

Understanding Therapist Heterogeneity in the Post-Pandemic Use of Video-Based Psychotherapy: A Person-Centered Longitudinal Analysis of German Outpatient Psychotherapists

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Abstract

Background: Video-based psychotherapy (VBT) became an essential modality during the COVID-19 pandemic, enabling continuity of outpatient care despite social distancing measures. While adoption surged during the pandemic, little is known about how usage and attitudes evolved after restrictions were lifted. Understanding patterns of sustained use and the factors influencing acceptance can guide targeted implementation strategies.

Objective: This study examines changes in VBT usage, attitudes, and determinants among German outpatient psychotherapists before, during, and one year after the pandemic restrictions. Specifically, it assessed (1) frequency and purposes of use, (2) changes in perceived effectiveness and therapeutic factors, (3) determinants of acceptance and continued use, and (4) attitudinal profiles of psychotherapists based on a person-centered clustering approach.

Methods: A longitudinal partially repeated cross-sectional survey was conducted among German outpatient psychotherapists (N=296) during the pandemic (T1:2020/ 2021) and one year after restrictions were lifted (T3:2023). Measures included VBT usage frequency, perceived effectiveness, therapeutic change mechanisms based on Grawe's model, and determinants from the Unified Theory of Acceptance and Use of Technology for therapists (UTAUT-T). Sociodemographic, practice characteristics, regulatory perceptions, and digital affinity were recorded. Analyses combined longitudinal comparisons, theory-based regression modeling, and person-centered clustering to examine changes in VBT usage, attitudes, and acceptance. Descriptive statistics and non-parametric tests assessed temporal changes in usage, perceived effectiveness, and therapeutic factors. Based on the UTAUT-T framework, multiple linear regressions identified determinants of behavioral intention and actual use. Cluster analysis (hierarchical and k-means) classified psychotherapists into attitudinal profiles, which were compared using ANOVA and chi-square tests.

Results: Out of the 296 outpatient psychotherapists surveyed, 202/296 (68.2%) reported using VBT post-pandemic. Usage rose from 13/296 (4.4%) pre-pandemic to 240/296 (81.1%) during the pandemic and declined post-pandemically but remained above pre-pandemic levels, $Q(2)=357.2$, $P<.001$. Longitudinal data (117 therapists) showed balanced inflow and outflow of users (15, 12.8% new users; 14, 12.0% discontinuers; $\chi^2(1)=0.0$, $P=1.000$). Active users reported 50.7 (SD 57.4) VBT sessions with 10.9 (SD 11.3) patients annually, corresponding to 5.7% (SD 6.4) of caseload. VBT was rated less effective than face-to-face therapy (Wilcoxon, $P<.001$), with non-users assigning significantly lower ratings than users ($U=5638.00$, $P<.001$). Predictors of intention to use included Therapy Quality Expectation ($\beta=.513$, $P<.001$) and Ease of Use ($\beta=.213$, $P<.001$). Logistic regression showed that prior use ($OR=.25$, $P<.001$), perceived effectiveness ($OR=.36$, $P=.001$), professional internet use ($OR=.48$, $P=.029$), and regulatory awareness ($OR=.30$, $P<.001$) significantly predicted post-pandemic usage. A three-cluster solution based on UTAUT-T dimensions revealed Tech-Savvy Optimists (high acceptance and use, 92.6% users), Cautious Neutrals (moderate acceptance and use, 79.2% users), and Skeptical Traditionalists (low acceptance and use, 11.9% users). Cluster profiles differed significantly in VBT usage intensity, digital affinity, therapeutic orientation, pandemic usage, awareness of and perceived restrictions by

regulations, and perceptions of Grawe's therapeutic factors.

Conclusions: Post-pandemic VBT adoption among German outpatient psychotherapists remains heterogeneous, shaped by distinct attitudinal profiles that reflect deeper professional value orientations. Implementation strategies should be tailored to profile-specific needs, consider professional identity, and ensure regulatory clarity. These findings point to the central role of person-technology fit in sustaining digital innovations in psychotherapy. However, sustained implementation has boundaries; not all therapists will adopt VBT, even under favorable conditions, and some may view face-to-face therapy as more compatible with their values.

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Original Manuscript

Original Paper

Understanding Therapist Heterogeneity in the Post-Pandemic Use of Video-Based Psychotherapy: A Person-Centered Longitudinal Analysis of German Outpatient Psychotherapists

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Abstract

Background

Video-based psychotherapy (VBT) became an essential modality during the COVID-19 pandemic, enabling continuity of outpatient care despite social distancing measures. While adoption surged during the pandemic, little is known about how usage and attitudes evolved after restrictions were lifted. Understanding patterns of sustained use and the factors influencing acceptance can guide targeted implementation strategies.

Objective

This study examines changes in VBT usage, attitudes, and determinants among German outpatient psychotherapists before, during, and one year after the pandemic restrictions. Specifically, it assessed (1) frequency and purposes of use, (2) changes in perceived effectiveness and therapeutic factors, (3) determinants of acceptance and continued use, and (4) attitudinal profiles of psychotherapists based on a person-centered clustering approach.

Methods

A longitudinal partially repeated cross-sectional survey was conducted among German outpatient psychotherapists (N=296) during the pandemic (T1:2020/ 2021) and one year after restrictions were lifted (T3:2023). Measures included VBT usage frequency, perceived effectiveness, therapeutic change mechanisms based on Grawe's model, and determinants from the Unified Theory of Acceptance and Use of Technology for therapists (UTAUT-T). Sociodemographic, practice characteristics, regulatory perceptions, and digital affinity were recorded. Analyses combined longitudinal comparisons, theory-based regression modeling, and person-centered clustering to examine changes in VBT usage, attitudes, and acceptance. Descriptive statistics and non-parametric tests assessed temporal changes in usage, perceived effectiveness, and therapeutic factors. Based on the UTAUT-T framework, multiple linear regressions identified determinants of behavioral intention and actual use. Cluster analysis (hierarchical and k-means) classified psychotherapists into attitudinal profiles, which were compared using ANOVA and chi-square tests.

Results

Out of the 296 outpatient psychotherapists surveyed, 202/296 (68.2%) reported using VBT post-pandemic. Usage rose from 13/296 (4.4%) pre-pandemic to 240/296 (81.1%) during the pandemic and declined post-pandemically but remained above pre-pandemic levels, $Q(2)=357.2$, $P<.001$. Longitudinal data (117 therapists) showed balanced inflow and outflow of users (15, 12.8% new users; 14, 12.0% discontinuers; $\chi^2(1)=0.0$, $P=1.000$). Active users reported 50.7 (SD 57.4) VBT sessions with 10.9 (SD 11.3) patients annually, corresponding to 5.7% (SD 6.4) of caseload. VBT was rated less effective than face-to-face therapy (Wilcoxon, $P<.001$), with non-users assigning significantly lower ratings than users ($U=5638.00$, $P<.001$). Predictors of intention to use included Therapy Quality Expectation ($\beta=.513$, $P<.001$) and Ease of Use ($\beta=.213$, $P<.001$). Logistic regression showed that prior use (OR=.25, $P<.001$), perceived effectiveness (OR=.36, $P=.001$), professional internet use (OR=.48, $P=.029$), and regulatory awareness (OR=.30, $P<.001$) significantly predicted post-pandemic usage. A three-cluster solution based on UTAUT-T dimensions revealed Tech-Savvy Optimists (high acceptance and use, 92.6% users), Cautious Neutrals (moderate acceptance and use, 79.2% users), and Skeptical Traditionalists (low acceptance and use, 11.9% users). Cluster profiles differed significantly in VBT usage intensity, digital affinity, therapeutic orientation, pandemic usage, awareness of and perceived restrictions by regulations, and perceptions of Grawe's therapeutic factors.

Conclusions

Post-pandemic VBT adoption among German outpatient psychotherapists remains heterogeneous, shaped by distinct attitudinal profiles that reflect deeper professional value orientations. Implementation strategies should be tailored to profile-specific needs, consider professional identity, and ensure regulatory clarity. These findings point to the central role of person-technology fit in sustaining digital innovations in psychotherapy. However, sustained implementation has boundaries; not all therapists will adopt VBT, even under favorable conditions, and some may view face-to-face therapy as more compatible with their values.

Keywords: video-based psychotherapy; telehealth; teletherapy; digital mental health; technology acceptance; psychotherapist perspective; Germany

Introduction

The COVID-19 pandemic marked what Wind and colleagues called a “black swan” moment for mental health care [1]. Psychotherapists and facilities quickly switched mental health care to mainly video-based psychotherapy (VBT). Thus, VBT rapidly evolved from a niche solution into a central pillar of outpatient psychotherapy [2,3,4]. In Australia, for example, VBT accounted for 38% of all telepsychiatric contacts in private practice during the second quarter of 2020, and this figure rose to 42% in the following quarter [5]. Within the U.S. Veterans Health Administration, the proportion of VBT in mental health services increased from just 5% before the pandemic to 20% by mid-2020 [5]. Similar trends were observed in Italy, where 67% of psychiatric departments reported using VBT to replace face-to-face (F2F) sessions during lockdown [5]. In Germany, VBT experienced a sharp increase too: more than 40% of psychotherapy sessions were conducted via video during the first lockdown, rising to 57% during the second [6,7].

This rapid expansion, however, raises a critical question: Under what conditions do innovations like VBT persist once the extraordinary circumstances that initially facilitated their uptake have faded [8,9]? Since the end of pandemic-related restrictions, VBT usage has declined, yet not uniformly [10,11,12]. While some psychotherapists continue to integrate VBT into their routine practice, others have reverted to exclusively F2F formats. This divergence demonstrates the relevance of sustainability as a distinct and dynamic phase in the implementation process.

Sustainability refers to the extent to which an innovation, once implemented, continues to be delivered over time, yields sustained benefits for recipients, and is

supported by the ongoing capacity of the service system to maintain it [8,9,13,14,15]. Crucially, sustainability is not merely the continuation of an intervention under stable conditions, but involves ongoing adaptation, contextual alignment, and routinization [15,16]. The dynamic nature of sustainability is especially salient in psychotherapy, where practice patterns, therapeutic values, and regulatory environments continuously evolve. Moreover, sustainability depends not solely on demonstrated effectiveness but also on the alignment between an intervention and its users' professional routines, values, and competencies, which has been conceptualized within the framework of a person-technology fit approach [14,17].

To capture this complexity, we propose a multidimensional explanatory framework that reflects three relevant perspectives on sustainability of VBT in psychotherapy: technology acceptance, clinical process, and a person-centered perspective. These three perspectives were derived conceptually from prior theoretical models (eg, UTAUT-T, Grawe's change mechanisms, and person-technology fit theory) and empirical findings from implementation research. We argue that their combination provides a theoretically grounded and clinically meaningful lens to investigate sustainability in digital psychotherapy. Each perspective captures a distinct but interrelated aspect of what it takes for digital practices like VBT to persist beyond their initial uptake: Technology must be acceptable and usable, it must be perceived as clinically valid and effective, and it must fit the professional identity, values, and working styles of its users.

