The Social Present in Psychotherapy: Duration of Nowness in Therapeutic Interaction

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Introduction

Let us start with a definition of psychotherapy: Psychotherapy is a social practice that causes or triggers a learning process of a client or, in systemic approaches, of a multipersonal system. The goal of this practice is to facilitate changes of experiencing and/or behavior in the client(s) that are instrumental in alleviating their symptoms and problems. To attain its goals, psychotherapy presupposes the application of interventions, which are commonly performed by a therapist.

All the elements of this definition are subject to research, and many questions in psychotherapy research are actually open questions: What types of interventions are there? What is the unit that interventions are aimed at – the client, or the client's social system, or the client's experiences or behavior? How essential is the relationship between client and therapist? In this chapter, we shall list some assumptions that we think are helpful to answer such questions and then propose a novel concept, the social present.

The first assumption, *embodiment*, originates from a broad recent discussion in psychology and cognitive science. This discussion has shown the importance of the

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body for virtually all mental processes. Embodiment is defined as the conviction that mental processes are influenced by bodily variables and vice versa; thus, the relationship between mind and body is characterized by a fundamental bidirectionality. "Implications of embodiment" (Tschacher & Bergomi, 2011) are that these bidirectional influences between mental states and bodily states must be considered throughout psychology and thus also in psychotherapy. Psychotherapy is not only a "talking cure" or a training for the restructuring of cognitive beliefs, but psychotherapy also and importantly involves the body – nonverbal behavior, posture, and physiological arousal are factors that are closely connected to mental variables. Bodily parameters are not just an expression of the mind, but they may in turn shape and control the mind. The same is true for psychopathological conditions: the cognitivistic concept of mental disorders must be criticized as one-sided and misguided. This is true for schizophrenia spectrum disorder, which is characterized by many psychomotor abnormalities (Tschacher, Giersch, & Friston, 2017; Walther, Ramseyer, Horn, Strik, & Tschacher, 2014), so that schizophrenia may be best considered a disembodiment disorder (Fuchs & Schlimme, 2009; Martin, Koch, Hirjak, & Fuchs, 2016). Affects and emotions are likewise based on a specific embodiment (Michalak et al., 2009), and symptoms of depression can be enhanced or even generated by the way we move and position our bodies. This embodied stance is consistent with the introduction of mindfulness into cognitive-behavioral psychotherapy and mentalization into dynamic psychotherapy, and it is certainly consistent with systemic therapy approaches (Ochs & Schweitzer, 2012). Thus, the new emphasis on embodied cognition signals a turning away from the "computer metaphor" of mind that has been the foundation of cognitive psychology for decades. Mind is not a device for digital information processing.

A second assumption is that we must put *process over cross-section* in methodology and philosophy. In our view, it does not make much sense to neglect time as a variable when all topics of interest – psychotherapy, social interaction, and therapeutic alliance – are obviously processes unfolding in time (Salvatore & Tschacher, 2012) instead of frozen states. Yet in the reality of psychological research, this neglect of addressing the process quality of psychotherapy is pervasive. Academic research is still heavily biased toward cross-sectional designs. We however assume that the application of time series analysis is overdue and mandatory (Tschacher & Ramseyer, 2009; Ramseyer, Kupper, Caspar, Znoj, & Tschacher, 2014).

Notwithstanding the so-called replication crisis presently discussed in psychotherapy outcome research (Hengartner, 2017), the issue of the effectiveness of psychotherapy is settled to a large degree. The results of thousands of outcome studies have shown that the effect sizes of the principal forms of psychotherapy are moderate to large when compared to untreated or waiting list controls (Lambert, 2013) and small to moderate when compared to treatment-as-usual control groups (Cuijpers et al., 2016). We therefore assume thirdly that the time has come to explore what it is that makes psychotherapy effective (Pfammatter & Tschacher, 2012). This type of process research should depict the dynamics of the *here-and-now* of therapeutic interaction. We should turn to the careful observation of the very situation in which therapeutic changes occur.

