ORIGINAL ARTICLE

How to measure outcome? A perspective from the dynamic complex systems approach

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Abstract

The evaluation and assessment of outcome is an important issue in psychotherapy research and practice. Since the beginning of empirical research, the effectiveness of treatments has been in the focus of interest to optimise mental health care. Despite this importance, the assessment of outcome by pre-to-post comparisons of point measures is hampered by some limitations. These include, amongst others, the predominant use of standard questionnaires neglecting personalised outcome criteria, the focus on point measures that ignore dynamic patterns representing the volatility of mental functioning, memory biases that become important if a recall of longer time periods is urged, and the non-ergodicity of trajectories of change. Based on new methods of digitalised data collection in the real-life setting of patients, some conclusions for process and outcome monitoring can be drawn: first, most mental diseases are characterised by specific dynamic patterns (dynamic diseases) whose changes can be assessed by high-frequency time sampling, for example daily assessments of patients. Second, personal criteria for self-assessments can be identified by multiperspective case formulations. Third, electronic devices such as smartphones allow for data collection in the real-world settings of patients, which gives access to experiences in their ecosystems.

KEYWORDS
non-linear dynamics, outcome assessment, patterns of change, pre–post measures, psychotherapy treatment effects, real-world settings

1 | CLINICAL IMPACT STATEMENT

1.1 | Question

There are different limitations of point measures as used for pre-to-post comparisons assessing outcome, such as their failure to grasp the dynamics and the singularities of individual change and their dependency on memory biases.

1.2 | Findings

This conceptual paper shows methodical alternatives which overcome the existing limitations by creating personalised outcome criteria based on methods of case formulation.

1.3 | Meaning

Change processes represent not only the evolution but also the outcome of psychotherapy and can be assessed in the real-world setting of a patient by using daily quantitative and qualitative (e.g. diaries) measures.

1.4 | Next steps

Dynamic, personalised and ecosystemic assessment can be realised by digitalised Internet- and app-based technologies (e.g. the Synergetic Navigation System). Given the effects of process monitoring and feedback on improving outcome and catalysing change, policy has to decide on the role of this approach in routine practice. Should personalised process criteria assessed by high-frequency monitoring become part of 'good practice'? If yes, it has to be granted that complexity and non-linear dynamics at the theoretical level and feedback interviewing at the practical level will be implemented in clinical training.

2 | CHALLENGES OF OUTCOME EVALUATION

Throughout the history of psychotherapy research, most studies have focused on outcome (Lambert, 2013). In the early years, this was due to the need for legitimating and establishing a new profession. Later, the issue was the comparison of treatment approaches, schools or programmes. Independent of the study designs—with or without treatment comparisons or untreated or placebo controls—the aim was to demonstrate that treatments are effective and that it is the treatment that causes the effect. It was a doubtless belief that the assessed pre–post differences were due to the applied treatment—especially when statistical procedures such as controlling for pre-values or for regression to the mean were implemented.

> **Implications for practice**
> - Pre–post questionnaire data, which are often used for outcome assessments, have numerous limitations, above all the neglect of the dynamic patterns and the individuality of mental functioning.
> - Dynamic and personalised assessments can be realised by digitalised Internet- and app-based technologies (e.g. the Synergetic Navigation System) to get a more valid real-time monitoring of a patient´s change, which can be practically used for more specific interventions in counselling and psychotherapy.

Statistical procedures and requirements to study designs (e.g. in randomised controlled trials, RCTs) became more and more sophisticated in order to eliminate any alternative explanation (Verhagen et al., 1998). However, the routine of pre–post measures remained, additionally complemented by follow-up measures to prove the sustainability of treatment effects. In most studies, pre-, post- or follow-up assessments are single-point measures.

During the last decades, alternatives to pre-to-post comparisons by single-point measures taken in the treatment setting (psychotherapist's office or hospital) have been developed. The aim of this article is to delineate some of these alternatives that should provide solutions to essential challenges of measuring outcome. New methods of digitalised and app-based assessment deliver the technical base of these developments, which concern—amongst others—criteria such as the diversity of outcome measures, the dynamics and time dependency of change, the option to avoid memory biases, the singularities of individual change or data collection in real-life settings (ecological validity).