To investigate the sustainability of VBT in routine outpatient care, we conducted a longitudinal survey study among licensed psychotherapists in Germany. Anchored in the assumption that external constraints primarily drove initial VBT adoption during the pandemic, this study focuses on the post-pandemic phase. We aim to explain variation in sustained use by examining psychological, clinical, and attitudinal factors, framed within a multidimensional sustainability model.

Technology Acceptance Perspective

Given its widespread application in technology acceptance research, we conceptualized the technology acceptance perspective using the Unified Theory of Acceptance and Use of Technology for Therapists (UTAUT-T) [18], an adaptation of the original UTAUT model introduced by [19]. UTAUT synthesizes core constructs from several established frameworks, including the Theory of Planned Behavior (TPB) [20], the Technology Acceptance Model (TAM) [21], and the Innovation Diffusion Theory (IDT) [22].

Its goal is to offer a comprehensive model for explaining technology use intentions and behavior [19]. UTAUT-T consists of the following central predictors of technology acceptance: Ease of Use (eg, *It is easy to learn how to provide online therapy.*), Therapy Quality Expectancy (eg, *The quality of online therapy is the same as in-person therapy.*), Professional Support (eg, *My professional organization supports online therapy.*), Pressure from Others (eg, *People who influence me think that I should use online therapy.*), and Convenience (eg, *Working online is more convenient.*) [18,19]. Across studies, therapy quality expectancy has consistently emerged as the strongest predictor of therapists' intention to continue using VBT [18].

Clinical Process Perspective: Effectiveness and Change Mechanisms

Numerous studies have demonstrated the effectiveness of VBT, particularly in the treatment of depression and anxiety disorders. Overall, treatment outcomes are comparable to F2F psychotherapy [23,24,25]. Meta-analyses further confirm that VBT can achieve robust symptom reduction and high levels of patient engagement [26,27]. These findings provide strong empirical support for the effectiveness of VBT under routine care conditions.

However, evidence of clinical efficacy, while necessary, is insufficient to ensure sustained implementation in routine practice. In psychotherapy, sustained use depends on outcome data and psychotherapists' perceptions of clinical process quality [10,28,29]. Practitioners make decisions about continued use based on whether a modality allows them to carry out therapy aligned with their therapeutic values, standards of care, and professional identity [10,28,30]. This means that sustainability is closely tied to perceived process validity: the belief that VBT enables meaningful therapeutic work.

While outcome research has demonstrated that VBT can be as effective as F2F psychotherapy, this prompts a subsequent question that is highly relevant for clinical integration: how does change occur in VBT formats? Beyond symptom reduction, psychotherapists often evaluate the legitimacy of a treatment based on whether it enables the foundational therapeutic change mechanisms they deem essential. Understanding whether VBT supports these change mechanisms is therefore critical, not only from a theoretical point of view, but also as a determinant of psychotherapist endorsement and sustained use in everyday practice. To explore this dimension, this study examined psychotherapists' subjective appraisals of whether VBT supports core change mechanisms, as conceptualized in Grawe's [31,32] model of general change mechanisms. This model

provides a widely accepted framework for examining the clinical process perspective. These five mechanisms represent fundamental ingredients of effective psychotherapy across different therapeutic approaches: the therapeutic bond or alliance (*Can I build a trusting, collaborative relationship?*), problem activation (*Can emotionally relevant issues be accessed?*), motivational clarification (*Can clients explore and articulate their motives and goals?*), resource activation (*Are clients' strengths and coping capacities mobilized?*), and mastery (*Can behavioral change be practiced and reinforced?*). Psychotherapists' subjective evaluations of whether VBT enables these mechanisms are likely to influence their long-term commitment to the modality [10,28].

Emerging evidence suggests that certain mechanisms, such as resource activation and problem solving, can be effectively implemented via VBT [10,28]. However, concerns frequently center on the therapeutic relationship. Although some studies report marginally lower alliance ratings in VBT compared to F2F formats, these differences are not clinically significant and do not translate into poorer outcomes [26,29]. A recent meta-analysis confirmed that alliance quality in VBT is positively associated with treatment outcomes, reinforcing the centrality and attainability of a strong working alliance in digital formats [27]. Nevertheless, qualitative and quantitative studies reported limitations perceived by therapists, including restricted access to nonverbal communication, a diminished sense of presence and containment, and a perceived incompatibility between digital media and core therapeutic values or methods [12,30,33,34]. Some psychotherapists report a diminished sense of spontaneity or emotional resonance, particularly in sessions requiring deep emotional processing [35]. These constraints can prompt shifts toward more structured, verbally focused, and cognitively oriented therapy styles in VBT [28,34].

At the same time, VBT has introduced new therapeutic affordances. Many practitioners observe that patients appear more at ease in their home environments, facilitating openness and emotional expression [3,34,36]. Others emphasize the logistical advantages of VBT, including increased accessibility for patients with mobility constraints, time limitations, or geographical barriers [3,29,36,37]. The rapid transition to digital formats during the pandemic forced therapists to adapt their micro-skills: enhancing verbal precision, explicitly structuring sessions, and developing deliberate techniques to foster presence in the absence of embodied cues [10,28,35]. These adaptations highlight that VBT is not merely a digital translation of F2F therapy but a distinct therapeutic modality with unique demands, requiring conceptual flexibility and methodical reorientation.

Person-Centered Perspective: Heterogeneity in Therapist Profiles and Behavioral Patterns

While previous sections have focused on established predictors of sustained VBT use, such as perceived effectiveness and technology acceptance, these variable-centered approaches may only partially capture the complexity of decision-making in clinical practice. Indeed, sustained use is likely influenced by individual attitudes or competencies and by the combination of these factors within distinct therapist profiles. This introduces the relevance of a person-centered perspective, which shifts the analytical focus from isolated predictors to typologies of therapists characterized by shared constellations of attitudes, values, and behaviors.

Existing studies provide valuable insights into the determinants of therapist acceptance [28,30]. In particular, the machine learning approach of Békés et al. [38] provides a robust predictive model and highlights the importance of professional self-doubt, working alliance, and age as key variables for technology acceptance. This model revealed natural divisions within the therapist population and suggested that therapists can indeed be divided into different groups with different technology acceptance profiles.

Similarly, Lin et al. [39] reported that therapists perceived reduced common therapeutic skills and outcomes in VBT compared to F2F settings. Crucially, these perceptions differed systematically across demographic, experiential, and therapeutic orientation factors, indicating marked heterogeneity in how therapists evaluate VBT [39]. Such heterogeneity underscores the need for person-centered approaches.

However, to our knowledge, no other study used formal cluster analysis methods to systematically identify therapist types. Moreover, most studies are based on data collected during the COVID-19 pandemic, raising questions about generalizability beyond this exceptional context. These limitations highlight a methodological gap: while the predictors of acceptance are increasingly well understood, systematic person-centered analyses are lacking.

Such approaches are particularly suitable for implementation research, as they reflect grouped, context-sensitive behavior patterns rather than isolated predictors [40,41]. By applying cluster analysis methods, the present study aims to close this gap and identify different therapist profiles. We expect to discover several subgroups with different usage patterns. Identifying such profiles deepens the theoretical understanding of person-

technology fit and provides practical implications for targeted training, supervision, and implementation strategies.

We thus conceptualize actual VBT use as the behavioral outcome of the person-technology fit process. However, this outcome is not uniform across individuals: it is shaped by the specific ways in which therapists' technological expectations and clinical convictions align, or fail to align, with the affordances of VBT. Misalignments in one or more domains can result in disengagement, while positive alignment may support continued use. Bringing this into a person-centered framework allows for a differentiated understanding of these behavioral expressions: Usage is not merely a function of isolated variables but a reflection of profile-specific alignment patterns. The person-technology fit perspective helps explain why some therapists discontinue VBT despite favorable infrastructure and evidence of effectiveness, while others sustain it even under suboptimal conditions.

Research Objectives

The overarching aim of this longitudinal study was to investigate whether and under what conditions VBT has become a sustainable component of outpatient care after the COVID-19 pandemic. Specifically, we sought to identify the psychological, contextual, and attitudinal factors that shape the continued use of VBT beyond the initial phase of externally driven adoption.

First, we examined therapists' post-pandemic usage behavior, including usage frequency, patterns of application, and disorder-specific implementation. Second, we assessed the role of technology acceptance in shaping sustained VBT use, drawing on the Unified Theory of Acceptance and Use of Technology for Therapists (UTAUT-T) to explain both behavioral intention and actual usage behavior (Technology Acceptance Perspective). Third, we explored how therapists evaluate the clinical process quality of VBT, focusing on their beliefs regarding its capacity to support core therapeutic change mechanisms, and whether these evaluations varied across user groups and over time (Clinical Process Perspective). Fourth, we applied a person-centered analytical approach to identify meaningful subgroups of therapists based on attitudinal and behavioral constellations, thereby capturing practitioner heterogeneity in patterns of VBT use (Person-Centered Perspective).

This multidimensional approach allows for a differentiated understanding of how clinical, technical, and individual-level factors interact to influence the sustainability of digital psychotherapy in routine care. It further provides empirical guidance for the development of

tailored implementation strategies, including therapist-type-specific training, infrastructure support, and regulatory refinement.

Methods

Study Design

This study used a longitudinal, partially repeated cross-sectional survey design to examine the continuity of VBT usage among German outpatient psychotherapists after the COVID-19 pandemic. The study builds on initial data from Domröse and colleagues [7], with the first survey conducted between July 2020 and January 2021.

The design allows for both between-group comparisons to examine differences across subgroups of therapists (eg, users vs. non-users of VBT, or therapists with different therapeutic approaches) within each survey wave and within-subject analyses of therapists who participated in both waves to investigate changes in usage patterns, attitudes, and perceptions of VBT over time.

The paper was prepared according to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines [42] (the STROBE checklist is provided in Multimedia Appendix 3).

Participants and Recruitment

Participants were licensed outpatient psychotherapists practicing guideline-based psychotherapy for adults. For the second wave of the study, 1885 psychotherapists from the federal states of Brandenburg, Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, and Thuringia were contacted via postal mail.¹ After accounting for 281 (14.9%) undeliverable letters and 33 (1.8%) individuals relocated outside these regions, 1696 (90.0%) invitations were successfully delivered. Of the 299 (17.6%) questionnaires returned, 3 (1.0%) respondents were excluded due to missing information on their licensure status, a mandatory inclusion criterion. Thus, 296 (17.5%) responses were retained for analysis. 117/296 (39.5%) therapists also participated in the first wave, enabling longitudinal comparisons. This rate aligns with the expected range for postal surveys targeting specific professional groups such as psychotherapists, where response rates typically vary between 7.5% and 56% [43,44]. The high clinical workload typically associated with independent outpatient practice, along with the comparatively extensive nature of the questionnaire and

¹ Psychotherapists in these federal states are organized within the East German Psychotherapists' Chamber (Ostdeutsche Psychotherapeutenkammer, OPK). Study recruitment was restricted to this chamber, as access to membership data from other regional chambers was not available.

the longitudinal design of this study, likely influenced participation rates [45]. The survey was paper-based to reduce selection bias and ensure accessibility regardless of digital affinity.