In short, we claim that psychotherapy should be viewed as embodied, processual, and situated. In this chapter, we will therefore cover what we think are promising steps toward such a perspective. We will in the next section discuss a "minimal model" of psychotherapy, namely, the interaction system of therapist and client. We will describe the systems-theoretical underpinnings of this model. In Sect. 3, we will continue and explain the methods that can be used to explore the minimal model. We will focus on time series that are sufficiently fine-grained to cover the very moment in which therapist and client communicate and to directly address the here-and-now of therapeutic interaction. In Sect. 4, preliminary findings will be presented.

A Minimal Model of Psychotherapy

We wish to model in detail what happens in the therapeutic setting and in the therapeutic relationship. Our model of psychotherapy is "minimal" insofar as we restrict the model to its bare essentials and for the time being disregard the specifics of psychotherapeutic schools with their philosophies and conventions. Systems theory, seen as a structural science, is an appropriate vantage point for establishing a basic model of therapeutic interaction.

The psychotherapy system in its totality is always highly complex because when we consider all the variables that can influence the therapeutic situation, we end up with a huge number of variables. In the minimal model, however, we are dealing with just two variables, namely, the temporal sequences of a therapist's and a client's individual states. Thus we have to consider a two-dimensional system, which can be represented by two differential equations because these variables will change in time. Here we will not formulate this system in mathematical terms (see Tschacher & Haken, 2019) but describe its properties in natural language.

First, we believe that psychotherapeutic processes are always a mixture of stochastic and deterministic influences. "Stochastic" means that random inputs from outside the system must be considered; there is a constant influx of randomness that cannot be foreseen but must be acknowledged in any phase of treatment. "Deterministic" influences are those inputs that have a directed influence. Obviously, in the context of psychotherapy, interventions and therapeutic techniques can represent such deterministic inputs. When we consider the canon of ingredients and mechanisms that are currently discussed in psychotherapy research (Wampold, Imel, & Flückiger, 2018; Tschacher, Junghan, & Pfammatter, 2014), we see a multifaceted picture of interventions, ranging from unspecific contextual factors of intervention (e.g., good alliance between therapist and client) to quite specific techniques (e.g., the family constellations technique). All interventions have their own profile of stochastic and/or deterministic effects, where the specific techniques are commonly the more deterministic interventions. Wampold's contextual factors (in the discussion usually termed "common factors"), on the other hand, often deal with the modulation of stochastic inputs acting on the client.

Our goal is to represent both *stochastic* and *deterministic* inputs in a systems-theoretical framework; thus we have to realize the limitations of most popular methodological approaches. On one hand, conventional social science statistics constitute the very basis of psychotherapy research but suffer from the shortcoming of a strong reliance on statistical null hypothesis testing and the neglect of dynamics. Dynamical systems theory and chaos theory, on the other hand, are partially insufficient because they are purely deterministic theories albeit dynamical theories. The framework of synergetics (Haken, 1977) offers a systems theory that explicitly addresses both types of modeling, stochastic and deterministic. This can be realized by using the mathematical model of the Fokker-Planck equation, which describes the probability of some state variable x depending on time t. This equation is a stochastic differential equation, which has two components, a stochastic and a deterministic term. The mathematical *ansatz* of the Fokker-Planck equation can be used to discuss psychotherapy processes in principle; while it is quite formal and abstract, it is not biased toward one type of process.

Second, we are usually dealing with asymptotic *stability*, i.e., equilibrium behavior. Concretely, this means that the processes we observe are stationary and therefore remain in the bounds of a subclass of values of the state variables. In terms of dynamical systems theory, this is the hallmark of behavior within the basin of an attractor. Such stability over time can be either negative or beneficial – affective disorders can be represented by an attractor in the aversive range of emotionality; healthy functioning may be represented by stability in the agreeable range of emotionality. At any rate, it is necessary to use a theory that can encompass equilibrium behavior and that predicts forces that will pull behavior back into its attractor if the system state has been displaced before.

Third, we are interested in the *coupling* between people. Coupling is a technical term in systems theory that describes how two processes become mutually connected. Especially in psychotherapy, the coupling between therapist and client is the focus of interaction because a therapist's interventions can only have a grip on the client's problems when the two are somehow linked. Coupling in psychotherapy is the basis for common factors such as the therapeutic relationship, alliance, goal consensus, transference relationship, and many more (Tschacher et al., 2014). We will in the next section define therapeutic presence as the time during which therapist and client are significantly coupled.

