effects. In this study, there was a larger effect on general self-efficacy measures (e.g., general self-efficacy, attribution, perceived control, mastery) than specific self-efficacy measures (e.g., mental health self-efficacy, caregiver mastery, coping self-efficacy). This is in contrast to Bandura's (2006) recommendations to measure self-efficacy as specifically as possible and previous findings that IBI have a positive effect on self-efficacy measured with disease-specific self-efficacy scales, while no effects were found for self-efficacy measured with general self-efficacy scales (Samoocha et al., 2010). These results should, however, be interpreted with caution, because of the high heterogeneity among studies that assessed general self-efficacy measures. This could be an indication that the measures in this category assessing constructs related to self-efficacy, such as mastery, were not comparable. However, in a subgroup analysis regarding only studies that applied self-efficacy measures we found similar results in effects and heterogeneity as when we included related constructs. The actual overlap among these constructs should be investigated empirically to

clarify their distinctions. Nonetheless, we consider it a strength of our analysis to have included related constructs broadly, as this approach offers a more comprehensive understanding given their inherent conceptual overlap. Results for the effects of IBI on self-efficacy at follow-up were mixed with stable moderate effects at short- and mid-term follow-up for within group comparisons and small or non-significant effects for between group comparisons. The sample sizes for long-term follow-ups were very small. Thus, the sustained effectiveness of IBI on self-efficacy beyond the immediate post-treatment period remains unclear.

As expected, the effect sizes were largest for comparisons with waitlist controls, while IBI were shown to be not more efficacious in enhancing self-efficacy than active controls or TAU. Clinical trials with waitlist controls yield limited conclusions, as they tend to overestimate the treatment effect sizes (Mohr et al., 2014). The reasons that the active controls were also effective could be due to non-specific or common therapeutic factors (e.g., positive expectations of treatment benefits, hope, and structure provided by treatment), which may arise due to the receipt of any psychological intervention (Mulder et al., 2017). Moreover, the content of the active control interventions often consisted of therapeutic material, such as the basic version of the intervention or the same content in a different order and were offered in a similar delivery mode. The non-significant effect size for IBI compared to TAU is in line with other meta-analysis that showed comparable efficacy of both treatment settings on mental health outcomes (Carlbring et al., 2018; Schaeuffele et al., 2024). Our findings suggest that IBI and TAU (e.g., face-to-face psychotherapy, telephone CBT, and nonfrequent counseling) can be similarly effective in improving self-efficacy offering a promising alternative in contexts where more costly traditional treatments are less accessible. The classification of control conditions is critical for interpreting the effectiveness of IBI. As Goldberg et al. (2023) emphasize, inconsistencies in control group definitions can impact effect size estimates and complicate cross-study comparisons. Our study categorized control groups into waitlist, active control, and treatment-

as-usual conditions, aligning with conventional approaches. However, future research may benefit from adopting a more standardized classification.

Guided interventions appear to offer more benefits in increasing self-efficacy, while unguided interventions showed smaller effects. The level of guidance necessary in IBI for mental health remains a current debate. While the majority of studies demonstrate a superiority of guided over unguided IBI on mental health outcomes, some studies do not support these findings, making it unclear at this point how much human support is needed in IBI. The superiority of guided interventions on self-efficacy, observed in this study, could potentially be explained by the supportive nature that personalized feedback often entails. Participants might be able to overcome difficulties that occur during the intervention and develop more positive beliefs about their abilities through encouraging messages. Additionally, guided interventions motivate participants to engage fully and persistently with the intervention and practice skills regularly, which is crucial for a sense of achievement and the development of self-efficacy. However, the high heterogeneity in this group suggests that factors such as the extent and nature of guidance play a crucial role. Blended interventions showed a slightly larger effect than unguided but smaller effect than guided IBI in the within group comparisons, whilst there was a non-significant effect of blended interventions in the between group comparisons. The findings are particularly interesting regarding the construct of self-efficacy because they indicate that guidance within IBI is important to improve self-efficacy, an attribute strongly related to autonomy and self-motivation. It suggests that a moderate level of support enhances the intervention's effectiveness without the need for the more intensive face-to-face-support applied in blended approaches, offering a balance between independence, and directed help. However, the limited number of studies investigating blended interventions call for cautious interpretation. More research is needed regarding the necessary level of guidance in IBI, especially for secondary outcomes like self-efficacy.

IBI seemed to be effective in enhancing self-efficacy regardless of the mental disorder targeted. The smallest effects were found for interventions targeting individuals with substance abuse (including smoking) and non-clinical populations. Individuals with more severe symptoms of mental health disorders tend to have lower self-efficacy expectancies (Kim, 2003; Muris, 2002) which may result in larger gains in self-efficacy. However, it is unclear how non-clinical so-called community samples are. For example, Donker et al. (2013) recruited a community sample that reported a mean depression baseline score indicative of major depression.

The results for self-efficacy as a potential predictor or moderator were inconsistent. Three studies found evidence that individuals with low self-efficacy at baseline benefit more from IBI. These results were unexpected, as social learning theory assumes greater therapeutic benefit for people with high pretreatment self-efficacy (Bandura, 1997). Clarke et al. (2014) suggested that the increase may have been greatest in users with low self-efficacy because their higher depression scores at the start of the intervention offered them greater potential for improvement, or that an IBI to increase self-efficacy was particularly well suited to these individuals. On the other hand, one study found that higher self-efficacy was associated with a greater reduction in grief and two studies found no significant result for self-efficacy as a predictor. These conflicting results are in line with the review on transdiagnostic predictors of therapy outcome in guided IBI by Haller et al. (2023) that yielded inconsistent results for self-efficacy. In our study, a trend for the benefit of low self-efficacy at baseline was observed but given the small number of studies and the different symptoms of mental disorders they investigated, no firm conclusions can be drawn about whether high or low self-efficacy at baseline contributes to the response to IBI and for whom and under what conditions IBIs have different effects.

We found evidence for self-efficacy as a mediator in IBI. Seven comparisons in five studies showed a significant mediation effect for self-efficacy on outcomes, while four studies yielded mixed results, such as there was only a mediating effect found for some of the outcomes

but not for others or self-efficacy turned out to be only partially mediating the outcome. Only one study showed no significant effect. These results are in correspondence with previous systematic reviews on mechanisms of change in IBI for depression (Domhardt et al., 2021) and PTSD (Steubl et al., 2021) that found self-efficacy as a mediator. Overall, the quality assessment for process research of the included mediation studies revealed significant room for improvement. Only two of the ten studies met the criteria of temporality (Kazdin, 2007). All five studies that found a significant mediation effect in this review did not meet the criteria of temporality and thus are insufficient to make a statement about the causal relationship of changes in self-efficacy and the outcomes. Furthermore, only five of the ten studies included multiple mediators and none of the studies employed an experimental design by manipulating self-efficacy. The findings of this review suggest that IBI may work in part by increasing the participants' self-efficacy and that because of this, precise targeting of self-efficacy may have the potential to increase the efficacy of IBI for mental disorders. However, the quality of studies is too poor to draw final conclusions, and the small mean R^2 effect size estimate should therefore be interpreted with caution.

Several limitations must be considered when interpreting the results of this review and meta-analysis. First, as most of the primary studies were conducted in Western countries and recruited mainly female participants, the samples included were not representative of different ethnicities and genders. Only studies published in English were included, which may introduce language bias. Secondly, we may have missed relevant studies where self-efficacy was assessed but not mentioned in the titles or abstracts. Another important limitation of our results is the high heterogeneity of effects, which partly persisted in the subgroup analysis and limits the generalizability of our findings. This is probably due to the broad inclusion of different samples (i.e., different targeted symptoms, clinical- and non-clinical samples, caregivers, etc.) and IBI settings. Another reason could be that the included studies examine self-efficacy

heterogeneously, including general and specific self-efficacy and related constructs such as perceived control and mastery. Other meta-analyses on IBI for specific mental disorders have also reported high heterogeneity (Domhardt et al., 2021; Steubl et al., 2021), suggesting that IBI is a very broad term for interventions differing greatly in terms of intensity, content, and delivery. The third limitation is regarding the results of the mediator analyses. The box-scoring approach can only be considered for visualization and effect size estimates did not account for study sample differences. Future research should apply meta-analytic structural equation modeling if possible. Fourthly, although the quality of the included studies can be considered satisfactory, risk of bias was a concern, particularly due to self-reported outcomes and limited documentation of blinding procedures. This is consistent with previous findings that blinding is rarely used in randomized clinical trials of psychological interventions, which can lead to an overestimation of the beneficial effects of the experimental interventions studied and an underestimation of the harmful effects (Juul et al., 2021). While participant and personnel blinding is often impractical in psychotherapy research, it may be more feasible in IBI (Domhardt et al., 2021). Given these challenges, we rated the risk of bias in outcome measurement as raising some concerns. Furthermore, we didn't assess an inter-rater reliability for the risk of bias rating. Lastly, the majority of included studies reported high dropout rates, which is a common problem in IBI (Moshe et al., 2021). We did not examine the relationship between adherence and self-efficacy, but future research should explore how self-efficacy influences adherence and whether enhancing it can improve engagement in IBI (Smoktunowicz et al., 2024). Besides the limitations, this study has notable strengths, including its comprehensive approach that integrates self-efficacy and related constructs to provide a holistic understanding of their roles in internet-based interventions. Additionally, we have ensured transparency and reproducibility by making all project data, including the data extraction sheet and relevant R code, publicly available.

Given that the overall effects of IBI on self-efficacy were moderate in the included RCTs, the reach of such scalable, low-intensity interventions could yield important public health advantages by engaging individuals who may not typically pursue or have access to traditional forms of treatment (Bennett-Levy et al., 2010). More research is needed on the long-term efficacy of IBI on self-efficacy. From a clinical standpoint this is of crucial relevance because self-efficacy is conceptualized as a component of resilience (Schwarzer & Warner, 2013) and thus, enhancing self-efficacy sustainably could be an important goal of treatment to prevent future episodes of mental disorders. The findings of our study also suggest that self-efficacy might be a mediator of improved mental health outcomes in IBI. Expanding the evidence base with component studies investigating the active ingredients of treatment as well as mediation studies following methodological recommendations for process research and using appropriate statistical methods for mediation analysis, will further improve our knowledge on mechanisms of change of IBI for mental disorders (Domhardt et al., 2021). Given the positive influence of high self-efficacy on mental health and its potential role as a mediator for treatment success, it could be of interest to target enhancing self-efficacy as an outcome. Given the mixed evidence for self-efficacy as a predictor or moderator for treatment outcomes, more research is needed to determine for whom self-efficacy enhancing intervention components could be beneficial. Here it would be advantageous to conduct an individual patient data meta-analysis for more precise analysis of how self-efficacy influences treatment outcomes and adherence across different populations. We included a diverse range of self-efficacy measurement tools in our study. Future research could focus specifically on the impact of different self-efficacy measurement instruments within IBI research to determine whether certain measures are more sensitive to change or better suited for digital interventions.

Overall, results from this systematic review and meta-analysis suggest that IBI can be as effective as traditional treatment in improving self-efficacy. Given the scalability and cost-

effectiveness of IBI, they could serve as a viable alternative to face-to-face treatments, particularly for individuals who prefer digital interventions. Self-efficacy may play an important role in the context of IBI as a mediator and could therefore itself be a valuable target to increase the efficacy of IBI for symptoms of mental disorders. More research is needed on long-term effects of IBI on self-efficacy, self-efficacy as a predictor or moderator, and more studies with appropriate study designs for process research are needed to further investigate the role of self-efficacy in IBI.

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3.6 Appendix for study 2

Appendix Table A Search strings for Cinahl, PsycINFO, PubMed, and Web of Science

Appendix Table B Within-group effects

Appendix Figure A Forest plot within effects

Appendix Table C Within-group effect sizes and heterogeneity at post after removing outliers

Appendix Table D Between-group effect sizes and heterogeneity at post after removing outliers

Appendix Table A

Search Strings For Cinahl, Psycinfo, Pubmed, And Web Of Science

Search	Cinahl	PsycINFO	PubMed	Web of Science
S1	treatment.ti,ab.	treatment.ti,ab,kw.	treatment.ti,ab.	treatment.ti,ab,ak.
S2	therapy.ti,ab.	therapy.ti,ab,kw.	therapy.ti,ab.	therapy.ti,ab,ak.
S3	intervention.ti,ab.	intervention.ti,ab,kw.	intervention.ti,ab.	intervention.ti,ab,ak.
S4	CBT.ti,ab.	CBT.ti,ab,kw.	CBT.ti,ab.	CBT.ti,ab,ak.
S5	psychotherapy.ti,ab.	psychotherapy.ti,ab,kw.	psychotherapy.ti,ab.	psychotherapy.ti,ab,ak.
S6	self-help.ti,ab.	self-help.ti,ab,kw.	self-help.ti,ab.	self-help.ti,ab,ak.
S7	S1 or S2 or S3 or S4 or S5 or S6	S1 or S2 or S3 or S4 or S5 or S6	S1 or S2 or S3 or S4 or S5 or S6	S1 or S2 or S3 or S4 or S5 or S6
S8	online.ti,ab.	online.ti,ab,kw.	online.ti,ab.	online.ti,ab,ak.
S9	digital.ti,ab.	digital.ti,ab,kw.	digital.ti,ab.	digital.ti,ab,ak.
S10	web.ti,ab.	web.ti,ab,kw.	web.ti,ab.	web.ti,ab,ak.
S11	internet.ti,ab.	internet.ti,ab,kw.	internet.ti,ab.	internet.ti,ab,ak.
S12	computer.ti,ab.	computer.ti,ab,kw.	computer.ti,ab.	computer.ti,ab,ak.
S13	app.ti,ab.	app.ti,ab,kw.	app.ti,ab.	app.ti,ab,ak.
S14	e-health.ti,ab.	e-health.ti,ab,kw.	e-health.ti,ab.	e-health.ti,ab,ak.
S15	mobile.ti,ab.	mobile.ti,ab,kw.	mobile.ti,ab.	mobile.ti,ab,ak.
S16	smartphone.ti,ab.	smartphone.ti,ab,kw.	smartphone.ti,ab.	smartphone.ti,ab,ak.
S17	blended.ti,ab.	blended.ti,ab,kw.	blended.ti,ab.	blended.ti,ab,ak.
S18	S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17	S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17	S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17	S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17
S19	self-efficacy.ti,ab.	self-efficacy.ti,ab,kw.	self-efficacy.ti,ab.	self-efficacy.ti,ab,ak.
S20	self efficacy.ti,ab.	self efficacy.ti,ab,kw.	self efficacy.ti,ab.	self efficacy.ti,ab,ak.
S21	mastery.ti,ab.	mastery.ti,ab,kw.	mastery.ti,ab.	mastery.ti,ab,ak.
S22	attribution.ti,ab.	attribution.ti,ab,kw.	attribution.ti,ab.	attribution.ti,ab,ak.
S23	locus of control.ti,ab.	locus of control.ti,ab,kw.	locus of control.ti,ab.	locus of control.ti,ab,ak.
S24	control beliefs.ti,ab.	control beliefs.ti,ab,kw.	control beliefs.ti,ab.	control beliefs.ti,ab,ak.
S25	perceived control.ti,ab.	perceived control.ti,ab,kw.	perceived control.ti,ab.	perceived control.ti,ab,ak.
S26	external-internal control.ti,ab.	external-internal control.ti,ab,kw.	external-internal control.ti,ab.	external-internal control.ti,ab,ak.
S27	sense of control.ti,ab.	sense of control.ti,ab,kw.	sense of control.ti,ab.	sense of control.ti,ab,ak.
S28	S19 or S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27	S19 or S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27	S19 or S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27	S19 or S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27
S29	stress.ti,ab.	stress.ti,ab,kw.	stress.ti,ab.	stress.ti,ab,ak.
S30	mental.ti,ab.	mental.ti,ab,kw.	mental.ti,ab.	mental.ti,ab,ak.
S31	psychological.ti,ab.	psychological.ti,ab,kw.	psychological.ti,ab.	psychological.ti,ab,ak.
S32	psychiatric.ti,ab.	psychiatric.ti,ab,kw.	psychiatric.ti,ab.	psychiatric.ti,ab,ak.
S33	emotional.ti,ab.	emotional.ti,ab,kw.	emotional.ti,ab.	emotional.ti,ab,ak.
S34	depression.ti,ab.	depression.ti,ab,kw.	depression.ti,ab.	depression.ti,ab,ak.
S35	anxiety.ti,ab.	anxiety.ti,ab,kw.	anxiety.ti,ab.	anxiety.ti,ab,ak.
S36	S29 or S30 or S31 or S32 or S33 or S34 or S35	S29 or S30 or S31 or S32 or S33 or S34 or S35	S29 or S30 or S31 or S32 or S33 or S34 or S35	S29 or S30 or S31 or S32 or S33 or S34 or S35
S37	S7 and S18 and S28 and S36	S7 and S18 and S28 and S36	S7 and S18 and S28 and S36	S7 and S18 and S28 and S36

Note. ab = search in abstract, ak = search in author keywords, kw = search in keyword, ti = search in title.

Within group effect sizes

Table B shows the within effects and heterogeneity (Q-statistic, I^2) for the overall and subgroup analyses from pre- to post-assessment, short-, mid-, and long-term follow-up. In addition, the results are visualized in the forest plot (Figure A). Findings show a moderate effect ($k = 67$, $d = 0.47$, 95% CI = 0.38 - 0.56) of IBI on the self-efficacy of the participants at post with high heterogeneity among the studies ($I^2 = 85.77\%$, $Q = 308.61$), suggesting considerable variability in the effectiveness of IBIs on self-efficacy. There was a moderate effect on general self-efficacy ($k = 29$, $d = 0.64$, 95% CI = 0.45 - 0.82) and a small effect on specific self-efficacy measures ($k = 38$, $d = 0.36$, 95% CI = 0.27 - 0.45). The heterogeneity for general self-efficacy was very high ($I^2 = 92.44\%$, $Q = 184.12$) while it was moderate ($I^2 = 70.91\%$, $Q = 114.11$) for specific self-efficacy. We conducted subgroup analyses without related constructs, which yielded similar patterns in effects and heterogeneity (general: $k = 20$, $d = 0.64$, 95% CI = 0.40 - 0.88, $I^2 = 94.44\%$, $Q = 149.1$; specific: $k = 30$, $d = 0.33$, 95% CI = 0.23 - 0.42, $I^2 = 68.61\%$, $Q = 87.35$). In the follow-up assessment there was an overall moderate effect in the short-term follow-up (FU1: $k = 13$, $d = 0.49$, 95% CI = 0.32 - 0.66) and in the mid-term follow-up (FU2: $k = 14$, $d = 0.46$, 95% CI = 0.27 - 0.66) and a small effect in the long-term follow-up (FU3: $k = 6$, $d = 0.31$, 95% CI = 0.07 - 0.55).

Subgroup analyses showed a moderate effect for guided interventions ($k = 19$, $d = 0.66$, CI = 0.44 - 0.87) and small to moderate effects for unguided ($k = 44$, $d = 0.39$, 95% CI = 0.29 - 0.49) and blended interventions ($k = 4$, $d = 0.48$, 95% CI = 0.31 - 0.64). Looking at different types of disorders or symptoms that the interventions targeted, there were large effects for interventions targeting trauma ($k = 9$, $d = 0.89$, 95% CI = 0.49 - 1.29) and mood disorders ($k = 11$, $d = 0.80$, CI = 0.36 - 1.24), moderate effects for transdiagnostic interventions ($k = 5$, $d = 0.58$, 95% CI = 0.37 - 0.78) and interventions targeting other symptoms (e.g. stress and insomnia) ($k = 9$, $d = 0.50$, 95% CI = 0.28 - 0.71). Small effects were found for

interventions targeting relatives or caregivers of people with diseases ($k = 8$, $d = 0.41$, 95% CI = 0.10 - 0.73), non-clinical populations ($k = 20$, $d = 0.26$, 95% CI = 0.18 - 0.35) and people with substance abuse ($k = 5$, $d = 0.25$, 95% CI = 0.01 - 0.48).

Sensitivity analyses with 0.3 and 0.7 re-test correlations led to marginally different effect sizes in all comparisons without altering the direction of the results. Overall, we found significant heterogeneity amongst studies which remained high in the subgroup analysis in the categories general self-efficacy, unguided and guided interventions, and interventions targeting mood, trauma and relatives or caregivers ($I^2 = 78.32 - 97.55\%$). Removing outliers in the sensitivity analyses (Appendix Table C) lowered heterogeneity and showed overall slightly smaller effect sizes ($k = 51$, $d = 0.41$, 95% CI = 0.36 - 0.47).

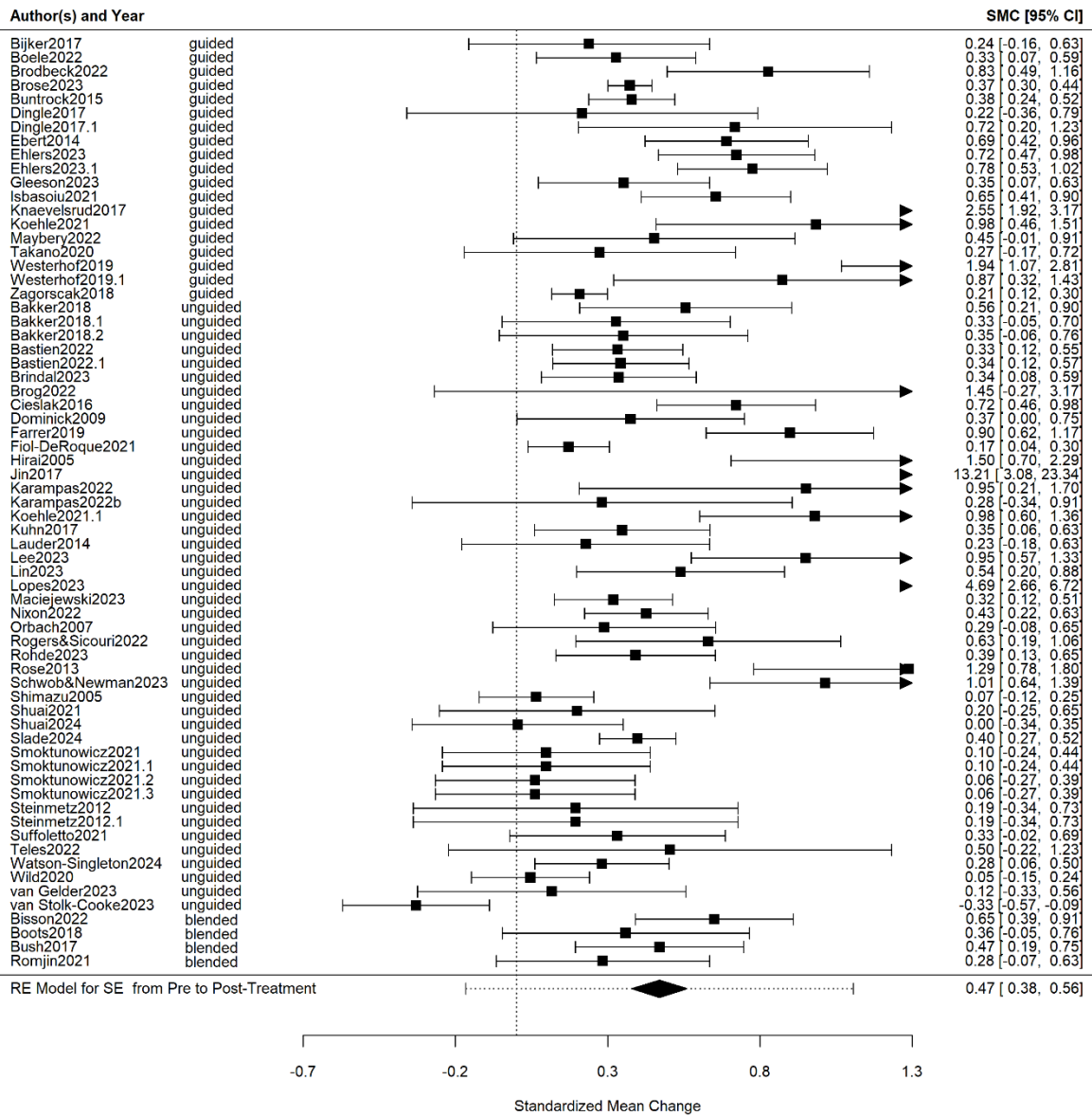
Appendix Table B

Within-Group Effect Sizes For IBI On Self-Efficacy At Baseline Compared To The End Of Treatment And Follow-Up (FU)

	Pre – Post						Pre – FU1						Pre – FU2						Pre – FU3						
	k	d _{SM} c	LL	UL	I ²	Q	k	d _{SMC}	LL	UL	I ²	Q	k	d _{SMC}	LL	UL	I ²	Q	k	d _{SMC}	LL	UL	I ²	Q	
IBI (all)	67	0.47	0.38	0.56	85.77	308.61	13	0.49	0.32	0.66	87.02	60.02	14	0.46	0.27	0.66	86.51	54.30	6	0.31	0.07	0.55	72.20	14.65	
Type of Self-Efficacy Measure																									
General	29	0.64	0.45	0.82	92.44	184.12	6	0.57	0.28	0.87	89.72	32.55	8	0.69	0.38	0.99	88.57	34.67							
Specific	38	0.36	0.27	0.45	70.91	114.11	7	0.42	0.22	0.62	77.98	25.46	6	0.17	0.08	0.26	0.00	6.09							
Type of Setting																									
Unguided	44	0.39	0.29	0.49	78.32	181.22	8	0.56	0.31	0.82	84.83	39.41	6	0.23	0.06	0.40	0.00	4.18							
Guided	19	0.66	0.44	0.87	94.10	115.65	5	0.36	0.18	0.54	78.29	13.12	8	0.66	0.33	1.00	95.06	49.39							
Blended	4	0.48	0.31	0.64	13.45	3.20																			
Type of Disorder																									
Mood	11	0.80	0.36	1.24	97.55	58.92																			
Trauma	9	0.89	0.49	1.29	92.82	47.15																			
Transdiagnostic	5	0.58	0.37	0.78	68.29	13.32																			
Substance	5	0.25	0.01	0.48	24.44	5.15																			
Relationship	8	0.41	0.10	0.73	81.47	45.67																			
Non-clinical	20	0.26	0.18	0.35	45.95	36.45																			
Other	9	0.50	0.28	0.71	71.18	22.47																			

FU1 = short-term follow-up between 1 and 5 months, FU2 = mid-term follow-up between 6 and 12 months, and FU3 = long-term follow-up over 12 months, *d*_{SMC} = standardized mean changes, LL = lower limit of 95% confidence interval, UL = upper limit of 95% confidence interval. *I*² values are reported in percent (%). *k* = number of comparisons. Comparisons with *k* < 3 studies are not reported.