Survey Instrument

The questionnaire was developed for the first wave and revised for the second with expert input from five VBT-experienced therapists. It comprised several structured sections and used a variety of response formats, including filter questions, dichotomous and multiple-choice items, Likert-type rating scales, completion options, and open-ended responses. Completion time was estimated at 20-30 minutes.

The survey included the validated UTAUT-T instrument [18], which assesses therapists' acceptance of VBT across seven dimensions: performance expectancy, effort expectancy, social influence, facilitating conditions, therapy quality expectancy, perceived professional support, and behavioral intention. The 21-item scale showed high internal consistency (Cronbach's $\alpha=.79$).

To assess therapists' appraisal of clinical effectiveness and change mechanisms, the survey included items targeting perceived general effectiveness, disorder-specific applicability, and the perceived enactment of Grawe's five general change mechanisms [31,32]: therapeutic alliance, problem activation, motivational clarification, resource activation, and mastery. These items aimed to capture therapists' process-level judgments of how well VBT supports core psychotherapeutic functions.

Additional sections collected sociodemographic data (eg, age, gender, therapeutic orientation), as well as indicators of digital affinity such as private and professional media use. VBT-specific usage patterns were also assessed, including frequency of use, patient characteristics, and contextual motivations. Filter questions were applied to differentiate between active VBT users and non-users, with tailored follow-up questions for each group.

Sample Size and Power

Sample size estimation was based on power analyses targeting a power of .90 at $\alpha=.05$ (2-tailed), following Cohen's criteria. For within-subject comparisons (eg, paired *t*-tests), a minimum sample size of $N=44$ is required to detect medium effects ($d=.5$). For multiple linear regression models with six predictors, reflecting the main UTAUT-T dimensions, a minimum of $N=98$ is recommended, while a more conservative estimate of

$N \geq 150$ -200 ensures sufficient power for detecting smaller effects and for stable model estimation.

For the cluster analysis, a sample size of at least $N=200$ was targeted to ensure meaningful subgroup identification with sufficient cases per cluster, particularly when including behavioral and attitudinal dimensions.

Ethical Considerations

Ethical approval was obtained from the DIPLOMA University of Applied Sciences Ethics Committee (ID: 1104 / 2024). Only participants who provided informed consent were included in this study. To support recruitment, participants were offered a lottery-based incentive [46,47].

Data Analysis

The analytic strategy combined longitudinal analyses with theory-driven modeling and person-centered classification, enabling a differentiated understanding of continuity and divergence in sustained VBT use. Most of the analyses were conducted in SPSS 29.0 (IBM, Chicago, USA). Analyses were conducted based on complete cases using listwise deletion. The proportion of missing values was low and randomly distributed across variables. In the descriptive data, missingness ranged from 0% to 1.7%. For items assessing usage frequency, 2.4% to 5.1% of responses were missing. Items evaluating the suitability of VBT for specific disorder groups showed 3.4% missing values. For the UTAUT-T items, missingness ranged from 0% to 3.0%. Therefore, no imputation techniques were employed. The following steps were implemented:

To examine how frequently and for which disorders VBT is used post-pandemically, descriptive statistics were calculated. Temporal comparisons of usage across three time points (pre-, during, and post-pandemic) were analyzed using Cochran's Q tests for dichotomous items, McNemar tests for pairwise comparisons, and Wilcoxon signed-rank tests for ordinal data.

The UTAUT-T scale's internal consistency was assessed (Cronbach's α), and construct validity was evaluated via subscale intercorrelations. A multiple linear regression model was used to predict behavioral intention to continue using VBT and actual usage behavior, based on performance expectancy, effort expectancy, facilitating conditions, social influence, and therapy quality expectations.

Wilcoxon signed-rank tests were applied for longitudinal comparisons to investigate changes in perceived VBT effectiveness and therapeutic process quality (change mechanisms based on Grawe). Between-group comparisons (eg, user vs. non-user) were conducted using Mann-Whitney U tests and chi-square analyses for categorical outcomes. VBT usage was operationalized following Leukhardt et al. [11], who define active users as those who have conducted at least 5 video consultations with a minimum of 3 different patients.

A two-step cluster analysis was conducted to identify subgroups of psychotherapists based on VBT acceptance. The following 5 variables from the UTAUT-T framework were included: therapy quality expectations, ease of use, pressure from others, professional support, and behavioral intention. All variables were standardized (z-scores) before analysis to ensure equal weighting. Cases with missing values on any of the variables included were excluded using listwise deletion. First, a hierarchical agglomerative cluster analysis using Ward's minimum variance method and squared Euclidean distance was applied to explore the underlying structure and determine suitable starting centroids. Second, a k-means clustering procedure (using the starting centers derived from the hierarchical solution) was performed to optimize within-cluster homogeneity and finalize the cluster assignment. To examine differences between the identified clusters, one-way analyses of variance (ANOVAs) with post-hoc Tukey tests were conducted for continuous variables, and chi-square tests were used for categorical variables. Effect sizes were reported as η^2 for ANOVAs and Cramér's V for chi-square tests.

All cluster analyses were conducted in R [48]. Data management, preprocessing, and reshaping were performed using *dplyr* [49], *tidyr* [50], and *tibble* [51]. Descriptive statistics, inferential analyses, and effect size estimation were carried out with *rstatix* [52] and *effectsize* [53]. Assumptions for parametric tests were evaluated with *car* [54] and *biotools* [55]. Cluster analyses and related visualizations were performed with *cluster* [56] and *factoextra* [57]. Data visualization was conducted using *ggplot2* [58] and table presentation with *gt* [59]. Data import from SPSS was facilitated via the *haven* package [60].

Results

Sample Characteristics

Table 1 summarizes the sociodemographic and professional characteristics of the $N=296$ participating outpatient psychotherapists, stratified by VBT usage status. The sample was

predominantly female (228/296, 77.0%), with a mean age of 50.5 (SD 9.2) years and an average of 12.6 (SD 8.0) years of professional experience. Most participants reported a cognitive-behavioral approach (227/296; 76.7%), followed by psychodynamic (70/296; 23.6%), psychoanalytic (12/296; 4.1%), and systemic (7/296; 2.4%) approaches². These data are comparable to data from similar studies [61]. Detailed information on the sample characteristics is provided in Table 1.

Table 1: Sample Characteristics

Characteristics	All	User*	Non-User
Gender			
N	296	202	94
Female	77.0%	78.2%	74.5%
Male	23.0%	21.8%	25.5%
Divers	0.0%	0.0%	0.0%
Age in years			
N	294	201	93
M	50.52	49.88	51.89
SD	9.16	8.98	9.43
Years working as a psychotherapist			
N	296	202	94
MW	15.7	15.0	17.3
SD	9.2	8.5	10.4
Years of working in outpatient psychotherapeutic practice			
N	296	202	94
MW	12.6	11.9	14.0
SD	8.0	7.7	8.5
Residence			
N	296	202	94
Missing	0.3%	0.5%	0.0%
Rural Area	18.2%	16.9%	21.3%
Small town	18.2%	15.9%	23.4%
Medium-sized town	24.0%	25.9%	20.2%
City	39.2%	41.3%	35.1%
Federal state in which practicing			
N	296	202	94
Brandenburg	19.6%	23.3%	11.7%
Mecklenburg-Western Pomerania	13.9%	13.4%	14.9%
Saxony	30.1%	30.2%	29.8%
Saxony-Anhalt	20.6%	19.3%	23.4%
Thuringia	15.9%	13.9%	20.2%
Therapeutic Approach			
N	296	202	94
Cognitive Behavioral	76.7%	80.7%	68.1%
Psychodynamic	23.6%	19.3%	33.0%
Psychoanalytic	4.1%	2.0%	8.5%
Systemic	2.4%	2.5%	2.1%
Contingents			
100%	41.6%	37.6%	50.0%
75%	1.7%	2.5%	0.0%
50%	56.5%	58.9%	50.0%
Private Internet use			

² In Germany, outpatient psychotherapists are typically trained and licensed in one or more of four guideline-based therapeutic approaches: cognitive behavioral therapy, psychodynamic therapy, psychoanalysis, and systemic therapy. Membership in one or more of these orientations is required for licensure and reimbursement within statutory health insurance.

N	296	202	94
Hourly	11.5%	11.9%	10.6%
Several times per day	67.6%	72.3%	57.4%
Daily	19.6%	14.9%	29.8%
Weekly	1.4%	1.0%	2.1%
Monthly	0.0%	0.0%	0.0%
never	0.0%	0.0%	0.0%
Internet use for psychotherapeutic practice compared to colleagues			
Missing	1.7%	1.0%	3.2%
Much more	1.0%	1.5%	0.0%
More	15.9%	20.8%	5.5%
On average	70.6%	69.8%	74.7%
Less	8.9%	6.9%	13.2%
Much less	2.1%	0.0%	6.6%

* After the Covid-19 pandemic (since 07.04.2023), at least 5 video consultations with at least 3 different patients

VBT Usage Patterns

Of the 296 therapists surveyed, 202/296 (68.2%) reported using VBT after the pandemic. Between April 2023 and April 2024, these users conducted an average of 50.7 (SD 57.4) sessions with 10.9 (SD 11.3) patients. Weekly, they held 1.9 (SD 2.5) VBT sessions, corresponding to 5.7% (SD 6.4) of their overall caseload. Information on psychotherapists contracted weekly service volume (eg, 50%, 75%, or 100% care mandates) is provided in Table 1 to contextualize these usage rates.

Before the pandemic, 13/296 (4.4%) used VBT. Usage rose to 240/296 (81.1%) during the pandemic and declined to 202/296 (68.2%) afterward (see Table 2). To assess changes over time, Cochran's Q test was applied to the proportion of users across the three periods, using the definition of active use as ≥ 5 sessions with ≥ 3 patients [11]. The test indicated a significant shift in usage rates, $Q(2)=357.2$, $P<.001$. Post-hoc McNemar tests (Bonferroni-adjusted) confirmed significant increases from pre- to during-pandemic ($P<.001$) and a subsequent significant decline ($P<.001$) in post-pandemic usage levels, which remained significantly above pre-pandemic rates ($P<.001$). The decline was primarily attributable to former users discontinuing VBT ($n=46$), with few new adopters ($n=4$).

