

In Sync with Your Shrink:
The Vital Role of Interpersonal Synchrony in Psychotherapy

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Every day, millions of people turn to psychotherapy to deal with a variety of mental health problems, including depression, anxiety disorders, psychotic disorders, eating disorders, personality disorders, and substance abuse. Although there are over a thousand psychotherapies, virtually all of them involve some kind of structured interactions between a patient (or patients) and a therapist. The working relationship between patient and therapist is thus a vital part of psychotherapy. Indeed, the quality of the therapeutic relationship ranks among the most robust predictors of better outcomes in psychotherapy (Horvath, Del Rey, Flückiger, & Symonds, 2011).

What determines whether patient and therapist in psychotherapy establish a good working relationship? In the present chapter, we suggest that the answer to this question may be found in the basic principles of social psychology, the scientific discipline studies the nature of people's relation with one another more generally. In particular, we highlight the significance of *interpersonal synchrony* as an important key to establishing a beneficial working relationship between patient and therapist. Interpersonal synchrony is defined here as the temporal coordination of social agents' mutual behavioral, physiological, and neurological functions. By optimally synchronizing their mutual functioning, patient and therapist may find themselves 'on the same wavelength' and literally 'in sync' with each other. This, in turn, may contribute to therapeutic goals and self-regulatory skills of the patient, especially when it comes to the patient's ability to self-regulate her or his emotional states.

The remainder of this chapter is organized into five parts. In Part 1, we briefly review clinical-psychological research on psychotherapy. In this review, we focus especially on

research that pertains on the working relationship between patient and therapist, also known as the *therapeutic alliance*. In Part 2, we turn to social-psychological research on interpersonal synchrony. The focus of our discussion here is on how this basic research can be used to understand the alliance between patient and therapist. In Part 3, we show how the clinical- and social-psychological literatures are integrated in the INterpersonal SYNChrony (IN-SYNC) model of psychotherapy (Koole & Tschacher, 2016). In Part 4, we review empirical research that bears on the IN-SYNC model. Finally, in Part 5, we summarize our main conclusions and consider the broader implications of this work for social psychology and its applications.

Part 1: The Alliance

The working relationship between patient and therapist has inspired an extensive literature in clinical psychology, where it is designated by various terms such as the alliance, the therapeutic bond, therapeutic relationship, treatment alliance, helping alliance, or working alliance. Here, we consider briefly the historical development of alliance research, how it got caught up in the culture wars within clinical psychology during the 1980s and '90s, and the main findings of modern research on the alliance.

Historical Background

The importance of the patient-therapist relationship has been noted since the first psychotherapies were pioneered by psychoanalysts, around the start of the 20th century (Elvins & Green, 2008). Both classic and modern psychoanalysis see it as their mission to address the patient's emotional conflicts and interpersonal relationships (Shedler, 2010). From this orientation, it follows naturally that the patient-therapist relationship may play an important role in the psychological healing process. Indeed, the founder of the psychoanalytic movement, Sigmund Freud, discussed the importance for the analyst to maintain a supportive

attitude toward the patient (Freud, 1912). Freud further observed that the patient may transfer experiences from earlier relationships into her or his dealings with the therapist. These early observations, and particularly the notion of transference, were subsequently elaborated and translated into theoretical models of the patient-therapist relationship (Shedler, 2010). The psychoanalytic tradition has thus emphasized especially the patient's contributions to the alliance.

The rise of experimental psychology during the 20th century, led to the development of new behavior psychotherapies the 1950s, which were complemented by cognitive therapies in the 1960s and '70s (Keegan & Holas, 2009). The resulting cognitive-behavioral tradition focused on problematic habits and maladaptive thinking styles of the individual patient, which are to be countered with an array of behavioral and cognitive interventions. Within the cognitive-behavioral tradition, at least initially, psychologists did not explicitly theorize about the possible therapeutic benefits of the patient-therapist relationship.

Nevertheless, around the same time that cognitive-behavioral therapy emerged, practitioners outside mainstream psychology were developing humanistic or existential psychotherapies, which had a keen eye on the patient-therapist relationship. Unlike the psychoanalysts, however, humanistic-existential psychologists have emphasized the therapist's contributions to the alliance (Cain, 2002; Van Deurzen, 2012; Yalom, 1980). Particularly influential has been client-centered therapy (Rogers, 1951), which suggests that the therapist should relate authentically with the patient, while offering acceptance and empathy for the patient's perspective. These ideas were subsequently refined and translated into empirical measures of the patient-therapist relationship.