Appendix Figure A. Forest Plot Within Effects



Appendix Table C

Within-Group Effect Sizes At Post After Removing Outliers

Pre – Post						
	k	d _{SMC}	LL	UL	I ²	Q
IBI (all)	51	0.41	0.36	0.47	41.42	79.79
Type of Self-Efficacy						
General	22	0.59	0.48	0.70	57.50	49.05
Specific	31	0.35	0.30	0.39	3.60	26.39
Type of Setting						
Unguided	33	0.32	0.26	0.38	21.58	40.00
Guided	16	0.54	0.42	0.65	62.32	38.07
Blended	4	0.48	0.31	0.64	13.45	3.20
Type of Disorder						
Mood	8	0.58	0.35	0.82	83.21	22.63
Trauma	8	0.67	0.54	0.80	33.92	13.33
Transdiagnostic	5	0.58	0.37	0.78	68.29	13.32
Substance	5	0.25	0.01	0.48	24.44	5.15
Relationship	7	0.53	0.29	0.77	55.76	13.29
Non-clinical	19	0.23	0.16	0.30	18.54	22.38
Other	8	0.43	0.28	0.58	39.10	12.07

Appendix Table D

Between-Group Effect Sizes At Post After Removing Outliers

Pre – Post						
	k	d _{SMC}	LL	UL	I ²	Q
IBI (all)	55	0.29	0.22	0.36	35.59	88.53
Type of Self-Efficacy						
General	19	0.38	0.25	0.50	44.67	32.98
Specific	35	0.21	0.13	0.29	23.36	45.74
Type of Control						
Waitlist	23	0.39	0.30	0.47	3.10	21.64
TAU	14	0.21	0.12	0.31	4.48	14.79
Active Control	21	0.02	-0.07	0.12	38.65	32.74
Type of Setting						
Unguided	41	0.25	0.17	0.33	38.17	69.47
Guided	13	0.37	0.21	0.54	41.14	20.40
Blended	4	0.19	-0.15	0.52	63.02	7.90
Type of Disorder						
Mood	9	0.67	0.16	1.18	95.35	50.43
Trauma	8	0.38	0.17	0.59	51.87	14.67
Transdiagnostic	5	0.33	-0.03	0.69	80.25	16.83
Substance	5	0.03	-0.38	0.45	52.26	8.25
Relationship	6	0.26	-0.02	0.54	47.08	9.74
Non-clinical	20	0.14	0.06	0.23	15.36	21.63
Other	9	0.37	0.18	0.56	35.95	11.90

Chapter 4

Study 3: Therapeutic Alliance, Self-efficacy, and Agency as Mechanisms of Change in Blended Care and Routine Psychotherapy

The following paper was resubmitted after the review process at Psychotherapy Research:

Behr, S., Bohn, J., Fenski, F., Hammelrath, L., Bellu, L., Boettcher, J., Knaevelsrud, C.[°], Schaeuffele, C.[°] (submitted). *Therapeutic Alliance, Self-efficacy, and Agency as Mechanisms of Change in Blended Care and Routine Psychotherapy*.

[°]shared last-authorship

Therapeutic Alliance, Self-efficacy, and Agency as Mechanisms of Change in Blended Care and Routine Psychotherapy

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Abstract for study 3

Blended Care (BC) has emerged as a promising approach to address the growing demand for mental health treatment, but little is known about its mechanisms of change and how they compare to traditional psychotherapy (PT). This study investigates therapeutic alliance, general and mental health self-efficacy, and therapeutic agency function as mechanisms of change.

We conducted a secondary analysis of a randomized controlled trial (N = 1,159 patients) comparing BC to PT in routine outpatient care. Mechanism and outcome variables (mental distress, satisfaction with life) were assessed at four time points over six months. We used random-intercept cross-lagged panel models (RI-CLPM) to differentiate between- from within-person effects.

All constructs were associated with better outcomes. Temporal effects showed that increases in mental health self-efficacy and therapeutic alliance predicted improved outcomes for multiple measurements. General self-efficacy showed inconsistent effects, with counterintuitive findings in the BC group, where higher self-efficacy predicted increased mental distress. Agency was mainly related to satisfaction with life. Outcomes also predicted changes in mechanisms. Differences between BC and PT were only significant for general self-efficacy.

Our findings suggest that therapeutic change is dynamic and reciprocal. The unexpected associations in the BC group need replication.

Clinical or Methodological Significance of this Article

Blended Care

Psychotherapy is an effective treatment for mental disorders, yet the demand for psychotherapy surpasses available resources (Cuijpers et al., 2023; Demyttenaere et al., 2004). Digital tools are increasingly used to improve access and efficiency in mental health care, marking an evolution in the delivery of mental health provision. Blended care (BC) combines traditional face-to-face (f2f) psychotherapy with internet-based interventions (IBI) and is a promising approach to enhance treatment accessibility, flexibility, and personalization. BC interventions can leverage the advantages of f2f-therapy and IBI. By incorporating digital content into the therapeutic process, BC interventions aim to increase the treatment dose and promote patient autonomy and empowerment (Kooistra et al., 2020). By outsourcing some of the therapeutic content into autonomous work with the IBI, valuable clinician time could be saved and thus treatment capacities could be scaled up. These characteristics suggest that BC could influence psychological mechanisms of change, such as enhancing patients' sense of agency and self-efficacy, or reshaping the therapeutic alliance (Erbe et al., 2017; Ferrao Nunes-Zlotkowski et al., 2024). There is very little empirical evidence on whether BC and f2f-psychotherapy share the same mechanisms of change, and whether their impacts are consistent across both settings.

Mechanisms of change

Investigating the mechanisms of change in psychotherapy research is crucial for gaining an understanding of how and why therapeutic interventions lead to positive outcomes. Understanding mechanisms of change can be a first step to bring light into why psychotherapy works and to optimize treatment based on this knowledge (Kazdin, 2007). Even though therapeutic approaches use their own specific techniques and theoretical frameworks, they seem to share some mechanisms of change, so called "common factors" (Cuijpers et al., 2019). The most

studied common factor in psychotherapy is therapeutic alliance. In addition, other common factors, such as self-efficacy and agency have been investigated (Lambert et al., 2013). In the context of IBI und BC, no specific “digital factors” have been identified yet (Domhardt et al., 2021). Most existing studies rely on cross-sectional or single-time-point measurements, which limits conclusions about temporal dynamics or causality. Few studies use longitudinal designs that can test mechanisms of change over time, especially in the context of IBI and BC.

Therapeutic Alliance

Therapeutic alliance is defined as the collaborative relationship between the therapist and the patient and includes the bond, agreement about the goals of therapy, and agreement about the tasks of therapy (Bordin, 1979; Wampold, 2001). A consistent finding is that the stronger the alliance the greater the therapeutic change in various therapeutic approaches (Horvath et al., 2011). Longitudinal research has demonstrated that alliance not only predicts subsequent symptom improvement but is also shaped by it (Falkenström et al., 2014; Xu & Tracey, 2015). This has been substantiated by Flückinger and colleagues (2020) in an individual participant data meta-analysis of 17 studies (N = 5.350), showing significant session-by-session reciprocal effects between alliance and symptoms in the early phase of therapy. Higher-than-usual alliance ratings predicted lower symptom ratings in the subsequent session, and vice versa, even after adjusting for prior session scores. Although the patient-therapist relationship is shaped in a different way in IBI, the therapeutic alliance seems to be a significant factor (Flückiger et al., 2018). In IBI, the interaction is typically asynchronous and text-based rather than face-to-face, with less nonverbal communication and immediacy. As a result, alliance formation likely relies more on written empathy, clarity of feedback, and perceived therapist responsiveness rather than direct interpersonal cues. Alliance in IBI can even extend beyond the human interaction and include alliance to the IBI itself, in particular agreement with the goals and tasks in the IBI. In a narrative review on the therapeutic alliance in IBI, Berger (2017) found

that alliance ratings by patients are comparable to f2f-psychotherapy. A meta-analysis on therapeutic alliance in therapist assisted IBI and remote psychological interventions with 20 included studies (Kaiser et al., 2021) found a small association of therapeutic alliance and symptom outcomes. So how is the therapeutic alliance affected when you combine psychotherapy and IBI in BC? First empirical investigations suggest that alliance quality in BC is often comparable to that in f2f-psychotherapy, although findings are mixed (Askjer & Mathiasen, 2021; Kooistra et al., 2020; Vernmark et al., 2019). For instance, Kooistra et al. (2020) found no differences in patient or therapist ratings of alliance between BC and face-to-face therapy, with generally high satisfaction reported in both groups. However, only in the f2f-group was patient-rated alliance significantly associated with symptom reduction. This may reflect a shift in emphasis toward self-guided work and autonomy in BC formats (Kooistra et al., 2020). Similarly, Vernmark et al. (2019) and Askjer and Mathiasen (2021) found no differences in the quality of the therapeutic alliance between the BC and f2f-groups. In both studies, therapist-rated alliance was related to treatment outcome, whilst patient-rated alliance was not. In contrast, the large-scale E-COMPARED trial (Doukani et al., 2024), which included 943 participants across nine European countries found that patient-rated alliance was higher in blended CBT than in treatment as usual (TAU) and that higher alliance scores were associated with greater symptom reduction. However, TAU included a variety of treatments ranging from watchful waiting or pharmacological treatment to f2f-CBT. While alliance is frequently assessed in BC studies, in the existing studies it is only assessed at one time-point, which limits the ability to evaluate temporal precedence or reciprocal relationships with symptom change (Ferrao Nunes-Zlotkowski et al., 2024). Longitudinal analyses are needed to clarify whether therapeutic alliance functions as a mechanism of change in BC. Empirical evidence about the therapeutic alliance in BC is particularly relevant as some practitioners voiced concern about IBI components negatively affecting the alliance between patient and therapist (van der Vaart et al., 2014). In a qualitative

study by Mol et al. (2020), some therapists even revised these fears and reported that due to the intensified contact with patients via IBIs and the possibility of online monitoring, the therapeutic relationship had strengthened compared to traditional psychotherapy.

Self-efficacy

Bandura's social learning theory (Bandura, 1977) provides another promising framework to examine mechanisms of change in the context of mental disorders and psychotherapy. Bandura (1977) assumes that therapeutic change derives from a common transdiagnostic cognitive mechanism: self-efficacy. Self-efficacy is defined as the "beliefs in one's capabilities to organize and execute behavior required to produce given attainments" (Bandura, 1997). It can be measured on a general level or in specific domains. General self-efficacy measures an individual's overall confidence in their abilities in a wide range of situations. Meanwhile, specific self-efficacy focuses on the confidence an individual has in specific abilities or situations. In the context of mental health, mental health self-efficacy is particularly relevant and refers to an individual's confidence in their ability to manage their emotional or psychological problems (Clarke et al., 2014). Self-efficacy is considered to be an important common factor of psychotherapy (Pfammatter & Tschacher, 2016). Given the autonomous nature of IBI, self-efficacy is an especially interesting construct to investigate in IBI and BC approaches. It is conceivable that a patient's belief in their ability to effectively engage with and complete an IBI can influence the outcome of a BC intervention regarding symptom reduction. Self-efficacy emerged as a relevant predictor of change in various mental disorders and seems to also be relevant mediator in IBI (Behr et al., 2025; Domhardt et al., 2021; Steubl et al., 2021). This is also reflected in recent meta-analyses on mediator studies in IBI for depression more broadly which confirmed that self-related factors, including self-efficacy and perceived control, are the most robust mediators of symptom improvement in IBI (Angerer et al., 2025).

Agency

Another related, yet conceptually distinct, factor derived from Bandura's social cognitive theory (Bandura, 2006) is agency. While self-efficacy describes an individual's belief in their capability to perform specific actions successfully, agency explicitly refers to the intentional and enacted aspect of influencing one's behaviors and circumstances (Bandura, 2006). In other words, agency reflects active, deliberate engagement in initiating and controlling one's actions, rather than merely believing one can. Agency includes the ability to recognize one's self as the agent of one's actions and thoughts and is one sub-construct of the domain "social processes" in the Research Domain Criteria (RDoC) of the National Institute of Mental Health (Insel et al., 2010). Across therapeutic approaches, it is an important goal in psychotherapy to enhance an individual's capacity to act and gain or regain a sense of agency (Julia Huber et al., 2019). Agency can also pertain to the therapeutic process itself: Therapeutic agency is considered the personal influence of the patient within their psychotherapy (J. Huber et al., 2019). A patient demonstrating therapeutic agency may bring up topics for the sessions, set therapy goals or address concerns with their therapist. Patients high in agency may reflect on things discussed during therapy or take the initiative to apply therapeutic strategies outside of sessions. Though agency is mentioned frequently in theoretical literature on psychotherapy process, empirical investigation of its role is still scarce. First studies show that higher therapeutic agency predicts subsequent symptom improvement in psychodynamic psychotherapy (Huber et al., 2021; Jennissen et al., 2022). The BC format inherently requires patients to play a more active role because some of the therapy takes place independently through digital modules. Patients are expected to complete exercises, reflect on content and apply strategies independently between sessions. This may shift more responsibility onto patients compared to traditional f2f-therapy. If this is reflected in a higher therapeutic agency in the therapy process in BC compared to f2f-therapy and if agency could facilitate positive treatment outcomes has yet to be investigated.

Objective

Therapeutic alliance, self-efficacy, and agency have emerged as mechanisms of change in f2f-psychotherapy. In the context of IBI and BC there is first evidence for therapeutic alliance and self-efficacy as influential factors, while therapeutic agency has not yet been investigated in these settings. Also, direct comparisons of change factors for BC versus f2f-psychotherapy exist only for therapeutic alliance and longitudinal designs are missing. Therapeutic alliance, self-efficacy, and therapeutic agency are especially interesting to investigate in the context of BC, because of the combination of f2f-contact and autonomous work with an IBI. Most IBI are based on a cognitive behavioral approach and focus on specific diagnoses. This does not reflect the reality in routine psychotherapy care, where comorbidities are prevalent and different therapeutic approaches are applied. To fill this gap, the transdiagnostic and transtheoretic BC Intervention “TONI” was developed (Behr et al., 2024) and evaluated in a large RCT in routine care in Germany (Schaeuffele et al., 2022). The aim of this paper is to perform a secondary analysis of this data, to investigate whether the common factors therapeutic alliance, general self-efficacy, mental health self-efficacy, and agency are mechanisms of change in this BC intervention in routine care. Also, differential effects of the mechanisms between BC and f2f-psychotherapy will be investigated. In addition to symptom reduction, life satisfaction will be included as an outcome to reflect broader aspects of well-being.

Research Questions

- 1: To what extent do changes in (mental health) self-efficacy, working alliance, and therapeutic agency predict subsequent changes in mental distress and satisfaction with life, and vice versa, over the course of 6 months?
- 2: Do the effects between the four variables and treatment outcomes differ between BC and f2f-psychotherapy?

Methods

The present study is a preregistered secondary analysis (<https://osf.io/8mcxs>) of a randomized controlled trial (N = 1159 patients; N = 231 therapists) comparing BC (“TONI” + PT) to f2f-psychotherapy (PT) in routine outpatient psychotherapy in Germany (Schaeuffele et al., 2022). The RCT was preregistered in the German clinical trial register (DRKS00028536) and received ethic’s approval by the ethics committee of Psychologische Hochschule Berlin (EK202121).

Procedure

Data collection took place between July 2023, and June 2024. After providing electronic informed consent, patients completed all assessments online via the TONI platform, and both patients and therapists were automatically reminded to complete them at the respective time points. Randomization occurred after baseline measurements at the patient level using a concealed, pre-specified algorithm implemented in the TONI system. Detailed information on the study procedure, recruitment, and randomization is available in the study protocol and main outcome publication (Schaeuffele et al., 2022, 2024).

Participants

Psychotherapists irrespective of their therapeutic approach participating in routine psychotherapy in Germany with internet access in their practice were eligible to take part in the study. Psychotherapists invited their patients to the study if they met the following criteria: (a) 18 years or older, (b) access to the internet, (c) sufficient language skills of German, (d) ability to read and write. There were no exclusion criteria regarding diagnosis or symptom severity. Patients needed to be enrolled at the very beginning of the treatment.

Interventions

Routine Psychotherapy (PT).

All patients received routine outpatient psychotherapy. Psychotherapists providing the treatment were either psychologists or medical doctors licensed as psychotherapists after completing postgraduate psychotherapy training in cognitive-behavioral therapy (CBT), psychodynamic therapy (including psychoanalysis), systemic therapy, or a combination. Therapists delivered routine psychotherapy according to standard clinical practice in Germany, with no restrictions regarding treatment length, session frequency, or therapeutic procedures. Additional mental health treatment and services outside of the study (e.g., medication, inpatient care, other outpatient consultations) were not restricted, due to the pragmatic design of the study.

Blended Care (BC).

Participants in the BC condition received routine outpatient psychotherapy, as described above, augmented by the IBI TONI (therapeutic online intervention). TONI was developed as an adjunctive digital tool to f2f-psychotherapy in a participatory development process involving therapists of different approaches and patients (Behr et al., 2024). TONI consists of twelve transdiagnostic modules covering relevant therapeutic topics and psychological processes common to various mental disorders. The twelve modules included:

Table 1

Modules In TONI

Module	Content
Development	Biopsychosocial model, biographical history, intergenerational aspects of mental health.
Values & Goals	Motivation for change, identification of personal values, setting therapeutic goals.
Mindfulness	Mindfulness principles, guided exercises, internal and external mindfulness practice.
Getting active	Activity-mood relationship, planning enjoyable activities, implementing activity changes.
Thoughts	Thought-emotion connections, recognizing and modifying dysfunctional thoughts, mentalization.

Understanding feelings	Emotional awareness, emotional schemas, and biographical shaping of emotions.
Dealing with feelings	Emotion tolerance skills, recognizing defense mechanisms, adaptive emotional responding.
Self-worth & strengths	Concepts of self-worth, kindness and self-compassion, identifying personal resources.
Communication	Effective communication, relationship reflection, non-violent communication strategies.
Body & well-being	Body-mind relationship, sleep, movement, pain, stress, sexuality, body image, and eating behaviors.
Addictive substances & behaviors	Understanding addiction, weighing pros and cons, managing cravings, and relapse prevention.
Collaboration (<i>for significant others</i>)	Mental well-being of significant others, basics of psychotherapy, joint exercises for patients and significant others.

Each module is structured into two to seven independent chapters, allowing psychotherapists to flexibly choose relevant chapters and individualize content according to patient needs. Patients have an overview of available contents and can request modules from their psychotherapist. In addition to the modules, TONI includes a diary, a tracker that allows patients to track their distress, mood, activity, sleep, craving, or individual problems. Therapists are able to view their patients' digital activities (e.g., diary entries, module exercises) and can enable messaging functions for direct patient communication via the TONI platform. Due to the naturalistic trial design, no fixed guidelines or requirements regarding frequency, intensity, or specific integration methods of TONI were imposed.

Measures

Figure 1 provides an overview of the assessment schedule, measured variables, and treatment conditions in the study.

Outcome Variables

The primary outcome variables, self-reported anxiety and depression, were evaluated using the GAD-7 and PHQ-8 instruments at three time points: 6 weeks, 12 weeks, and 6 months post-randomization. The Patient Health Questionnaire-8 (PHQ-8) is an eight-item measure

designed to assess depressive symptoms (Gräfe et al., 2004; Kroenke et al., 2001; Kroenke et al., 2009). It excludes the suicidality symptom item present in the PHQ-9. Participants rate their emotional state over the previous two weeks on a 4-point Likert scale (0 = "not at all" to 3 = "nearly every day"), with total scores ranging from 0 to 24, where higher scores indicate more severe depression. The PHQ-8 has demonstrated high internal consistency ($\alpha = .88$) and is validated for use in both clinical and non-clinical populations (Wu et al., 2020). The Generalized Anxiety Disorder Screener (GAD-7) is a seven-item measure used to screen for generalized anxiety disorder (Löwe et al., 2008; Spitzer et al., 2006). Participants rate their anxiety symptoms over the past two weeks using a 4-point Likert scale (0 = "not at all" to 3 = "nearly every day"). The GAD-7 is a unidimensional tool with high internal reliability ($\alpha = .89$) and is effective in identifying elevated anxiety symptoms across various anxiety disorders. For the statistical analysis, we calculated a composite "mental distress" score by summing individual PHQ-8 and GAD-7 scores, following the validated approach of the PHQ Anxiety and Depression Scale (Kroenke et al., 2016).

We further assessed satisfaction with life with the 5-item Satisfaction with Life Scale (Diener et al., 1985; Glaesmer et al., 2011). The scale comprises five statements that participants rate on a seven-point Likert scale, ranging from 1 "strongly disagree" to 7 "strongly agree". The total score ranges from 5 to 35, with higher scores indicating greater life satisfaction. The SWLS has demonstrated high internal reliability ($\alpha = .92$) (Glaesmer et al., 2011).

Mechanism variables

Self-efficacy was measured using two scales: the 3-item General Self-Efficacy Short Scale (Beierlein et al., 2013) and the 6-item Mental Health Self-Efficacy Scale (Clarke et al., 2014). The ASKU assesses patients' general beliefs in their ability to cope with challenging situations and accomplish tasks effectively. Participants rate the items on a five-point Likert

scale (from 1 “not at all” to 5 “fully applicable”), with higher scores indicating greater self-efficacy. The ASKU has demonstrated good internal reliability (McDonald ω between .81 and .86) (Beierlein et al., 2013). The MHSES is designed to evaluate individuals' beliefs in their ability to cope with and manage mental health challenges. It comprises six items, that participants rate on a 10-point Likert scale with higher values reflecting higher mental health self-efficacy related to mental health. The MHSES has demonstrated high internal reliability ($\alpha = .84$) (Clarke et al., 2014).

Patients rated their therapeutic agency using the 15-item Therapeutic Agency Inventory (Julia Huber et al., 2019), which assesses their perceived active involvement in the therapeutic process. Patients rate their level of agency in 15 questions on a 5-point Likert scale (0 = “not true” to 4 = “exactly right”), with higher values indicating higher agency. The TAI has demonstrated good internal reliability ($\alpha = .84$).

Patients rated the therapeutic alliance using the 12-item Working Alliance Inventory-Short Revised (Munder et al., 2010; Sturgiss et al., 2018). The WAI-SR measures the quality of the therapeutic relationship, including the collaborative bond, agreement on therapy goals, and mutual trust. Patients rate their agreement with statements about the current therapeutic relationship on a 5-point Likert scale with higher scores indicating a stronger therapeutic alliance. The WAI-SR has good internal reliability ($\alpha > .80$).

Statistical Analysis

Random-intercept cross-lagged panel models (RI-CLPM) were applied to examine the temporal associations between mechanisms and outcome variables. This approach was chosen because it allows for the estimation of directional effects over time, while separating stable between-person differences from within-person fluctuations. By including a random intercept, the RI-CLPM accounts for trait-like differences that are stable over time, ensuring that the

cross-lagged paths reflect within-person changes rather than static individual characteristics. A graphical depiction of the RI-CLPM structure applied is presented in Figure 2.

Figure 1. Overview Of Assessments And Treatments Over Time

	T0 baseline	T1 6 weeks	T2 12 weeks	T3 6 months
Mechanisms	ASKU MHSE	TAI WAI-SR ASKU MHSE	TAI WAI-SR ASKU MHSE	TAI WAI-SR ASKU MHSE
Outcomes	PHQ-8 GAD-7 SWLS	PHQ-8 GAD-7 SWLS	PHQ-8 GAD-7 SWLS	PHQ-8 GAD-7 SWLS
PT	f2f-therapy in routine outpatient care			
BC	f2f-therapy in routine outpatient care + the IBI "TONI"			

Note. MD = Mental Distress; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

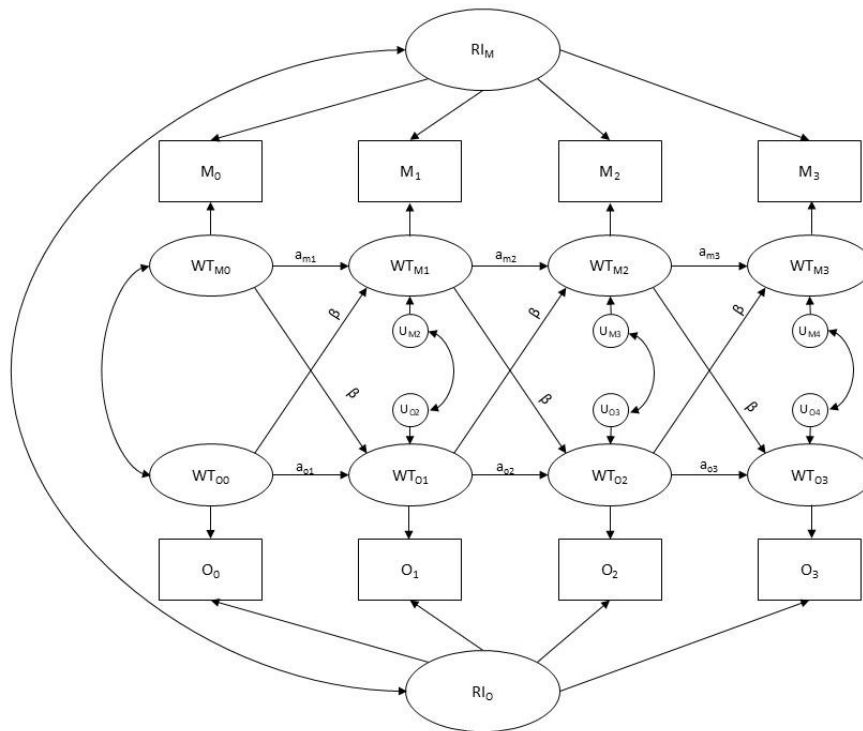
Model Specifications

To examine the temporal dynamics between therapeutic mechanisms and outcomes, RI-CLPM were estimated separately for each treatment condition. The models included autoregressive paths to account for the temporal stability of each construct and cross-lagged paths to test directional effects between mechanisms and outcomes. Random intercepts were included to capture stable between-person differences, and their covariances were estimated to assess trait-level associations. As preregistered, we intended to conduct an additional RI-CLPM including all four mechanisms. However, the combined model did not converge, and estimating all cross-lagged paths would have resulted in a model that was overly complex, difficult to interpret, and beyond the scope of this paper. This is why we did not proceed with the combined RI-CLPM including all four mechanisms.

All models were estimated using the lavaan package in R 4.3.2 (R Core Team, 2023) with robust maximum likelihood estimation (MLR). Little's MCAR test was conducted for all included variables across T1 to T3. The result, $\chi^2(12) = 11,0$, $p = .895$, indicated that the data were consistent with a Missing Completely At Random (MCAR) pattern. Consequently, full information maximum likelihood (FIML) estimation was applied to handle missing data. Model fit was evaluated using standard fit indices, including the Chi-square Test (χ^2), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). A good model fit is indicated by $\chi^2/df < 2$, $RMSEA < .05$, $SRMR < .05$ and $CFI > .97$ and an acceptable model fit by $\chi^2/df < 3$, $RMSEA < .08$, $SRMR < .10$ and $CFI > .95$ (Schermelleh-Engel et al., 2003). In a second step, we used multigroup models to examine differences between the intervention groups, testing whether the effects differed across groups receiving different types of interventions. An unconstrained model (allowing regression paths to differ between groups) was compared to a constrained model (forcing regression paths to be equal) using a scaled Chi-square difference test because of the robust estimator (Satorra & Bentler, 2001). This comparison allowed us to test whether the relationships between mechanisms and outcomes are statistically equivalent across BC and PT, or whether they differ depending on the treatment format.