Table 2: Frequency of VBT Use

	N	%
pre-pandemic (cut-off date March 16.,2020)		
user*	13	4.4
non-user	266	89.9
not working as an outpatient	17	5.7
during pandemic (March 16, 2020 - April 07, 2023)		
user*	240	81.1
non-user	50	16.9
not working as an outpatient	6	2.0

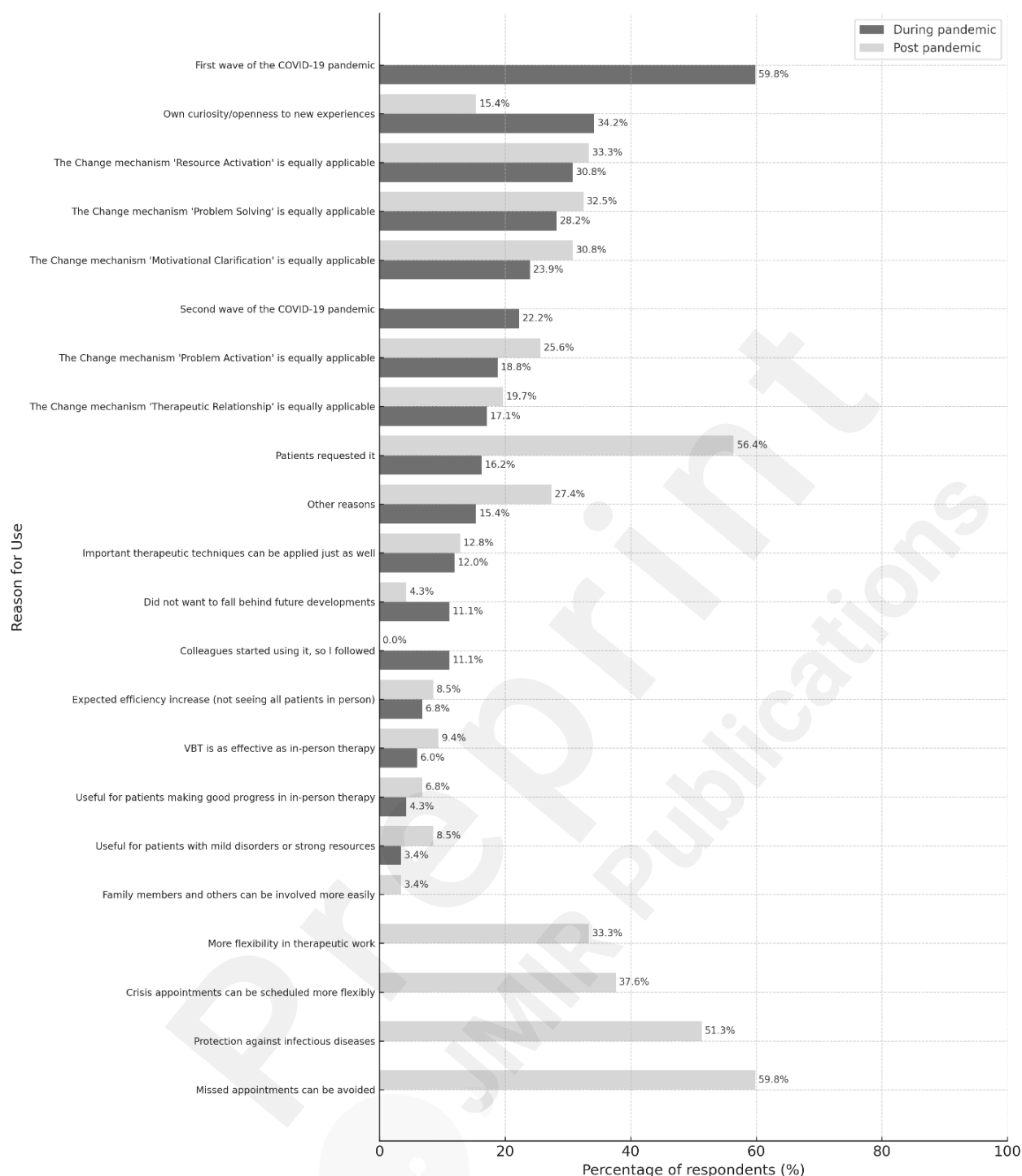
post-pandemic (since April 07, 2023)

user*	202	68.2
non-user	94	31.8

Note. "Not working as an outpatient" refers to respondents who were not yet practicing as licensed outpatient psychotherapists during the reference period but have since entered outpatient practice. User status was defined as having conducted at least 5 VBT sessions with at least 3 different patients.

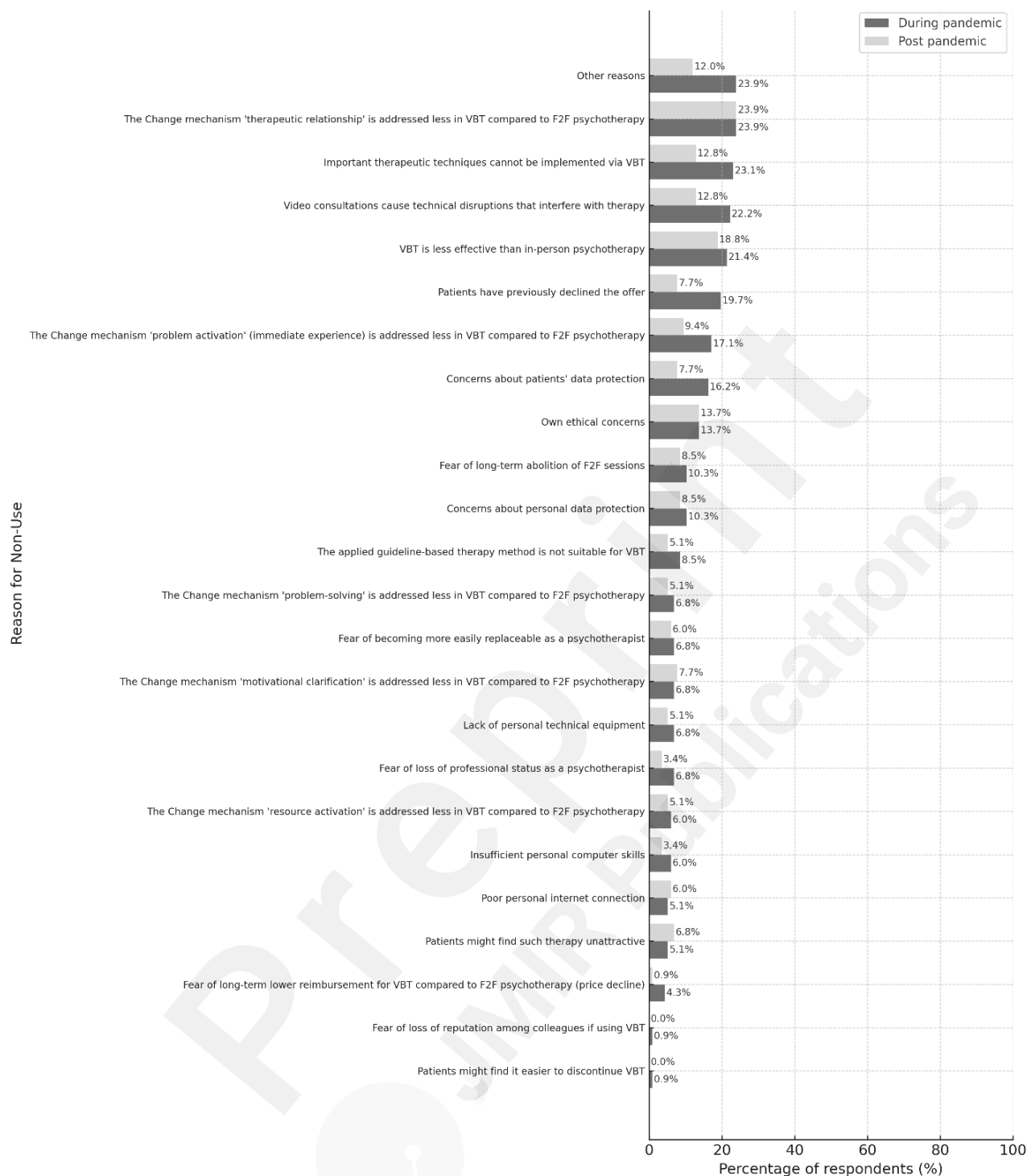
Among the 117 therapists who participated in both survey waves, 15 (12.8%) used VBT after not using it during the pandemic, while 14 (12.0%) discontinued its use. McNemar testing indicated no significant net change in user status, $\chi^2(1)=0.0$, $P=1.000$. Motivation patterns shifted notably between the two survey waves (see Figure 1). During the pandemic, therapists often cited acute factors such as infection waves, post-pandemic; these were replaced by more general health-related reasons (eg, infection prevention). Practical and patient-centered reasons, like *avoiding missed appointments* and *patient requests*, have increased post-pandemic. Flexibility in therapeutic work and the scheduling of crisis appointments played an important role as well. In contrast, exploration motives, such as curiosity, peer comparison, or future relevance, declined. At both time points, users consistently endorsed VBT's value for core therapeutic processes, even showing slight increases post-pandemic. Small increases were also observed in perceptions of effectiveness and the applicability of therapeutic techniques. Perceived barriers also changed over time (see Figure 2). The assumption that VBT is less effective than F2F psychotherapy has decreased slightly. Fewer patients were reported to decline VBT, and concerns about the applicability of important therapeutic techniques diminished. Technical disruptions were mentioned less frequently, and ethical concerns declined somewhat. Fears of psychotherapists becoming replaceable or of a permanent replacement of F2F sessions were less common. Reports of lacking technical equipment or insufficient computer skills decreased, whereas poor internet connection remained a stable barrier across both time points. Interestingly, worries that patients might perceive VBT as unattractive have increased slightly. References to change mechanisms being less well addressed in VBT also became somewhat less prominent as reasons for non-use.

Figure 1: Change in Reasons for VBT Use



Note. Normalized to sample size. Data of $N=117$ therapists who participated in both survey waves. Answer options *missed appointments can be avoided*, *protection against infectious diseases*, *crisis appointments can be scheduled more flexibly*, *more flexibility in therapeutic work*, and *family members and others can be involved more easily* were added in the second survey. Answer options *first wave of the COVID-19 pandemic* and *second wave of the COVID-19 pandemic* were not included in the second survey.

Figure 2: Change in Reasons for VBT Non-Use



Not

e. Normalized to sample size. Data of N=117 therapists who participated in both survey waves.

Therapists also reported which diagnoses they considered suitable for VBT. Perceptions of VBT's disorder-specific suitability were heterogeneous. While 92/286 (31.1%) respondents considered VBT suitable for all disorders, 38/285 (12.8%) viewed it as unsuitable for any. Most therapists, however, identified select conditions they deemed appropriate for VBT, including anxiety (123 mentions), depression (136 mentions), obsessive-compulsive disorder (80 mentions), adjustment disorders (148 mentions),

somatoform disorders (107 mentions), post-traumatic stress disorder (43 mentions), and eating disorders (72 mentions). Conditions like bipolar disorder (31 mentions), personality disorders (51 mentions), and substance use disorders (38 mentions) were named less frequently. Manic episodes (12 mentions) and schizophrenia-related conditions (4 mentions) were rarely rated as suitable.