From the 1980s onward, the notion of the alliance found its way into mainstream psychology. Two developments are notable here. First, the psychoanalytic and humanistic

notions of the alliance were combined into a transactional conception, in which the alliance is seen as the product of the interactions between patient and therapist (Hougaard, 1994).

Second, the notion of the alliance was increasingly extended across all psychotherapies (Bordin, 1979). Definitions of the alliance were stripped from notions belonging to a specific therapeutic tradition, like the psychoanalytic notion of transference or the humanistic-existential notion of authenticity. Instead, the alliance became a ‘pantheoretical construct’ that subsumed all collaborative elements within the therapeutic relationship (Horvath & Luborsky, 1993). For instance, one influential formulation defined the alliance as consisting of the patient and therapist 1) agreeing on the *goals* of the therapy; 2) dividing *tasks* among each other; and 3) developing *bonds* between them (Bordin, 1979).

The Great Psychotherapy Debate

As the alliance construct was extended to encompass all psychotherapies, alliance research became caught up in what some have called ‘the great psychotherapy debate’ (Wampold & Imel, 2015). This debate revolves around the question what makes psychotherapy work. One side holds that psychotherapy is effective because of the effects of specific treatment methods. For instance, cognitive-behavioral therapy might cure depression because it replaces maladaptive thought patterns with adaptive ones. The other side of the debate believes that psychotherapy is effective because of factors that are common across different treatment factors, such as patients’ hope that the treatment will be effective.

The great psychotherapy debate has pitted the effectiveness of specific treatment methods against the effects of the alliance, which operates across different treatment methods and can thus be seen as a common factor. However, this way of framing the debate is itself debatable (Norcross & Lambert, 2011). First, treatment methods and the alliance have a profound synergy. When the alliance is good, patients are much more motivated to adhere

with the treatment. Conversely, specific treatment methods will almost invariably affect the alliance, and can thus be viewed as relational acts. Moreover, even in cases when specific treatment methods and the alliance have separate effects, they can still operate side by side. There is no inherent reason why beneficial effects of the alliance should come at the expense of the beneficial effects of specific therapeutic interventions. Creating a dichotomy between the alliance and treatment methods is thus artificial and potentially misleading.

Second, the great psychotherapy debate has had polarizing effect on the discipline, leading to something akin to culture wars within clinical psychology (Norcross & Lambert, 2011). Rival camps have published countless critiques back and forth, leading to entrenched positions on each side. This problem is exacerbated by the complexity of determining what makes psychotherapy work, which requires multiple, very large studies with complicated design, along with experimental studies and theoretical work (Cuijpers, Reijnders, & Huibers, 2019; Kazdin, 2007). This means that it could take decades to determine the relative importance of the alliance and specific treatments, to the extent that it this can be determined at all.

Importantly, the many debates on the relative effects of the alliance versus the effects of specific treatments have masked the larger agreement that clinical psychologists have reached on the importance of the alliance. To be sure, some clinicians attribute more importance to the alliance than others. However, the authors of this chapter have never met a psychotherapist who found the alliance completely irrelevant to her or his clinical work, even though one of us have been in the field for decades. There is thus a near-universal consensus among clinicians that a good working relationship between patient and therapist is desirable and conducive to good outcomes psychotherapy. This strong consensus provides a firm foundation for modern alliance research.

Modern Alliance Research

It is practically almost impossible to randomly assign patients to different levels of the alliance, and even if this could be achieved, doing so may not be ethical. Consequently, alliance research has generally used correlational designs. Typically, the patient and the therapist (or sometimes an external observer) rate the alliance on a standard questionnaire. For instance, the widely used Working Alliance Scale has items such as “[My therapist] and I understand each other” and “We agree on what is important for me to work on” (Horvath & Greenberg, 1989). Factor-analytic research indicates that the core of patients’ view of the alliance consists of being confident in and committed to a process that feels promising and helpful (Hatcher & Barends, 1996). Items relating to goals and tasks tend to be correlated (Elvins & Green, 2008), suggesting that the distinction between goals and tasks may not matter so much on a psychological level,

In a meta-analysis of 190 independent studies, Horvath et al. (2011) found an average correlation of the alliance and psychotherapy outcomes of .275. Thus, stronger alliances are associated with better therapeutic outcomes. The strength of the alliance-outcome association is statistically modest, given that alliance measures on average account for about 7.5% of psychotherapy outcomes. However, statistical outcomes should not be equated with clinical relevance, and, unfortunately, there exist no validated methods for establishing clinical significance (Cuijpers, Turner, Koole, Van Dijke, & Smit, 2014). It is further notable that the alliance-outcome association is robust across different kinds of studies (randomized controlled trials or other), types of psychotherapy (cognitive-behavior therapies or other), different alliance measures, and types of outcomes (e.g., specific symptoms or general wellbeing). This makes the alliance-outcome association one of the most robust findings in modern clinical psychology.