The theoretical and methodological background of these developments is provided by the dynamic complex systems approach, which focuses on understanding, analysis and modelling change dynamics (time series), pattern formation and pattern transitions in complex systems. This approach offers different methods of nonlinear time-series analysis, which seem to be useful in understanding psychotherapeutic change dynamics. Instead of long-term predictions, it takes the limited predictability of chaotic processes and develops methods for short-term predictions (precursors) of critical events. Another focus of interest is the spontaneous emergence of patterns and pattern transitions ('self-organisation') with or without external input onto the respective system. These and other phenomena seem to be important nonlinear features of psychotherapy (e.g. Gelo & Salvatore, 2016; Haken & Schiepek, 2010; Hayes et al., 1997). Being able to measure and model non-linear features of change dynamics is a precondition for developing theories of change, methods for real-time monitoring and feedback, and concepts for capturing the diversity of pattern transitions, which incorporate outcome beyond pre-to-post comparisons. It is

not only the advanced focus on complexity and dynamics but also the transdisciplinarity and the applicability to different types of systems (e.g. biological and neural, mental, behavioural or social) which make the nonlinear dynamic systems approach promising for psychotherapy research.

2.1 | Limited range of outcome criteria—not related to real-life settings

In addition to the increasing sophistication of statistical procedures and study designs, as well as the need for reliability and validity of the measures, the fairness of the selected outcome criteria is a long-lasting issue. This means that the criteria should cover the expected foci of change (e.g. behavioural, cognitive, psychodynamic, personality development and interpersonal) and the preferred constructs of all included and compared treatment approaches. This has yet not been fulfilled in many studies; for example, the requirements of primary and secondary outcome criteria such as symptoms, quality of life, spirituality, interpersonal or ecosystemic. Crits-Christoph et al. (2008) state, with reference to the criterion of quality of life: 'Psychotherapy outcome research generally focuses on the reduction of symptoms and impairments in functioning, including interpersonal, cognitive, and social impairments. (…) Despite the fact that improving general quality of life is often a goal of psychotherapy and that positive life experiences can facilitate the change process, there is a dearth of research that evaluates such positive changes over the course of treatment. The majority of studies evaluating changes in quality of life over the course of treatment has focused on specialized populations that might have major impairments in quality of life: geriatric patients (e.g. Clark, 2005), patients with chronic medical conditions (e.g. Aaronson et al., 2003), and patients with severe psychiatric impairments (e.g. Ho et al., 1998)'. Referring to the spirituality criterion, the meta-analysis of Smith et al. (2007) reports on 31 outcome studies of spiritual therapies, conducted from 1984 to 2005, with clients suffering from a variety of psychological problems. Compared with the huge amount of outcome studies published since the early days of psychotherapy research, this is a small number. The criterion of ecosystemic validity is usually highlighted in the literature on ecological momentary assessment (Ebner-Priemer & Trull, 2009; Shiffman et al., 2008; Stone & Shiffman, 1994; Wenze & Miller, 2010). To achieve this criterion, assessment procedures have to go beyond therapists' offices into the real-world settings of the patient, for example by using ecological momentary assessment tools (e.g. Shiffman et al., 2008).

2.2 | Outcome is not necessarily related to interventions

As we know, effects may be identified in controlled or naturalistic studies, but, notwithstanding, they are not always related to interventions. Spontaneous recovery should be outbalanced or controlled in RCTs. However, there are other specific phenomena that can only be identified by the microscope of high-frequency process monitoring. Change may occur before interventions are realised (early rapid responses, e.g. Haas et al., 2002; Kleinstaeuber et al., 2017; Stulz et al., 2008) or appear independent of interventions. In a study on change processes during psychotherapy of patients diagnosed with obsessive–compulsive disorder (OCD), we showed that critical instabilities and symptom reduction occurred before exposure with response prevention was applied (Heinzel et al., 2014). In a single case study on the change dynamics of a patient diagnosed with borderline personality disorder (BPD) and dissociative identity disorder (DID), the triggers of the pattern transitions between the patient`s alternating ego states and a more integrated mental functioning were not intended and planned interventions, but a personal decision of the patient based on a job opportunity (transition 1) and a personal conflict with her life partner (transition 2) (Schiepek et al., 2016). Clinical observations based on 15 years of monitoring-based and feedback-informed case supervision (unpublished data, paper in preparation) suggest that change may occur independently of planned interventions or applied treatment techniques (e.g. Hayes et al., 1997). This corresponds to the results of common factor research, which makes it evident that it is a synergy of different, especially non-technical factors, which contribute to personal change and therapeutic effects (contextual model, Wampold & Imel, 2015).