Fourth, we are interested in observing the here-and-now of therapeutic encounters directly. Indirect assessments are common ground in psychology – the use of questionnaires allows the insight into self-reported experience, but usually this is a subjective aggregation over many experiences, for example, over an entire session. Even ecological assessments and experience sampling cannot give an account of what happens in the very moment of psychotherapy because sampling necessarily disrupts the therapeutic moment. Thus we have to resort to other kinds of data and analyze observational data instead of self-report. The psychology of time says that the "now," i.e., the moment of conscious experience, extends over a few seconds (Fraisse, 1984; Wittmann, 2011). The "now" can be derived from a variety of temporal estimation tasks in psychophysics, from dwell times of bistable gestalt stimuli,

or, indirectly, from the durations of verses in poetry and melody lines in music (Tschacher, Ramseyer, & Bergomi, 2013). Therefore, to assess and explore such durations, we need observational variables that can be measured at least with frequency 1 Hz or higher. *Fine-grained time series* are a necessary premise for addressing the social present of psychotherapy, that time span in which therapy is actually situated.

Methods to Assess the Minimal Model of Psychotherapy

Social embodiment has been a topic of phenomenological philosophy decades before the phenomenon was analyzed in psychology: Merleau-Ponty's (1945) *intercorporéité* means that my interaction partner is first of all perceived and assessed on the basis of his/her body expression, and this expression will have a bodily impact on myself prior to my cognitive reflections. Intercorporeal resonance (Fuchs, 2010) was thus recognized in phenomenology as a basis of embodied communication. The phenomenological method for studying intercorporeality was philosophical reflection and introspection.

Social psychology was later among the scientific fields to study the relevance of embodiment in the context of interaction by quantitative empirical observations. It was found repeatedly in experiments and systematic observations that, for instance, emotional processes do not only get expressed as facial expressions, but the same emotions can also be caused by prescribed activations of face muscles. Body variables such as postures can affect attitudes and appraisals. One conclusion from such findings was that embodiment has profound implications for social interaction and communication because attitudes and emotional appraisals are essential elements of social behavior. A concept coined in this line of research is the chameleon effect (Chartrand & Bargh, 1999), a kind of social mimicry of nonverbal behavior in communicative situations. As soon as one interaction partner observes the behavior of the other, the probability of the respective behavior in himself/herself is involuntarily increased. Walkers in a group, for instance, tend to synchronize their gait. Further examples are the alignments of body postures of people in close conversations (Grammer, Kruck, & Magnusson, 1998). In interacting humans, motor synchrony arises spontaneously, often escaping the awareness of the individuals involved in such resonance.

In developmental studies, social synchronization processes were also examined at different levels (Feldman, 2007). Meltzoff and Moore (1983) found synchronized behaviors to occur even in newborn infants, who tend to mimic caregivers' behavior (e.g., facial behavior such as sticking out of the tongue). Isabella and Belsky (1991) showed that interactional synchrony of mother and child was associated with attachment styles. Reciprocal and temporally attuned interaction behavior – i.e., synchronized interaction – was higher in secure attachment.

Nonverbal synchrony can be computed based on several observables: on physiological signals such as skin conductance or cardiac parameters (e.g., Karvonen,

Kykyri, Kaartinen, Penttonen, & Seikkula, 2016; Coutinho et al., 2019), on prosodic variables such as voice loudness and pitch, and on variables of motor behavior, i.e., body movement. The latter operationalization of synchrony as movement synchrony has specifically proved valuable to study social interactions in the here-and-now. Movement synchrony was studied in most of the studies cited above.

Recently, we adopted a methodology by which movement can be recorded objectively and quite economically – Motion Energy Analysis (MEA, Ramseyer & Tschacher, 2011). MEA was inspired by the approach of Grammer, Honda, Schmitt, & Jütte (1999), who operationalized the extent of body movement via video analysis – movement was derived from the number of pixel changes in certain "regions of interest" in video recordings. One of us (FR) wrote a software application (www.psync.ch), which reads out the movement in selected regions of interest of digital videos that, for example, depict psychotherapy sessions. The result of MEA is one time series per region of interest. The time series are fine-grained because digital video formats consist of between 25 to 60 frames per second, which results in time series of 25 to 60 MEA data points per second (i.e., 25 to 60 Hz). Hence, this operationalization conforms with the demands of the minimal model mentioned before because it yields embodied, processual, and situated data streams.