Technological Acceptance (UTAUT-T)

Correlation and regression analyses were conducted to assess the relevance of UTAUT-T constructs for predicting therapists' intention to use VBT. Internal consistency coefficients for the UTAUT-T subscales are reported in the appendix (see Table A1). Behavioral Intention of VBT use was most strongly associated with Therapy Quality Expectation ($r=.764$), followed by Ease of Use ($r=.601$), Pressure from Others ($r=.514$), Professional Support ($r=.426$), and Convenience ($r=.327$). A multiple regression confirmed the predictive power of the UTAUT-T model: $F(5,286)=113.91$, $P<.001$, $R^2=.666$ (adjusted $R^2=.660$). The strongest predictors of Behavioral Intention were Therapy Quality Expectation ($\beta=.513$, $P<.001$) and Ease of Use ($\beta=.213$, $P<.001$). Pressure from Others ($\beta=.197$, $P<.001$) and Professional Support ($\beta=.108$, $P=.005$) also contributed significantly. Convenience was not predictive ($\beta=-.006$, $P=.874$). No multicollinearity issues were detected (tolerance $>.4$; VIF < 2.5).

A logistic regression was conducted to explore how additional contextual factors translated into actual usage status (user or non-user), including prior usage, digital affinity, regulatory awareness, and perceived clinical effectiveness. The model was significant, $\chi^2(5)=109.35$, $P<.001$, explaining 47.0% of variance (Nagelkerke R^2) and correctly classifying 82.6% of cases. Significant predictors were prior VBT use (OR=0.25, $P<.001$), perceived effectiveness (OR=0.36, $P=.001$), professional internet use (OR=0.48, $P=.029$), awareness of VBT regulations (OR=0.30, $P<.001$), and perception of regulations as restrictive (OR=0.60, $P=.004$). Full results are presented in Table 3.

Table 3: Logistic Regression Predicting Post-Pandemic VBT Use

Predictor	B	SE	Wald	<i>d</i>	P	OR	95% CI for OR
Constant	12.086	0.470	50.994	1	<.00	177300.54	
Prior VBT Use	-1.379	0.408	11.211	1	<.00	0.252	[0.113, 0.560]
Perceived Effectiveness	-1.033	0.313	10.728	1	.001	0.356	[0.193, 0.657]

Awareness of Regulations	-1.194	0.270	18.878	1	<.00	0.303	[0.178, 0.514]
Perceived Regulatory Restrictions	-0.512	0.176	8.210	1	.004	0.599	[0.424, 0.846]
Professional Internet Use	-0.740	0.336	4.763	1	.029	0.477	[0.247, 0.922]

Perceived Effectiveness and Clinical Process Quality

A Wilcoxon signed-rank test indicated a statistically significant difference in therapists' ratings of VBT and F2F therapy effectiveness ($P<.001$), with a median score of $Mdn=4$ (on a 5-point scale where higher values indicate lower perceived effectiveness) for VBT. This suggests that therapists generally evaluated VBT as less effective than F2F therapy in terms of overall treatment outcome. No significant differences were found between therapeutic approaches ($U=6391.50$, $P=.144$).

Longitudinal data from $n = 110$ therapists showed that 68/110 (61.8%) gave identical ratings at both time points, 27/110 (24.5%) rated VBT as less effective post-pandemically, and 15/110 (13.6%) as more effective. The Wilcoxon test for change over time showed no statistically significant shift ($Z=-1.85$, $P=.064$), indicating relative stability in therapists' evaluations.

A Mann-Whitney U test revealed significant differences in perceived effectiveness by user status ($U=5638.00$, $P<.001$): Non-users assigned significantly lower effectiveness ratings to VBT than users, suggesting that experience with the modality may shape its perceived value.

Group differences were also observed in therapists' assessments of general change mechanisms as described by Grawe [31,32]. While only 106/294 (35.8%) therapists agreed that VBT addressed essential change mechanisms comparable to F2F therapy, 187/294 (63.2%) believed certain change mechanisms were less well addressed, especially the therapeutic relationship (57.8%), problem activation (30.1%), and motivational clarification (13.9 %). A Chi-square test confirmed significant group differences in these evaluations ($\chi^2(2)=24.28$, $P<.001$). Specifically, 91/202 (45.0%) VBT users versus only 15/92 (16.3%) non-users agreed that VBT supports change mechanisms according to Grawe [31,32] to a similar degree as F2F therapy. Similarly, a separate Chi-square test showed that significantly fewer 97/110 (88.2%) users than 74/76 (97.4%) non-users rated the therapeutic relationship as weaker in VBT compared to F2F settings ($\chi^2(1)=5.12$, $P=.028$).

In terms of overall experience, most users reported favorable impressions of VBT. 138/202 (68.3%) users described their experience as positive or very positive, 62/202

(30.7%) as mixed, and only 2/202 1.0% as negative or very negative. The average rating was $M=2.19$ (SD 0.69) on a scale from 1 (very positive) to 5 (very negative).

Regarding the perceived therapeutic impact, 135/202 (66.8%) users reported that VBT supported the treatment process, and 145/202 (71.8%) users noted that patients responded positively. However, only 47/202 (23.3%) users observed explicit therapeutic gains, 40/202 (19.8%) users saw no significant effect, and 7/202 (3.5%) users experienced negative outcomes. Although 15/202 (7.4%) of users felt overwhelmed or dissatisfied, negative patient feedback was virtually absent (1/202, 0.5%). Despite the overall acceptance, many users reported challenges in therapeutic implementation. Common concerns included the risk of reinforcing avoidance behavior 100/202 (49.5%), reduced perceptual engagement 94/202 (46.5%), and lack of eye contact 52/202 (25.7%).

Therapist Heterogeneity: Person-Centered Profiles

As a first step, we examined differences in usage across therapeutic orientations and levels of digital affinity. Cognitive Behavioral therapists were significantly more likely to use VBT post-pandemic ($\chi^2(1)=5.70$, $P=.017$, $\phi=0.14$), while psychodynamic ($\chi^2(1)=6.64$, $P=.010$, $\phi=0.15$) and psychoanalytic therapists ($\chi^2(1)=7.03$, $P=.008$, $\phi=0.15$) showed lower usage rates. These differences should be interpreted with caution due to small subgroup sizes. No significant effect was found for systemic therapists ($\chi^2(1)=0.03$, $P=.855$; $n=7$). In terms of digital affinity, VBT users reported significantly higher digital affinity. Mann-Whitney U tests showed lower internet use among non-users, both in private ($U=8048.00$, $Z=-2.55$, $P=.011$) and professional context ($U=6710.00$, $Z=-4.54$, $P<.001$).

A two-step cluster analysis was conducted to identify subgroups of psychotherapists according to VBT acceptance, using clustering variables from the UTAUT-T framework. Five variables were included: Therapy Quality Expectation, Ease of Use, Pressure from Others, Professional Support, and Behavioral Intention. The UTAUT Convenience scale was excluded because, in preliminary analyses, it was not predictive of Behavioral Intention in this dataset.

Cluster validity was assessed using the average silhouette width, the elbow method (WSS), and the gap statistics. The silhouette analysis indicated the highest value for a two-cluster solution ($M\approx 0.35$), with decreasing values from three clusters onward ($k=3$: $M\approx 0.28$). The selected three-cluster solution yielded an average silhouette width of 0.22 (Cluster 1: 0.22; Cluster 2: 0.21; Cluster 3: 0.24), indicating moderate separation. Despite only

moderate internal validity, the three-cluster solution was preferred for theoretical and substantive reasons, reflecting heterogeneity in perceived usefulness, normative influence, and behavioral intention beyond a simple user/non-user dichotomy.

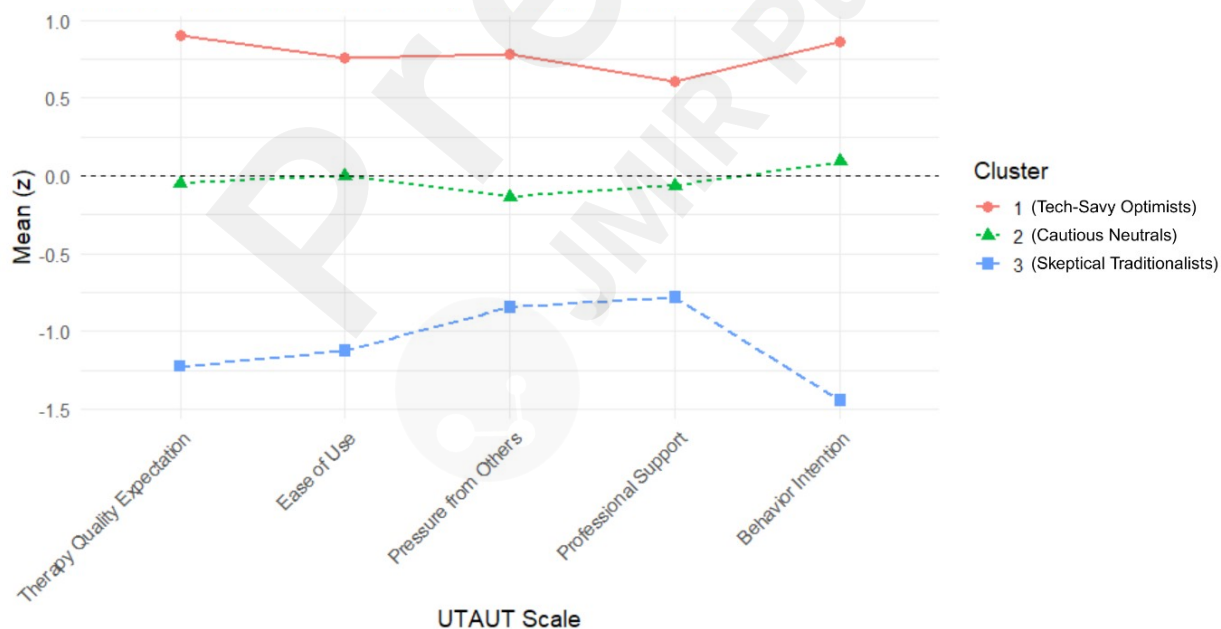
Figure 3 presents the z-standardized UTAUT-T profiles of the three clusters, which were labeled as follows:

Cluster 1–*Tech-Savvy Optimists*: High scores across all UTAUT dimensions, particularly Behavioral Intention.

Cluster 2–*Cautious Neutrals*: Moderate scores across all dimensions, with intermediate Behavioral Intention.

Cluster 3–*Skeptical Traditionalists*: Lowest scores across all dimensions, especially Ease of Use and Behavioral Intention.