2.3 | Therapeutic change is not always represented by single scores or mean values

Whereas early rapid responses or sudden gains and losses are usually defined by changes in the mean levels of any outcome criterion (e.g. Tang & DeRubeis, 1999), research on pattern transitions in a patient with ego state disorder (DID) shows that patterns of change can also manifest in different dynamic patterns (e.g. from rhythmic to chaotic or to other complex dynamics, from stable to unstable) or in changed synchronisations between cognition and emotions. In the general linear model of statistics, and in outcome research using pre-to-post comparisons, interpersonal and intrapersonal variability provides disturbance and should be eliminated (Arocha, 2021). This is different to the complexity science paradigm, which interprets variability and complexity as information on the behaviour of any dynamic system (e.g. Arocha, 2021; Haken & Schiepek, 2010; Schiepek, Gelo, et al., 2020; van Geert & van Dijk, 2021).

2.4 | Can standard questionnaires grasp the singularities of individual change?

The most common way of assessing outcome is by applying standard questionnaires, such as the Symptom Checklist-90 (SCL-90), Beck Depression Inventory (BDI), Inventory of Interpersonal Problems (IIP), and General Health Questionnaire (GHQ), amongst

others. When looking more closely into the stories behind the responses to standard questionnaires, it becomes evident that pre-to-post comparisons can grasp only part of the patient's specific experiences and that, in some cases, they might be completely misleading. Desmet and colleagues used all available clinical materials and information on the change processes of 29 patients (e.g. transcripts, follow-up interviews, perspectives of the therapist, and a method called 'consensual qualitative research') and compared it with the pre–post evaluation by standard questionnaires (Desmet et al., 2021). In one case, an important reduction in IIP scores, suggesting an improvement in interpersonal problems, was a result of the social withdrawal of the patient who ceased to expose himself to difficult social experiences or harm. In another case, the outcome scores were only marginally reduced, but the rest of the clinical material revealed that the patient had decided to end her relationship with her boyfriend, a step she considered crucial in her life. In an email to the therapist, sent months after the end of the therapy, she expressed her profound gratefulness, since to her, this was much more important than any symptom reduction. In a third case, the initial phase of the psychotherapy was characterised by the patient's strong denial of problems and conflicts, but during the therapeutic progress this suppression of problems was dissolved and the confrontation with avoided issues was intensified. Consequently, the complaint scores increased dramatically, and while the patient felt very satisfied with the results of the therapy, the scores were still higher at the end of the therapy than at the beginning. The authors discussed several other cases in which the simple pre-to-post reductions (or increases) in symptom scores did not reflect the quality of the therapeutic process. The authors conclude that any assessment must be sensitive to the singularities of human change processes and to the complexity of treatment outcome, with qualitative and narrative information being necessary to interpret quantitative measures (Desmet, 2018).

2.5 | Can individual patterns of change be generalised to populations?

Usually, the assessment of outcome is not only a point of interest in the therapeutic progress of a single patient, but may also be considered in the development of treatments for wider populations. For example, the question may be whether a specific treatment approach would be effective in a diagnosis-related population. Generalisations like this assume ergodicity as a precondition for conclusions drawn from individuals to the population and vice versa. Simply spoken, ergodicity means that the part is stable and behaves similarly to the whole. Or, more specifically, two conditions should be fulfilled (Molenaar & Campbell, 2009). The first condition is that each subject in the population must obey the same statistical model (homogeneity of the population), which means that the main features of a statistical model describing the data are invariant across subjects. The second condition is that a

psychological process should have constant statistical characteristics in time (stationarity)—meaning that the statistical parameters of the data (factor loadings etc.) should remain invariant across all time points. Both conditions are violated in most human developmental processes, especially in psychotherapy, where, almost by definition, processes have statistical characteristics that change over time. Nonlinear dynamics are usually non-ergodic because of occurring phase transitions (qualitative changes of patterns) and the individuality of processes (sensitivity of complex dynamics on initial conditions, input, and parameter changes).