According to simulation results reported by Mulder (2023), the power of RI-CLPMs depends strongly on sample size, number of waves, and the proportion of within-person variance. In models with unconstrained coefficients across time points, which are comparable to the present study, sample sizes of around 1000 or more are generally sufficient to detect small-to-medium cross-lagged effects (approximately .10–.15), whereas substantially larger samples are required for very small effects. Thus, with our total sample of $N = 1.159$ patients, we are sufficiently powered to detect small to medium effects.

Figure 2. Four-Wave Random Intercept Cross-Lagged Panel Model (RI-CLPM) With One Mechanism And Outcome Variable



Note. Observed variables (M_0 – M_3 , O_0 – O_4 ; boxes) represent repeated measures of the variables across four time points, with M referring to the mechanism and O to outcome. Latent trait factors (RI_M and RI_O , large ovals) model time-invariant, between-person differences. Within-person latent state variables (WT_{M0} – WT_{M3} , WT_{O0} – WT_{O3} ; medium ovals) reflect time-specific, person-centered deviations from individual means. Residual variances (U; small circles) represent within-person, time-specific unexplained variance. Autoregressive (a) and cross-lagged (β) paths are estimated among within-person components. Agency and Therapeutic Alliance were assessed only at time points 1 through 3, as it is not possible to measure them at baseline.

Data Availability

All resources for this project, including the data and R code to follow the analyses, have been made publicly available on the OSF and can be accessed at https://osf.io/hfmze/?view_only=fb4e1d69518648f4b7697fca493da3ce (note: this is a view only link and will be replaced by a stable link upon acceptance of this manuscript).

Results

Participants were predominantly women in their mid-thirties, most of whom were in a relationship, well-educated, and employed (for a detailed overview of demographic characteristics, see the supplementary material). The primary mental health diagnoses were affective

disorders (53%), anxiety disorders (23%), and adjustment disorders (16%), with approximately half of the sample (55%) reporting at least one comorbid diagnosis. Educational levels differed significantly between groups. Participants in the BC group were more often found at both ends of the educational spectrum, having either nine years of education or a college entrance qualification, whereas secondary school and vocational qualifications were more common in the face-to-face group. Descriptive statistics for all study variables are presented in Table 2. Visualizations of variable distributions are shown in Appendix Figures A1–A4. Bivariate correlations across timepoints and between trait components are reported in Appendix Tables A3 and A4.

Table 1

Descriptive Statistics Of Mental Distress, Satisfaction With Life, Self-Efficacy, Mental Health Self-Efficacy, Agency, And Therapeutic Alliance

Variable	<i>tp</i>	<i>BC</i>					<i>PT</i>				
		<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Mental Distress	0	582	23.46	9.12	0	45	576	23.61	8.95	3	45
	1	484	19.62	8.84	0	45	481	19.52	8.56	0	45
	2	430	18.16	8.85	0	44	439	17.90	8.50	0	43
	3	384	16.49	8.45	0	44	390	16.15	8.67	0	45
Satisfaction with Life	0	582	18.70	5.63	5	34	576	18.90	5.85	5	35
	1	482	18.67	5.74	5	35	478	18.62	5.94	5	34
	2	426	20.12	6.08	5	34	434	20.35	6.44	5	35
	3	384	20.06	6.05	5	35	390	20.61	6.23	5	35
Self-efficacy	0	582	10.12	2.41	3	15	576	10.11	2.34	3	15
	1	480	10.29	2.26	3	15	473	10.33	2.36	3	15
	2	424	10.30	2.35	3	15	434	10.41	2.34	3	15
	3	372	10.88	2.30	3	15	383	10.74	2.34	3	15
Mental Health Self-efficacy	0	582	34.61	13.93	0	60	576	33.63	13.96	0	60
	1	479	36.97	14.14	0	60	473	36.37	14.16	0	60
	2	423	38.49	14.12	0	60	434	38.49	14.23	0	60
	3	374	41.49	14.01	0	60	383	40.40	14.32	0	60
Therapeutic Alliance	1	478	46.37	7.88	18	60	470	45.59	8.57	12	60
	2	421	47.34	7.99	12	60	433	46.84	8.53	12	60
	3	371	47.40	8.35	12	60	381	46.64	9.18	12	60
Agency	1	478	48.83	4.43	28	59	471	48.88	4.24	28	59
	2	422	49.36	4.53	29	60	433	49.55	4.28	29	61
	3	371	49.66	4.36	29	61	381	49.51	4.17	29	60

Note. *tp* = time point; *n* = sample size; *M* = mean; *SD* = standard deviation; *Min* = minimum; *Max* = maximum.

Random-intercept cross-lagged panel models

Table 3 provides an overview of model fit indices, indicating acceptable to excellent fit across all models. A detailed summary of unstandardized coefficients, standardized coefficients, standard errors, significance values, and confidence intervals can be found in Tables 4 to 7. Autoregressive effects can be found in the appendix Tables A5 to A8. Since the stable between-person differences are captured in the random intercepts, autoregressive effects show no clear pattern and are non-significant for most variables. In the following paragraphs we focus on the between level association and the standardized cross-lagged effects as these are central for addressing our research questions.

Table 2

Scaled Model Fit Indices

Model	χ^2	<i>df</i>	<i>p</i> (χ^2)	CFI	RMSEA	SRMR
MD & ASK	25.09	18	0.122	0.998	0.026	0.023
MD & MHSE	18.03	18	0.045	1.000	0.002	0.019
MD & WAI-SR	15.30	12	0.225	0.999	0.022	0.018
MD & TAI	14.61	12	0.263	0.999	0.019	0.016
SWLS & ASK	30.03	18	0.037	0.997	0.034	0.021
SWLS & MHSE	26.26	18	0.094	0.998	0.028	0.028
SWLS & WAI-SR	47.37	12	0.000	0.987	0.071	0.028
SWLS & TAI	15.10	12	0.236	0.999	0.017	0.016

Note. *df* = degrees of freedom; CFI = Comparative Fit Index; Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; MD = Mental Distress; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

Mental Distress

Across groups, individuals who consistently reported higher self-efficacy, mental health self-efficacy, and therapeutic alliance tended to report lower mental distress, as shown by significant negative correlations of the random intercepts (self-efficacy: BC $r = -0.658$, $p < .001$; PT $r = -0.573$, $p < .001$; mental health self-efficacy: BC $r = -0.722$, $p < .001$; PT $r = -0.729$, $p < .001$; therapeutic alliance: BC $r = -0.199$, $p = .008$; PT $r = -0.252$, $p = .001$). In other words, individuals who feel more capable, confident in managing their mental health symptoms, and

more connected to their therapist, also tended to report lower distress and those who felt less mentally distressed also tended to feel more self-efficacious and connected to their therapist. For agency, no stable association with mental distress was found in the BC group ($r = 0.004$, $p = .955$). In contrast, the PT group showed a significant negative between-person association ($r = -0.182$, $p = .018$), indicating that participants with higher trait-like agency reported lower average mental distress.

The time-specific deviations in the mechanisms could predict the distress at the following time point in several cases. Higher self-efficacy at a previous time point predicted higher mental distress in the BC group at baseline to T1 ($\beta = 0.217$, $p = .003$) and showed a trend from T2 to T3 ($\beta = 0.132$, $p = .096$). In the PT group, higher self-efficacy at T2 predicted lower mental distress at T3 ($\beta = -0.219$, $p = .025$). For mental health self-efficacy, higher values at a previous time point tended to predict lower mental distress across time points in both groups (BC: baseline to T1 $\beta = -0.116$, $p = .097$; T1 to T2 $\beta = -0.175$, $p = .066$; PT: T1 to T2 $\beta = -0.160$, $p = .059$; T2 to T3 $\beta = -0.199$, $p = .099$).

Higher working alliance predicted lower mental distress only from T2 to T3 in the BC group ($\beta = -0.213$, $p = .030$) and showed a trend from T1 to T2 in the PT group ($\beta = 0.162$, $p = .098$). In the BC group, individuals who reported higher agency at T1 tended to experienced lower mental distress at T2 ($\beta = -0.308$, $p = .065$). This effect was not found for the PT group.

The time-specific deviations in mental distress could predict the mechanism at the following time point in several cases. Higher mental distress at a previous time point predicted lower self-efficacy in both groups (BC: baseline to T1 $\beta = -0.149$, $p = .089$; T2 to T3 $\beta = -0.329$, $p = .001$; PT: T1 to T2 $\beta = -0.169$, $p = .035$; T2 to T3 $\beta = -0.222$, $p = .017$) and lower mental health self-efficacy (BC: baseline to T1 $\beta = -0.205$, $p = .011$; T1 to T2 $\beta = -0.278$, $p =$

.004; T2 to T3 $\beta = -0.293$, $p = .019$; PT: T2 to T3 $\beta = -0.197$, $p = .038$). No bidirectional effects were found for working alliance or agency.

Group comparisons revealed significant differences for self-efficacy and mental distress ($\Delta\chi^2 = 24.58$, $p = .017$), but not for mental health self-efficacy ($\Delta\chi^2 = 12.86$, $p = .379$), working alliance ($\Delta\chi^2 = 7.68$, $p = .566$), or agency ($\Delta\chi^2 = 6.74$, $p = .664$). This means that the temporal association between self-efficacy and mental distress differed depending on whether therapy is delivered in a blended or f2f-format, whereas for mental health self-efficacy, therapeutic alliance, and agency, no significant differences were observed across groups.

Table 3

Cross-Lagged Effect For Mental Distress And Mechanism Variables In BC

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK _{t-1} -> MD _t	0-1	0.217	0.854	0.286	.003	0.292	1.415
	1-2	-0.114	-0.572	0.407	.160	-1.370	0.226
	2-3	0.132	0.561	0.337	.096	-0.099	1.220
MD _{t-1} -> ASK _t	0-1	-0.149	-0.28	0.017	.089	-0.061	0.004
	1-2	0.077	0.018	0.022	.430	-0.026	0.061
	2-3	-0.329	-0.072	0.021	.001	-0.113	-0.030
MHSE _{t-1} -> MD _t	0-1	-0.116	-0.070	0.042	.097	-0.152	0.013
	1-2	-0.175	-0.109	0.059	.066	-0.226	0.007
	2-3	-0.065	-0.037	0.066	.576	-0.167	0.093
MD _{t-1} -> MHSE _t	0-1	-0.205	-0.303	0.118	.011	-0.535	-0.071
	1-2	-0.278	-0.461	0.162	.004	-0.778	-0.144
	2-3	-0.293	-0.493	0.210	.019	-0.905	-0.082
WAI _{t-1} -> MD _t	1-2	-0.115	-0.140	0.115	.223	-0.364	0.085
	2-3	-0.213	-0.235	0.108	.030	-0.448	-0.023
MD _{t-1} -> WAI _t	1-2	-0.146	-0.125	0.081	.123	-0.284	0.034
	2-3	-0.119	-0.112	0.095	.238	-0.297	0.074
TAI _{t-1} -> MD _t	1-2	-0.151	-0.308	0.167	.065	-0.636	0.020
	2-3	-0.062	-0.117	0.179	.515	-0.468	0.234
MD _{t-1} -> TAI _t	1-2	-0.015	0.008	0.050	.878	-0.106	0.091
	2-3	-0.156	-0.071	0.059	.225	-0.186	0.044

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; MD = Mental Distress; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

Table 5*Cross-Lagged Effect For Mental Distress And Mechanism Variables In PT*

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK _{t-1} -> MD _t	0-1	0.025	0.094	0.296	.750	-0.485	0.674
	1-2	-0.094	-0.348	0.272	.200	-0.880	0.184
	2-3	-0.219	-0.894	0.398	.025	-1.674	-0.113
MD _{t-1} -> ASK _t	0-1	0.023	0.006	0.022	.802	-0.038	0.049
	1-2	-0.169	-0.045	0.021	.035	-0.087	-0.003
	2-3	-0.222	-0.058	0.024	.017	-0.105	-0.010
MHSE _{t-1} -> MD _t	0-1	0.058	0.033	0.060	.579	-0.085	0.151
	1-2	-0.160	-0.090	0.047	.059	-0.182	0.003
	2-3	-0.199	-0.118	0.071	.099	-0.258	0.022
MD _{t-1} -> MHSE _t	0-1	-0.028	-0.044	0.137	.749	-0.313	0.225
	1-2	-0.085	-0.151	0.138	.274	-0.422	0.119
	2-3	-0.197	-0.381	0.183	.038	-0.740	-0.022
WAI _{t-1} -> MD _t	1-2	-0.162	-0.168	0.101	.098	-0.366	0.031
	2-3	-0.103	-0.110	0.105	.296	-0.317	0.096
MD _{t-1} -> WAI _t	1-2	-0.020	-0.020	0.111	.854	-0.238	0.197
	2-3	-0.082	-0.098	0.119	.411	-0.332	0.136
TAI _{t-1} -> MD _t	1-2	-0.092	-0.162	0.159	.307	-0.474	0.149
	2-3	0.025	0.047	0.152	.759	-0.251	0.344
MD _{t-1} -> TAI _t	1-2	0.045	0.026	0.054	.627	-0.079	0.132
	2-3	-0.115	-0.066	0.060	.277	-0.184	0.053

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; MD = Mental Distress; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

Satisfaction with Life

Individuals who consistently reported higher self-efficacy, mental health self-efficacy, therapeutic alliance, and agency across all time points also reported higher life satisfaction (self-efficacy: BC $r = 0.605$, $p < .001$; PT $r = 0.595$, $p < .001$; mental health self-efficacy: BC $r = 0.638$, $p < .001$; PT $r = 0.659$, $p < .001$; therapeutic alliance: BC $r = 0.230$, $p = .001$; PT $r = 0.344$, $p < .001$; agency: BC $r = 0.240$, $p = .001$; PT $r = 0.191$, $p = .010$). In other words, individuals who feel more capable, confident in managing their mental health symptoms, and more connected and active in their therapy, also report greater satisfaction with their lives and

those who felt more satisfied with their life also tend to feel more self-efficacious, connected and active in their therapy.

The time-specific deviations in the mechanisms could predict life satisfaction at the following time point in several cases. Higher self-efficacy predicted higher life satisfaction only at T1 to T2 in the BC group ($\beta = 0.163$, $p = .054$), but not in the PT group. Higher mental health self-efficacy at T1 and T2 predicted higher life satisfaction at T2 and T3 in both groups (BC: T1 to T2 $\beta = 0.216$, $p = .007$; T2 to T3 $\beta = 0.256$, $p = .015$; PT: T1 to T2 $\beta = 0.227$, $p = .013$; T2 to T3 $\beta = 0.341$, $p = .002$). Higher therapeutic alliance predicted higher life satisfaction at the next time point in the BC group (T1 to T2 $\beta = 0.175$, $p = .059$; T2 to T3 $\beta = 0.213$, $p = .054$), but no such effects were found in the PT group. For agency, higher values at T1 predicted higher life satisfaction at T2 in the BC group ($\beta = 0.207$, $p = .039$) as well as in the PT group ($\beta = 0.282$, $p = .027$).

The time-specific deviations in life satisfaction also predicted several mechanisms at the next time point. Higher satisfaction with life predicted higher self-efficacy (BC: T1 to T2 $\beta = 0.219$, $p = .008$; T2 to T3 $\beta = 0.294$, $p = .004$; PT: T1 to T2 $\beta = 0.222$, $p = .008$; T2 to T3 $\beta = 0.294$, $p = .007$) and higher mental health self-efficacy (BC: T1 to T2 $\beta = 0.227$, $p = .012$; T2 to T3 $\beta = 0.287$, $p = .007$; PT: T1 to T2 $\beta = 0.195$, $p = .013$). Higher satisfaction with life also predicted higher therapeutic alliance in the BC group (T1 to T2 $\beta = 0.171$, $p = .053$), but not in the PT group. Only in the PT group, higher life satisfaction at T1 showed a trend-level association with increased agency at T2 ($\beta = 0.161$, $p = .066$), and higher life satisfaction at T2 significantly predicted greater agency at T3 ($\beta = 0.190$, $p = .024$).

This means that when individuals felt more capable, confident in managing their mental health, or more connected to their therapist than usual, they tended to feel more satisfied with their lives at the next time point. This pattern was more consistent in the BC group, while in the

PT group, only mental health self-efficacy showed this effect. Interestingly, the pattern for agency was different: individuals in the BC group who felt more active in their therapy than usual at one time point tended to be less satisfied with their life at the next, whereas in the PT group, individuals who felt more satisfied with their lives tended to report higher agency at the next time point.

Group differences were not significant for any mechanisms in relation to life satisfaction (self-efficacy: $\Delta\chi^2 = 4.11$, $p = .981$; mental health self-efficacy: $\Delta\chi^2 = 5.68$, $p = .932$; therapeutic alliance: $\Delta\chi^2 = 8.61$, $p = .474$; agency: $\Delta\chi^2 = 5.90$, $p = .710$).

Table 6

Cross-Lagged Effect For Satisfaction With Life And Mechanism Variables In BC

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK _{t-1} -> SWLS _t	0-1	0.130	0.274	0.178	.125	-0.076	0.623
	1-2	0.163	0.476	0.247	.054	-0.008	0.960
	2-3	0.106	0.273	0.236	.248	-0.190	0.735
SWLS _{t-1} -> ASK _t	0-1	-0.021	-0.009	0.048	.853	-0.103	0.085
	1-2	0.219	0.101	0.038	.008	0.027	0.175
	2-3	0.294	0.111	0.039	.004	0.036	0.187
MHSE _{t-1} -> SWLS _t	0-1	0.115	0.037	0.033	.263	-0.028	0.103
	1-2	0.216	0.082	0.030	.007	0.022	0.142
	2-3	0.256	0.101	0.042	.015	0.019	0.182
SWLS _{t-1} -> MHSE _t	0-1	-0.035	-0.111	0.328	.735	-0.755	0.532
	1-2	0.227	0.689	0.276	.012	0.148	1.230
	2-3	0.287	0.796	0.297	.007	0.214	1.378
WAI _{t-1} -> SWLS _t	1-2	0.175	0.126	0.066	.059	-0.005	0.256
	2-3	0.213	0.152	0.079	.054	-0.003	0.307
SWLS _{t-1} -> WAI _t	1-2	0.171	0.289	0.150	.053	-0.004	0.582
	2-3	0.012	0.018	0.166	.915	-0.307	0.342
TAI _{t-1} -> SWLS _t	1-2	0.158	0.207	0.100	.039	0.011	0.403
	2-3	-0.041	-0.053	0.111	.630	-0.271	0.164
SWLS _{t-1} -> TAI _t	1-2	-0.015	-0.014	0.090	.880	-0.191	0.164
	2-3	-0.046	-0.033	0.092	.724	-0.214	0.149

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; SWLS: Satisfaction with Life Scale; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory

Table 7*Cross-Lagged Effect For Satisfaction With Life And Mechanism Variables In PT*

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK _{t-1} -> SWLS _t	0-1	-0.050	-0.102	0.195	.603	-0.485	0.281
	1-2	0.059	0.151	0.240	.529	-0.320	0.622
	2-3	0.225	0.580	0.357	.104	-0.119	1.279
SWLS _{t-1} -> ASK _t	0-1	-0.187	-0.088	0.065	.176	-0.216	0.040
	1-2	0.222	0.105	0.040	.008	0.027	0.183
	2-3	0.294	0.113	0.042	.007	0.031	0.195
MHSE _{t-1} -> SWLS _t	0-1	-0.032	-0.010	0.048	.836	-0.104	0.084
	1-2	0.227	0.084	0.034	.013	0.017	0.150
	2-3	0.341	0.134	0.043	.002	0.048	0.219
SWLS _{t-1} -> MHSE _t	0-1	-0.202	-0.655	0.431	.129	-1.500	0.190
	1-2	0.195	0.642	0.259	.013	0.135	1.150
	2-3	0.104	0.310	0.315	.325	-0.307	0.927
WAI _{t-1} -> SWLS _t	1-2	0.047	0.038	0.089	.665	-0.135	0.212
	2-3	-0.101	-0.079	0.149	.594	-0.371	0.212
SWLS _{t-1} -> WAI _t	1-2	-0.023	-0.035	0.233	.882	-0.492	0.423
	2-3	0.101	0.165	0.148	.265	-0.125	0.455
TAI _{t-1} -> SWLS _t	1-2	0.231	0.282	0.128	.027	0.032	0.532
	2-3	-0.009	-0.011	0.121	.930	-0.248	0.227
SWLS _{t-1} -> TAI _t	1-2	0.156	0.161	0.087	.066	-0.011	0.332
	2-3	0.232	0.190	0.084	.024	0.025	0.355

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; SWLS: Satisfaction with Life Scale; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory

Discussion

The integration of digital tools into psychotherapy has transformed not only how treatment is delivered but may also transform how we can understand therapeutic change. This study contributes to this understanding by being the first to provide a comprehensive longitudinal investigation of multiple proposed mechanisms of change - self-efficacy, mental health self-efficacy, therapeutic alliance, and therapeutic agency - across both BC and traditional f2f-psychotherapy. By using random-intercept cross-lagged panel models, our study captures both stable between-person differences and within-person processes over time.

Summary of findings

Stable between-person effects

Our findings provide empirical support for core assumptions in psychotherapy research. Consistent with the common factors model, on a stable between-person level both self-efficacy constructs and therapeutic alliance were associated with better outcomes – namely, lower psychological distress and higher satisfaction with life. These stable between-person associations align with prior evidence that patients who perceive themselves as more capable (Bandura, 1997; Behr et al., 2025a) or who report stronger bonds with their therapist (Flückiger et al., 2018; Horvath et al., 2011) generally fare better across various forms of psychotherapy. Our findings extend this evidence by demonstrating that these associations also hold in routine care settings using BC. In contrast to the findings of Kooistra and colleagues (2020), who reported in their study that stronger patient-rated alliance was associated with reduced depression symptoms in the f2f group, but not in the BC group, we also found this association in the BC group. One possible reason for this discrepancy lies in the aims and design of the interventions: Kooistra and colleagues (2020) aimed to maintain therapeutic effectiveness while reducing the number of f2f sessions, which may have weakened the alliance-outcome relationship. In contrast, our study did not reduce f2f sessions in the BC group, likely preserving the importance of therapeutic alliance as a mechanism of change. Our findings align with meta-analytical evidence showing that therapeutic alliance is strongly related to outcomes across therapy formats, including both traditional and IBI (Flückiger et al., 2018). Specifically in the context of BC, our results correspond with Askjer and Mathiasen (2021) and Vernmark and colleagues (2019), who reported comparable alliance levels between BC and f2f therapies. In our study, the sense of therapeutic agency over all time points was negatively associated to mental distress only in the PT group and positively associated with life satisfaction in both groups. This suggests that therapeutic agency may be more closely related to positive outcomes, while its direct influence on

symptom reduction is less clear and may depend on other unexamined factors related to mental distress. However, this pattern stands in contrast to previous findings (Huber et al., 2021; Jennissen et al., 2022) and should be replicated before drawing conclusions on group differences.

Time-varying within-person effects

We found some evidence for therapeutic alliance as a change mechanism, where stronger-than-usual alliance predicted better outcomes. However, this effect was not found consistently for all time points. A bidirectional effect was only found for satisfaction with life for one path, with higher life satisfaction predicting subsequently stronger alliance in the BC group. This is consistent with findings from Flückiger and colleagues (2020), who showed reciprocal session-by-session effects between therapeutic alliance and symptom change in a large individual participant data meta-analysis. While their analysis showed robust bidirectional effects across early sessions, our use of RI-CLPM extends this approach by simultaneously capturing stable individual differences and reciprocal temporal dynamics in a routine care BC setting. Unlike the consistent reciprocal pattern identified by Flückiger et al. (2020), our findings were limited to specific time points and outcomes. One possible explanation for our less consistent reciprocal findings compared to previous studies (Flückiger et al., 2020; Xu & Tracey, 2015) is the longer intervals between assessments in our study. Shorter, session-by-session intervals, as used in prior studies, may capture more immediate reciprocal effects, whereas longer intervals might dilute these effects, making them harder to detect consistently over time. Another reason why our reciprocal findings were less consistent compared to previous studies could be our use of RI-CLPM, which explicitly controls for stable between-person differences. Previous studies using models without such controls might have conflated stable individual traits with temporal changes, thereby potentially overstating reciprocal effects. By statistically separating these stable traits, our analysis provides a more precise test of within-person effects.

Temporal within-person effects largely pointed to the role of mental health self-efficacy as a mechanism of change. Increases in mental health self-efficacy predicted subsequent reductions in mental distress and increases in satisfaction with life, supporting its role as a mechanism of therapeutic change (Domhardt et al., 2021; Steubl et al., 2021). Mental health self-efficacy was also influenced by mental distress and satisfaction with life at the previous timepoints. This bidirectional pattern suggests a dynamic interplay in which mental health self-efficacy both drives and is shaped by changes in psychological well-being. The temporal effects for general self-efficacy were less consistent. Some paths indicated that increases in general self-efficacy led to improvements in well-being and vice versa. However, these effects appeared inconsistent across time points and groups. Interestingly, in the BC group, within-person increases in general self-efficacy unexpectedly predicted increased mental distress at the subsequent time point. This pattern may reflect that individuals with higher self-efficacy engaged more intensively in therapeutic tasks, thereby possibly increasing emotional exposure and triggering higher distress. In contrast to standard f2f-therapy, where therapists can gradually guide such exposure, the BC format allows patients greater autonomy to engage with therapeutic content in the IBI at their own pace. However, this remains a hypothetical interpretation, as our data does not include information on the intensity of intervention usage between measurements. It is also important to note, that the trait-like general self-efficacy is associated with less mental distress. Therefore, this effect might be triggered by an initial overestimation of one's own self-efficacy. Also, the surprising within effect was only found for one path. Results have to be replicated before any conclusions can be drawn.

Agency showed limited temporal associations with mental distress. While no consistent effects were observed, the BC group showed a trend suggesting that individuals who felt more agentic at one time point may have experienced reduced distress at the next. In contrast, agency was more clearly linked to satisfaction with life. In both groups, higher agency predicted greater

life satisfaction over time. Moreover, in the PT group, higher life satisfaction also predicted increases in agency, suggesting a reciprocal relationship between the two constructs in this group. These findings partially contrast with previous research. Huber et al. (2021) and Jennissen et al. (2022) identified agency as a mechanism predicting symptom change in psychodynamic outpatient psychotherapy. In particular, Huber et al. (2021) found that session-by-session increases in agency were followed by reductions in distress, which suggests a temporal role. Similarly, Jennissen et al. (2022) reported that discrepancies in patient and therapist perceptions of agency and alliance were linked to symptom trajectories. In our study, however, this effect was not as clear. This discrepancy may reflect differences in the therapeutic context, as our study included multiple therapeutic orientations and formats, including BC. Moreover, the longer intervals between measurement points (multiple weeks rather than session-level) may have reduced sensitivity to capturing immediate within-person dynamics of agency and mental distress. Furthermore, given that agency is less well empirically studied, differences in context (e.g., therapy modality, diagnosis, session frequency) may account for the inconsistent results. The association with satisfaction with life could point to a broader function of agency, reflecting patients' perceived autonomy and active engagement in shaping meaningful aspects of their lives beyond symptom reduction. This may indicate that agency contributes more directly to positive functioning and well-being than to symptom reduction.