Figure 3: Profile Plot of Cluster Means (z-scores) on UTAUT-T Scales



A MANOVA with cluster as the grouping variable and the five UTAUT scales as dependent variables yielded a significant multivariate effect, Pillai's Trace = 0.81, $F(10,574)=55.14$, $P<.001$. Univariate ANOVAs (Table 4) revealed significant between-cluster differences for

all scales (all $P < .001$), with effect sizes ranging from $\eta^2 = .266$ to $.726$. Post hoc comparisons consistently showed the pattern Cluster 1 > Cluster 2 > Cluster 3, with the largest difference between Clusters 1 and 3 on Behavioral Intention.

Table 4: ANOVA Results for Cluster Validation

Variable	F (df = 2, 292)	P	η^2
Ease of Use	135.00	<.001	.482
Therapy Quality Expectation	230.00	<.001	.614
Pressure from Others	85.80	<.001	.373
Professional Support	52.30	<.001	.266
Behavioral Intention	384.00	<.001	.726

Note: All between-group differences were statistically significant ($P < .001$).

Cluster membership was strongly associated with post-pandemic VBT user status, $\chi^2(2) = 131.11$, $P < .001$, Cramer's $V = .67$, 95% CI .57 to 1.00 ($N = 292$; Table 5). User rates were highest in Cluster 1 (88/95, 92.6%), followed by Cluster 2 (103/130, 79.2%), and lowest in Cluster 3 (8/67, 11.9%). Usage intensity also differed significantly between clusters (Table 6). Welch ANOVAs indicated significant differences in the total number of sessions, number of patients treated, weekly sessions, and percentage of caseload delivered via VBT (all $P < .001$). Cluster 1 reported the highest values in all measures, followed by Cluster 2, with markedly lower values in Cluster 3.

Table 5: Post-Pandemic VBT User status by Cluster Membership

Cluster	n (Cluster Size)	n (VBT-Users)	User Rate (%)
1	95	88	92.6
2	130	103	79.2
3	67	8	11.9

Note: $\chi^2(2) = 131.11$, $P < .001$; Cramer's $V = .67$, 95%-CI .57 to 1.00 ($N = 292$).

Table 6: Post-Pandemic VBT Usage Intensity by Cluster

Cluster	Total Sessions (M ± SD)	Total Patients (M ± SD)	Weekly Sessions (M ± SD)	% of Weekly Caseload (M ± SD)
1	66.84 ± 72.91	13.07 ± 12.98	2.24 ± 2.15	8.09 ± 7.75
2	30.29 ± 29.55	7.31 ± 8.79	1.42 ± 2.71	3.15 ± 3.46
3	15.00 ± 22.76	4.14 ± 6.31	0.55 ± 0.80	1.73 ± 3.32

Additional between-cluster differences were observed for pandemic usage, therapeutic orientation, age, perception of regulations, professional internet use, and perceived equivalence of Grawe's change mechanisms. A summary of key characteristics, usage metrics, and sociodemographic differences is provided in Table 7. Large effects were found for post-pandemic VBT usage status, pandemic usage rate, and professional internet use.

Moderate effects were observed for awareness of regulations and perceived regulatory restrictions. Cluster 1 generally exhibited the highest post-pandemic and pandemic usage rates, greatest awareness of regulations, and higher perceived regulatory restrictions, whereas Cluster 3 consistently showed the lowest usage rates, least awareness, and lowest perceived restrictions. Differences in age, therapeutic orientation, and perceptions of Grawe's therapeutic factors were also statistically significant, though with smaller to moderate effect sizes. No significant differences were found for prior VBT training.

Table 7: Cluster characteristics

Variable	Cluster 1 Tech-Savy Optimists	Cluster 2 Cautious Neutrals	Cluster 3 Skeptical Traditionalist s
Age (M±SD)	48.64 ± 9.86	50.12 ± 8.07	53.91 ± 9.46
Therapeutic orientation	77.7	84.5	62.1
CBT (%)			
Pandemic usage rate (%)	98.9	89.7	46.2
Grawe's change mechanisms equally addressed (%)	60	31.5	10.6
Awareness of VBT regulations (median; 1 = lowest, 4 = highest)	4	4	3
Perceived regulatory restrictions (median; 1 = lowest, 4 = highest)	3	3	1
Prior VBT training (% yes)	16.0	15.0	12.1
Professional internet use (median; 1 = lowest, 5 = highest)	3	3	3

Discussion

This study examined the post-pandemic sustainability of VBT among outpatient psychotherapists in Germany. By integrating technology acceptance, clinical process, and a person-centered perspective, we identified distinct usage patterns, predictors of sustained implementation, and subgroup-specific attitudes. Although VBT usage declined from pandemic levels, it remained significantly above pre-pandemic rates. Longitudinally, no significant net change in user status was observed among therapists who participated in both waves (during and post-pandemic). This suggests that those who had already integrated VBT into their clinical routines during the pandemic were likely to maintain its use thereafter. At the same time, those who had not adopted it were unlikely to begin using it post-pandemically.

Over time, acute pandemic-related drivers of VBT use were replaced by more general and practical reasons, with patient-centered motives (eg, avoiding missing appointments, flexibility, patient requests) gaining importance, while exploration motives declined. Therapists continued to value VBT for core therapeutic processes, with small post-pandemic increases in perceptions of applicability and effectiveness. Barriers shifted in a similar direction: doubts about effectiveness, patient refusal, concerns about therapeutic techniques, technical disruptions, ethical issues, and fears of professional replaceability decreased. Equipment-related obstacles also declined, though poor internet connection remained unchanged. Only concerns about patient acceptance increased slightly. These patterns suggest a normalization of VBT. As pandemic-specific reasons faded, practical benefits and therapeutic equivalence became more central, while technical and professional concerns lost significance. Beyond frequency, sustained use was shaped by multiple factors. Regression models showed that performance and quality expectations, ease of use, regulatory knowledge, and digital affinity predicted therapists' behavioral intention and actual VBT use. In parallel, perceived clinical process quality, particularly the ability of VBT to address core change mechanisms, was associated with sustained VBT use. Users rated both overall effectiveness and therapeutic mechanisms more positively than non-users.

Our cluster analysis revealed three distinct subgroups of psychotherapists with marked differences in attitudes, perceived barriers, and actual use.

Technology Acceptance Perspective

The UTAUT-T model provided a valid explanatory framework for VBT acceptance in the post-pandemic phase. Therapy quality expectation and perceived ease of use best predicted behavioral intention of VBT use, replicating prior findings from international samples [18]. Social influence and professional support also emerged as significant, albeit weaker, predictors. Notably, convenience did not significantly predict behavioral intention. In UTAUT-T, convenience refers to the extent to which VBT is perceived as saving time and effort by offering greater flexibility regarding location, access, and scheduling compared to F2F therapy [18,19]. Although convenience is frequently cited in this study and other studies [10,37,61] when therapists describe the advantages of VBT (eg, flexibility, logistical benefits, prevention of missed appointments), it appears less decisive when it comes to the actual intention to use VBT, where perceptions of therapy quality and effectiveness seem to play a greater role. This suggests that quality concerns override logistical considerations in long-term use.

Logistic regression further revealed that actual VBT use was significantly associated with perceived clinical effectiveness, prior use, digital affinity, and regulatory awareness. Interestingly, those who are more engaged with VBT are also more likely to perceive regulatory frameworks as overly rigid, perhaps reflecting frustration with ambiguous or evolving legal requirements. This underscores the importance of clarifying and streamlining policy guidelines for digital care.

The changes in reasons for VBT use and non-use suggest that VBT has moved from exceptional use to integration into routine practice. Regarding the Diffusion of Innovations framework [22], the focus shifted from trial and peer influence toward the recognition of relative advantage and compatibility with therapeutic goals. Within the UTAUT-T model [18,19], reductions in technical barriers and professional concerns reflect improvements in facilitating conditions, and effort expectancy, while rising emphasis on flexibility and patient-centered benefits highlights perceived usefulness, convenience, and social influence.

Perceived Clinical Process Quality and the Role of Change Mechanisms

Despite empirical support for VBT efficacy, therapists in this study, especially non-users, rated its clinical effectiveness lower than F2F psychotherapy. While the effectiveness of VBT is now well-established across diagnostic groups and settings, effectiveness alone is insufficient to ensure long-term sustainability. Therapists do not simply use interventions because they work; they continue because they work in ways that resonate with their

clinical logic and professional identity. In this context, Grawe's model [31,32] of general change mechanisms offers a valuable perspective. Our findings suggest that therapists' perception of how well VBT supports these mechanisms plays a crucial role in whether they continue to use it. Thus, sustained use hinges on outcomes and perceived process fidelity.

The therapeutic relationship, a cornerstone of Grawe's [31,32] change model and psychotherapy in general, was most frequently perceived as less well addressed in VBT. This concern has also been highlighted in prior qualitative and quantitative research [10,35,39]. Lin et al. [39] reported that therapists perceived reduced capacity to enact core therapeutic skills such as empathy, warmth, and alliance in VBT. Interestingly, these perceptions contrast with evidence from meta-analyses [27] showing comparable alliance ratings across formats. These seemingly divergent perspectives point to a potential perception-evidence gap. However, whether this discrepancy reflects limitations in alliance measurement tools, contextual factors in VBT implementation, or persisting reservations rooted in professional identity remains unclear. Future research should therefore aim to better understand how therapists experience and evaluate relational processes in digital settings, and under what conditions these perceptions deviate from standardized outcome metrics. However, a more nuanced picture emerges when considering user status. Active VBT users were significantly more likely to view the therapeutic mechanisms, especially resource activation and motivational clarification, as comparably addressable in VBT. This suggests that experiential familiarity may recalibrate expectations and reduce skepticism, potentially serving as a mechanism of sustained use.

Importantly, practical and patient-centered reasons, such as minimizing missed appointments or responding to patient requests, gained prominence as motivations for continued VBT use, replacing earlier pandemic-related rationales. This shift signals a transition from emergency response to functional integration, a hallmark of sustainable implementation [8,14].

Therapist Heterogeneity and Person-Centered Profiles

The cluster analysis identified three distinct attitudinal profiles that differed markedly in VBT usage, perceptions of applicability, and training needs. *Tech-Savvy Optimists* (Cluster 1, $n=95$, 32.5%) reported the highest adoption rates, the largest proportional VBT workload, and the most favorable evaluations of Grawe's therapeutic change mechanisms via VBT. In contrast, *Skeptical Traditionalists* (Cluster 3, $n=67$, 22.9%) reported the lowest VBT usage, the most pronounced doubts about its applicability, and low regulatory

awareness. *Cautious Adopters* (Cluster 2, $n=130$, 44.5%) fell in between, showing moderate use and generally reserved attitudes. Nearly half of the sample were *Cautious Adopters*, indicating that ambivalence and moderate engagement remain the most common stances toward VBT. About one third were *Tech-Savvy Optimists*, representing a substantial minority that has fully integrated VBT and evaluates it positively. Fewer than one quarter were *Skeptical Traditionalists*, suggesting that outright rejection is less common but still a relevant barrier. Overall, most therapists fall between enthusiasm and resistance, underscoring the need for targeted support to move ambivalent practitioners toward more confident and sustained use.