2.6 | Memory biases

Point measures such as self-assessments of any affective, cognitive or behavioural criteria used in the evaluation of primary or secondary outcome are usually produced by the recalling of experiences and of mental functioning over a certain time period. Recalling is based on memory, and includes a range of memory biases which are known in psychology. State-dependent memory implies that emotional and cognitive states at any given moment bias the memory of events, experiences or activities in the past (for a meta-analysis, see Ucros, 1989). The likelihood of recalling an event generated some days ago has been found to be higher when the mood at the moment of generation and the recalled mood match, compared to when they mismatch (mood congruent memory bias; Eich et al., 1994). There is a huge variety of further memory biases, all of which might affect self-evaluation. These include consistency bias (incorrectly remembering one's past attitudes and behaviour as resembling present attitudes and behaviour), egocentric bias (recalling the past in a self-serving and self-esteem enhancing manner, e.g. remembering one's exam grades as being better than they were), self-serving bias (perceiving oneself to be responsible for desirable outcomes but not for undesirable ones), telescoping effect (the tendency to displace recent events backward in time and remote events forward in time so that recent events appear more remote, and remote events, more recent), availability bias (greater likelihood of recalling recent, nearby or otherwise immediately available examples, and the imputation of importance to those examples over others), fading affect bias (a bias in which the emotion associated with unpleasant memories fades more quickly than the emotion associated with positive events), confirmation bias (the tendency to search for, interpret, or recall information in a way that confirms one's beliefs or hypotheses), plus many others (e.g. Koriat et al., 2000; Schacter, 1999). Memory biases become particularly salient when judgements are required on previous events or extended periods of time, such as in answering questions that ask for a subjective averaging of cognitive–emotional states during a number of weeks. This is one of the reasons why momentary assessments are recommended, which grasp the current experience in a narrow time horizon, such as on the same day (Ebner-Priemer & Trull, 2009; Shiffman et al., 2008; Wenze & Miller, 2010).

2.7 | Instability and time dependency of outcome assessment

Cognitions, behaviours, emotions and moods are unstable and dynamic. This holds true for us all in everyday experiences, but especially for patients struggling with their mental functioning. During psychotherapy, patients may experience progress or set backs, stressful events or encounters which may either bolster or weaken hopefulness and well-being (e.g. Lutz et al., 2013). Circadian rhythms may be intensified by some disorders (e.g. major depressive disorder, MDD), whereas other disorders are particularly characterised by cognitive or emotional volatility over longer periods of time (e.g. BPD). Depending on such state dynamics, self-assessments may also be different and volatile. Consequently, we cannot expect measures to be stable and the concept of test-retest reliability may be misleading. Pre-to-post comparisons may strongly depend on the time of assessment.

In a preliminary study (publication in preparation) involving 64 patients (inpatient treatment, mixed diagnoses), we compared the pre–post results by calculating the difference between the first day and the last day of the assessment period $\Delta(t_1 - t_n)$ with the difference between the third day and the third last day $\Delta(t_3 - t_{n-2})$ (n is the number of daily self-ratings, corresponding to the days of hospital stay). For the assessment, we used the factors 'emotional and problem intensity' and 'insight/confidence/therapeutic progress' of the Therapy Process Questionnaire (TPQ; Schiepek et al., 2019). Comparing $\Delta(t_1 - t_n)$ with $\Delta(t_3 - t_{n-2})$, a regression model revealed low R^2 values for the 'emotional and problem intensity' factor and for the 'insight/confidence/therapeutic progress' factor. A categorisation of patients as 'improved' or 'impaired' by using the $\Delta(t_1 - t_n)$ difference (reduction in symptoms vs. increase in symptoms) revealed partly contradictory classifications compared with the $\Delta(t_3 - t_{n-2})$ difference. A classification based on the 'emotional and problem intensity' factor resulted in contradictory classifications in nearly half of the cases. A classification based on the 'insight/confidence/therapeutic progress' factor showed approximately a quarter of contradictory classifications. Diverging outcomes and contradicting classifications, such as 'improved' or 'impaired' by only slightly varying measurement points, may have severe consequences for the concerned hospitals, psychotherapists (e.g. in terms of financial support) and patients (e.g. in terms of decisions on further treatment or after-care options).