Methodological Considerations and Limitations

Despite the strengths of this study, including its large sample size, the routine care context, and the use of a longitudinal modeling approach that distinguishes between stable between-person differences and within-person temporal processes, several limitations must be noted. First, although measurement time points were standardized by weeks post-randomization, the actual number of therapy sessions each patient received between these points likely varied substantially. This variation, which was not systematically recorded, may have influenced both the

outcomes and the mechanisms of change. Some patients may have experienced no sessions within a measurement window, while others may have had intensive contact. Additionally, patients in the BC group were free to use the digital modules at their own discretion, and thus engagement with the IBI also varied across time points. Therefore, the temporal changes captured in the model may reflect different stages of therapeutic engagement and varying amounts of digital therapeutic input, rather than standardized therapeutic exposure. This variability highlights a broader challenge of conducting process research in routine care, where treatment intensity and content are not controlled. Second, we did not estimate a model including all mechanisms simultaneously. This limits our ability to examine how different mechanisms might influence each other over time, for example, whether changes in one mechanism precede and predict changes in another. The generalizability of our findings is further limited by the characteristics of the sample, which consisted predominantly of well-educated, employed women in their mid-thirties, most of whom were in a relationship. While this reflects typical populations in outpatient psychotherapy, it may not represent individuals from more socioeconomically diverse or marginalized backgrounds. Factors such as education, employment, and relationship status can influence access to therapy (Niemeyer & Knaevelsrud, 2023), the access to digital interventions (Krukowski et al., 2024) and the perceptions of self-efficacy, agency or alliance (Meilstrup et al., 2020; Wolgast et al., 2022). Future research should aim to include more diverse populations to better understand whether the observed mechanisms function similarly across sociodemographic subgroups. As Mulder (2023) demonstrated, detecting very small within-person cross-lagged effects in RI-CLPMs requires larger samples than the one used here. The sample size in our study was relatively large in the context of psychotherapy research and BC research in particular. However, smaller effects may have remained undetected. Overall, we did not find substantial differences between BC and psychotherapy. Our findings suggest that they operate similarly. Much like in other therapeutic approaches, common factors may be

similarly activated regardless of the specific treatment format (Cuijpers et al., 2019). However, we also did not find any differences in effectiveness (Schaeuffele, 2024). Usage of the BC platform varied between users and remained, overall, on a rather low level. It could be argued that the BC condition made little use of the digital components and was therefore too similar to the psychotherapy condition. Other, more controlled settings of BC, could still reveal relevant differences in mechanisms of change.

Implications for Clinical Practice

The findings from this study offer several practical implications for psychotherapy in both f2f-therapy and BC. The role of mental health self-efficacy suggests it could be considered a therapeutic target. Therapists might foster this construct explicitly through techniques that build perceived control over mental health, for example by encouraging patients to try out new skills, providing feedback, and supporting the management of difficult emotions (Clarke et al., 2014). The unexpected distress associated with higher than usual general self-efficacy in the BC group points to the importance of preparing patients for possible emotional challenges when they engage in autonomous therapeutic tasks in IBI. Therapists working in blended formats may benefit from closely monitoring early increases in distress and helping patients understand these as a normal part of the change process while also monitoring potential risks. The relationship between therapeutic alliance and outcomes, also in the BC format, underscores the continued importance of the therapeutic relationship, even when IBI are integrated into treatment. Finally, the absence of differential effects between BC and f2f-therapy suggests that the key therapeutic mechanisms examined may be activated in similar ways regardless of the format. This suggests that integrating digital components does not alter the fundamental processes underlying therapeutic change but rather provides an alternative way to engage with them.

Future Directions

Our study addresses the important question of the temporal dynamics between outcome and mechanism variables. Schleider and colleagues (2024) highlighted that identifying mechanisms of change in mental health interventions requires a deeper consideration of when change occurs. Many psychological interventions may only be effective if they align with moments of receptivity or motivation, yet many studies overlook the temporal context. By using RI-CLPM, our study tries to gain more insight into time-sensitive fluctuations, revealing, for example, that increases in general self-efficacy in the BC group predicted increases in distress, which may reflect deeper engagement with therapeutic content at times of increased receptivity. However, the design of our study, which involves four measurement time points over the course of six months, does not allow us to investigate finer temporal fluctuations. Additionally, our measurements were time-based rather than being triggered by specific therapy phases or symptom changes. Schleider (2024) further notes that dynamic, state-level variables like self-efficacy can shape both engagement and outcomes, particularly in digital or partially digital interventions. Future studies could build on this by designing adaptive interventions that tailor content to when the patients are most responsive or vulnerable to change (Schleider et al., 2024). Including more detailed information about session frequency and the specific use of digital modules would allow for a more precise analysis of how dosage and integration affect treatment outcomes and mechanisms of change. Additionally, future research could explore contextual factors such as diagnostic groups, or therapist characteristics to better understand for whom and under what conditions certain mechanisms are more or less effective. While our dataset includes diagnostic information, we did not analyze these contextual moderators in the present study. Incorporating such variables in future work may help clarify individual differences in treatment response and mechanism functioning. The bidirectional effects observed in our study suggest a non-linear, dynamic system of change, in line with the findings by Flückinger and colleagues (2015).

Future work might benefit from more intensive longitudinal designs (e.g., ecological momentary assessment and Just-In-Time Adaptive Interventions (JITAI)) to capture and react to finer-grained fluctuations. Finally, therapeutic agency remains a promising but still underexplored process variable in psychotherapy research. While initial findings from psychodynamic settings suggest its relevance for symptom change, the construct has not yet been systematically investigated across different therapeutic contexts, including blended or digital interventions. Future research is needed to better understand how agency develops and functions in these emerging formats, and how it may contribute to both symptom reduction and broader well-being.

Conclusion

In conclusion, this study contributes to a more nuanced understanding of how psychological mechanisms - in our study self-efficacy, mental health self-efficacy, therapeutic alliance, and therapeutic agency - relate to outcomes in both f2f and BC psychotherapy. By applying a longitudinal approach that distinguishes between stable individual differences and within-person changes over time, we were able to explore the dynamic interplay between the mechanisms and outcomes. Our results suggest that the mechanisms of change we investigated may not follow a simple, linear path. Instead, they seem to unfold within a dynamic system. We found few differences between the BC and f2f group in the strength or direction of mechanisms, except for general self-efficacy. This suggests that, while the overall processes of change may be similar across formats, the context of autonomous engagement in BC can alter how certain mechanisms play out over time. Further research is needed to replicate these findings, explore underlying processes and therapy context in more detail, and investigate how interventions might be adapted to better align with patients' individual trajectories and moments of change.

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4.6 Appendix for study 3

Appendix Table A1

Sociodemographic Characteristics Of Patients At Baseline

Demographic variable	BC (n = 583)		TAU (n = 576)		Total (n = 1159)		Statistical test of group difference		
	n	%	n	%	n	%	df	X ² _a	p
Gender									0.20 ^b
Female	400	68.61	417	72.40	817	70.49			
Male	172	29.50	155	26.91	327	28.21			
Non-binary	4	0.68	2	0.35	6	0.52			
Gender-fluid	4	0.68	0	0.00	4	0.35			
Other	1	0.17	0	0.00	1	0.09			
No answer	2	0.34	2	0.35	4	0.35			
Age									
Mean (SD)	35.82 (12.57)		37.43 (12.96)		36.62 (12.79)		1154	-2.15	0.03 ^{*c}
Range	18-89		18-83		18-89				
Relationship							1	2.38	0.12
Single	205	35.16	177	30.73	382	32.69			
In a relationship	378	64.84	399	69.27	777	67.04			
Highest education									<0.01 ^{**b}
No degree	2	0.34	2	0.35	4	0.35			1.00 ^b
Nine years of education	40	6.86	25	4.34	65	5.61			0.07 ^b
Secondary school certificate	79	13.55	107	18.58	186	16.05			0.02 ^{*b}
College entrance qualification	322	55.23	268	46.53	590	50.91			<0.01 ^{**b}
Vocational education	136	23.33	162	28.13	298	25.71			0.07 ^b
Other	4	0.67	12	2.08	16	1.38			0.05 ^{*b}
Employment status							5	7.61	0.18
Employed	333	57.12	350	60.76	683	58.93			
Self-employed	22	3.77	36	6.25	58	5.00			
Unemployed	51	8.75	38	6.60	89	7.68			
Pensioned	24	4.12	21	3.65	45	3.88			
In education	108	18.52	91	15.80	199	17.17			
Other	45	7.72	40	6.94	85	7.33			
Place of residence							2	1.44	0.49
Rural area	221	37.91	237	41.15	458	39.52			
Medium-sized city	235	40.31	225	39.06	460	39.69			
Large city	127	21.78	114	19.79	241	20.80			
Migration									
Foreign country of birth	43	7.38	31	5.38	74	6.38	1	1.61	0.20

At least one parent born in foreign country	130	22.30	102	17.71	232	20.02	1	3.53	0.06
Subjective socio-economic status ^d									
Mean (SD)	5.30	(1.87)	5.20	(1.84)	5.25	(1.85)	1157	0.89	0.37 ^c
Range	1-10		1-10		1-10				
Currently on medication	172	29.50	199	34.55	371	32.01	1	3.16	0.08
Physical health issues									
Yes (at least one) ^e	245	42.02	242	42.01	487	42.02	1	4.81	1.00
BMI ≥ 30	141	24.19	149	25.87	290	25.02	1	0.35	0.56
Cardiac disease	26	4.46	29	5.03	55	4.75	1	0.10	0.75
Asthma	74	12.69	45	7.81	119	10.27	1	6.97	0.01**
Cancer	9	1.54	13	2.25	22	1.90	1	0.45	0.50
Diabetes	9	1.54	13	2.25	22	1.90	1	0.45	0.50
Autoimmune disorder	49	8.40	61	10.59	110	9.49	1	1.37	0.24
Prior psychotherapy	268	45.97	287	49.83	555	47.89	1	1.58	0.21
Mean number of treatments (SD) ^f	1.76	(1.04)	1.87	(1.28)	1.81	(1.17)	533	-1.14	0.25 ^c
Treatment within the last five years	186	31.90	212	36.80	398	34.34	1	2.87	0.09
Distance to therapist									
Mean number of minutes (SD)	23.93		22.28		23.11		1157	0.75	0.45 ^c
	(44.64)		(28.30)		(37.42)				
Mean treatment preference ^g									
For BC (SD)	7.47	(2.40)	7.49	(2.52)	7.48	(2.46)	1157	-0.10	0.92 ^c
For TAU (SD)	6.20	(2.86)	6.10	(2.94)	6.15	(2.90)	1157	0.61	0.54 ^c
Primary diagnosis ^e									
Mental and behavioural disorders due to substance use	8	1.37	5	0.87	13	1.12	1	0.29	0.59
Schizophrenia, schizotypal and delusional disorders	3	0.51	3	0.52	6	0.52			1.00 ^b
Affective disorders	311	53.34	305	52.95	616	53.15	1	0.01	0.94
Anxiety disorders	134	22.98	138	23.96	272	23.47	1	0.10	0.75
Obsessive-compulsive disorder	15	2.57	14	2.43	29	2.50	1	<0.01	1.00
Acute stress reaction and post-traumatic stress disorder	55	9.43	33	5.73	88	7.59	1	5.15	0.02*
Adjustment disorder	93	15.95	98	17.01	191	16.48	1	0.17	0.68
Somatoform disorders	30	5.15	31	5.38	61	5.26	1	0.02	0.96

Eating disorders	24	4.12	17	2.95	41	3.54	1	0.84	0.36
Personality disorders	26	4.46	30	5.21	56	4.83	1	0.21	0.64
Hyperkinetic and attention-deficit disorders	15	2.57	12	2.08	27	2.33	1	0.13	0.72
Other disorders ^h	21	3.64	25	4.39	46	4.01	1	0.24	0.62
Missing diagnosis	8	1.37	6	1.04	14	1.21	1	0.06	0.81
At least one comorbid diagnosis	333	57.12	307	53.30	640	55.22	1	1.56	0.21
Family history of similar mental health issues	301	51.63	290	50.35	591	50.99	1	0.14	0.71

^a = For samples with $n < 40$ Yates continuity correction was applied

^b = Fisher's Exact Test

^c = t-test for independent samples

^d = Based on the German version of the MacArthur Scale (SSS-D)

^e = Multiple answers possible

^f = Unplausible values were removed

^g = On a scale from 0 (not at all) to 10 (very much), patients were asked how much both treatment options (BC vs. TAU) appealed to them.

^h = Dissociative disorders, other and unspecified reactions to severe stress, other neurotic disorders, sexual dysfunction, enduring personality change after catastrophic experience, Habit and impulse disorders, pervasive developmental disorders, emotional disorders with onset specific to childhood, nonorganic sleep disorders

* = $p < 0.05$

** = $p < 0.01$

Appendix Table A2*Sociodemographic Characteristics Of Therapists At Baseline*

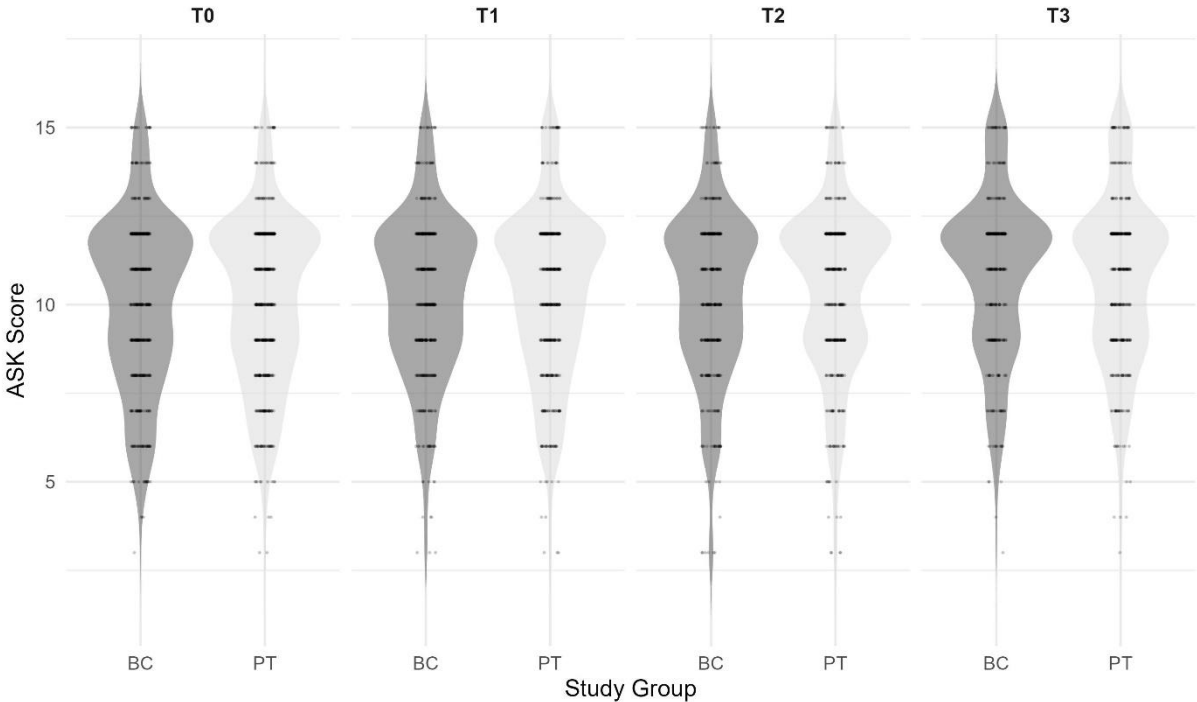
Demographic variable	<i>n</i> = 178 (%)
Gender	
Female	138 (77.53)
Male	38 (21.35)
No answer	2 (1.12)
Age ^a	
Mean (SD)	45.54 (9.42)
Range	27-74
Years of professional experience	
Mean (SD)	12.03 (8.16)
Range	1-44
Licensed in ^b	
Cognitive-behavioral therapy	148 (83.15)
Psychodynamic therapy	35 (19.66)
Psychoanalytic therapy	6 (3.37)
Systemic therapy	7 (3.93)
More than one approach	11 (6.18)
Application of ^b	
Cognitive-behavioral therapy	147 (82.58)
Psychodynamic therapy	37 (20.79)
Psychoanalytic therapy	5 (2.81)
Systemic therapy	22 (12.36)
More than one approach	30 (16.85)
Location of practice	
Rural area	60 (33.71)
Medium-sized city	61 (34.27)
Large city	57 (32.02)

Note. Demographic characteristics are available for *n* = 178 therapists. *N* = 179 therapists recruited patients and are included in later analysis.

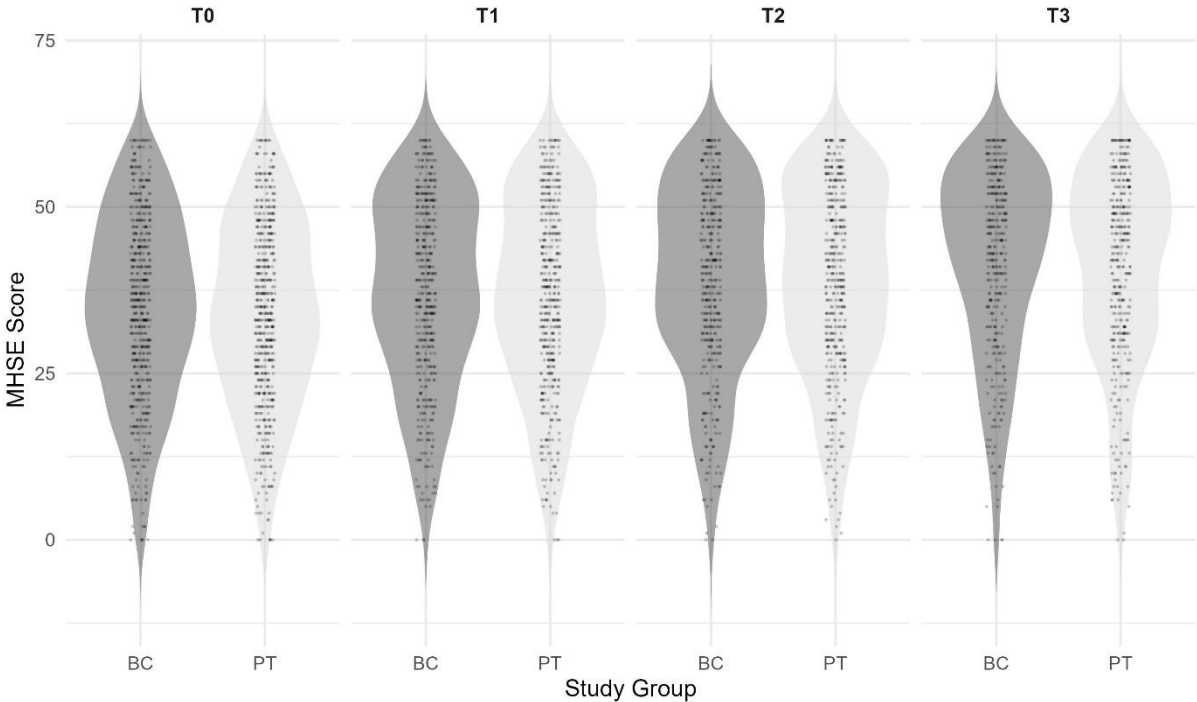
^a = Unplausible values were removed

^b = Multiple answers possible

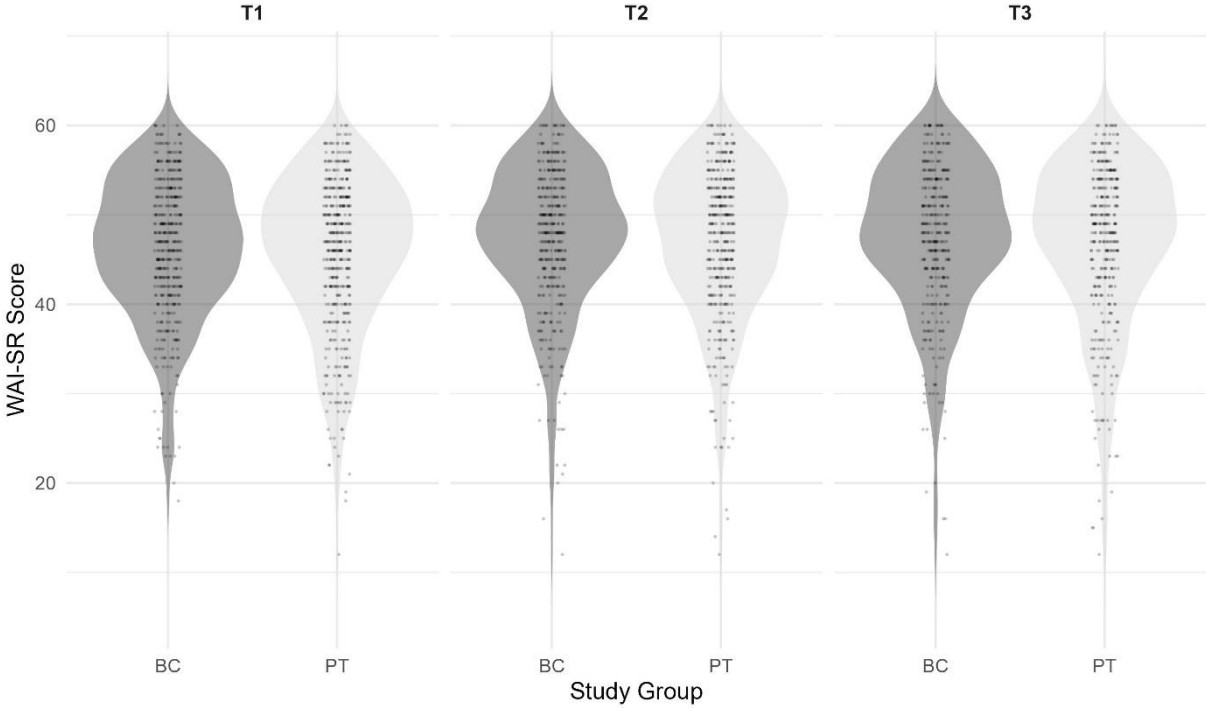
Appendix Figure A1. Violin Plot Of ASK Scores By Study Group Across Time Points



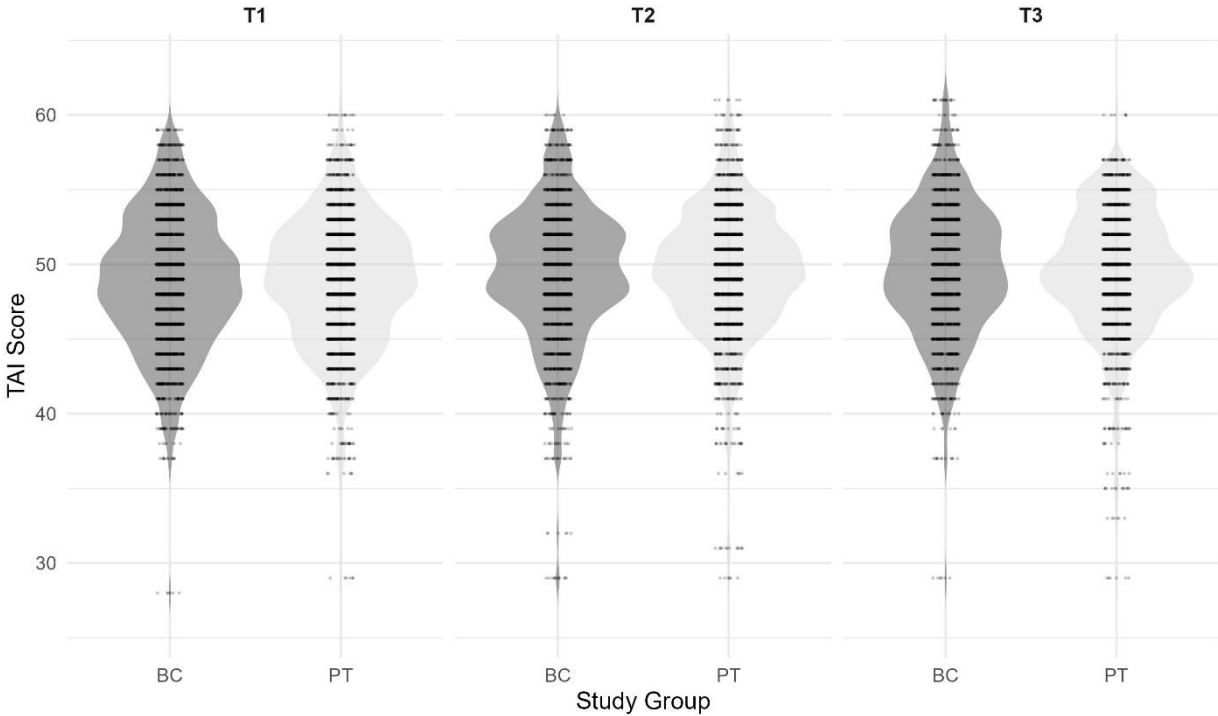
Appendix Figure A2. Violin Plot Of MHSE Scores By Study Group Across Time Points



Appendix Figure A3. Violin Plot Of WAI-SR Scores By Study Group Across Time Points



Appendix Figure A4. Violin Plot Of TAI Scores By Study Group Across Time Points



Appendix Table A3

Correlations Between Mechanisms And Mental Distress

Variable / Timepoint	MD 0	MD 1	MD 2	MD 3
Self-efficacy 0	-.41***			
Self-efficacy 1		-.46***		
Self-efficacy 2			-.50***	
Self-efficacy 3				-.54***
Mental Health Self-efficacy 0	-.50***			
Mental Health Self-efficacy 1		-.60***		
Mental Health Self-efficacy 2			-.69***	
Mental Health Self-efficacy 3				-.61***
Therapeutic Alliance 1		-.19***		
Therapeutic Alliance 2			-.21***	
Therapeutic Alliance 3				-.23***
Agency 1		-.047		
Agency 2			-.113***	
Agency 3				-.062***

Note. MD: Mental Distress; * $p < .05$. ** $p < .01$. *** $p < .001$ (2-sided)

Appendix Table A4

Correlations Between Mechanisms And Satisfaction With Life

Variable / Timepoint	SWLS 0	SWLS 1	SWLS 2	SWLS 3
Self-efficacy 0	.43***			
Self-efficacy 1		.51***		
Self-efficacy 2			.56***	
Self-efficacy 3				.56***
Mental Health Self-efficacy 0	.39***			
Mental Health Self-efficacy 1		.50***		
Mental Health Self-efficacy 2			.65***	
Mental Health Self-efficacy 3				.56***
Therapeutic Alliance 1		.24***		
Therapeutic Alliance 2			.32***	
Therapeutic Alliance 3				.28***
Agency 1		.0169***		
Agency 2			.246***	
Agency 3				.163***

Note. SWLS: Satisfaction with Life Scale; * $p < .05$. ** $p < .01$. *** $p < .001$ (2-sided)

Appendix Table A5*Autoregressive Effects Of Mental Distress And Mechanism Variables In BC*