How can we derive nonverbal synchrony and the social present from such time series? We apply windowed cross-correlation together with surrogate tests (Moulder, Boker, Ramseyer, & Tschacher, 2018). Since we compute *su*rrogate *sy*nchrony, we may use the abbreviation SUSY for this methodological step (Tschacher & Meier, 2019). Let us assume that we have defined two regions of interest in MEA, each of which contains the movement of one participant, e.g., therapist and client (Fig. 1). Then SUSY estimates the degree of correlated movement of both participants by using simultaneous as well as time-lagged correlations between their movement streams. The number of time lags determines a moving window; within this window (our default value is ten seconds), all cross-correlation coefficients are computed and aggregated. In the case of 30 Hz data

Fig. 1 The principle of Motion Energy Analysis (MEA). All pixel changes within the original video recording (left panel) of an interaction scene are highlighted (right panel). The rectangles delimit the respective regions of interest

and a 10 seconds window, this means $10 \times 30 + 1 = 301$ correlations ("+1" because of the correlation at lag = 0). From these (cross-)correlations, we can compute the mean of all cross-correlations using their absolute values and plot the cross-correlations against the different lags (Fig. 2).

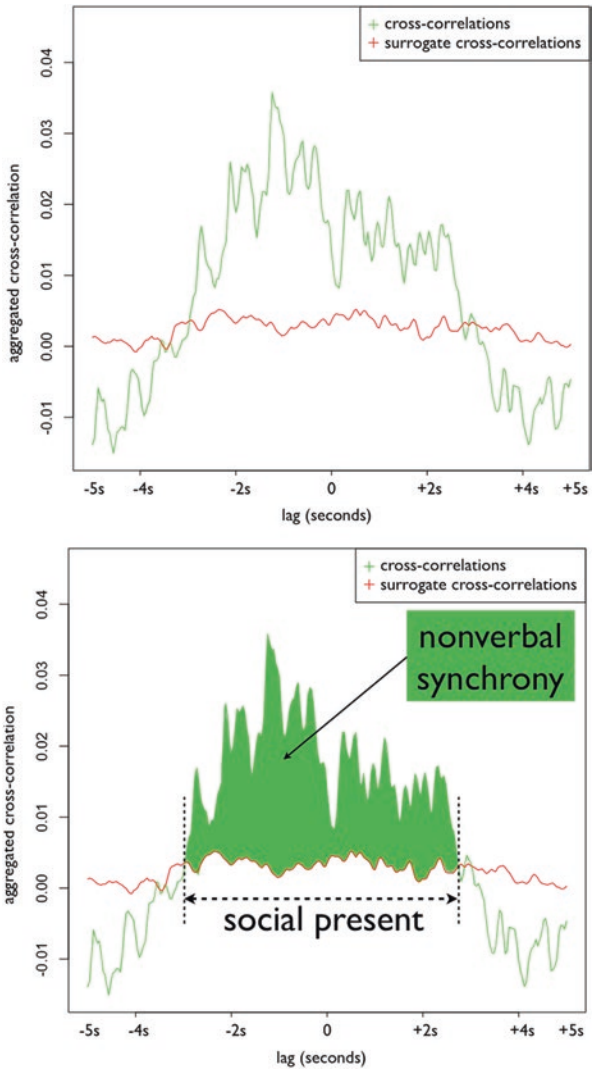

Fig. 2 The principle of surrogate synchrony (SUSY). Upper panel: The raw data are 10 minutes of interaction of two individuals such as shown in Fig. 1. The green graph depicts the cross-correlations as a function of the respective lag. The red graph does the same for the average of all surrogate time series, representing pseudosynchrony. Lower panel: Significant synchrony is found when the green graph exceeds the red graph. The duration of significant synchrony (here approximately six seconds) is called social present. The area under the curve is defined as nonverbal synchrony

SUSY then assesses the significance of this synchrony measure. The surrogate method is applied by randomly shuffling the genuine movement time series and then computing the synchrony of shuffled (i.e., surrogate) data. For details of the surrogate step, see Moulder et al. (2018) or Ramseyer and Tschacher (2010). Comparing genuine synchrony to shuffled "pseudosynchronies" allows proof of existence and, if present, estimating the magnitude of genuine movement coordination.