These findings also support the argument that sustained use is a function of alignment between technological and clinical beliefs, underscoring the theoretical utility of person-technology fit as a unifying concept. They also extend earlier research: Békés and colleagues [38] used machine learning to predict therapists' acceptance of VBT, identifying key predictors (eg, professional self-doubt, working alliance, age). The model reveals natural splits in the therapist population. Comparable heterogeneity in therapists has also been observed by Lin et al. [39], who found that perceptions of reduced therapeutic skills in VBT varied systematically by demographic and therapeutic orientation factors. The cluster analysis in this study extends these findings by empirically classifying such heterogeneity into distinct profiles, offering a systematic framework for understanding therapist subgroups.

The identified clusters reflect more than attitudinal profiles; they embody broader psychological positions toward digital care. *Skeptical Traditionalists* may maintain a rigid professional identity that resists digital mediation, potentially due to concerns about therapeutic authenticity or control. In contrast, *Tech-Savvy Optimists* adopt a future-oriented stance, likely marked by cognitive openness and digital self-efficacy. *Cautious Adopters* acknowledge the flexibility of digital formats but remain hesitant without further competence building. This suggests that training motivation and support needs are profile dependent.

From an implementation perspective, addressing value tensions related to professional identity is as important as addressing technical barriers. Implementation strategies could benefit from tailoring interventions to these profiles, leveraging the openness of *Tech-Savvy Optimists*, building confidence among *Cautious Adopters*, and engaging *Skeptical Traditionalists* through value-congruent approaches that bridge traditional practice and digital care. These implications align with implementation science

literature emphasizing the integration of innovation into existing professional values and routines [8,15]

Implications for Practice and Implementation

Rather than relying on uniform training formats, implementation strategies should address profile-specific needs, professional identity, and regulatory clarity. With their high usage rates and strong positive perceptions, *Tech-Savvy Optimists* may respond well to interventions focusing on peer exchange, advanced applications, and integration with emerging technologies. *Cautious Adopters*, who combine moderate use with a reserved attitude, may benefit from gradual exposure to digital formats and opportunities to explore their compatibility with established therapeutic values. In contrast, *Skeptical Traditionalists* display a consistently low inclination toward VBT. This indicates that barriers may be rooted less in technical competence than in professional identity, philosophical orientation, or concerns about therapeutic authenticity. For this group, intensive persuasion efforts are unlikely to be effective; instead, their preference for in-person modalities can be acknowledged as a legitimate professional stance.

From a policy perspective, the results point to the importance of refining regulatory frameworks to ensure both clarity and flexibility. While higher regulatory awareness was associated with VBT use, therapists who perceived regulations as overly restrictive were also among active users. This paradox suggests engaged practitioners may feel constrained by policy ambiguities or technical requirements. Professional bodies should therefore prioritize transparent, therapist-oriented guidelines that safeguard data protection while preserving professional autonomy.

Sustainable implementation will also depend on supportive infrastructure beyond formal training content. This includes accessible digital resources, user-friendly platforms, and structures for supervision and peer mentorship. Collaboration between health authorities, training institutions, and professional associations will be essential to create conditions that accommodate diverse professional values, varying levels of digital affinity, and different stages of adoption.

Strengths and Limitations

This study's longitudinal design and partial panel structure offer unique insights into the sustainability of VBT beyond the pandemic. Integrating the UTAUT-T framework with a

person-centered typology and clinical process evaluation provides a multidimensional understanding of usage patterns and their determinants.

Nevertheless, several limitations warrant consideration. First, the sample was restricted to psychotherapists in the Eastern German states, potentially limiting generalizability. Second, the use of paper-based questionnaires may have introduced selection bias, although it also minimized digital access barriers. Third, the sample consisted predominantly of cognitive-behavioral therapists, which may limit insights into other therapeutic orientations. Fourth, self-reported data are susceptible to social desirability and retrospective bias. Finally, a possible nonresponse bias cannot be ruled out: therapists with greater digital affinity or more positive attitudes toward VBT may have been more likely to participate in the study. This could lead to an overestimation of VBT acceptance and frequency in the sample, particularly in a post-pandemic context where broader therapist engagement is critical for implementation strategies.

Future Research

Future studies should examine long-term patient outcomes under sustained VBT usage to better align provider perceptions with clinical efficacy data. Mixed-methods designs could deepen our understanding of motivational patterns, particularly within distinct therapist profiles. Qualitative studies may shed light on identity-related barriers and nuanced experiences with therapeutic alliance in digital formats. Moreover, the role of continuing education, peer support, and institutional incentives in sustaining VBT should be explored.

Although this study focused on VBT, its implications reach beyond video platforms. As digital psychotherapy expands to include virtual reality, AI-assisted diagnostics, and blended care models, sustainability becomes even more pressing. Our findings suggest that future innovations will be adopted not merely based on technical performance, but on their perceived compatibility with core therapeutic values. Thus, the concept of person-technology fit must be extended to anticipate future tensions between innovation and tradition in psychotherapeutic work.

Conclusion

As outlined, the sustainability of VBT involves more than its clinical efficacy. It requires compatibility with therapists' professional identity, therapeutic routines, and values, an alignment conceptualized as person-technology fit [17]. The present findings underscore

this conceptualization. While effectiveness data on VBT is robust [26,27], sustained use depends on therapists' subjective perceptions of quality, applicability, and workflow integration, particularly in the absence of pandemic-related external pressures.

The present study shows that sustained use of VBT results from complex, multidimensional alignment processes. By examining technology acceptance, perceived clinical process quality, and therapist heterogeneity, we identified key psychological, contextual, and professional factors that shape sustainable use. In this context, sustainability is not merely about continuation, but about meaningful adoption, adaptive fit, and therapeutic confidence.

However, our findings also highlight that sustained implementation has its boundaries. Not all therapists will adopt VBT, even under optimal conditions, and some may continue to view F2F therapy as more compatible with their professional standards and therapeutic values. These positions are not deficits to be corrected but reflect legitimate diversity in the field. Effective implementation strategies must therefore balance promotion with respect for such divergence.

Future reforms, innovations, and educational efforts must take this complexity seriously. Training programs, supervision structures, and regulatory policies need to address the technical, clinical, and identity-related factors that affect therapists' engagement with digital formats. Only by recognizing and addressing these multifaceted influences can sustainable integration of VBT and future digital innovations be achieved.

While digital formats are likely to expand, the sustainable integration of such tools must proceed with caution, respect for therapeutic diversity, and recognition that innovation is not inherently superior to tradition. Moving forward, it will be essential to continuously evaluate the benefits and boundaries of digital care, empirically, ethically, and professionally.

End Sections

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Conflicts of Interest

None declared.

Data Availability

The datasets generated and analyzed during this study are available from the corresponding author on reasonable request.

Author Contributions

Conceptualization was performed by JR and MS with support from TB. Data curation was performed by JR with support from JS and MS. Formal analysis was performed by JR with support from MS and TB. Funding acquisition was provided by MS. Investigation was performed by JR and MS with support from TB. Methodology was designed by JR, MS, and TB. Project administration was performed by JR and MS. Resources were provided by JR with support from MS and TB. Visualization was performed by JR with support from MS. The original draft was primarily written by JR with contributions from MS, JS, and TB. Review and editing were performed by JR, MS, TB, and JS.

Abbreviations

F2F: face-to-face

UTAUT: Unified Theory of Acceptance and Use of Technology

VBT: Video-based Therapy

Multimedia Appendix 1

Supplementary tables.

Table A1: Reliability Analysis of UTAUT-T Scales

Scale	Cronbach's Alpha
Therapy Quality Expectation	.901
Ease of Use	.674
Pressure from Others	.955
Professional Support	.489
Convenience	.568
Behavior Intention	.973

Table A2: Between-cluster differences in additional variables

Variable	Test	Test statistic	df	P-value	Effect size (method)	Significant pairwise differences (Holm-adj. p=
Post-pandemic VBT usage status	χ^2	131.11	2	<.001	Cramer's V=.67	1>2 (P=.004), 1>3 (P<.001), 2>3 (P<.001)
Pandemic VBT usage rate	χ^2	82.26	2	<.001	Cramer's V=.53	1>3, 2>3, 1>2 (all P≤.006)
Age	Welch-ANOVA	F(2,154.23)=6.0	2	.003	$\eta^2=.073$	3>1 (P=.002), 3>2 (P=.018)
Therapeutic orientation	χ^2	9 12.42	2	.002	Cramer's V=.19	2>3 (P=.001)
CBT Grawe's change	Fisher's exact	-	-	<.001	Cramer's V=.27	1>3, 1>2, 2>3 (all P≤.001)

mechanisms Awareness of VBT	test Kruskal- Wallis	H(2)=24.3	2	<.001	$\eta^2[H]=.08$	1>3 (P<.001), 2>3 (P=.001)
regulations Perceived regulatory	Kruskal- Wallis	H(2)=32.6	2	<.001	$\eta^2[H] =.11$	1>3 (P<.001), 2>3 (P<.001)
restrictions Prior VBT training	χ^2	0.48	2	.788	Cramer's V=0.00	1 vs. 2: $\chi^2(1)=.041$, P=.839, P= 1; 1 vs. 3: $\chi^2(1)=.464$, P=.496, P=1; 2 vs. 3: $\chi^2(1)=.291$, P=.590, P=1
Professional internet use	Kruskal- Wallis	H(2)=52.1	2	<.001	$\eta^2[H]=.17$	3>2 (P<.019), 3>1 (P<.001), 2>1 (P<.001)

Multimedia Appendix 2

Questionnaire.

Multimedia Appendix 3

STROBE Checklist.