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK & MD							
ASK _{t-1} -> ASK _t	0-1	0.157	0.129	0.074	.080	-0.016	0.273
	1-2	0.204	0.226	0.118	.055	-0.005	0.457
	2-3	0.013	0.013	0.094	.890	-0.172	0.198
MD _{t-1} -> MD _t	0-1	0.459	0.421	0.078	.000	0.269	0.574
	1-2	0.428	0.446	0.081	.000	0.288	0.604
	2-3	0.459	0.428	0.084	.000	0.264	0.592
MHSE & MD							
MHSE _{t-1} -> MHSE _t	0-1	0.179	0.177	0.087	.043	0.006	0.347
	1-2	0.195	0.199	0.111	.074	-0.019	0.416
	2-3	0.005	0.005	0.127	.967	-0.245	0.255
MD _{t-1} -> MD _t	0-1	0.383	0.383	0.073	.000	0.204	0.490
	1-2	0.332	0.338	0.101	.001	0.140	0.535
	2-3	0.340	0.314	0.115	.006	0.089	0.540
WAI & MD							
WAI _{t-1} -> WAI _t	1-2	0.276	0.284	0.182	.118	-0.073	0.641
	2-3	0.323	0.358	0.154	.020	0.057	0.659
MD _{t-1} -> MD _t	1-2	0.400	0.404	0.096	.000	0.216	0.592
	2-3	0.396	0.303	0.090	.001	0.126	0.480
TAI & MD							
TAI _{t-1} -> TAI _t	1-2	0.098	0.098	0.24	.426	-0.144	0.341
	2-3	0.027	0.026	0.128	.842	-0.226	0.277
MD _{t-1} -> MD _t	1-2	0.098	0.098	0.124	.426	-0.144	0.341
	2-3	0.027	0.026	0.128	.842	-0.226	0.277

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; MD = Mental Distress; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

Appendix Table A6*Autoregressive Effects For Mental Distress And Mechanism Variables In Pt*

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK & MD							
ASK _{t-1} -> ASK _t	0-1	0.099	0.101	0.086	.241	-0.068	0.270
	1-2	0.250	0.246	0.092	.008	0.065	0.427
	2-3	0.063	0.062	0.105	.554	-0.143	0.267
MD _{t-1} -> MD _t	0-1	0.129	0.115	0.088	.192	-0.058	0.288
	1-2	0.256	0.259	0.093	.005	0.077	0.440
	2-3	0.160	0.173	0.103	.092	-0.028	0.374
MHSE & MD							
MHSE _{t-1} -> MHSE _t	0-1	0.114	0.117	0.117	.316	-0.112	0.346
	1-2	0.374	0.374	0.079	.000	0.219	0.529
	2-3	0.232	0.251	0.110	.023	0.034	0.467
MD _{t-1} -> MD _t	0-1	0.143	0.126	0.080	.116	-0.031	0.284
	1-2	0.202	0.200	0.082	.014	0.040	0.361
	2-3	0.097	0.103	0.117	.379	-0.126	0.332
WAI & MD							
WAI _{t-1} -> WAI _t	1-2	0.245	0.254	0.236	.282	-0.208	0.716
	2-3	0.397	0.478	0.182	.009	0.122	0.834
MD _{t-1} -> MD _t	1-2	0.243	0.244	0.098	.013	0.052	0.436
	2-3	0.185	0.197	0.101	.052	-0.002	0.396
TAI & MD							
TAI _{t-1} -> TAI _t	1-2	0.203	0.207	0.151	.171	-0.089	0.203
	2-3	0.065	0.064	0.149	.667	-0.228	0.065
MD _{t-1} -> MD _t	1-2	0.244	0.244	0.101	.016	0.046	0.441
	2-3	0.213	0.228	0.095	.016	0.042	0.414

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; MD = Mental Distress; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

Appendix Table A7*Autoregressive Effects Of Satisfaction With Life And Mechanism Variables In BC*

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK & SWLS							
ASK _{t-1} -> ASK _t	0-1	0.199	0.184	0.084	.029	0.018	0.349
	1-2	0.299	0.245	0.111	.028	0.027	0.463
	2-3	0.285	0.056	0.108	.604	-0.155	0.267
SWLS _{t-1} -> SWLS _t	0-1	0.218	0.210	0.124	.090	-0.033	0.453
	1-2	0.214	0.352	0.099	.000	0.158	0.546
	2-3	0.058	0.286	0.095	.003	0.099	0.472
MHSE & SWLS							
MHSE _{t-1} -> MHSE _t	0-1	0.237	0.234	0.099	.018	0.040	0.429
	1-2	0.256	0.256	0.100	.010	0.061	0.451
	2-3	0.025	0.026	0.118	.827	-0.206	0.258
SWLS _{t-1} -> SWLS _t	0-1	0.228	0.237	0.129	.066	-0.016	0.490
	1-2	0.271	0.313	0.105	.003	0.107	0.518
	2-3	0.186	0.193	0.114	.090	-0.030	0.416
WAI & SWLS							
WAI _{t-1} -> WAI _t	1-2	0.351	0.357	0.195	.067	-0.025	0.739
	2-3	0.378	0.395	0.202	.051	-0.002	0.791
SWLS _{t-1} -> SWLS _t	1-2	0.319	0.380	0.100	.000	0.184	0.575
	2-3	0.260	0.264	0.108	.014	0.053	0.476
TAI & SWLS							
TAI _{t-1} -> TAI _t	1-2	0.071	0.072	0.123	.558	-0.168	0.312
	2-3	0.034	0.031	0.124	.800	-0.211	0.273
SWLS _{t-1} -> SWLS _t	1-2	0.350	0.412	0.103	.000	0.211	0.613
	2-3	0.353	0.354	0.084	.000	0.190	0.519

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; SWLS: Satisfaction with Life Scale; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

Appendix Table A8*Autoregressive Effects Of Satisfaction With Life And Mechanism Variables In PT*

Model	Time	Std. β	β	SE	p	95% CI	
						LL	UL
ASK & SWLS							
ASK _{t-1} -> ASK _t	0-1	0.120	0.119	0.100	.233	-0.077	0.315
	1-2	0.244	0.238	0.094	.011	0.054	0.423
	2-3	0.010	0.010	0.122	.934	-0.229	0.249
SWLS _{t-1} -> SWLS _t	0-1	0.179	0.173	0.144	.228	-0.109	0.455
	1-2	0.316	0.393	0.123	.001	0.152	0.634
	2-3	0.189	0.186	0.115	.104	-0.038	0.411
MHSE & SWLS							
MHSE _{t-1} -> MHSE _t	0-1	0.128	0.132	0.154	.391	-0.170	0.433
	1-2	0.360	0.355	0.077	.000	0.205	0.505
	2-3	0.310	0.345	0.127	.007	0.096	0.593
SWLS _{t-1} -> SWLS _t	0-1	0.096	0.094	0.174	.590	-0.247	0.434
	1-2	0.200	0.246	0.155	.114	-0.059	0.550
	2-3	0.075	0.079	0.152	.604	-0.218	0.376
WAI & SWLS							
WAI _{t-1} -> WAI _t	1-2	0.058	0.059	0.415	.887	-0.754	0.871
	2-3	0.328	0.435	0.162	.007	0.118	0.751
SWLS _{t-1} -> SWLS _t	1-2	0.344	0.424	0.130	.001	0.169	0.679
	2-3	0.358	0.350	0.088	.000	0.177	0.523
TAI & SWLS							
TAI _{t-1} -> TAI _t	1-2	0.218	0.221	0.141	.118	-0.056	0.499
	2-3	0.052	0.051	0.158	.1745	-0.258	0.361
SWLS _{t-1} -> SWLS _t	1-2	0.295	0.367	0.161	.023	0.051	0.682
	2-3	0.343	0.340	0.109	.002	0.126	0.553

Note. Std. β = standardized coefficients; β = unstandardized coefficients; CI = confidence interval of unstandardized coefficients; LL = lower limit; UL = upper limit; SWLS: Satisfaction with Life Scale; ASK = General Self-efficacy; MHSE = Mental Health Self-efficacy; WAI-SR = Working Alliance Inventory-Short Form Revised; TAI = Therapeutic Agency Inventory; SWLS: Satisfaction with Life Scale

Chapter 5

Study 4: Empowered to Change: A Qualitative Analysis of Patient Perspectives in Blended and Routine Psychotherapy

The following paper is submitted to BMC Psychiatry as:

Behr, S., Steubl, S. S., Baumeister, H., Domhardt, M., Zarski, A.-C., Ebert, D. D., Soyeaux, L., Fenski, F., Hammelrath, L., Boettcher, J., Knaevelsrud, C., Schaeuffele, C. (submitted). *Empowered to Change: A Qualitative Analysis of Patient Perspectives in Blended and Routine Psychotherapy*.

Empowered to Change: A Qualitative Analysis of Patient Perspectives in Blended and Routine Psychotherapy

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Abstract for study 4

Background: Empowerment has long been recognized as a treatment target in psychotherapy. Digital components integrated into treatment, particularly those with which patients engage autonomously, may play a distinct role in fostering a sense of empowerment. However, previous studies have primarily examined empowerment quantitatively in relation to clinical outcomes, in inpatient settings, or among individuals with chronic medical conditions. **Objectives:** This study aimed to explore how patients subjectively experience empowerment during routine outpatient psychotherapy, including blended care (BC) and standard face-to-face (f2f) formats, and to identify factors that contribute to this process. **Methods:** We conducted a qualitative content analysis of responses to two open-ended questions from participants in two large randomized controlled trials following six months or 18 weeks of psychotherapy (total N = 951). Patients were asked to describe where they had noticed an increase in their sense of empowerment in everyday life, and what they believed had contributed to this. The data was analyzed using a combined deductive-inductive coding approach. **Results:** Patients described experiencing empowerment across functional domains (e.g., social interactions, work, daily routines), coping strategies (e.g., problem-solving, emotion regulation), self-concept (e.g., self-efficacy, self-worth), and psychological insight. The most frequently cited sources of empowerment were the therapeutic relationship and the structure of psychotherapy (e.g., regular sessions). While only 4% explicitly mentioned the digital component, those who did described it as a helpful, always-available extension of therapy. Patients frequently framed the same elements both as outcomes of empowerment and as processes that had contributed to its development. **Conclusion:** Our findings suggest that empowerment in outpatient psychotherapy appears to develop through reciprocal processes, where the same factors act as both outcomes and mechanisms of change. Thus, empowerment might be not only a treatment goal, but also a pathway through which psychotherapy exerts its effects.

Background

Mental disorders such as depression, anxiety disorders, and post-traumatic stress disorder are commonly associated with feelings of helplessness, loss of control, and diminished self-esteem (1). Within this context, empowerment has long been recognized as an important factor that enables individuals to regain autonomy and actively participate in health-related decisions (2, 3). In various therapeutic approaches, empowerment is regarded both as an important therapeutic goal and as a construct associated with better treatment outcomes, adherence, and patient satisfaction (2, 4, 5).

The World Health Organization (WHO) defines empowerment primarily as a process that enables individuals to gain greater control over decisions and actions affecting their health (6). This process includes participation, access to knowledge, the development of health-related skills, and a supportive environment. Especially in the context of chronic medical conditions, the WHO considers empowerment as essential for self-management and established it as a core principle in the Ottawa Charter for Health Promotion (6). Despite its long-standing and widespread use, a closer look reveals that the concept of empowerment is inconsistently defined (7, 8). In a theoretical review, Varela and colleagues (9) propose that empowerment should be understood as a multidimensional, evolving process involving changes in one's identity, abilities, and perceptions. This perspective aligns with other definitions highlighting both intrapersonal (e.g., coping abilities) and interpersonal (e.g., trust and communication with providers) dimensions of empowerment (10). Empowerment can also be seen as an outcome, a state in which patients feel empowered, self-efficacious, and self-confident (5, 8).

The recent emphasis on empowerment as an important treatment target illustrates the ongoing shift from a paternalistic doctor-patient relationship to a patient-centered approach in which patients play an active role (4). In psychotherapy, empowerment is thought to be supported by factors such as the therapeutic alliance, goal setting, and the acquisition of coping

skills (11). A systematic review by Stepanian et al. (12) examined empowerment interventions across various chronic conditions as well as mental illnesses, and found that they are associated with improved health status, psychological status, and quality of life among patients. Empowerment-oriented interventions, such as self-management programs and shared decision-making, have been shown to increase autonomy and improve health outcomes (13, 14). Most of the evidence on empowerment comes from quantitative studies on chronic illnesses, such as cancer or diabetes (12). Only a few qualitative studies have explored the subjective experience of empowerment, particularly in mental health contexts. One such study (15) showed that inpatients with affective and psychotic disorders primarily understood empowerment as the ability to control their own lives, particularly regarding daily functioning, social relationships, treatment decisions, and outlook on the future. For the development of empowerment, patients in this study emphasized the importance of a trusting therapeutic relationship, access to clear information, and meaningful personal connections. Similarly, a qualitative study by Tveiten et al. (16) with psychiatric inpatients found that empowerment was supported by respectful communication, involvement in decisions, and trusting relationships with staff. However, patients also reported that rigid institutional routines and unequal power dynamics limited their sense of control and participation.

Recent developments in digital and blended therapies have opened new ways in which empowerment can be fostered (3, 4). As digital tools usually involve a much stronger focus on self-guided therapeutic training outside the therapy room, they might encourage a stronger sense of empowerment. Patients can, for example, monitor their own progress, apply strategies in their daily lives and recognize that improvements are the result of their own actions rather than solely the therapist's work. Samoocha and colleagues (3) found in a meta-analysis with 14 included RCTs that internet-based interventions can enhance empowerment in patients with mental and somatic disorders. Karni and colleagues (4) outline how the elements of digital

interventions can contribute to patient empowerment. In their framework model, they define individual components of empowerment (control, coping, self-efficacy, understanding, legitimacy, and experienced support) as well as the corresponding digital strategies (education, feedback, monitoring, communication, analysis, and engagement). A qualitative study by Allan and colleagues (17) explored how people with psychosis used a digital self-help tool (EMPOWER) in daily life and found that digital features such as feedback and self-monitoring supported self-efficacy and self-management. Patients in this study described gaining insight into patterns and changes in their mental health, reappraisal, and an increased self-worth as helpful in this process.

Despite growing interest in empowerment, the current evidence base remains limited in several ways. It is largely unclear how the respective dimensions are activated when digital interventions are combined with f2f-sessions in blended care (BC) and how patients experience these dynamics in their everyday lives. Additionally, research has focused on quantitative outcomes and on chronic somatic illnesses such as cancer and diabetes, as reflected in recent meta-analyses (12, 14), while qualitative studies in the context of mental health are still scarce even though they can deepen our understanding of how patients subjectively feel empowered by psychotherapy beyond predefined constructs. Moreover, existing qualitative work primarily examines inpatient settings and highly burdened or acutely ill populations (16, 17). Therefore, this study examines how patients perceive empowerment within the context of routine f2f-psychotherapy (PT) and BC. By analyzing qualitative data from patient experiences, the study aims to

1. explore the subjective experience of empowerment in psychotherapy and, as a secondary aim, to
2. highlight contributing therapeutic mechanisms.

Methods

Study Design

This study is based on data from two randomized controlled trials (RCTs) conducted within the German routine mental healthcare system: the PSYCHOnlineTHERAPY project (German clinical trial register: DRKS00023973) and the PsyTOM project (German clinical trial register: DRKS00028536). Both studies evaluated the effects of BC, which combined f2f-psychotherapy with online modules, in comparison to standard f2f-psychotherapy alone (PT). Participants in both trials were adults (≥ 18 years) undergoing outpatient psychotherapy in Germany.

The PSYCHOnlineTHERAPY project (18) employed a cluster-randomized controlled non-inferiority design with three parallel study arms: (1) standard f2f cognitive behavioral therapy (PSYCHOnlineTHERAPYstandard; PT), (2) fixed-ratio BC (PSYCHOnlineTHERAPYfix; 8 f2f-sessions and 8 online modules), and (3) flexible-ratio BC (PSYCHOnlineTHERAPYflex; 0 to 16 online modules, with the number of f2f-sessions adjusted accordingly). Patients diagnosed with depressive and/or anxiety disorders were eligible for inclusion. Treatment was delivered by licensed psychotherapists trained in CBT.

The PsyTOM project (19) followed a two-arm cluster-randomized controlled superiority design, comparing standard PT with a flexible BC condition. This study included a broader range of therapeutic orientations (cognitive-behavioral, psychodynamic, and systemic therapies). The psychotherapists delivering the treatment were also licensed psychotherapists trained in their respective approaches. The PsyTOM trial was transdiagnostic, and no exclusion criteria were applied for the inclusion of patients regarding their diagnosis or symptoms.

For this study, we included responses from all treatment groups from both projects (BC and PT).

Intervention

In the f2f-only conditions (PT) in both studies, psychotherapy was conducted according to standard practice guidelines in Germany, following the principles of the respective therapeutic orientation without the digital component. Therapists were free to individualize session content and therapeutic focus. In both trials, the BC groups received structured access to digital self-help modules.

In the PSYCHOnlineTHERAPY project, these modules covered evidence-based CBT content, including psychoeducation, behavioral activation, cognitive restructuring, and relapse prevention (18). The modules featured interactive exercises, automated feedback, and progress monitoring. Therapists could choose from a variety of disorder-specific and transdiagnostic modules to assign to their patients, optionally in collaboration with their patients.

The “TONI” intervention used in PsyTOM was designed as a transdiagnostic, transtheoretical tool applicable across all included therapeutic approaches (19). The TONI intervention addressed transdiagnostic topics such as emotion regulation and cognitive patterns. It offered interactive components including a digital diary and symptom tracking tools. The use of the modules was flexible, with no predefined structure regarding the number or sequence of modules or the frequency of f2f-sessions, allowing therapists and patients to tailor the integration to individual needs. Therapists in TONI could assign modules to patients, but patients also had access to the full library of topics and were encouraged to request the ones they found personally relevant. This joint decision-making process aimed to balance therapist guidance and patient choice.

Data Collection

At post assessment (in PSYCHOnlineTHERAPY after 18 weeks and in PsyTOM after 6 months after inclusion) participants in both studies were invited to answer two open-ended questions assessing whether and how the intervention contributed to a feeling of strength and confidence and how they experience this in their everyday life. The questions were:

1. Many patients report that they feel stronger and more confident after therapy. Is this also the case for you? If so, where in your everyday life do you notice that you are stronger and feel more confident?
2. What contributed to you feeling stronger and more confident after the treatment?

Data Analysis

Not all study participants completed the open-ended questions on patient empowerment. In this analysis, we included patients who answered at least one of the questions. All textual responses were analyzed using qualitative content analysis following the approach by Kuckartz and Rädiker (20). The coding process followed a combined deductive-inductive approach. Deductive categories were initially derived from empowerment theory, while inductive codes were developed during iterative reading and coding of the material. One researcher (LSS in PSYCHOnlineTHERAPY & LS in PsyTOM) conducted the primary coding, with regular discussions in the research team to reflect on interpretations. The researchers had backgrounds in clinical psychology and psychotherapy, with CBT and psychodynamic orientations represented. Coding was supported using MAXQDA software (21), a tool for qualitative data analysis. Inter-coder reliability was assessed by having a second coder (SB for both projects) double-code 10% of the data from both study groups and for both items. Cohen's Kappa indicated a substantial level of agreement ($\kappa = 0.61$). Although we present frequencies separately for descriptive

purposes, no formal group comparisons were conducted as our focus was on patients' subjective experiences of empowerment in general.

Results

Participants

Tables 1 and 2 provide an overview of the sociodemographic characteristics of participants in the two studies. Of the 495 participants in the PSYCHOnlineTHERAPY trial, 374 (76%) provided a written response to at least one of the open-ended questions. In PSYCHOnlineTHERAPY, more responses came from the BC arms ($n = 279$ across both BC conditions PSYCHOnlineTHERAPYfix and PSYCHOnlineTHERAPYflex) than from the PT arm (PSYCHOnlineTHERAPYstandard; $n = 95$), reflecting the original study design with two BC arms and one PT arm, which also resulted in unequal group sizes at baseline (STANDARD = 120, FIX = 129, FLEX = 246). Participants who responded to the empowerment questions did not differ significantly from non-responders in baseline depressive symptoms (PHQ-9; $t(209.7) = 0.24$, $p = 0.811$, Welch's t-test) or anxiety symptoms (GAD-7; $t(211.9) = 0.26$, $p = 0.797$ (Welch's t-test)). In the PsyTOM trial, 577 out of 1,159 participants (50%) responded. Participation was approximately balanced across treatment arms, with 287 responses from the PT condition and 290 from the BC condition. Similarly, baseline levels did not differ between responders and non-responders in depressive symptoms (PHQ-8; $t(1155.5) = 0.40$, $p = .691$, Welch's t-test) or anxiety symptoms (GAD-7; $t(1150.6) = -0.56$, $p = .572$, Welch's t-test). The following results summarize data from participants across both trials and all treatment arms ($N = 951$). The majority of participants were well-educated, employed women in their mid-thirties who were in a relationship. The most common mental health diagnoses in the PsyTOM Study were affective disorders, anxiety disorders, and adjustment disorders. In the

PSYCHOnlineTHERAPY study, the largest percentage of patients was included with a moderate depressive episode.

Table 1

Sociodemographic Characteristics Of Participants In PSYCHOnlineTHERAPIE

Demographic variable	BC (n = 279)		PT (n = 95)		Total (n = 374)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender						
Female	181	64.87	66	69.47	247	66.04
Male	95	34.05	29	30.53	124	33.16
Diverse	0	0.00	0	0.00	0	0.00
No answer	3	1.08	0	0.00	3	0.80
Age						
Mean (SD)	37.68 (13.53)		38.39 (13.58)		37.86 (13.53)	
Range	18-74		18-70		18-74	
Relationship						
Single	98	35.13	25	26.32	123	32.89
In a relationship	178	63.80	75	73.68	248	66.31
No answer	3	1.08	0	0.00	3	0.80
Highest education						
Currently in education (no prior degree)	0	0.00	0	0.00	0	0.00
Pre-vocational training year	2	0.72	1	1.05	3	0.80
Lower secondary school / basis vocational training	33	11.83	17	17.89	50	13.37
Intermediate secondary school / two-year vo- cational training	78	27.96	28	29.47	106	28.34
High school diploma / 3.-3.5-year vocational training	85	30.47	28	29.47	113	30.21
Bachelor / advanced vo- cational qualification	46	16.49	17	17.89	63	16.84
Master / Diploma	30	10.75	3	3.16	33	8.82
Doctorate (PhD)	2	0.72	1	1.05	3	0.80
No answer	3	1.08	0	0.00	3	0.80
Employment status						
Employed	186	66.70	53	55.80	239	63.9
Self-employed	5	1.79	4	4.21	9	2.41
Open labor market	1	0.36	0	0.00	1	0.27

Student / trainee / apprentice	42	15.00	12	12.60	54	14.40
Voluntary service	4	1.43	0	0.00	4	1.07
Homemaker	11	3.94	9	9.47	20	5.35
Retired / pension	4	1.43	3	3.16	7	1.87
Unemployed	14	5.02	11	11.60	25	6.68
Unable to work	9	3.23	3	3.16	12	3.21
No answer	3	1.08	0	0.00	3	0.80
Migration						
No migration background	194	69.53	68	71.58	262	70.05
Parents or grandparents immigrated	66	23.66	20	21.05	86	22.99
Self-immigrated	16	5.73	7	7.37	23	6.15
No answer	3	1.08	0	0.00	3	0.80
Inclusion diagnosis ^a						
Moderate depressive episode (F32.1)	83	37.56	31	37.35	114	37.50
Severe depressive episode without psychotic symptoms (F32.2)	14	6.33	1	1.20	15	4.93
Severe depressive episode with psychotic symptoms (F32.3)	1	0.45	0	0.00	1	0.33
Recurrent depressive disorder, current episode moderate (F33.1)	46	20.81	21	37.35	77	25.33
Recurrent depressive disorder, current episode severe without psychotic symptoms (F33.2)	4	1.81	3	3.61	7	2.30
Recurrent depressive disorder, current episode severe with psychotic symptoms (F33.3)	0	0.00	2	2.41	2	0.66
Dysthymia (F34.1)	9	4.07	4	4.82	13	4.28
Agoraphobia without panic disorder (F40.00)	1	0.45	0	0.00	1	0.33
Agoraphobia with panic disorder (F40.01)	17	7.69	3	3.61	20	6.58
Social phobia (F40.1)	21	9.50	15	18.07	36	11.84
Specific (isolated) phobia (F40.2)	14	6.33	0	0.00	14	4.61
Panic disorder (F41.0)	31	14.03	4	4.82	35	11.51

Generalized anxiety disorder (F41.1)	15	6.79	5	6.02	20	6.58
Mixed anxiety and depressive disorder (F41.2)	19	8.60	3	3.61	22	7.24
Other mixed anxiety disorders (F41.3)	1	0.45	0	0.00	1	0.33
Missing diagnosis	58	20.79	12	12.63	70	18.72
At least one further diagnosis	46	16.49	12	12.63	58	15.51

^a = Inclusion diagnoses following ICD-10 were provided by the treating therapist. Multiple diagnoses per patient were possible.

Table 2

Sociodemographic Characteristics Of Participants In PsyTOM

Demographic variable	BC (n = 290)		PT (n = 287)		Total (n = 577)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender						
Female	211	72.76	219	76.31	430	74.52
Male	74	25.52	67	23.34	141	24.44
Non-binary	1	0.34	0	0.00	1	0.17
Gender-fluid	2	0.69	0	0.00	2	0.35
Other	1	0.34	0	0.00	1	0.17
No answer	1	0.34	1	0.35	2	0.35
Age						
Mean (SD)	37.14 (13.17)		37.87 (13.15)		37.50 (13.15)	
Range	18-89		18-69		18-89	
Relationship						
Single	101	34.83	78	27.18	179	31.02
In a relationship	189	65.17	209	72.82	398	68.98
Highest education						
No degree	0	0.00	0	0.00	0	0.00
Nine years of education	13	2.25	7	1.21	20	3.46
Secondary school certificate	33	5.72	49	8.49	82	14.21
College entrance qualification	169	29.29	137	23.74	306	53.03
Vocational education	73	12.65	89	15.42	162	28.08
Other	2	0.35	5	0.87	7	1.21
Employment status						
Employed	168	57.93	179	62.37	347	60.14
Self-employed	12	4.14	17	5.92	29	5.03
Unemployed	20	6.90	17	5.92	37	6.41
Pensioned	15	5.17	13	4.52	28	4.85

In education	55	18.97	46	16.03	101	17.50
Other	20	6.90	15	5.23	35	6.07
Migration						
Foreign country of birth	25	8.62	12	4.18	37	6.41
At least one parent born in foreign country	62	21.38	47	16.38	109	18.89
Primary diagnosis ^a						
Mental and behavioural disorders due to substance use	2	0.69	3	1.05	5	0.87
Schizophrenia, schizotypal and delusional disorders	2	0.69	1	0.35	3	0.52
Affective disorders	151	52.07	152	52.96	303	52.51
Anxiety disorders	69	23.79	67	23.34	136	23.57
Obsessive-compulsive disorder	7	2.41	8	2.79	15	2.60
Acute stress reaction and post-traumatic stress disorder	31	10.69	13	4.53	44	7.62
Adjustment disorder	48	16.55	43	14.98	91	15.77
Somatoform disorders	14	4.83	16	5.57	30	5.26
Eating disorders	18	6.21	6	2.09	24	4.16
Personality disorders	14	4.83	15	5.23	29	5.06
Hyperkinetic and attention-deficit disorders	6	2.07	7	2.44	13	2.25
Other disorders ^b	11	3.81	15	5.26	26	4.53
Missing diagnosis	3	1.03	2	0.70	5	1.21
At least one comorbid diagnosis	168	57.93	153	53.31	321	55.63

^a = diagnoses following ICD-10 were provided by the treating therapist. Multiple diagnoses per patient were possible; ^b = Dissociative disorders, other and unspecified reactions to severe stress, other neurotic disorders, sexual dysfunction, enduring personality change after catastrophic experience, Habit and impulse disorders, pervasive developmental disorders, emotional disorders with onset specific to childhood, nonorganic sleep disorders

Perception of Empowerment

The responses to the question of whether and in which aspects of their life's patients noticed increased empowerment in their everyday lives at the post-treatment assessment reflect a broad spectrum of personal change. Table 3 shows the main categories and subcategories and the number and percentage of participants who mentioned each subcategory, both overall and within the different treatment groups. It also provides illustrative participant statements. The

detailed coding system for the first question comprises five main categories and nine sub-sub-categories.