3 | PERSPECTIVES AND SOLUTIONS

The different limitations of outcome evaluation converge to three suggestions of how to meet these challenges. These concern the dynamics of the clinical phenomenon under consideration, the personalisation and patient-relatedness of the outcome criteria, and the need to obtain data in the real-world setting of the patient (ecosystemic validity).
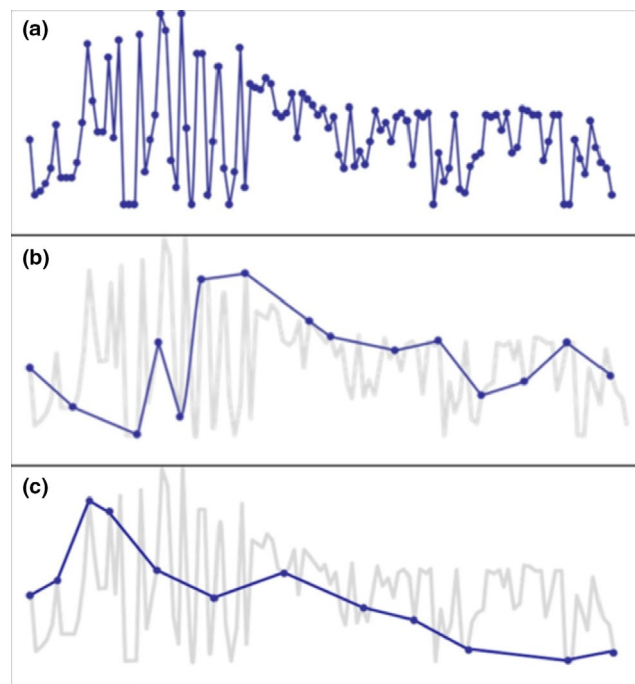

FIGURE 1 This figure illustrates the dependency of assessing dynamic patterns on the sampling rate. Downsampling of measurement frequencies changes the features of the resulting dynamic patterns. (a) Time series of the emotion 'grief', assessed by daily self-ratings (visual analogue scale) of a patient diagnosed with Borderline Personality Disorder (BDP). The patient was treated in an inpatient setting (psychotherapy clinic). There is a period of high volatility, which disappears after about one third of the therapy process. (b, c) A reduced number of measurement points was selected at a rhythm of about one week. On average, measurements were taken every 7th day from the complete time series with a variability of ± days around this sampling rate. (b, c) only differ by varying measurement points around the mean sampling rate of 7 days. Although the measurement values remain unchanged, the overall impression of the change process is completely different and the impression of the complex pattern (a) is lost

3.1 | Dynamic patterns

The problems with single-point measures should result in a turn to the use of process measures. Beyond the mere problems of measurement, we have to be aware that many clinical and psychopathological phenomena are not only represented by intensities (e.g. symptom severity) but also by dynamic patterns (Orsucci, 2015). It is a question of so-called *dynamic diseases* (an der Heiden, 1992; Mackey & an der Heiden, 1982), which means that the symptoms, as well as the pathological mechanisms of a disease, are characterised by dynamics and therefore should be measured by time signals. This holds true for bipolar disorders, which are defined by oscillating rhythms between depressed and manic states with different period lengths (slow or rapid cycles; an der Heiden, 1992). Emotional instability is a crucial criterion of 'emotional instability personality disorder' as defined in the ICD-10, or BPD as defined in the DSM-5. Intensity,

complexity, unpredictability, and uncontrollability of the oscillations are the reasons for subjective suffering. Interestingly, the high dynamic complexity can discontinuously change to another dynamic regime with reduced amplitudes and frequencies (see the case report in Schiepek et al., 2016). Phase transitions like these (Figure 1) are important outcome criteria and document the need for appropriate sampling rates (Hayes et al., 1997; Schiepek, Gelo, et al., 2020).

Following the Nyquist–Shannon sampling theorem, at least a double sampling rate of the oscillation phase of the dynamics under investigation is necessary to get a rough estimation of the real period (Seibt, 2006). Different algorithms for the identification and quantification of amplitudes, frequencies, and the complexity of time series are available (e.g. time–frequency distributions or dynamic complexity, as integrated in the 'phase transition detection algorithm'; Schiepek, Schöller, et al., 2020). Depending on the sampling rate, the complexity of a specific dynamic might appear completely different (Figure 1). In psychotherapy, sampling rates of a particular number of hours for the identification of circa–dyadic rhythms or of days, as used in the routine process monitoring of the complete period of treatment, have been established.