The comparison of genuine synchrony with pseudosynchrony delivers two quantities, *nonverbal synchrony* and the *social present*. This can be illustrated by the example shown in Fig. 2: Nonverbal synchrony is the area under the green graph, whereas social present is the time during which the green graph exceeds the red graph. Nonverbal synchrony can be expressed by an effect size statistic, the social present by a temporal duration (in seconds).

There are quite a number of different methodological options for synchrony computation. One may apply windowed cross-correlation such as we do in SUSY, but it is also feasible to apply wavelet analysis, i.e., analysis in the frequency domain (Fujiwara & Daibo, 2016). Some researchers do not use the cross-correlations directly but the correlations of piece-wise slopes of the time series and then compute a "concordance index" from these (Karvonen et al., 2016). We have applied sensitivity analyses of the various possible parameter settings in SUSY (Ramseyer & Tschacher, 2016), finding that different parameters give moderately different results, which is however a common finding in statistics. Schoenherr et al. (2019) have recently discussed the pros and cons of the different approaches. We cannot go into more detail here, but certainly more studies are needed that compare the different algorithms of synchrony detection. Thus we have to choose one of several algorithms to compute synchrony and have to make the decision whether we base the computation on cross-correlation or on frequency/wavelets.

In the following overview of findings, we have relied on movement synchrony, mostly measured by MEA, and have always used windowed cross-correlation and surrogate synchrony, SUSY.

Findings on the Social Present of Psychotherapy

As mentioned, the social synchrony that characterizes the here-and-now of the therapeutic setting can be expressed by two quantities, by the extent of synchrony and by the duration of synchrony. The former quantity has been studied in the majority of applications to psychotherapy (Altmann, 2013; Ramseyer & Tschacher, 2011, 2014; Paulick et al., 2018; Lozza et al., 2018). The latter quantity, duration of synchrony, is a way to illustrate the social present or nowness. It constitutes an emerging field in embodiment research, and only very limited published evidence is available at this moment (Table 1).

The measure of the social present was introduced in a paper on the subjective present in psychopathology (Tschacher et al., 2013). In this paper, we reported on

Table 1 Studies of social present available until 2018. WCC, windowed cross-correlation; SUSY, surrogate synchrony determination; MEA, Motion Energy Analysis

Type of interaction	Sample	Method	Covariates	Duration of "nowness"	Reference
Conversations between non-acquainted healthy individuals	51 dyads, $n = 153$ conversations	MEA: Whole body SUSY	–	Mean 5.7 s	Tschacher et al. (2013)
Conversations between non-acquainted healthy individuals	84 dyads, $n = 420$ conversations	MEA: Whole body SUSY	Sex, avoidant attachment, openness for experiences	Mean 6.0 s	Tschacher, Ramseyer, and Koole (2018)
Dyadic psychotherapy in a single case	1 dyad, $n = 27$ sessions	Actigraphy: Wrist sensors SUSY	Phase of therapy	Mean 6.0 s; Initial 6.0 s; Final 8.0 s	Ramseyer and Tschacher (2016)
Dyadic psychotherapy	84 dyads, $n = 104$ sessions	MEA: Whole body SUSY	Self-efficacy	Mean 5.75 s	Unpublished (cf. Ramseyer and Tschacher, 2011)
Dyadic psychotherapy	142 dyads, $n = 284$ sessions	MEA: Whole body Windowed cross-correlation	Depression (HSCL)	–	Schwartz, Paulick, Deisenhofer, and Lutz (2017)

various studies in which we explored the individual present moment and one additional study, where we explored the socially shared present by introducing the procedure as illustrated by Fig. 2. We applied this procedure to a dataset of 51 dyads of unacquainted healthy participants from the Stanford study (Ramseyer & Horowitz, in preparation). All dyads interacted in three prescribed conversations of six minutes duration each. It was found that the mean social present in this student sample was 5.7 seconds. No covariates of the social present were analyzed.