Functional Life Domains

Participants described empowerment in several functional domains, including general social interactions, their daily life, work, and contact with their significant others (category: Functional Life Domains). The most frequently mentioned domain, reported by $n = 184$ (19.3%) of respondents, involved improvements in general social interactions (subcategory: General Social Interactions). Participants frequently described themselves as more open in communication, more willing to articulate personal needs, and more confident in asserting boundaries. One patient described: “It's easier for me to approach people, and I'm more confident in making contact with them” (PT, POT). Almost as many patients ($n = 177$, 18.6%) reported changes to their everyday routines and lifestyle (subcategory: Daily Life). Participants described improvements in their ability to manage everyday tasks and responsibilities, such as grocery shopping, making phone calls, and handling paperwork. They also reported being more active in daily life. Many participants also mentioned increased autonomy, including living independently and managing challenges on their own. For example: “This has an effect on all everyday situations, e.g., being in a very crowded place. Even if it's not pleasant, I get through these situations without panicking and have the certainty that I can apply the techniques I've learnt at any time, in any place” (PT, PsyTOM). A proportion of respondents ($n = 122$, 12.8%) reported positive changes in their professional lives (subcategory: Work). These changes included an improved ability to manage work routines and contact with colleagues as well as reintegration into the job market. One patient shared her experience with a new job: “I notice it at work. I've changed jobs and am now doing something completely different. I was worried that my fears might arise again, as all the work processes are completely new. However, I've realized that I'm not shying away from new tasks” (PT, PsyTOM). Additionally, $n = 73$ (7.7%) of participants described

improvements in their relationships with loved ones, such as family members, intimate partners, or friends (subcategory: Significant Others). This included greater trust, emotional security, control in shaping these interactions, more openly communicating personal needs, and handling conflict situations more confidently. Several patients also mentioned the relationship with their children, such as “I notice this especially when dealing with my daughter, everything is much calmer and more relaxed” (PT, POT).

Coping Strategies

Patients also described how empowerment manifested through applied coping strategies (category: Coping Strategies). The largest subgroup, with $n = 155$ (16.3%) of patients, emphasized that, as a result of psychotherapy, they had acquired problem-focused skills that enabled them to initiate meaningful changes in their lives (subcategory: Problem-Focused). Patients described behaviors, such as active planning, behavioral regulation, and cognitive control in challenging situations. One patient described it as such: “Recently, I overburdened myself again for weeks and did too many things, so that I was rather depressed again for a few days afterwards. But thanks to the therapy, I now know how to deal with the situation and what helps me to get out of it” (BC, PsyTOM). A similar proportion of participants ($n = 126$, 13.2%) reported using emotion-focused strategies in everyday life to enhance their emotional well-being, either in specific challenging situations or more broadly (subcategory: Emotion-Focused). These strategies primarily involved emotion regulation techniques but also practices such as mindfulness and acceptance. One patient described her experience with managing her anxiety: “I try to live with fear and always tell myself: fear is just a feeling. I practice understanding that fear cannot harm me” (PT, PsyTOM). A smaller group of patients ($n = 77$, 8.1%) reported experiencing cognitive reappraisal or increased cognitive flexibility, such as the ability to question one’s own assumptions and shift perspectives on problems or situations (subcategory: Appraisal-Focused). This included general changes in perspective and life goals, as well as a more accepting attitude

towards managing their mental health condition and symptoms. For one patient this manifested as follows: “Another realization is that my demands on myself and my perfectionism are unnecessary. I have realized that my standards are far too high for my own good” (BC, POT).

Self-Concept

Many patients reported a change in their self-perception, often describing the development of a more positive self-image (category: Self-Concept): 126 patients (13.2%) mentioned feeling more self-efficacious and more willing to take on new tasks (subcategory: Self-Efficacy). They described a general sense of increased confidence and control, and more certainty in their own decision-making. Some also expressed optimism about their ability to cope with future challenges. One patient wrote: “I'm starting to feel ready to be an adult and I'm beginning to trust myself with these tasks. It's hard not to get stressed again straight away, but positive experiences show me that it's not as difficult and not as impossible as I first thought” (BC, POT). Some (n = 40, 4.2%) also noted an increase in self-esteem, which they experienced in a greater sense of personal value, less negative self-talk, and more acceptance of their weaknesses (subcategory: Self-Worth). One patient painted the following picture: “I feel much more comfortable in my body and hide it much less. I dare to be myself more often: the other day I went to therapy in jogging bottoms. That doesn't sound like therapy success at first. But all my life I've never left the house in jogging bottoms, apart from for sport, because ‘you don't do that’. But I felt so comfortable, and it felt good.” (BC, POT)

Well-being and Symptom Reduction

A total of n = 118 (12.4%) of participants reported an improvement in their mental well-being, which was often accompanied by feelings of strength or mental relief (category: Well-Being and Symptom Reduction). These changes were reflected in a more positive mood, an increased life satisfaction, or a reduction in psychological symptoms. One patient described the

reduction of her symptoms as such: “I can interpret physical symptoms better; they no longer lead to panic so quickly. I integrate them into my everyday life (irritable bowel-like symptoms), so I still go to the toilet often, but with less panic” (BC, PsyTOM).

Psychological Insight and Self-Reflection

A subset of n = 59 participants (6.2%) reported feeling empowered by engaging in self-reflection, which gave them a greater awareness of their experiences and behaviors (category: Psychological Insight and Self-Reflection). They mentioned developing an insight into their problems and gaining a deeper understanding of themselves. One patient mentioned TONI in this context: “The therapy helped me to understand why I was feeling down. These realizations helped me a lot. Thanks to TONI and my therapist, I now see how therapy can have a positive impact over time. I am 57 years old and have suffered from depression and anxiety since puberty. TONI and my therapist have introduced me to some wonderful therapeutic approaches. After so many years, I finally understood things that my previous therapies had denied me” (BC, PsyTOM).

Table 3

Experienced Empowerment

Category / Subcategory	Frequency n (%)			Illustrative Statement
	All	BC	PT	
Number of Patients	951	569	382	
Functional Life Domains				
General Social Interactions	184 (19.3)	108 (19.0)	76 (19.9)	“In my problem area of social contacts, I feel stronger and more capable than before.” (PT, PsyTOM)
Daily Life	177 (18.6)	114 (12.0)	63 (16.5)	“I can now drive and go shopping on my own again. It's not easy for me yet, but I'm getting there.” (BC, POT)
Work	122 (12.8)	65 (11.4)	57 (14.9)	“I have become more self-confident in my job and trust myself to take on more responsibility.” (BC, POT)

Significant Others	73 (7.7)	36 (6.3)	37 (9.7)	“I have a clear idea of what is important to me in a partnership, and I can express this fully without compromising myself.” (PT, PsyTOM)
Coping Strategies				
Problem-Focused	155 (16.3)	97 (17.0)	58 (15.2)	“I focus on solution-orientated thinking for problems and anxieties in everyday life” (PT, PsyTOM)
Emotion-Focused	126 (13.2)	71 (12.5)	55 (14.4)	“I trust myself more to listen to my feelings and desires, and I take my emotions more seriously.” (PT, POT)
Appraisal-Focused	77 (8.1)	46 (8.1)	31 (8.1)	“I judge less” (BC, PsyTOM)
Self-Concept				
Self-Efficacy	126 (13.2)	64 (11.2)	62 (16.2)	“I feel more self-confident, and I often tell myself in daily life that I can handle things and that I’m doing well.” (PT, POT)
Self-Worth	40 (4.2)	20 (3.5)	20 (5.2)	“I’m more understanding with myself and I don’t judge myself as quickly anymore when I can’t manage something the way I’d like to.” (PT, PsyTOM)
Well-Being & Symptom Reduction	118 (12.4)	62 (10.9)	56 (14.7)	“Through the therapy, I’ve partly regained my inner balance. I no longer feel as down and have more hope again for the life that lies ahead of me” (BC, POT)
Psychological Insight & Self-Reflection	59 (6.2)	39 (6.9)	20 (5.2)	“I feel more capable of recognizing specific behavioral and thought patterns – both positive and negative. That helps me to manage them more consciously.” (BC, POT)

Note. BC = Blended Care; PT = f2f-psychotherapy; POT = PSYCHOnlineTHERAPY.

Sources of Empowerment

In a second step, patients were asked to consider what might have contributed to their increased sense of empowerment. The category system used to code these sources of empowerment comprises seven main categories and twelve subcategories. Table 4 presents the main categories and subcategories, the number of participants who mentioned each subcategory (frequencies), and illustrative participant statements. Some of the categories are similar to those

given in answer to the first question, which may indicate that patients' perceived outcomes of empowerment are closely connected to the underlying mechanisms they describe.

Treatment-Specific Aspects

The most frequently mentioned factors contributing to empowerment were those directly related to psychotherapy itself (category: Treatment-Specific Aspects). Nearly one-quarter of patients ($n = 210$, 22.1%) emphasized the therapeutic relationship as a key element in their empowerment process (subcategory: Therapeutic Relationship). Emotional support, such as feeling heard and receiving understanding and encouragement, was mentioned as particularly meaningful. Some participants also highlighted specific personal attributes of their therapists, such as a benevolent, empathetic nature. One patient described the relationship to their therapist as such: “The reliability of the therapist. No overstepping of boundaries and good will in my development as a person. No personal interests of the therapist to enrich themselves in any way” (PT, PsyTOM). A similar proportion of patients ($n = 201$, 21.1%) identified the therapeutic conversations and the treatment process in general (subcategory: Therapeutic Setting). This included the value of regular sessions, opportunities for open dialogue, and the structured support provided within therapy. For example: “Open conversations about my current state of mind, my emotional state. A neutral person's view of me and my social environment, my behavior towards people who are important to me” (BC, PsyTOM). Only $n = 23$ (4.0% of participants in the BC conditions) specifically mentioned the digital component of BC as a source of empowerment (subcategory: Digital Intervention). However, when it was mentioned, it was described as a helpful tool for providing accessible support between sessions during challenging moments. Participants referred to specific features, such as case examples, educational content, and the idea of the intervention acting as an “emergency kit” that could be accessed when needed. One patient described how the case example led to a feeling of normalization and universality: “I found the case examples very helpful, as I recognized parallel or similar trains of

thought from time to time. This showed me that I was not the ‘only one’ with these problems, and it gave me a good feeling about the lesson, which confirmed that I was ‘right’ here” (BC, POT). Additionally, a small group of $n = 17$ patients (1.8%) specifically mentioned the participatory nature of therapy, describing collaborative work on goals and solutions as a source of empowerment (subcategory: Participatory Decision-Making). One patient described this shared decision-making as follows: “That my therapist actively searched with me for new methods that could work for me. Instead of trying to convince me of other methods” (PT, PsyTOM).

Problem Solving

Many participants reported that since undergoing psychotherapy, they had begun to apply coping strategies that contributed to feeling more empowered (category: Problem Solving). Problem-focused strategies introduced in therapy were mentioned most frequently ($n = 162$, 17%, subcategory: Therapeutic Strategies). These included both disorder-specific techniques, such as structured behavioral approaches, and more general methods aimed at changing either the stressor itself or the way they responded to it. As one patient put it, “I have learned and taken the first steps in how to deal with my high sensitivity: what I need to pay attention to in order to lower the stress level, make it bearable, or, if I have exceeded it, react to it” (PT, PsyTOM). Additionally, $n = 97$ (10.2%) participants reported using emotion-focused strategies to improve their emotional well-being in everyday life or in challenging situations (subcategory: Emotion-Focused). These strategies included methods of emotion regulation, such as recognizing and taking their feelings seriously, as well as approaches related to asserting personal needs. One participant described this process as follows: “I have come to take myself and my feelings seriously, that I can be important to myself and fulfill my needs. I have learned that if I don't do this and keep putting it off, it makes me sad, and if I pursue my needs and activities that I like and that are important to me, I can deal with many situations and things better” (BC, PsyTOM). A third group of strategies involved cognitive reappraisal (subcategory: Appraisal-

Focused). A total of $n = 104$ patients (10.9%) described questioning their own assumptions and modifying their thinking patterns. This was illustrated by one participant who wrote, “Consciously adopting different perspectives. See others' mistakes as necessary, which others need for their growth, and know that I don't always have to intervene. Other people's mistakes must hurt them and not me. I point out grievances. I don't have to resolve them” (BC, POT).

Resource Activation

Another source of empowerment identified by participants was the activation of various internal and external resources (category: Resource Activation). The most frequently mentioned resource was a changed self-image, reported by $n = 127$ (13.4%) of participants (subcategory: Self-Image). One patient described this as follows: “The therapy helped me to realize what I can already do and what I've already achieved, and that boosted my self-confidence” (PT, POT). For 40 (4.2%) participants, gaining knowledge about their mental health condition and its mechanisms was considered an important factor (subcategory: Psychoeducation). Psychoeducational input, such as understanding how anxiety and panic manifest in the body, was described as particularly helpful. As one patient put it: “Understanding the mechanisms of an anxiety disorder. I am a very understanding-orientated learner, and so the explanations and structured information were just right” (BC; POT). A smaller number of participants ($n = 27$, 2.8%) reported that interpersonal relationships, such as the support of a partner or friend, were seen as a source of empowerment (subcategory: Social Contact). For example: “But of course my partner and my mum also managed to rebuild and strengthen me” (BC, POT). Similarly, $n = 25$ (2.6%) mentioned other external resources, including employment, structured daily routines, taking time off work, or improved living conditions (subcategory: Other External Resources). One participant, for example, described how complementary physical treatment supported their recovery alongside therapy: “During the therapy I also received osteopathic treatment, which

improved my physiological performance level in a positive way, similar to the psychological one” (PT, POT).

Motivational Clarification and Self-Reflection

Whereas Psychological Insight and Self-Reflection were already described by patients as areas where empowerment was experienced, the category Motivational Clarification and Self-Reflection captures the processes that were described as contributing to this. N = 123 patients (12.9%) reported that developing an understanding of their personal goals, expectations, and values had empowered them (category: Motivational Clarification and Self-Reflection). Understanding their internal patterns and the factors influencing their thoughts and actions was described as helpful. Additionally, gaining insight into the origins and perpetuating factors of their mental health condition was identified as important for their empowerment. One participant described the process of identifying underlying patterns with the therapist as particularly meaningful: “We found out that I have felt obliged to take responsibility for others since I was a child, and that stresses me out enormously. She showed me that and I'm very grateful for that” (PT, PsyTOM).

Problem Actualization

Similarly, n = 71 (7.5%) of participants described active engagement with difficult emotions, situations, and behavioral patterns, in a sense of problem actualization, as helpful in the development of empowerment (category: Problem Actualization). This process helped participants gain clarity and confidence when facing previously overwhelming experiences. One patient described their experience with a therapeutic exposure as empowering: “For example, we took a lift for a while. And I realized that nothing happened; I didn't get stuck and I didn't panic. I tried out situations that I actually avoid or work around” (BC, POT).

Symptom Reduction

A smaller number of participants (n = 32, 3.4%) cited improved psychological well-being as a reason for changes in their empowerment (category: Symptom Reduction). Patients described experiencing a reduction in symptoms, as well as an increased sense of resilience, inner calm, emotional stability, or enhanced life satisfaction as contributors to their growing empowerment. One participant illustrated this shift by describing a noticeable decrease in inner turmoil: “I get out of bed on days off; the inner restlessness and the feeling of having to run (without actually knowing where to go) as well as the inner chaos have decreased massively” (PT, PsyTOM).

Medication

A small proportion of participants (N = 14, 1.5%) attributed their increased strength and confidence to the use of medication (category: Medication). The initiation or adjustment of psychopharmacological treatment was described. In one case, the increase in empowerment was linked to the start of gender-affirming hormone therapy: “I was allowed to start taking testosterone, which significantly improved my mood” (BC, PsyTOM).

Table 4

Sources Of Empowerment

Category / Subcategory	Frequency n (%)			Illustrative Statement
	All	BC	PT	
Number of Patients	951	569	382	
Treatment-Specific Aspects				
Therapeutic Relationship	210 (22.1)	125 (22.0)	85 (22.3)	“The therapist’s listening and empathy. I feel seen and taken seriously by her.” (BC, PsyTOM)
Therapeutic Setting	201 (21.1)	107 (18.8)	94 (24.6)	“The regular therapy appointments helped me get out of the house and gave me a sense of stability again.” (BC, POT)

Digital Intervention	23 (4.0)			“TONI helped me a lot. In difficult moments, I could sit down after work and focus on my health. It was like an emergency kit I could open whenever I needed it.” (BC, PsyTOM)
Participatory Decision-Making	17 (1.8)	8 (1.4)	9 (2.4)	“My therapist explained to me that I am the main person responsible for the therapy.” (PT, POT)
Problem Solving				
Therapeutic Strategies	162 (17.0)	93 (16.3)	68 (18.1)	“Because I did a role-play with my therapist where I played both sides in a conflict situation, and that gave me the strength to address things directly.” (BC, POT)
Emotion-Focused	97 (10.2)	52 (9.1)	45 (11.8)	“By shifting my focus in life – putting my own needs first instead of always thinking for others.” (PT, POT)
Appraisal-Focused	104 (10.9)	58 (10.2)	46 (12.0)	“Also, the realization that one’s own perspective and interpretation shape everything – and that thoughts and feelings aren’t inherently bad.” (PT, PsyTOM)
Resource Activation				
Self-Image	127 (13.4)	75 (13.2)	52 (13.6)	“I’ve learned to have more compassion for myself. Knowing that many other people struggle with similar mental health issues makes you feel less like a failure.” (BC, POT)
Psychoeducation	40 (4.2)	27 (4.7)	13 (3.4)	“Understanding and knowledge about my psychological processes give me more ability to act – or at least the feeling of being more capable of acting.” (BC, PsyTOM)
Social Contact	27 (2.8)	16 (2.8)	11 (2.9)	“I replaced bad friends with good ones. Great relationships.” (PT, PsyTOM)
Other External Resources	25 (2.6)	14 (2.5)	11 (2.9)	“Moving out of my toxic parental home.” (PT, PsyTOM)
Motivational Clarification and Self-Reflection	123 (12.9)	69 (12.1)	54 (14.1)	“Through my growing understanding of how my problems developed.” (PT, PsyTOM)
Problem Actualization	71 (7.5)	32 (5.8)	38 (9.9)	“Above all, that I faced my fears so often and repeated so many things again and again.” (PT, PsyTOM)

Symptom Reduction	32 (3.4)	19 (3.3)	13 (3.4)	“Getting my sleep problems mostly under control gives me more energy and—quite literally—a clear head again.” (BC, POT)
Medication	14 (1.5)	9 (1.6)	5 (1.3)	“Good Medication” (BC, POT)

Note. BC = Blended Care; PT = f2f-psychotherapy; POT = PSYCHOnlineTHERAPY.

Discussion

This study explored how patients perceive empowerment in the context of outpatient psychotherapy, examining both conventional f2f-formats (PT) and novel BC formats. To our knowledge, this is the first qualitative investigation of empowerment in this setting. Based on responses to two open-ended questions from a large sample of patients from two RCTs, the analysis revealed several thematic categories that illustrate how empowerment is subjectively experienced and which factors patients described as contributing to this experience.

Patients reported feeling empowered in their everyday lives, in areas such as social contacts, work, and daily routines, as well as in terms of internal experiences, such as increased self-efficacy and self-worth. They also described using new coping strategies, including problem-solving, emotion regulation, and cognitive reappraisal, which helped them manage challenges more actively. These findings are consistent with prior quantitative research showing that empowerment in psychotherapy is closely tied to improved coping, a strengthened sense of control, and increased confidence in one's ability to handle daily tasks and social interactions (11, 12). While prior research found this for inpatient populations (11), chronic diseases (3, 12), and severe mental illnesses (11, 22), our findings expand this evidence by indicating that similar empowerment processes are also experienced by patients with diverse diagnoses undergoing psychotherapy in routine outpatient settings, including BC formats. Furthermore, our study's qualitative approach complements existing quantitative research by grounding the findings in patients' subjective experiences. Participants described concrete shifts in their everyday functioning, such as speaking up more confidently, managing tasks independently, and setting personal boundaries, as well as internal changes, such as feeling more competent, emotionally stable, and optimistic about the future. These findings also align with previous qualitative research into how patients experience empowerment in psychiatric contexts. For example, Tveiten et al. (16) found in a focus group study that patients in an acute psychiatric ward described

empowerment as gaining recognition, regaining dignity and self-worth, and assuming responsibilities in their daily lives. Dignity did not emerge as a theme in our outpatient sample, which may be due to the different treatment context. Unlike acute inpatient care, outpatient psychotherapy typically involves fewer institutional power dynamics, less disruption of personal autonomy, and reduced exposure to stigmatization or medication-related loss of agency. Consistent with our findings, Kampa (15) reported that in focus groups patients with affective and schizophrenic disorders mentioned experiencing empowerment as a sense of agency, which had a positive impact on hope, self-esteem, and subjective control. Participants emphasized the importance of taking responsibility and rediscovering resources. Allan and colleagues (17) found in a qualitative interview study that patients with schizophrenia felt empowered by an internet-based intervention in building self-confidence, particularly regarding managing their symptoms and potential relapses.

In our study, we found an overlap between the areas in which patients experienced empowerment and the sources they identified as the cause of these changes. For instance, strategies such as self-reflection, emotional coping, and cognitive reappraisal were mentioned not only as outcomes of therapy but also as mechanisms through which empowerment develops. This mutual reinforcement supports conceptualizations of empowerment as a recursive process, rather than a static endpoint (7, 9). Across both studies and treatment formats in our study, the therapeutic relationship and the structure of psychotherapy itself were the most frequently cited contributors to empowerment. In addition, some participants mentioned participatory decision-making as an empowering factor, which can be understood as an integral part of the therapeutic alliance. These findings are consistent with previous research emphasizing the central role of the relationship between patients and health-care providers and collaborative aspects for empowerment in psychotherapy (11, 12, 15, 16). Additionally, several patients described symptom reduction, such as relief from anxiety, improved mood, or better sleep, as both an experience of

empowerment and a factor that enabled further change. This is also a finding that has been observed previously in quantitative studies, for example by Rodolico and colleagues (11), who found that empowerment was inversely associated with symptom severity, or Stepanian et al. (12), who reported that empowerment-focused interventions led not only to increases in autonomy and self-efficacy but also to improvements in psychological health and quality of life. These patterns also resonate with broader research on therapeutic change mechanisms. In face-to-face psychotherapy, factors such as cognitive and emotional change have been identified as mediators of symptom improvement (23). Similarly, research on digital mental health interventions highlights mechanisms such as increased self-efficacy, cognitive flexibility, and mindfulness skills as central pathways of change (24). Our study shows that this is not only a statistical association but also a subjective experience for patients.

Psychological insight and motivational clarification emerged as core components of the empowerment process. Patients described developing a deeper understanding of their goals, internal processes, and past experiences. This increased clarity appeared to improve their sense of orientation in everyday life and supported a feeling of regained control. This finding echoes earlier qualitative research linking empowerment to processes of self-understanding and meaning-making (9, 16, 17).

Taken together, the factors identified as contributing to empowerment closely align with the well-established common factors of psychotherapy (25). These include the therapeutic alliance, experiences of mastery, personal meaning, and instillation of hope (26, 27). The experience of empowerment may reflect a subjective articulation of these broader therapeutic change processes, or alternatively, empowerment might be shaped by common factors in much the same way as other treatment outcomes in psychotherapy. From this perspective, empowerment doesn't have to be a separate process but may develop through the same dynamics that cause therapeutic change in general.

Patients described similar experiences of empowerment and contributing factors across both treatment formats, suggesting that the underlying processes of blended and f2f-psychotherapy may not differ substantially, at least based on the qualitative patterns observed. Surprisingly, only a small portion of patients in the BC group explicitly mentioned the digital intervention as a source of empowerment. One possible explanation is that patients may not have perceived the digital modules as a separate element but rather as an integral part of the wider therapeutic process. Alternatively, the digital elements may have functioned more as background support than as central agents of change, particularly if they were not discussed or reinforced during sessions. Recent qualitative findings from the POT trial suggest that the integration of digital and f2f-elements varies in practice. Some patients described using both modalities in a highly interactive and mutually reinforcing way, whereas others encountered barriers that prevented digital components from becoming an integral part of their therapy (28). This might be different in blended settings with greater emphasis on the digital component or in fully stand-alone self-help interventions. It is also possible that the open-ended questions did not prompt participants to reflect specifically on the digital components, thereby underestimating their perceived relevance. When mentioned, the digital components were described as accessible tools that supported autonomy, particularly between sessions or during moments of distress. This aligns with previous research suggesting that digital elements can support empowerment in therapeutic practice (4, 29). The qualitative insight showed that patients valued the digital component for offering psychoeducational content that helped them better understand their struggles. They also appreciated case examples that they could relate to and exercises that could be flexibly integrated into daily routines. In the study by Allan et al. (17), which focused specifically on an empowerment internet-based intervention patients also reported gaining insight into patterns and changes in their well-being through the use of self-monitoring tools. Additionally, they emphasized the value of the peer support feature in reducing feelings of isolation and

enhancing a sense of connection. Although social isolation may be particularly prevalent among individuals with schizophrenia, similar experiences are common across various mental health conditions and peer support could be a valuable feature also for blended interventions.

Overall, many responses blurred the line between empowerment, general symptom improvement, and other positive effects of therapy. This suggests that patients may not distinguish clearly between empowerment-specific processes and broader therapeutic benefits. Instead, empowerment may be experienced by patients as embedded within the wider process of recovery.

Strengths, Limitations and Implications for Future Research

This study has several notable strengths. Firstly, it draws on qualitative data from two large-scale randomized controlled trials, resulting in a rich and diverse sample of over 950 patients. Because the study was conducted in routine outpatient care and included patients with a wide range of mental health diagnoses, the findings are likely to reflect real-world clinical practice. By analyzing open-ended responses, the study provides a valuable insight into how patients subjectively experience empowerment in psychotherapy on a broad scale.