Besides the quality of mind states (e.g. emotions, cognitions, or behaviours), it is also the rigidity and overstabilisation of mental functioning which characterises psychopathology (Cheng, 2001; Cheng, 2003; Fredrickson & Losada, 2005; Fresco et al., 2006; Friedman, 2007; Rottenberg, 2005; for a detailed review, see Kashdan & Rottenberg, 2010). It should be noted that the pattern of pathological functioning is usually not a stable state (fixed point) but a stable, rhythmic, complex, or chaotic attractor, or even a specific type of synchronisation between cognition and emotion (Kotsou et al., 2011) or between functional anatomic brain structures (Schiepek et al., 2021).

With reference to the pathways of change in psychotherapy, the concrete trajectories of each patient are based on the nonlinear interaction of specific or unspecific factors (de Felice et al., 2019; Schiepek et al., 2017). As Wampold and colleagues state, treatment '...only becomes *real* when it unfolds during the course of time', and '...all psychotherapies, even the most constrained and manualized treatments, unfold differently in each instance, due to characteristics of the therapist and the client' (Wampold et al., 2017, p. 24). Consequently, the evaluation of outcome should focus on the transition of dynamic patterns in biopsychosocial systems, such as human beings.

3.2 | Personalised outcome criteria

In order for any assessment to be sensitive to the singularities of human dynamics and to the complexity of treatment outcome, as stated above, it should include personal criteria into the evaluation of outcome. This could cover a broad range of criteria which play a role in a patient's problems. The identification of a spectrum of criteria could be based on a detailed and multiperspective case formulation, for example by idiographic system modelling (e.g. Schiepek et al., 2016). This method of modelling is a co-creative process between the patient and the therapist, producing a network model of
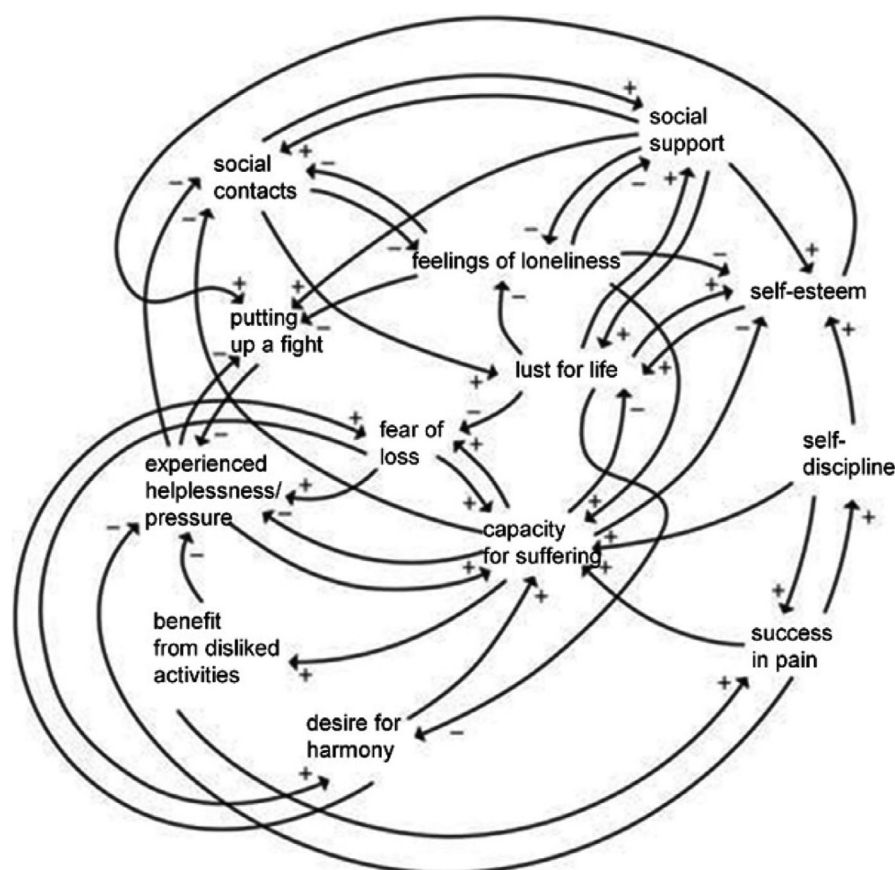

FIGURE 2 Example of an idiographic system model which was developed together with a client (from Schiepek et al., 2015)

the mental and social functioning of the patient. Conceptual components of a system model are 'variables' that change over time and represent intra-individual or interpersonal components of a complex system (e.g. cognitions, emotions, motives, and behaviours) (Figure 2).