The first comprehensive study of the social present was conducted in a sample of 84 unacquainted dyads (Tschacher, Ramseyer, & Koole, 2018). The 168 participants performed dyadic conversational interactions in five runs of five minutes each. The social present in this study had an overall duration of 6.0 seconds. The social present was found associated with task-related variables: competitive conversations had the longest duration, a fun task the shortest duration, and the cooperative tasks ranged in-between the other task affordances. The duration of the social present varied significantly with personality: longer present was found when participants had higher openness for new experiences (a "Big Five" trait of the Five Factor Personality Inventory, NEO-FFI, Borkenau & Ostendorf, 1991) and low narcissistic inclinations (IIP, Inventory of Interpersonal Problems, Horowitz, Strauss, & Kordy, 1994). Individuals with a tendency toward avoidant attachment (Measure of Attachment

Qualities, MAQ, Carver, 1997) were also involved in conversations with longer social present. Male-male dyads had longer social present than female-female dyads. The results of this study showed that the social present was not a good-or-bad issue. It was further found that although the social present was significantly correlated with the extent of synchrony, both measures were connected with covariates in a diverging way. Thus, the social present and synchrony are qualitatively different indicators of embodied interaction.

We computed the social present in a psychotherapy course with 27 sessions, where hand movements of both therapist and patient were monitored by actigraphy sensors attached to the wrists (Ramseyer & Tschacher, 2016; the data were originally monitored in the "Vitaport study" on sociophysiology: Tschacher & Brunner, 1995). Forty minutes of each session were analyzed. The mean social present in this psychotherapy course was again 6 seconds. In a comparison of the initial 10 sessions with the final 10 sessions, several changes across the therapy course were identified: The strength of synchrony increased from $Z = 0.129$ to $Z = 0.143$ [$T(9) = 2.23$; $p = 0.053$], and a shift from the patient being (subconsciously) "imitated" by the therapist (pacing) toward the patient imitating the therapist is visible ("leading" higher synchrony at negative lags). Additionally, the social present appears to be extended from around 6 seconds in the initial phase toward roughly 8 seconds in the final phase of therapy (see Fig. 3 for details).

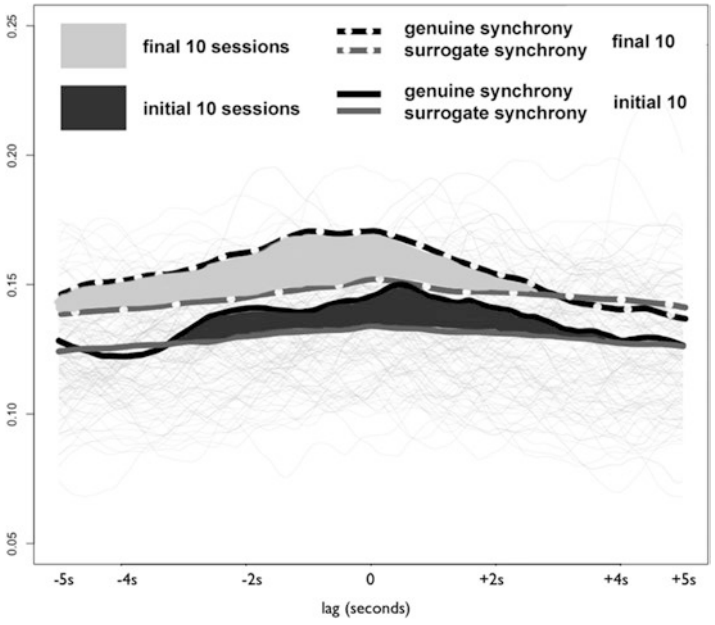

Fig. 3 Comparison of social present at initial stage of therapy (first ten sessions, dark gray) versus final stage of therapy (last ten sessions, light gray). Ordinate, synchrony *Z* values

We further reanalyzed the data of a psychotherapy process study of 104 sessions of cognitive-behavioral psychotherapy, a random selection that included 70 different patients (Ramseyer & Tschacher, 2011). The raw data of this study were MEA assessments of whole-body movement in 15-minute sections of the respective treatments. These sections were taken randomly from the initial third and the final third of the therapy courses. The mean social present in this sample was 5.75 seconds. There was no clear association of the social present with overall outcome, but longer durations of the present were linked with higher self-efficacy of the patients in the respective session (using items of the patients' session reports as a measure of self-efficacy).