At the same time, several limitations should be considered when interpreting our findings. Of the 1,159 participants in the PsyTOM study, only around half could be included in this sub-sample ($n = 577$), and of the 495 participants in the POT study, only 374 answered at least one of the two questions. Patients who disagreed with the first question, "Many patients report that they feel stronger and more confident after therapy. Is this also the case for you?" may not have responded at all, which limits the generalizability of our findings. Their perspectives on what may have hindered a gain in empowerment are therefore not included in this analysis. Future studies may explicitly ask about factors that limited or prevented empowerment and may focus specifically on patients who didn't respond to therapy in order to better understand potential barriers to empowerment. Further investigation is particularly needed to understand how

specific elements of digital interventions, such as content, timing, and integration into the f2f-sessions, contribute to or hinder empowerment. While some patients in our study described digital modules as helpful tools for reflection and support, we did not explicitly ask about them. Additionally, our open-ended questions also did not distinguish between empowerment and general therapeutic change, some responses may reflect the broader positive outcomes of psychotherapy rather than empowerment itself. This limitation shows how difficult it is to operationalize empowerment in qualitative research and suggests that future studies should either refine the wording of their questions or use more targeted measures in conjunction with them.

Furthermore, while open-ended questions offer insights into patient perspectives on a large scale, they inherently limit opportunities for in-depth contextualization. Critics have argued that brief responses often lack the depth required for interpretive qualitative approaches and may be less suitable for rigorous qualitative work (30). Our study acknowledged this constraint by not aiming to develop grounded theory but to identify common themes across our patient sample. We addressed methodological limitations by conducting iterative coding and integrating findings with existing theoretical frameworks to enhance conceptual coherence. Additionally, we involved researchers with different therapeutic backgrounds in the discussion and refinement of the coding scheme to add interpretive depth. Future research should build on these findings by exploring patients' experiences in greater depth, for example, through interviews or focus groups. These methods provide richer contextual insights and can help overcome the limitations of brief open-ended survey responses (30). Such formats would also allow for an exploration of factors that may hinder the development of empowerment during psychotherapy.

Furthermore, while the sample's heterogeneity is a strength in terms of representativeness, it also introduces variability. We combined qualitative responses from two RCTs without conducting separate subgroup analyses by demographic or clinical variables such as age,

gender, symptom severity, or treatment response. As a result, potentially meaningful differences in empowerment experiences across subgroups may have gone undetected. Future studies could explore whether specific patient characteristics or treatment outcomes are associated with distinct patterns of perceived empowerment. A similar consideration applies to therapeutic orientations. Empowerment is conceptually closely linked to common therapeutic factors, which generally operate across therapeutic orientations. Therefore, we would not expect substantial differences in empowerment experiences between treatment approaches. However, it is possible that specific mechanisms emphasized in certain approaches (e.g. cognitive restructuring and self-management in CBT; experiential or relational processes in psychodynamic) could influence the way in which empowerment is experienced or fostered. While the PsyTOM trial incorporated various therapeutic approaches, the distribution in the total sample was uneven (CBT accounted for 752 out of 951 cases), rendering any comparative analysis across approaches inappropriate. Future research specifically designed to make such comparisons could examine whether certain aspects of empowerment differ across therapeutic traditions.

Additionally, the level of intercoder reliability was only substantial ($\kappa = 0.61$). This may be partly due to the brevity of most responses (typically one to three sentences), which limited interpretive context and made it difficult to differentiate closely related subcategories, for example between cognitive and emotional coping. Nevertheless, the coding scheme proved applicable across both datasets, treatment formats, and the different post-treatment assessment time points.

Lastly, quantitative research is needed to complement these findings and examine whether empowerment functions as an outcome and as a potential mechanism of change in outpatient psychotherapy and BC. Longitudinal studies could assess how changes in empowerment relate to symptom improvement, functional outcomes, or treatment adherence. Given that some patients in our study described symptom relief as both a result and a driver of

empowerment, it would be valuable to examine whether improvements in empowerment precede or follow symptom reduction, or whether both evolve in a reciprocal process. Such research could also help differentiate between general common factors that support change and factors that may be uniquely relevant to fostering empowerment.

Conclusions

This study provides qualitative insights into how patients experience empowerment during outpatient psychotherapy, including in BC formats. By analyzing open-ended responses from a large sample across two projects, we identified key domains in which patients felt empowered, such as everyday functioning, coping strategies, and self-perception, as well as the therapeutic processes they attributed these changes to. The overlap between experienced outcomes and perceived sources of empowerment suggests that empowerment is a dynamic process, not a static endpoint. While some patients mentioned the digital components, the therapeutic relationship and the structure of psychotherapy were identified as the most mentioned contributors. To fully leverage the potential of both digital and f2f-elements, blended formats should ensure a sufficient number of sessions and meaningful integration of online components into the therapeutic process. Our findings emphasize the continued relevance of interpersonal processes in both traditional and digitally supported treatment formats and point to the importance of understanding empowerment not only as an outcome but also as a potential mechanism of therapeutic change.

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Chapter 6

General Discussion

This dissertation focuses on investigating mechanisms of change and facilitating factors in blended care (BC), a treatment format that combines digital and face-to-face (f2f) elements. The overarching aim was to examine if BC shows similar patterns in mechanisms of change to f2f-therapy and which factors in design and implementation need to be considered. To address these questions, four empirical studies were conducted using the following complementary designs: participatory intervention development, meta-analysis, longitudinal modelling, and qualitative content analysis. The next section summarizes the main findings of each study, which are then discussed in a broader context.

6.1 Summary of findings

6.1.1 Study 1 Participatory development of a transdiagnostic BC intervention

The first study examined what therapists and patients want and need for successful psychotherapy in a blended setting, and how these perspectives could inform the participatory development of a transdiagnostic and transtheoretic intervention. Using an iterative approach involving expert interviews, focus groups and prototyping, the study revealed that both therapists and patients saw potential in BC to enhance flexibility, structure, and continuity between sessions. Therapists emphasized that digital components could support psychoeducation and homework while allowing more focused in-session work. However, they also highlighted barriers such as insufficient training, increased administrative load, and poor integration into existing workflows. Patients, in turn, valued the autonomy and availability that could be offered by digital tools but expressed reservations about technical usability, data privacy, and potential loss of personal connection. These insights informed the design of the digital intervention TONI, which offers a modular design for a flexible integration with f2f-sessions and transtheoretical and transdiagnostic content for the use in routine care. Overall, the study demonstrates that participatory development helps anticipate usage and implementation barriers and align BC

interventions with the needs, as well as working and living realities of both therapists and patients.

6.1.2 Study 2: The role of self-efficacy in internet-based interventions

The second study systematically reviewed and synthesized evidence on self-efficacy as an outcome, predictor, and mediator in internet-based interventions for mental health, including BC. It included 41 randomized controlled trials to clarify whether digital interventions enhance self-efficacy and whether self-efficacy contributes to therapeutic change. Across studies, digital interventions produced small to moderate positive effects on self-efficacy compared to control conditions, suggesting that self-efficacy can be improved through digital treatments. However, when examined as a predictor or mediator of outcomes, findings were mixed and partly inconsistent. Some studies found that higher baseline or early-treatment self-efficacy predicted greater symptom improvement, while others reported no or even reversed associations. Mediation studies provided partial support for self-efficacy as a mechanism of change. Several trials indicated that symptom reductions were partly explained by increases in self-efficacy, but the evidence was limited by the methodological quality of the studies. Overall, the results suggest that self-efficacy is a relevant, but not yet consistently demonstrated, mechanism in digital interventions. Self-efficacy appears to be both a modifiable outcome of treatment and a potential mechanism of improvement, but causal evidence is still lacking and very little studies investigated blended settings. The study therefore emphasized the necessity of longitudinal research to test temporal precedence and examine how self-efficacy compares to other process variables in BC. In this way, Study 2's findings provided the basis for the longitudinal modelling approach adopted in Study 3.

6.1.3 Study 3 Therapeutic alliance, self-efficacy, and agency as mechanisms of change in blended and routine psychotherapy

The third study used data from a large randomized controlled trial (N = 1,159) comparing a blended setting using the TONI intervention developed in study 1 to f2f-psychotherapy in routine outpatient care. It examined therapeutic alliance, general self-efficacy, mental health self-efficacy, and therapeutic agency as potential mechanisms of change using random-intercept cross-lagged panel models (RI-CLPM). This longitudinal approach allowed the differentiation between stable between-person differences and within-person temporal effects across four measurement points over six months. At the between-person level, higher general and mental health self-efficacy and stronger therapeutic alliance were associated with lower psychological distress and higher life satisfaction across both BC and f2f groups. Therapeutic agency, though less strongly related to symptom change, was associated with greater satisfaction with life, suggesting its link to broader aspects of functioning and well-being rather than direct symptom reduction. At the within-person level, increases in mental health self-efficacy, therapeutic alliance, and agency predicted subsequent improvements in outcomes. Effects on general self-efficacy were less consistent. Notably, in the BC group, higher-than-usual general self-efficacy at two timepoints predicted increased distress at the next time point, possibly reflecting intensified engagement with challenging therapeutic content in the more autonomous BC format. Overall, the study found no consistent differences between BC and f2f-psychotherapy in how these mechanisms operated, indicating that core therapeutic processes function similarly across formats. However, contextual nuances in BC may shape how self-efficacy unfolds, though this finding needs to be replicated.

6.1.4 Study 4 Empowerment in blended and routine outpatient psychotherapy

The fourth study explored how patients experience empowerment during psychotherapy, both in BC and traditional f2f-formats. Drawing on qualitative responses from a large outpatient sample from two RCT (N = 951), we examined how patients felt empowered by therapy, and which factors they perceive as contributing to this development. Patients described empowerment as a multidimensional experience including functional, emotional, and cognitive aspects. They reported greater competence in managing everyday life, improved coping, emotion regulation, and increased self-efficacy and self-worth. Empowerment was linked to both the therapeutic relationship and therapeutic context, including collaborative goal setting, and the opportunity to apply new strategies. These aspects were described as giving patients a greater sense of direction and control. The processes through which patients felt empowered and the factors they attributed this to were largely overlapping. Only a minority of participants explicitly referred to digital components, but when they did, these were described as supportive tools that helped transfer therapy content into daily life and support between sessions.

6.2 Interpretation of Findings

6.2.1 Mechanisms of Change in BC

A central question motivating this dissertation was whether BC activates similar or distinct patterns in mechanisms of change compared to f2f-therapy. Across Studies 2, 3, and 4, the findings point to a pattern of convergence rather than divergence. From a theoretical perspective, the integration of digital components into psychotherapy could be expected to modify mechanisms of change in several ways: by altering the timing and intensity of therapeutic contact, increasing demands for autonomous engagement, structuring therapeutic tasks more explicitly, or introducing the digital tool itself as a third party in the therapy context. Against these expectations, the present findings suggest that BC mobilizes these same pathways, even when

digital elements introduce new contexts for therapeutic engagement. Taken together, these results align with common factors theory, which emphasizes relational processes, expectations, and adaptive actions as central drivers of change regardless of therapeutic approach (Grawe, 1997; Lambert, 1992; Wampold & Imel, 2015).

The importance of alliance as a change mechanism in psychotherapy is well established (Flückiger et al., 2018). In this dissertation, alliance showed comparable associations with outcomes in BC and f2f-psychotherapy, aligning with studies showing that therapeutic relationships can be robustly maintained in blended formats (Askjer & Mathiasen, 2021). This is an important finding because therapists have voiced concerns about how the introduction of digital elements might affect the therapeutic alliance (Titzler et al., 2018; van der Vaart et al., 2014). A recent conceptual paper by Berger et al. (2025) on the therapeutic alliance in IBI settings provides a useful lens for interpreting these findings. Meta-analytic evidence suggests that alliance-outcome associations in digital contexts are positive and broadly comparable to those in f2f-therapy, though often somewhat smaller in magnitude (Aafjes-van Doorn et al., 2024). However, Berger cautions that similar alliance scores across treatment formats do not necessarily reflect equivalent relational experiences or processes. In digital interventions, high agreement on goals and tasks may sometimes indicate an initial procedural fit or structured alignment, rather than a dynamically co-constructed relationship. Expectations about the format and reduced reciprocity may influence how the therapeutic alliance is experienced (Berger, 2025). As Bielinski and colleagues (submitted) illustrate in a conceptual paper on the present and future of BC, the specific combination of digital and f2f-elements may shape the therapeutic alliance in distinctive ways. Digital components may carry aspects of the therapist's presence into patients' everyday lives, thereby sustaining a sense of connection between sessions. In this way, BC may support not only continuity of care but also continuity of the therapeutic relationship, potentially facilitating emotional regulation and autonomous engagement with therapy

outside the consulting room. These processes could cause the therapeutic alliance in BC to function differently than in purely in-person or fully digital formats and strengthen it, even if overall alliance ratings appear similar (Bielinski, submitted). This interpretation highlights the importance of understanding not only whether alliance is present in BC, but also how it is enacted in both in-person and digital contexts. Qualitative studies could provide more insight into the subjective experience of the therapeutic alliance in BC.

Study 2 showed that digital interventions enhance self-efficacy, and that it emerges as a mediator in multiple studies. This supports prior meta-analytic evidence that self-related beliefs are central processes in IBI (Angerer et al., 2025; M. Domhardt et al., 2021; Steubl et al., 2021). Study 3 extended this work to a blended and f2f outpatient context and showed that mental health self-efficacy predicted subsequent improvements in clinical outcomes at the within-person level. General self-efficacy, however, showed mixed results and was the only investigated mechanism that showed indications of a different temporal pattern across settings. These findings will therefore be discussed in more detail in the next section. Therapeutic agency showed a mixed pattern. While its temporal associations with symptom distress were less consistent, agency was associated with life satisfaction over time in both BC and f2f-psychotherapy. Looking at recent empirical evidence, both Huber et al. (2021) and Jennissen et al. (2022) identified agency as a mechanism that predicts changes in symptoms during psychodynamic outpatient psychotherapy. Specifically, Huber et al. (2021) discovered that increases in agency from one session to the next were followed by reductions in distress. In our study, however, this effect was less consistent. This discrepancy may reflect differences in the therapeutic context, given that our study included multiple therapeutic orientations and formats, including BC. Further research is needed to clarify these dynamics and explore how the combination with digital components might influence the relationship between agency and symptom change. Similar to the therapeutic alliance, the nature of agency may also change in BC. Digital

components require patients to initiate activities, engage with therapeutic material between sessions, and regulate their own pacing and intensity of their work. For some patients, this may strengthen agency by fostering initiative and self-directed engagement. For others, however, it may feel as if they must rigidly follow the IBI's requirements instead of actively shaping their therapeutic work. Qualitative findings from Study 4 further illustrate how patients experience agency in the context of empowerment by taking initiative, applying strategies independently, and reflecting on their role in the therapeutic process. These descriptions closely resemble Bandura's (1989; 2001) conceptualization of human agency, particularly the dimensions of intentionality, forethought, and self-reflectiveness. This pattern of overlap between patients' qualitative descriptions and the proposed mechanisms of change was not limited to agency but extended across the examined constructs. In Study 4, empowerment emerged as a broader experiential construct encompassing functional, emotional, and cognitive change. Patients described increased confidence, emotional stability, and perceived competence in managing everyday challenges - experiences that closely align with self-efficacy processes. At the same time, patients identified factors that they perceived as contributing to empowerment, most notably shared decision-making, collaborative goal setting, and the structure of therapy – all of which relate to the therapeutic alliance. Thus, our findings suggest that empowerment encompasses both the experience of change (e.g., self-efficacy and agency) and the process of facilitating change (e.g., therapeutic alliance and structure). In this context, empowerment could be understood as an integrative, patient-centered narrative that unites alliance, self-efficacy, and agency into a coherent experience of change. This interpretation also aligns with theoretical accounts in community and mental health psychology that conceptualize empowerment as both a process and an outcome, characterized by recursive strengthening of control, meaning, and engagement (Rappaport, 1987; Varela et al., 2025).

In sum, the findings from this dissertation suggest that BC relies on similar change processes identified in psychotherapy research more broadly. Alliance, self-efficacy, and agency appear connected, with empowerment reflecting a broader experiential integration of these constructs. The investigated processes did not appear to be substantially modified or disrupted by the introduction of digital components. This convergence supports the view that BC extends rather than transforms the underlying mechanisms of change. However, it should be noted that contrary to some BC studies that reported enhanced outcomes (Erbe et al., 2017; Kalde et al., 2024), the main outcome trial from which Studies 3 and 4 largely drew their data found no significant difference in effectiveness between BC and f2f-psychotherapy (Schaeuffele, 2024). In this trial, usage of the BC platform varied between users and remained, overall, at a relatively low level. It could be argued that the BC condition made little use of the digital components and was therefore too similar to the psychotherapy condition. This may have affected the search for distinct patterns in BC mechanisms. Also, as illustrated by the example of the therapeutic alliance, differences in mechanisms of change may not be apparent in numerical or effect patterns, but rather in qualitative differences in experience. The challenges in investigating mechanisms of change in BC will be discussed further in section 6.2.4.

6.2.2 Mixed and Counterintuitive Findings: The Case of Self-Efficacy

Despite the generally supportive evidence for self-efficacy as a mechanism of change, several findings across Studies 2 and 3 indicate that the picture is more nuanced. Study 2 showed that IBI reliably increase self-efficacy, but predictive and mediation effects were inconsistent across studies. Some trials showed that higher baseline or early increases in self-efficacy predicted symptom improvement, while others found no association, and a few reported inverse relationships. Study 3 mirrored this variability. While mental health self-efficacy showed consistent beneficial within-person effects, general self-efficacy produced unexpected patterns, including instances in the BC group where higher-than-usual general self-efficacy predicted

increased distress at the following time point but also increased satisfaction with life. These counterintuitive results require careful interpretation. Several explanations are plausible. First, conceptual clarity matters. General self-efficacy reflects a broad belief in one's ability to manage challenges, while mental health self-efficacy is more proximal to therapeutic goals. Bandura (1977) emphasized that self-efficacy is most predictive when domain-specific. The mental health self-efficacy scale that was used in study 3 assesses patients' confidence, across six items, that they can actively influence how much stress, anxiety, or depression affects their everyday life (e.g., "I can do things other than just taking medication to reduce how much my stress, anxiety, or depression affects my daily life" or "I will have periods in which I do not experience stress, anxiety, or depression") (Clarke et al., 2014). In contrast, the general self-efficacy short-scale assesses the patient's agreement with the following three statements: "In difficult situations, I can rely on my abilities."; "I can handle most problems well on my own."; and "I am generally able to handle even demanding and complicated tasks well." (Beierlein et al., 2013). From this perspective, the more consistent effects of mental health self-efficacy observed in Study 3 are not surprising. Its items are more closely aligned with symptom change and satisfaction with life, making the construct theoretically and empirically closer to the outcomes investigated. In addition, the mental health self-efficacy scale includes twice as many items as the general self-efficacy short scale, which may contribute to greater sensitivity in detecting within-person change over time. In general, the finding might suggest that domain-specific efficacy beliefs are more directly involved in processes of symptom change, whereas general self-efficacy captures a broader sense of confidence that does not necessarily lead to immediate clinical improvement. Therefore, the larger effects for general self-efficacy observed in Study 2 may reflect its role as a more global outcome of digital interventions rather than a mechanism that directly reduces symptoms. Second, timing effects may complicate the interpretation. Schleider (2024) argues that patient receptivity fluctuates over time, and mechanisms assessed at the

wrong moment may appear unrelated to outcomes or inconsistent. In BC, there may be periods that require patients to confront challenging material between sessions, temporarily increasing distress while still keep engaging with the online material. Higher self-efficacy may therefore coincide with greater willingness to attempt difficult tasks, leading to short-term discomfort while satisfaction with life is increased. This interpretation remains consistent with Bandura's concept of self-efficacy as confidence in one's ability to act, not as an indicator of immediate psychological well-being. Third, symptom profiles may influence self-efficacy dynamics. In depression, for example, low energy, anhedonia, and impaired motivation may weaken the translation of efficacy beliefs into sustained action. In such contexts, high general self-efficacy could create a discrepancy between perceived capability and actual behavioral capacity, potentially increasing distress. Fourth, contextual factors specific to BC, such as greater demands for independent work, may amplify the complexity of self-efficacy processes. Patients with high but unstable self-efficacy may feel pressured or overwhelmed by digital tasks if they perceive them as mandatory or poorly aligned with their needs. Study 1 already showed that mismatched content or insufficient tailoring can feel burdensome for both therapists and patients. Taken together, these findings suggest that self-efficacy may be an important mechanism in BC but not a universally straightforward predictor of change. Its effects may depend on timing, patient characteristics, the measurement (specific versus general self-efficacy) or the therapeutic context, which might need more detailed and more fine-grained measurements.

6.2.3 BC as a Therapeutic and Implementation Context

Study 1 showed that the development and implementation of BC interventions depend heavily on fit with both patient and therapist preferences. These factors also emerged as important themes in the broader literature on attitudes, experiences, and the implementation of BC (Löchner et al., 2025; Schuster et al., 2018; Urech et al., 2019).

6.2.3.1 Patients as active agents and users of BC.

Even though the World Health Organization recognized the importance of partnership with “people with lived experience of mental illnesses” more than a decade ago (Saxena & Setoya, 2014), the views and voices of patients in psychotherapy research are still underrepresented (Schleider, 2023). But the efficacy of interventions can only hold practical value in real-life implementation if they truly fit patient needs. This is particularly relevant in BC, where patients are required to engage actively with both f2f and digital components. User-centered design approaches, such as the IDEAS framework (Mummah et al., 2016), the Person-Based Approach (Yardley et al., 2015), and the DID framework (Mertens & Van Gelder, 2025), explicitly emphasize the inclusion of patients as primary users throughout intervention development. Although the uptake and adherence to digital interventions have improved in research settings, engagement remains low in routine mental healthcare (Ferraio Nunes-Zlotkowski et al., 2024). For instance, an observational cohort study of 15,882 patients assessed for digital-only treatment revealed uptake rates of just 22%, with adherence among those who commenced treatment reaching 68% (Cross et al., 2022). In contrast, a meta-analysis including 29 studies found substantially higher adherence rates in BC, averaging 81% (Ferraio Nunes-Zlotkowski et al., 2024). Evidence suggests that not all BC formats are equally effective in fostering engagement. Integrative designs, in which digital components are closely linked to f2f-sessions, appear more effective in sustaining adherence than supplementary or sequential formats, which show higher dropout rates (Ferraio Nunes-Zlotkowski et al., 2024). Engagement in psychotherapy is closely linked to the therapeutic alliance (Sharf et al., 2010). While IBIs often have comparable therapeutic alliance ratings to BC and f2f-psychotherapy (Berger, 2017), the blended context may provide additional relational and structural support to help patients stay engaged. This again raises the question of how the therapeutic alliance differs qualitatively in IBI and BC compared to f2f-therapy, as mentioned in section 6.2.1, and how this affects adherence and engagement.

6.2.3.2 Therapists as potential gatekeepers in BC.

Insights from Jordan and colleagues (2025) qualitative study, which analyzed therapists' decisions about who to include in the RCT from study 3 and 4 underscore an additional, implementation challenge: therapists' gatekeeping role in deciding which patients are invited to use BC. The results of this study imply that BC uptake is shaped not only by patient characteristics but also by clinician beliefs and perceived fit. Apart from technical requirements, psychotherapists in this study stated that the inclusion of patients into the BC trial depended on how stable they perceived the therapeutic alliance and that they would consider stopping BC if they viewed the digital component to be a threat to the alliance quality. Therapists acting as a gatekeeper in BC also emerged as an important topic in other studies investigating therapists' attitudes towards BC (Schröder et al., 2017; Schuster et al., 2018). From a mechanism's perspective, this suggests that therapists implicitly evaluate BC in terms of its capacity to support or disrupt therapeutic processes. Beyond individual patient considerations, perceived fit with therapists' working style and therapeutic orientation might also play a role in the decision of therapists to use a BC format. Although BC interventions have mainly been grounded in CBT, TONI the intervention examined in this dissertation was explicitly designed to be compatible with multiple therapeutic orientations, and psychodynamic and systemic therapists contributed substantially to the participatory development process in Study 1. The final intervention included elements aligned with these approaches, such as mentalization-focused exercises, reflective prompts, and interpersonal mapping tools, yet the vast majority of users in the trial were CBT therapists. While multiple psychodynamic IBI exist (Lindegard et al., 2020; Mechler et al., 2024), the integration in BC might pose a challenge in practice. BC, by design, introduces a degree of structure and task orientation that aligns naturally with CBT's procedural logic. In contrast, psychodynamic and systemic approaches often rely on more open-ended exploration, unstructured session flow, or emergent processes that may be harder to translate into the BC setting. Empirical findings illustrate both the challenges and the potential of BC beyond CBT. Baumeister and

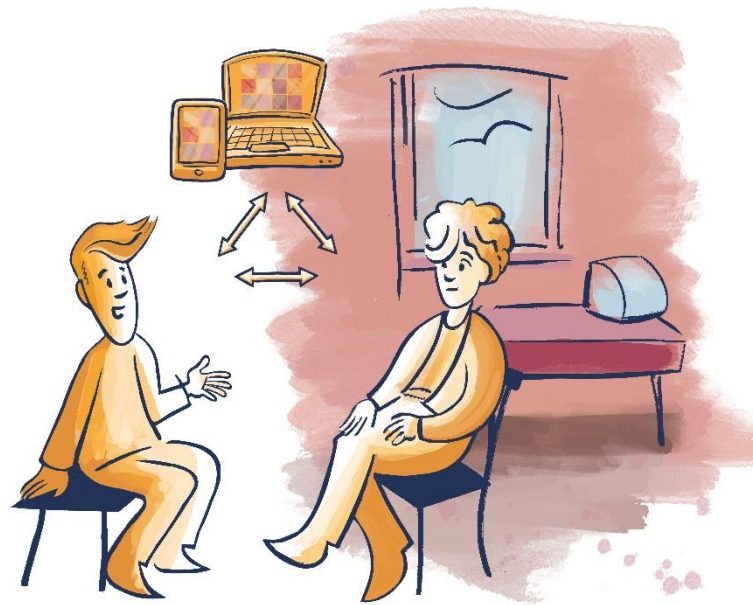
colleagues (2020) found that therapists working with depth psychology had lower acceptance for BC and that psychodynamic therapists profited more from an acceptance facilitating intervention for the use of BC than therapists with different approaches. A promising counterpoint comes from inpatient psychodynamic settings, where Zwerenz et al. (2017) showed that adding an IBI as an adjunct to inpatient psychodynamic psychotherapy resulted in significantly greater reductions in depressive symptoms compared to treatment as usual. However, this intervention functioned as an add-on within a highly structured inpatient setting, which limits its generalizability to routine outpatient care. Additional qualitative evidence underscores this challenge. An interview study by Fenski and colleagues (2023) with twenty outpatient psychodynamic therapists showed that, although many found online modules appealing, particularly for stabilizing work, deepening session content, and facilitating everyday transfer, they also had concerns about modality fit, including potential disruptions to open session structure, tensions with psychodynamic language and principles, and risks of shifting relational dynamics toward a more directive or “teacher-student” format. These findings suggest that the challenge is not merely adding psychodynamic or systemic content but addressing a deeper issue of attitudes and fit to the therapeutic approach. If so, then extending BC beyond CBT and making it suitable for transtheoretic application in routine care may require education on BC and flexibility in integrating the content (e.g., supplementary versus integrative). An ongoing multicenter pragmatic RCT (ClinicalTrials.gov ID NCT04337242) will provide more robust evidence by directly comparing blended versus f2f psychodynamic and CBT treatments. A recently launched RCT of blended Forensic Outpatient Systemic Therapy (FASTb) for adolescents with antisocial behavior (ClinicalTrials.gov ID NCT05606978) will examine whether a BC intervention is non-inferior to its traditional counterpart and which mechanisms determine its effectiveness (van Cappellen et al., 2023). The results of these studies will shed more light on the fit of BC for psychodynamic and systemic therapy and potential differences in mechanisms of change.