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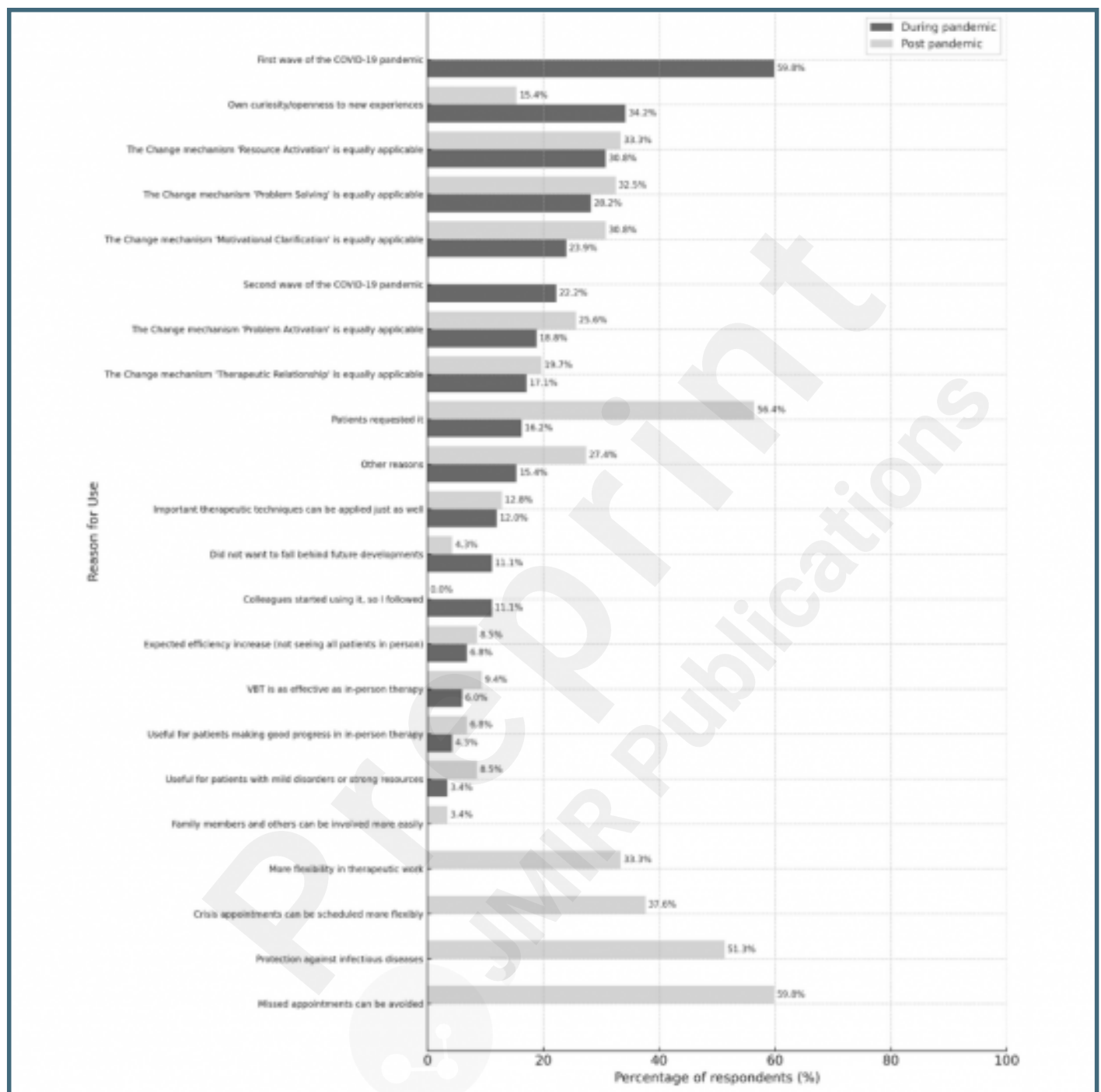
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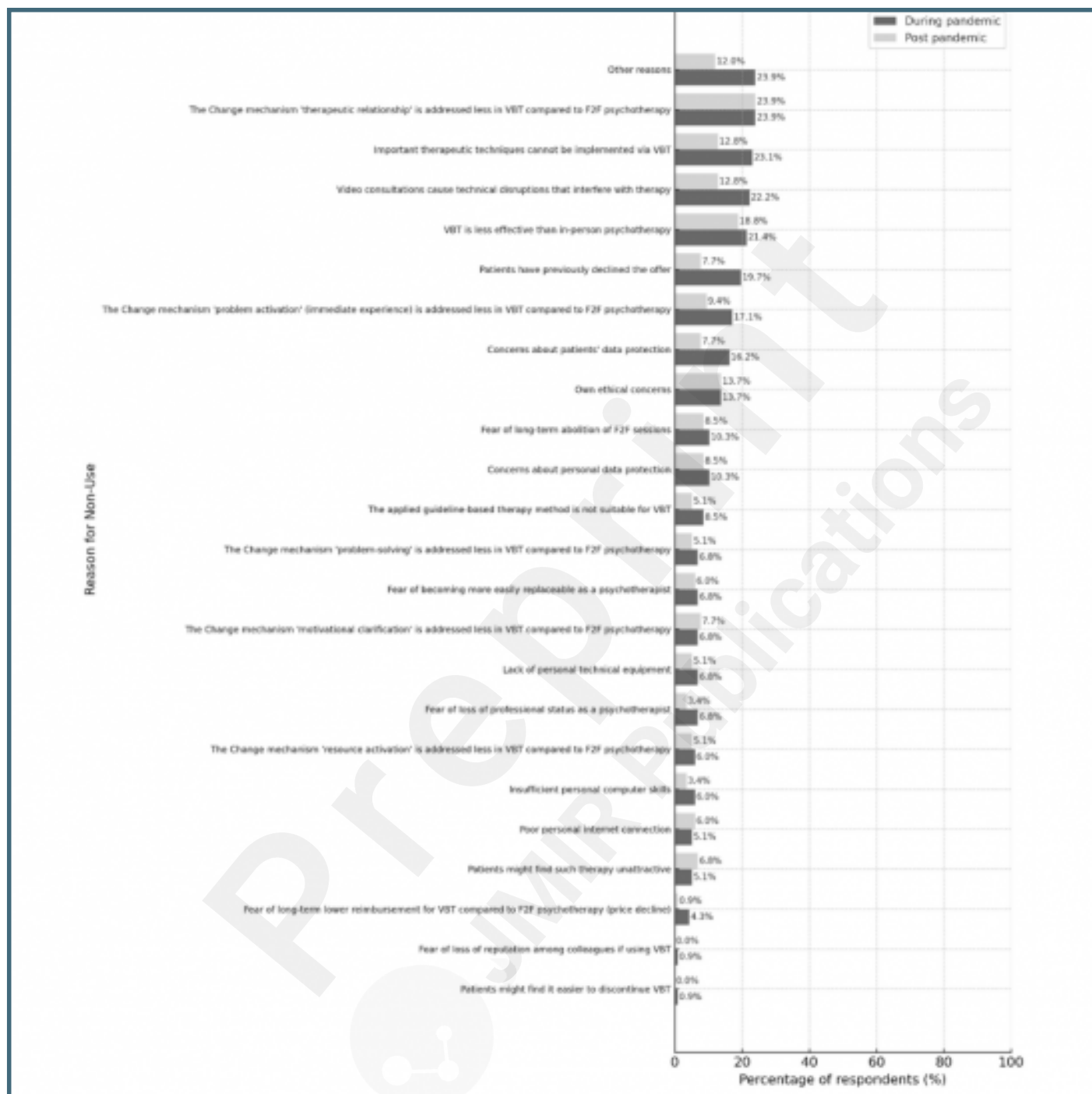
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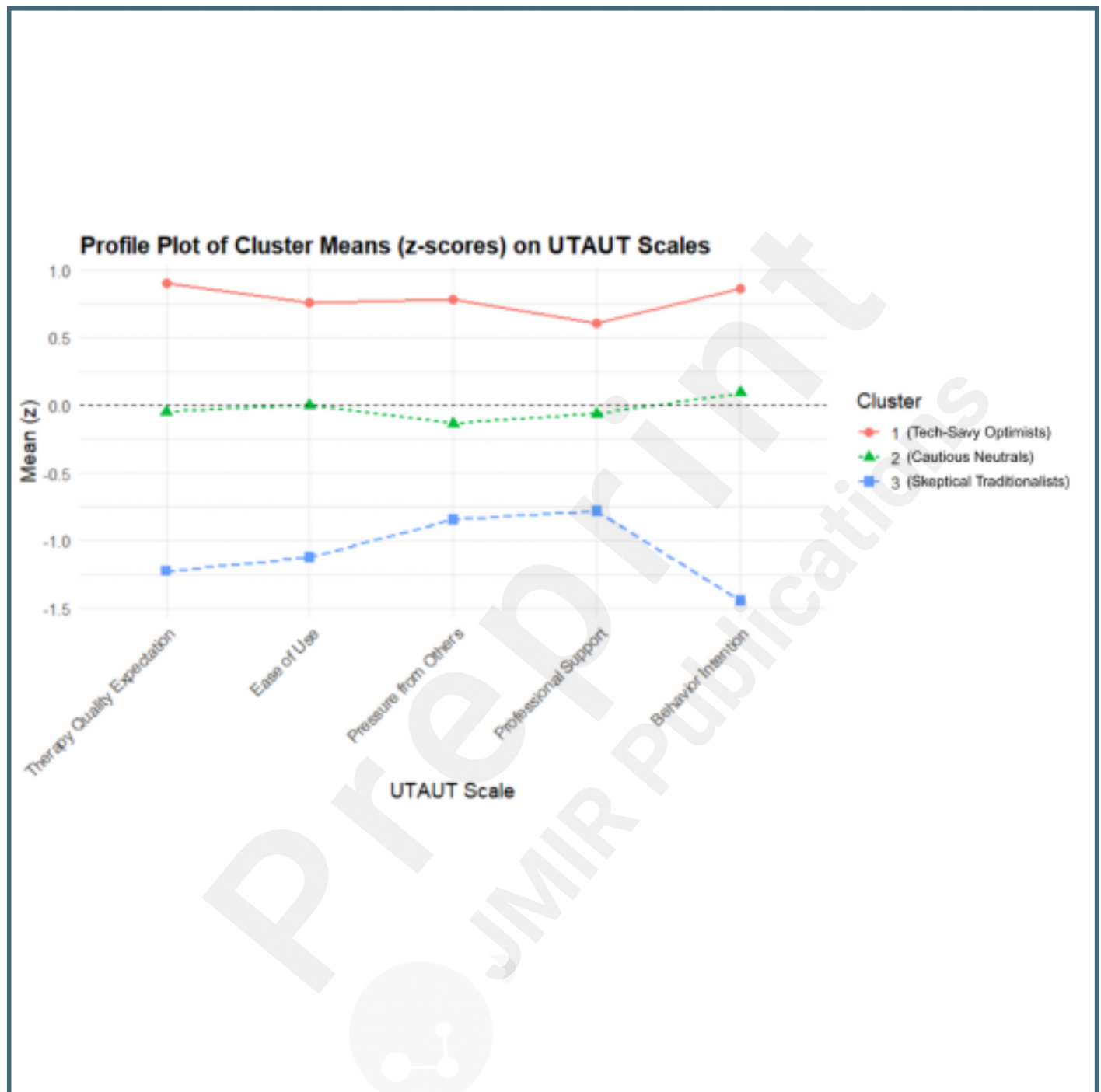
Change in Reasons for VBT Use.



Change in Reasons for VBT Non-Use.



Profile Plot of Cluster Means (z-scores) on UTAUT-T Scales.



Multimedia Appendixes

Questionnaire.

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CONSORT (or other) checklists

STROBE checklist.

URL: <http://asset.jmir.pub/assets/813114ad3f3c3a559d0258f110046b41.pdf>