Because the alliance-outcome association is correlational in nature, it is open to various explanations other than that a better alliance promotes good therapeutic outcomes. One obvious alternative explanation is that patients report a better alliance when they noticed they benefited from the therapy. However, studies using autoregressive cross-lagged modeling and similar analyses have shown that that alliance usually precedes symptom reduction (Zilcha-Mano, 2017). Consequently, the alliance seems to be more than just the result of therapeutic success.

A second alternative explanation is that patients who are easier to treat also form a better alliance with the therapist. Here, recent studies have begun to use advanced statistical techniques to separate the trait-like differences in forming the alliance from state-like, relationship-specific variations in the alliance (see Zilcha-Mano, 2017). The state-like component relates to the therapeutic nature of the alliance as an active ingredient sufficient in itself to bring about therapeutic change. The trait-like component relates to the patient's general trait-like ability to form strong and satisfying relationships. The trait-like component may enable the use of other aspects of treatment that may induce change, such as effective techniques. Importantly, research indicates that state-like changes in the alliance across treatment can predict therapeutic outcomes, independently of the patient's general trait-like ability to form a strong and satisfying alliance. Thus, the alliance-outcome link does not arise simply because "better" patients form a stronger alliance.

Summary and Outlook

Clinical psychologists have achieved important progress in studying the therapeutic alliance. First, clinical psychologists have converged on a transtheoretical definition of the alliance. Second, clinical psychological research found evidence for a robust relation between the alliance and therapeutic outcomes, which cannot be attributed to reverse causality or trait

variations in the ability to form beneficial relationships. As the same time, alliance research has limitations: First, it has largely relied on subjective ratings, ignoring objective aspects of the alliance. Second, alliance research has made little contact with disciplines outside clinical psychology. Third, alliance research lacks a theoretical framework for explaining why and how the alliance works. To address these limitations, we now turn to recent advances in social psychology.

Part 2: Interpersonal Synchrony

Social psychologists have long studied people's universal tendency to form close relationships with another (Baumeister & Leary, 1995; Bowlby, 1969; Butler, 2011). One of the most foundational principles in regulating relationships is *interpersonal synchrony* (Feldman, 2007; Koole & Tschacher, 2016; Semin & Cacioppo, 2008). Interpersonal synchrony may be defined as the temporal coordination of people's mutual behavioral, physiological, and neurological functions. Everyday examples of synchrony can be found when people are walking side by side in the same pace (van Ulzen, Lamothe, Daffertshofer, Semin, & Beek, 2008), when people are engaged in a naturally flowing conversation (Koudenburg, Postmes, & Gordijn, 2017), or when people are dancing together (Koch & Fischman, 2011).

The emergence of interpersonal synchrony is closely linked to positive, mutually beneficial social exchanges. In part, this is because people synchronize more readily with others with whom they seek to develop positive relationships (Miles, Lumsden, Richardson, & Macrae, 2011). However, interpersonal synchrony also has a causal impact in social interaction. Social-psychological experiments have shown that leading people to move in synchrony promotes cooperation and helping (Wiltermuth & Heath, 2009), increases liking, compassion, and rapport (Hove & Risen, 2009; Vacharkulksemsuk & Fredrickson, 2012;

Valdesolo & DeSteno, 2011) and the sensitivity of responding to interaction partners (Valdesolo, Ouyang, & DeSteno, 2010). Consequently, interpersonal synchrony appears to be a fundamental mechanism for promoting social coordination.

As further testimony to its fundamental nature, interpersonal synchrony has been observed in multiple response modalities. The four most important response modalities of interpersonal synchrony are: a) movement, b) physiological responding, c) language, and d) brain-to-brain responding. These response modalities are likely to be meaningfully interrelated (Koole & Tschacher, 2016; Shamay-Tsoory, Saporta, Marton-Alper, & Gvirts, 2019). Nevertheless, they have mostly been studied separately in, respectively, movement science/social psychology, psychophysiology, cognitive linguistics, and social-cognitive neuroscience. We therefore discuss each response modality in turn.

Movement Synchrony.