In the future, it will be interesting to find out if BC formats may support or challenge therapeutic processes differently, depending on how well they align with a therapeutic approach.

6.2.4 Why Mechanisms of Change in BC are Hard to Detect

Several methodological and conceptual challenges make change processes in BC difficult to capture, both in this dissertation and in general. First, BC involves two interacting modalities, digital and f2f, creating a therapy that is inherently complex to study. Patients move between in-session work and autonomous digital engagement, creating overlapping processes that are difficult to disentangle. Second, the routine care setting with variability in f2f-session and digital dose complicate mechanism analyses. In naturalistic settings, like the one in our study 3 and 4, patients engage with digital components to very different degrees, and therapists vary in how they incorporate digital material into sessions. This heterogeneity makes it difficult to detect temporal associations between the BC intervention and symptom change. Third, measurement timing is critical. As mentioned, Schleider (2024) highlights that mechanisms may be misidentified when assessments occur at times that do not align with patients' readiness for change. Weekly assessments, as in some psychotherapy studies, may capture rapid fluctuations, whereas monthly or broader measurement intervals, like in our study, may miss key micro-processes that occur during digital engagement or between sessions. Fourth, BC transforms the therapeutic structure from a dyad to a therapeutic triad consisting of patient, therapist, and digital intervention. This triad is illustrated in image 2, derived from the PsyTOM trial from Study 3 and 4. This structural shift has methodological implications: mechanisms of change must be examined in relation to all three relational configurations: patient-therapist, patient-digital tool, and potentially therapist-digital tool. For instance, therapeutic alliance should ideally be assessed twice: once regarding the patient's relationship with the therapist and once regarding the patient's relationship with the digital intervention. Current research, including the studies in this dissertation, typically measures mechanisms only within the patient-therapist dyad, potentially

Figure 2. Therapeutic Triad In BC



Note. Image from the PsyTOM trial.

missing critical processes occurring in the patient-digital relationship. Fifth, the subtlety of digital contributions must be considered. Digital tools may support existing mechanisms rather than introducing new ones. For example, they may enhance mastery experiences (supporting self-efficacy), provide structure (supporting agency), or increase transparency (supporting alliance via shared understanding). Such supportive effects may be real but incremental and thus small, making them difficult to detect. This subtle, background role of digital components is also reflected in study 4, where remarkably few participants spontaneously mentioned the digital intervention when discussing their therapy experience. Also, as illustrated in section 6.2.1 on the example of therapeutic alliance, mechanisms of change may be qualitatively rather than quantitatively different. Finally, BC mechanisms may depend on design characteristics, such as timing (before/after sessions), intensity, or personalization. Therefore, the absence of strong BC-specific mechanisms in this dissertation should not be interpreted as evidence that BC has no distinct processes, but rather that our current methodological tools and the naturalistic study design in these studies may not be sensitive enough to capture them. One potential BC-specific

mechanism could be the level of integration of digital content into the f2f sessions. Digital components may only influence mechanisms when therapists actively link module work to in-session themes, help patients interpret digital exercises, or use patient-generated data to structure the therapeutic agenda. In such cases, the digital material becomes part of the therapeutic process rather than a parallel activity. A second potential mechanism concerns the extent of therapist engagement between sessions, for example through brief feedback, asynchronous messaging, or comments on completed digital tasks. These small moments of contact may provide continuity, strengthen task agreement and the therapeutic alliance in general. However, these ideas remain hypothetical at this point.

6.3 Strengths and limitations

This dissertation has several methodological and conceptual strengths that enhance the interpretability and ecological validity of its findings. At the same time, important limitations must be acknowledged, some of which are inherent to conducting process research in routine care and BC contexts. Together, these strengths and limitations clarify the contribution of this work and delineate priorities for future research.

A central strength of the dissertation lies in its multi-method design, which combines participatory intervention development (Study 1), quantitative synthesis through meta-analysis (Study 2), longitudinal modelling of mechanisms (Study 3), and qualitative content analysis (Study 4). This combination made it possible to examine BC from different epistemological perspectives and to integrate insights from practitioners, patients, and empirical trial data. Another strength is the use of large, naturalistic samples from routine outpatient psychotherapy, particularly in Studies 3 and 4. Study 3 drew on data from a large randomized controlled effectiveness trial, which offers high external validity and allowed for robust longitudinal modelling. Study 4 used two large complementary datasets, allowing a rich qualitative analysis of

empowerment. These large samples provide a strong empirical basis for examining mechanisms and contextual factors in everyday psychotherapy settings. A related strength is the close connection to routine care and implementation realities. Whereas much process research is conducted in tightly controlled efficacy settings, the studies in this dissertation reflect the variability of actual clinical practice, including differences in therapists' theoretical orientations, session structures, caseloads, and the extent to which digital components are integrated into therapy. This enhances the relevance of the findings for understanding how BC functions when implemented in real-world environments. Finally, the dissertation benefits from the integration of quantitative and qualitative evidence.

Despite these strengths, several limitations must be considered. Many of the same features that strengthen ecological validity also introduce limitations. The naturalistic design is a clear example of such a double-edged sword: it increases real-world relevance but complicates the identification and interpretation of mechanisms. In Studies 3 and 4, therapists determined the frequency and structure of f2f-sessions, and patients varied widely in their engagement with digital components. This lack of standardization introduces heterogeneity in both the dose and timing of BC, which potentially obscures mechanism effects or reduces the detectability of BC-specific processes. Relatedly, the samples across studies, although large and drawn from routine care, were reflective of outpatient psychotherapy users but not necessarily the broader population of individuals with mental health conditions. Outpatient psychotherapy users are often not fully representative of the broader population with mental health problems: users skew toward women, younger adults, and the more educated, while older adults, men, migrants, some ethnic groups, and lower-education or lower-income groups are underrepresented (Leppänen et al., 2022; Olfson et al., 2025). Especially the concept empowerment is unlikely to function uniformly across all groups. Individuals facing discrimination or structural disadvantage may experience barriers to empowerment both in therapy and in digital contexts. Research in

psychotherapy shows that microaggressions, invalidation, and power imbalances can undermine therapeutic progress for marginalized groups (Arora et al., 2022; Bear et al., 2024). These factors shape both the likelihood of feeling empowered and the meaning empowerment holds. BC may mitigate some barriers (e.g., increasing privacy or autonomy) but exacerbate others, such as digital burden or cultural mismatch in module content. Future studies should therefore not only include more representative populations but also systematically assess these factors, for instance by examining microaggressions, perceived fit, and power dynamics as moderators of empowerment and other change mechanisms. Study 2, the meta-analysis, is limited by high heterogeneity across included trials. Although random-effects models account for some variability, differences in diagnostic groups, intervention intensities, and operationalizations of self-efficacy remain significant sources of noise. The heterogeneity in self-efficacy measures and applied interventions likely contributed to the mixed findings regarding the predictive and mediating role of self-efficacy. A conceptual limitation concerns the dissertation's focus on four mechanisms of change: therapeutic alliance, self-efficacy, therapeutic agency, and empowerment. Although theoretically justified, this selection excludes other potentially relevant processes, such as expectations/hope, emotion regulation, rumination, or meaning-making. While some of these emerged in Study 4, they were not examined longitudinally and thus were not tested as mechanisms. The dissertation therefore does not present an exhaustive account of change processes in BC. Another limitation involves measurement timing and granularity. The four measurement points in Study 3, collected across six months, are appropriate for modelling medium-term change but may miss micro-processes unfolding between sessions or during digital engagement. Finally, as BC formats vary widely, the findings cannot be generalized to all types of BC. Mechanisms may operate differently in approaches with differing digital intensity or therapist involvement between sessions. Taken together, these limitations point to structural

challenges in BC research and underscore the need for more granular, experimentally controlled, and design-sensitive studies.

6.4 Implications for Future Research and Clinical Practice

The findings and limitations of this dissertation suggest several important areas for future research and clinical practice. These concern two complementary domains: (1) the methodological advances required to study the mechanisms of change in BC with greater precision and causal clarity; and (2) the design considerations for the next generation of BC interventions that will support therapeutic processes and implementation in routine practice more effectively.

6.4.1 Methodological Priorities for Advancing Mechanism Research in BC

A major methodological implication of this dissertation is the need to move beyond correlational and medium-interval longitudinal associations toward designs that can provide causal and temporally fine-grained evidence for mechanisms of change in BC. Studies 2 and 3 identified self-efficacy, alliance, and agency as promising processes, but establishing their causal roles requires designs that systematically manipulate or closely track these mechanisms over time. BC is uniquely well suited for such research because digital components can be experimentally varied with high precision and measured continuously, enabling methodological approaches that are largely infeasible in purely face-to-face psychotherapy.

One priority is the direct experimental manipulation of hypothesized mechanisms. Micro-randomized trials (MRTs) and just-in-time adaptive interventions (JITAI) offer powerful ways to test proximal effects of specific digital features (Klasnja et al., 2015; Nahum-Shani et al., 2015). In MRTs, elements such as reminders, feedback messages, or reflective prompts are repeatedly randomized within individuals, allowing researchers to observe their momentary impact on variables such as self-efficacy, affect, engagement, or perceived alliance. Component

experiments could also systematically vary therapist behaviors linked to mechanisms, for instance, the depth of feedback on digital exercises, the frequency of between-session check-ins, or the autonomy given to patients when selecting modules. Such designs provide a more rigorous test of Kazdin's (2007) criteria for identifying mechanisms by examining whether enhancing a process deliberately produces changes in symptoms.

A second priority involves factorial and component-based designs that disentangle the contribution of specific blended ingredients. In digital mental health research, component trials, such as those by Furukawa et al. (2021), Šipka et al. (2025), and Watkins et al. (2023), have demonstrated how dismantling or factorial experiments can isolate active elements like behavioral activation, cognitive restructuring, or guidance intensity. Translating this methodology to BC would allow researchers to identify which aspects of the blend meaningfully contribute to therapeutic change. Relevant components include the degree of integration between digital modules and in-session work, the modality and intensity of therapist feedback, the sequencing and timing of modules, and the decision architecture determining how modules are selected (patient-driven, therapist-guided, or algorithmically assigned). Factorial designs can test combinations of these parameters to determine which configurations optimize processes for different patient populations.

A third methodological direction concerns fine-grained, temporally sensitive process measurement. Study 3 relied on four assessments across six months, which is appropriate for modelling medium-term processes but insufficient for capturing the rapid fluctuations that occur between sessions or during digital engagement. Ecological momentary assessment (EMA) and diary approaches can provide far more granular insights into short-term dynamics. EMA allows researchers to track momentary self-efficacy, emotional states, perceived support, or therapy-related reflections in everyday life, while simultaneously linking these patterns to digital usage logs. This could open the door to "mechanism mapping" across modalities,

identifying, for example, whether specific digital behaviors (e.g., starting a challenging module, completing an exercise, receiving feedback) are followed by immediate changes in mood, self-efficacy, or alliance. Such designs would reveal temporal sequences that are currently impossible to detect with traditional assessment schedules.

A fourth priority is to broaden research populations and contexts. The present dissertation examined routine outpatient psychotherapy in Germany, a context characterized by relatively high mental health literacy, education and mild symptom severity. To ensure generalizability, BC mechanism research must expand to other clinical groups, including children and adolescents, older adults, and those with severe mental illness. Mechanisms may operate differently across these groups, for example, alliance formation may require more scaffolding for younger patients, while autonomy-related processes such as agency or empowerment may need to be adapted for patients with severe symptoms. Cultural and linguistic diversity is equally important. Mechanisms like empowerment or agency may be conceptualized or experienced differently across cultural contexts, and digital components may need adaptation to accommodate varying norms around autonomy, help-seeking, and technology use. Future studies should therefore incorporate culturally sensitive measures and consider how mechanisms unfold within socioeconomically diverse populations.

Together, these methodological factors highlight the need for experimental manipulation, fine-grained temporal measurement, component testing, and the inclusion of broader and more diverse populations to advance mechanism research in BC. These efforts will enable future studies to clarify how BC works and how to design fitting interventions for diverse clinical and cultural groups.

6.4.2 Emerging Directions for Mechanism-Informed BC Interventions

Advancing mechanism research in BC requires not only methodological innovation but also consideration of how blended interventions are designed, and integrated in practice. The findings of this dissertation suggest that the impact of digital components in psychotherapy depends on their fit with patient needs, therapeutic context, and implementation. At the same time, developments in digital mental health indicate that the next wave of BC innovation might be shaped by two particularly promising and complex avenues of research: personalization of digital components and the integration of AI-based tools. This section outlines these emerging directions and discusses how they may influence future BC intervention development, the mechanisms they aim to activate, and the ethical and practical considerations that accompany them.

6.4.2.1 Personalization of BC components.

The findings of this dissertation indicate variability in the way patients and therapists engage with BC. This suggests that blended formats are unlikely to be effective as 'one-size-fits-all' solutions. While these findings do not directly address the effects of personalization, they align with broader conceptual arguments in psychotherapy research that emphasize heterogeneity in treatment response and the necessity of more tailored intervention strategies (Barber & Solomonov, 2019). Conceptually, personalization in IBI can be thought of as operating on at least four components: (1) content and its order, which psychoeducational elements or tools patients receive and when; (2) guidance, what kind of human or non-human support with a therapeutic aim is provided. (3) communication/alerts, the type and intensity of reminders, prompts, or push-notifications; and (4) UX/UI, how the intervention looks, feels, and is used (Hornstein et al., 2023; Schaeuffele et al., 2025; Zagorscak, 2025). In BC, all four components are relevant because digital modules are embedded in an ongoing therapeutic process. For example, in our case, the TONI intervention has a modular design and thus, the content can be

provided to patients completely flexible and fitting for the individual patient and therapy phase. It is up to the therapists to decide with their patients which modules to use and when (content). TONI was developed for the implementation in the context of routine outpatient care. The number of f2f-sessions can be chosen individually. How closely therapists monitor and integrate work done in TONI into their session is up to the therapist's decision (guidance). Patients can decide how frequently reminders are sent and therapists can choose to communicate with their patients via TONI or not (communication). The platform TONI looks mainly the same for all users. However, patients can personalize it to their needs by pinning important content on their start page and therapists can take notes in TONI on each patient (UX/UI). BC offers further possibilities than IBI for personalization. The way of blending the two components can be personalized on all dimensions introduced in the B-FIT framework by Bielinski and colleagues (Bielinski, submitted): if the emphasis is on the digital component or on the f2f-therapy, the degree to which digital and f2f-elements are intertwined, and the timing of the digital component (before, during, after the f2f-treatment). These examples also clarify, knowing which components are personalized is only a first step. It may be equally important to specify who makes the decisions on personalization (patient, therapist, algorithm, or a combination), and on what basis (symptom data, usage data, preferences, context factors). These decisions are likely to also influence mechanisms of change. For instance, allowing patients to choose modules might foster agency and empowerment, whereas algorithm-only choices might increase efficiency but risk reducing perceived control if not transparently communicated. A major challenge for advancing personalization research, already evident in IBI research, is the quality of reporting. Personalization is often implemented as one aspect of a complex intervention but is not described in enough detail to be linked to outcomes or mechanisms (Zagorscak, 2025). The same risk applies to BC trials: without transparent documentation of how digital elements were tailored, when they were offered, whether they were optional or prescribed, and how therapists

incorporated them into sessions, it remains difficult to compare studies, or identify which “blend” works for whom. Existing reporting standards such as CONSORT for RCT (Hopewell et al., 2025) or PRISMA for systematic reviews (Page et al., 2021) have already become established. More intervention-focused frameworks such as TIDieR (Hoffmann et al., 2014) offers a foundation for specifying the rationale, materials, providers, and dosage of interventions, but do not fully address the complexities of personalization in IBI or BC. Zagorszak and colleagues (2025) addresses this gap and developed the ADAPT-I checklist that supports detailed reporting of what IBI components are personalized, on what basis, and through which decision agents. For BC, however, further extensions will likely be needed to account for personalization in the blend. To date, there are very few studies investigating personalization in BC. One study by Friedl and colleagues (2020) examined whether the Personalized Advantage Index could support individualized allocation to BC versus treatment as usual in depression and identified different predictors for each condition. Another study by Wentzel and colleagues (2016) introduces the “Fit for Blended Care” framework, which focuses on assessing organizational, therapist, and patient prerequisites for implementing BC. However, these studies primarily address whether BC is suitable for specific individuals or settings, rather than how BC interventions themselves can be personalized. Consequently, many nuances of intervention personalization remain largely unexplored in BC research even though such insights could inform intervention development and provide contextual knowledge for studying mechanisms of change in BC.

In summary, personalization is a promising but underdeveloped avenue for BC research. Future studies should not only test whether BC is effective but also identify which personalization strategies can optimally facilitate mechanisms such as alliance, self-efficacy, agency, and empowerment.

6.4.2.2 Integrating AI Technologies into Blended Psychotherapy.

A rapidly emerging frontier in digital mental health is the integration of artificial intelligence

(AI) tools into therapeutic workflows, particularly conversational agents and large language models (LLMs). In the context of BC, AI systems could complement f2f-psychotherapy and support personalization by providing structured feedback or offering continuity between sessions. However, the findings of this dissertation suggest that such integration must be approached with consideration of its potential impact on the mechanisms of change and on fit with patients' and therapists' preferences. Potential benefits include increased accessibility and scalability, as AI-driven tools can deliver continuous support and reach populations with limited access to psychotherapy - much like other IBI (Stade et al., 2024; Zhang & Wang, 2024). Early-stage trials suggest that AI tools can provide short-term reductions in anxiety and depressive symptoms and achieve therapeutic alliance ratings comparable to those of traditional psychotherapy and IBI (Bodner et al., 2025; Heinz et al., 2025; Zhang & Wang, 2024). However, the most comprehensive systematic review to date (Bodner et al., 2025) concluded that, although AI chatbots appear feasible and acceptable to users, current evidence is insufficient to determine their efficacy or safety in clinical practice, particularly regarding long-term outcomes and risks such as emotional dependence or parasocial relationships.

Risks and Regulations

The opportunities of AI coexist with substantial risks that are relevant to the therapeutic context, particularly for constructs such as alliance, agency, and empowerment. An 18-month ethnographic and practitioner-informed analysis by Iftikhar et al. (2025) evaluated 137 counselling sessions with LLM-based "AI counselors". The authors identified ethical violations across five core themes: (1) lack of contextual understanding, with oversimplified, one-size-fits-all interventions; (2) deceptive empathy, in which anthropomorphic statements ("I hear you," "I understand") created false impressions of emotional attunement; (3) unfair discrimination, manifesting as biased or culturally insensitive responses; (4) poor therapeutic collaboration, limiting user agency and misaligning with client-led therapeutic goals; and (5) inadequate

safety and crisis management, disproportionately impacting users with limited clinical knowledge or digital literacy. As the authors conclude, “reducing psychotherapy, a deeply meaningful and relational process, to a language generation task can have serious and harmful implications in practice” (Iftikhar et al., 2025, p. 1311). The importance of therapeutic alliance as a mechanism of change with a collaborative, co-constructed nature stands in contrast to AI systems that lack contextual understanding of a patient’s unique circumstances. Automated feedback may be misinterpreted as empathic or relationally meaningful, potentially altering alliance dynamics or shifting agency away from the patient and toward the system. AI-generated suggestions framed with high confidence may undermine agency and empowerment by diminishing patients’ sense of authorship over therapeutic decisions. Moreover, unpredictable or opaque model behavior may erode the trust and collaborative meaning-making central to the therapeutic relationship. AI systems, therefore, introduce a new class of relational, ethical, and epistemic vulnerabilities that BC formats with traditional digital components do not face. Given these risks, the need for governance frameworks becomes increasingly clear. Legislative frameworks such as the EU AI Act (<https://artificialintelligenceact.eu>) will likely shape the future development and deployment of these systems by requiring robust risk and quality management, transparency, and documentation. It is also important to emphasize that the scientific evidence reviewed here represents a momentary snapshot of a rapidly evolving technological landscape. AI systems, particularly LLMs, undergo frequent updates that may alter their behavior, risk profile, and therapeutic potential. For example, recent model updates announced by OpenAI (2025) explicitly address high-risk areas such as psychosis- and mania-related content, suicidality and self-harm, and the prevention of emotional dependence. Internal evaluations suggest substantial but still incomplete reductions in problematic outputs regarding psychological topics approximately 40%. These developments indicate growing awareness within industry of the clinical risks. However, systematic, peer-reviewed research validating these

improvements is still lacking.

Blending AI and F2F Human support

An important question for BC research in the context of AI is whether blended formats could buffer or mitigate some of the known risks of standalone AI tools. BC is often described as offering “the best of both worlds,” counterbalancing the limitations of digital interventions through human clinical judgment, empathy, and personal support. Figure 2 is an illustration of a fictitious future-oriented case example by Löchner et al. (2025) which presents an ideal case scenario: an AI companion (“K-AI”) continuously monitors a patient’s (Alex) behavioral and emotional patterns. When necessary, K-AI motivates the patient to seek help with a human practitioner, Dr. Vega. Dr. Vega reviews the data collected by K-AI. This data provides a dynamic and comprehensive overview of Alex's mental health, showing patterns that traditional diagnostic methods could not offer. Together, they develop a personalized, adaptive treatment plan. This incorporates digital interventions, such as mental health apps and virtual reality exposure therapy (VRET), as well as just-in-time adaptive interventions (JITAI), which deliver support based on real-time data. K-AI continuously monitors Alex’s mental state and provides tailored interventions. While K-AI enhances his treatment, it is Dr Vega’s human expertise that ensures the interventions remain in a personal space and clinically grounded, especially during critical phases. Together, Alex and Dr Vega develop a long-term strategy incorporating continuous monitoring, self-care practices, and clear relapse prevention measures (Löchner et al., 2025). Initial empirical evidence suggests that such hybrid human-AI arrangements may be beneficial under specific conditions. In one of the first real-world studies to examine the integration of generative AI into psychotherapy, Habicht et al. (2025) investigated the use of an AI-enabled therapy support tool alongside human-led group CBT in routine care. This observational study found that patients who received AI-supported guidance between sessions had higher attendance rates, lower dropout rates, and higher rates of reliable improvement and recovery compared to those using standard workbook-based materials. Importantly, the AI tool

Figure 3. Blending AI And F2F Support: The Case Of Alex

Alex begins experiencing serious mental health challenges.



K-AI detects concerning changes through digital phenotyping.



Alex meets Dr. Vega, who reviews the real-time data collected by K-AI.



Alex's treatment involves virtual reality exposure therapy.



K-AI continuously monitors his mental state and provides tailored JITAs.



Alex and Dr. Vega establish a long-term strategy, combining AI-driven support with human expertise.



Note. Based on the case example by Löchner et al. (2025).
Images produced by the author with ChatGPT (OpenAI, 2025).

did not replace therapist contact or deliver independent treatment; it was explicitly designed to support engagement with therapeutic exercises between sessions. Qualitative findings from this trial in a nonclinical population further indicated that patients primarily experienced the AI tool

as a means of gaining clarity, reflecting on their problems, and applying coping skills in daily life (Habicht et al., 2025). These functions are closely aligned with self-efficacy and agency, suggesting that the use of AI-based BC could enhance mechanisms of change. While these findings are preliminary, they suggest that AI systems could augment f2f-therapy when integrated into clearly defined, human-led therapeutic structures. Yet such seamless hybrid collaboration may be difficult to realize in practice. Evidence from human-AI collaboration research more broadly suggests that combining humans and AI does not automatically yield additive benefits. A recent synthesis by Vaccaro et al. shows that human-AI combinations frequently perform worse than the strongest humans or AI systems alone. Failures tend to occur when the boundaries of responsibility are unclear, when humans over- or under-trust AI suggestions, or when coordination demands exceed the benefits of augmentation. This raises the question of what an optimal blended AI design might look like. One possibility involves clearly defined human-AI loops, in which the AI system is explicitly shaped to support the therapeutic process. In these loops, AI systems could be trained to redirect users to therapists when emotionally charged or crisis-relevant topics arise. They scaffold reflection instead of providing interpretations and summarize themes for later discussion in therapy, rather than guiding clinical decisions. Most importantly, they would acknowledge uncertainty and establish transparent boundaries by positioning themselves as supportive tools rather than therapists. Such designs position AI as a facilitator of between-session engagement, not a surrogate therapist. They also could help preserve alliance, agency, and empowerment by ensuring that interpretation, emotional attunement, and shared decision-making remain within the therapist–patient relationship. As Berger (2025, p. 346) fittingly cited “engaging with a chatbot is like hearing a warm, reassuring voice in an empty room. The words may be comforting, the tone just right - but in the end, no one is truly there”. True empathy requires real human presence. Future studies should examine hybrid human-AI collaboration models, asking how AI can support, rather than replace,

clinicians in ways that preserve mechanisms of change, and uphold ethical standards. Without such safeguards, AI systems risk undermining the very processes that make psychotherapy effective.

6.5 Conclusion

BC has been proposed as a way to combine the strengths of digital interventions with those of f2f-psychotherapy, yet knowledge on how BC works and how this should influence intervention development are largely unclear. This dissertation sought to contribute to this developing field by examining BC from multiple angles combining participatory development, meta-analysis, longitudinal modeling, and qualitative analysis. The findings across studies suggest that BC draws largely on well-established therapeutic processes rather than introducing fundamentally new ones. Mechanisms such as therapeutic alliance, self-efficacy, agency, and empowerment appeared to operate in both blended and traditional formats, and the digital elements examined here did not substantially modify their function. Instead, digital components seemed to support these processes. At the same time, the results highlight areas of complexity and uncertainty. Some associations, most notably those involving general self-efficacy, need to be studied in more detail. Moreover, because a big part of the empirical work in this dissertation was conducted in routine outpatient care, variability in therapist behavior, patient engagement, and digital use may have obscured potential BC-specific processes. Thus, the absence of clear differentiated mechanisms should not be interpreted as evidence that such processes do not exist, but rather as first evidence and reminder of the methodological challenges inherent in studying psychotherapy as it naturally unfolds. The studies in this dissertation highlight several areas that could be prioritized in future research: more precise measurement and experimental manipulation of mechanisms, investigation of the effects of personalization strategies, and the potential of BC to mitigate the risks of using AI in mental healthcare.

Overall, this dissertation offers insights into how BC engages mechanisms of change in psychotherapy, while also underscoring how much remains to be explored. As digital mental health evolves, the challenge is not to replace what works but to integrate technology in ways that preserve and enhance the processes through which meaningful therapeutic change occurs.

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List of Publications

Behr, S., Martinez Garcia, L., Lucas, J., Kohlhase, E., Puetz, M., Boettcher, J., Schaeuffele, C.,[°] & Knaevelsrud, C.[°] (2025). The role of self-efficacy in internet-based interventions for mental health: A systematic review and meta-analysis. *Internet interventions*, 40, 100821. <https://doi.org/10.1016/j.invent.2025.100821>

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Berlin, Dezember 2025

Solveig Behr