Idiographic models show interactions, loops between variables, or recursions of a variable to itself (autocatalytic effects). The cross-linking of the variables makes it possible to see connections that were previously unnoticed or were only considered as unilateral cause-to-effect relations ('x is to blame for y'). After completion of the modelling, therapist and patient create an individualised process questionnaire for monitoring and data collection. During the therapeutic process, the therapist and patient can refer to the model and to the time series of the change dynamics. Beyond the identification of a spectrum of outcome criteria, that is, the variables of an idiographic model, the system model provides an impression of the network structure of the clinical pattern. This means that the evaluation (a) considers changing variables *and* changing structures of the important system or network, (b) makes use of multiple time series and its changing patterns and connectivity, and (c) contributes to the reflection and cooperative decision-making during the psychotherapeutic process. An important aspect of this personalised outcome evaluation is that it places greater emphasis on the patient rather than the general question of treatment effectiveness (e.g. is this type of treatment effective for this type of disorder?). At first, no generalisation to any population is intended, but in a second step, classifications and aggregations of completely individual, highly complex, non-ergodic and unpredictable trajectories of change can be realised.

3.3 | Ecosystemic assessments: Incorporate the real-life settings of the patient

Assessments carried out during sessions in the therapist's office have the disadvantage of the timing depending on relatively rare and not equidistant recordings, which may completely distort the pattern compared with the pattern which results from high-frequency and equidistant time sampling (e.g. daily measurements) (Figure 1). Furthermore, they are realised in an artificial setting. In-session self-assessments depend on this specific context with its specific cues and triggers and the therapist being mentally present (even if he or she is not in the same room).

One possible solution to this problem may be daily self-assessments in the real-world environment of the patient. They produce data from different settings close to his or her immediate experience. Memory biases, as discussed above, are less important because the time horizon only refers to the previous hours. The ecosystemic validity of the data is realised, especially if patients make use of diary entries. Interactive apps offer the option to not only write but also make speech recordings and upload pictures or videos taken in specific real-life situations, which may be important for the patient and his or her therapeutic focus. Feedback interviewing based on assessments allows a direct reference to the ecosystem of the patient by visualising the multiple time series and other diagrams of a personalised questionnaire including diary entries, photographs, or videos. An ecosystemic approach like this establishes the sensitivity required by the singularities of human dynamics and the complexity of treatment outcome. This is important not only for a final outcome assessment but also for the ongoing cooperative design of the process and for cooperative evaluation and decision-making.

Nowadays, this kind of process-oriented, personalised and ecosystemic psychotherapy feedback (including outcome evaluation) is based on digital technologies. These embrace data collection via different electronic devices, and assist in saving of the data, data analysis, especially by methods of nonlinear and converging time series analysis, visualisation of data and the analysis of the results, and making the results available to patients and therapists to facilitate discussion about the process (Michaelis et al., in press; Schiepek et al., 2016; Wenze & Miller, 2010). Data collection, process-related data analysis and cooperative process control become integrated and will no longer be a retrospective evaluation, but rather a catalysing feedback loop of the ongoing change process (e.g. de Jong et al., 2021; Lambert, 2013; Newnham et al., 2010; Reese et al., et al., 2009). Limitations of the high-frequency assessment may concern the patients´ willingness to cooperate in the daily procedures. According to practice experiences, patients develop their motivation to receive valuable feedback depending on the motivation of professionals and their attitude to the applied technologies (de Jong & de Goede, 2015; de Jong et al., 2021; de Jong et al., 2012). Administrative efforts will be reimbursed by a deeper insight into the therapeutic process for clinical and scientific advancement.

The resources needed for the implementation of monitoring and feedback in psychotherapy are neither technically challenging nor expensive. Digitalisation has become part of everyday life and of the equipment in hospitals and psychotherapy offices. Smartphones, tablets, or laptops are available everywhere and to everyone. More resources are needed for facilitating the acceptance of the techniques and the training of psychotherapists. The quality of feedback interviewing and of reflecting the processes is crucial for the success of the data-based approach and for the compliance of the patients. Therapists should cover the respective topics of theoretically understanding complex nonlinear systems, applying methods and analytical tools, and relating visualised results and data to the patient. Supervision by experts in feedback-driven practice should be available for psychotherapists in different settings. Generally, the approach supports the role of clinicians as scientist-practitioners.

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