The first and most visible type of interpersonal synchrony is synchronization of bodily movements. It is well-established that people quickly and efficiently synchronized their movements in controlled laboratory environments, such as finger-tapping tasks (Repp & Su, 2013). In more recent years, new technologies have enabled non-invasive movement registration during naturalistic social interactions (Leclère et al., 2016). Using these technologies, combined with advanced statistical techniques (Moulder, Boker, Ramseyer, & Tschacher, 2018; Ramseyer & Tschacher, 2010), researchers have been able to show that people spontaneously synchronize their movements in free and unstructured situations, both with strangers and familiar others (Feldman, 2007; Richardson, Marsh, Isenhower, Goodman, & Schmidt, 2007; van Ulzen et al., 2008). In addition, movement synchrony is associated with a sense of being mutually attuned in a shared present (Tschacher, Ramseyer, & Koole, 2018).

The latter findings have been confirmed by experimental studies, which have shown that moving in sync fosters social bonding and cooperation (Tarr, Launay, & Dunbar, 2016; Wiltermuth & Heath, 2009). Experimental studies have further been able to distinguish synchrony from mimicry (Chartrand & Lakin, 2013). Though synchrony and imitation both involve behavioral matching, they differ in what is being matched. In mimicry, people are matching the identity of their actions. By contrast, in synchrony, people matching the timing of their behavior, regardless of which specific actions are involved. To see if synchrony influences social behavior over and above the effects of, several experiments have manipulated whether participants display the same behavior in or out of synchrony (Hove & Risen, 2009; Valdesolo et al., 2010; Wiltermuth & Heath, 2009). The results showed higher levels of affiliation when participants were moving in (rather than out of) synchrony. These and related studies indicate that synchrony promotes affiliative responses even when mimicry is held constant.

Physiological Synchrony.

A second type of interpersonal synchrony emerges in physiological responding. Human infants already adopt their mother's biological rhythms in utero (Ivanov, Ma, & Bartsch, 2009; Van Leeuwen et al., 2009). After birth, physiological synchrony between caretaker and child sets the stage for autonomous emotion regulation (Feldman, 2007). Furthermore, adults physiologically synchronize in close relationships (Palumbo et al., 2017). Physiologically synchronization may further occur among strangers, for instance, when they are observing or performing a collective ritual (Konvalinka et al., 2011). Research on physiological synchrony has so far concentrated on the autonomous nervous system, which is divided into the sympathetic system—which supports activation, or the “fight-flight” response—and the parasympathetic system (PNS)—which supports restoration, or the “rest-and-digest” response.

Researchers have distinguished between three main patterns of interpersonal physiological regulation (Butler & Randall, 2013). The first pattern is *emotional contagion*, and occurs when interaction partners directly adopt another's level of arousal. Although emotional contagion can be regarded as a form of interpersonal synchrony, emotional contagion can lead to excessive arousal when one interaction partner is highly distressed. It is likely for this reason that covariation of cortisol, an important stress hormone, among partners has been found to be negatively associated with relationship satisfaction (Timmons, Margolin, & Saxbe, 2015). The second pattern is stress buffering, and occurs when one partner lowers the arousal level of the other partner. Although stress buffering is likely adaptive (Coan & Sbarra, 2015), it is not a reciprocal process and therefore it does not qualify as a form of synchrony. The third and last pattern is coregulation, and occurs when interaction partners synchronize their emotional responses within a stable range. Coregulation theoretically represents a healthy form of interpersonal regulation that contributes to the person's physiological adaptability to changing circumstances. Consistent with this, statistical markers of the coregulation are positively associated with relationship satisfaction (Helm, Sbarra, & Ferrer, 2014).

Linguistic Synchrony

A third type of interpersonal synchrony occurs through language. Part of the regulatory effects of language occur through the behavioral and physiological modalities of interpersonal synchrony: Conversation partners coordinate their postural sway and match each other's eye gaze, even when they cannot see each other (Shockley, Richardson, & Dale, 2009). Moreover, conversation synchronizes breathing patterns (McFarland, 2001), which in turn regulates cardiovascular responding (Lehrer & Gevirtz, 2014).

Cognitive linguists have further documented how the linguistic representations of conversation partners become aligned as a result of largely automatic processes (Pickering & Garrod, 2004). Such linguistic alignment involves a blend of mimicry (i.e., matching the identity of another's linguistic utterances) and synchrony (i.e., matching the timing of these utterances). It is often hard to say precisely to what degree linguistic alignment results from mimicry or synchrony. Nevertheless, it seems fair to say that synchrony is a key aspect of linguistic alignment. Notably, linguistic alignment occurs simultaneously at multiple levels of linguistic processing, such that conversation partners become aligned in their intonation, speech sounds, pronunciation, word use, and grammar. These levels appear to be mutually reinforcing, such that linguistic alignment at one level promotes alignment at other levels. For instance, conversation partners who use the same grammatical structures are more likely to reach a common understanding of the situation. Conversely, conversation partners who have reached a mutual understanding are also more likely to use the same grammatical structures.