Schwartz et al. (2017) studied a large sample of 142 outpatients undergoing treatment with cognitive-behavioral psychotherapy, following the same procedure as Ramseyer and Tschacher (2011) – 15 min sections were taken from the initial and final third of the respective therapies, and movement synchrony was monitored using MEA. The authors focused on the changes of the social present from sessions earlier to later in the course of psychotherapy. A decrease of the social present was associated with lower depression at the end of treatment, however only in patients who were high in initial depression. This finding may suggest that a reduced social present represents a patient's (healthy) detachment, and prolonged present may indicate psychomotor retardation in affective disorders.

The state of research in this field is currently still provisional; it is in need of conventions and standards that all researchers can agree upon. Only a standardized procedure in SUSY will allow a comparison of the absolute nowness durations between datasets. Currently, it is therefore unclear whether the social present durations increase in the course of psychotherapy (Ramseyer & Tschacher, 2016), decrease (Schwartz et al., 2017), or remain constant (Ramseyer & Tschacher, 2011).

Conclusions for Psychotherapy

The "here-and-now" of psychotherapy is considered to be of high significance, especially in humanistic psychotherapy and mindfulness-based psychotherapy approaches. Whenever the therapeutic relationship is acknowledged as a core factor of psychotherapy, such as in client-centered psychotherapy (Pascual-Leone & Greenberg, 2007) or dialogical family therapy (Seikkula, 2008), the present moment of psychotherapy must be a focus of attention as it characterizes the here-and-now (Stern, 2004). The present moment in psychotherapy is also highly relevant for other common change factors such as problem activation (Gassmann & Grawe, 2006) or corrective emotional experience (Castonguay & Hill, 2012), as they unfold their therapeutic impact in the here-and-now. In this theoretical view, the therapeutic presence (Geller & Porges, 2014) is a prerequisite of change. Experiencing, consciousness, and mindfulness – all these can, by definition, only occur in the present moment.

Nevertheless, in terms of empirical research, not much is known about this present moment in psychotherapy settings. We have therefore constructed a quantitative method that complements the phenomenological view of the therapeutic situation. We suggested a novel data-driven approach to study the here-and-now of psychotherapy by time series analysis of a "minimal model" of psychotherapy. This analysis uses cross-correlations and surrogate tests to define the social present as the duration of nonverbal synchronization of two interacting individuals, such as therapist and client. The methodology relies on fine-grained process data that describe the therapeutic encounter via body movement or physiological recordings. It directly addresses the coupling between therapist and client, i.e., their alliance, which is the core of such encounters. And additionally, it recognizes this coupling as a stable dynamical phenomenon, namely, the ongoing synchronization of the two individuals.

Preliminary findings have suggested that the resulting measure of the social present may be linked with some aspects of personality and with task affordances in healthy participants engaged in conversations. In psychotherapy data, we found an association with an important common factor of therapy process, the client's self-efficacy, and thus maybe also with therapy outcome. The mean duration of the social present was approximately six seconds when synchrony computation and surrogate testing were performed with default parameters. We are wondering whether it is more than mere coincidence that this duration is roughly twice the duration of individual nowness. This of course does not imply that the duration of the present increases linearly with the number of interacting people. At this stage of research, both synchrony and the social present are defined for dyadic systems only.

We consider these results as promising beginnings of a new field of psychotherapy process research that address a previously unstudied phenomenon. More studies are obviously needed to confirm the alleged significance of the social present in psychotherapy. Future studies should compare the data-driven situated approach proposed in the present chapter to phenomenological ratings performed by clients and therapists. Questionnaire measures – the Therapeutic Presence Inventory for therapists (TPI-T) and clients (TPI-C) – are already available (Geller, Greenberg, & Watson, 2010). This will provide an opportunity to connect the experiences of therapeutic presence with the time series measures we have introduced. The distant goal of such research is obviously the translation of findings into therapeutic practice – how shall we shape the therapist-client encounter in the present moment in order to optimize therapeutic effects?

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