Brain-to-Brain Synchrony.

Finally, a fourth type of interpersonal synchrony occurs between the brains of people as they are interacting. The notion of brain-to-brain synchrony may initially come across as esoteric, given that modern neuroscience has traditionally focused on individual brains. Nevertheless, brain-to-brain synchrony does not require extrasensory abilities, given that it builds on the brain's ability to be coupled to signals from the physical world (Hasson, Ghazanfar, Galantucci, Garrod, & Keysers, 2012; Konvalinka & Roepstorff, 2012; Nummenmaa, Lahnakoski, & Glerean, 2018). In brain-to-brain synchrony, the signal is generated by another person (or persons) living body and brain rather than by inanimate objects.

More than research on other synchrony modalities, research on brain-to-brain synchrony has been reliant on technological innovations. In so-called ‘hyperscanning studies, the conventional neuroimaging techniques of EEG and fMRI have been adapted to simultaneously record brain activity of interaction partners (Babiloni & Astolfi, 2014; Dikker et al., 2017; Mu, Cerritos, & Khan, 2018). Both techniques still have disadvantages. For instance, fMRI requires that people lie flat on their back with their head still inside a narrow, highly noisy magnet. EEG equipment can be made portable, but EEG signals suffer strongly from movement and speech interference. These problems may be resolved with new technological developments. For instance, functional near-infrared spectroscopy (fNIRS), which allows neuroimaging while people are sitting without head or body fixation, although fNIRS can currently only measure cortical activity up to 4 cm into the brain (Ferrari & Quaresima, 2012).

Despite these methodological problems, hyperscanning studies have been able to demonstrate find that joint action leads to brain-to-brain synchrony, for instance, among guitarists playing together (Müller, Sängler, & Lindenberger, 2018) and among students following the same lecture (Dikker et al., 2017). Brain-to-brain synchrony further emerges in emotionally charged relationships, such as parent-child dyads (Reindl, Gerloff, Scharke, & Konrad, 2018) and romantic partners (Kinreich, Djalovski, Kraus, Louzoun, & Feldman, 2017). One mechanism that promotes brain-to-brain synchrony appears the sharing of perspectives, particularly when it comes to emotional events. This was shown in a series of ‘pseudo-hyperscanning’ studies in which the synchronization of participants’ brain is recorded while they are watching or listening to a pre-recorded video or audio recording. In one of these studies, participants who were viewing similar emotional events in a movie showed synchronized brain activity in lower- and higher-order sensory areas and in corticolimbic emotion circuits (Nummenmaa et al., 2012). Similar effects have been found

for emotional speech (Nummenmaa et al., 2014). Such brain-to-brain synchronization is greatest when participants are led to adopt a similar psychological perspective on events (Lahnakoski et al., 2014). Brain-to-brain synchronization thus reflects shared emotions and a shared understanding of the situation.

Summary and Outlook.

A rapidly growing set of literatures have examined interpersonal synchrony in movements, physiology, language, and neural activations. This work has collectively provided strong evidence for synchrony as a fundamental mechanism of social coordination. At the same time, research on has remained somewhat scattered, given that it has been conducted in movement science/social psychology, psychophysiology, cognitive linguistics, and social-cognitive neurosciences. These disciplines have progressed in parallel, with little exchanges taking place across traditional disciplinary boundaries. This is unfortunate, given that it is theoretically plausible that there is crosstalk between the different response modalities of interpersonal synchrony. Moreover, in applied domains, the different response modalities of interpersonal synchrony cannot be neatly separated as they must always converge in real-life situations. In the next section, we therefore consider the integration of the different response modalities of interpersonal synchrony in the context of psychotherapy.

Part 3: The IN-SYNC Model

To integrate the different response modalities of interpersonal synchrony, we have recently proposed the Interpersonal Synchrony (IN-SYNC) model of psychotherapy (Koole & Tschacher, 2016). The IN-SYNC model is a new framework that combines processes that have traditionally been studied in movement science, social psychology, psychophysiology, and social-cognitive neuroscience, cognitive linguistics. In addition, the IN-SYNC model draws insights from developmental science, relationship science, and emotion science. The

IN-SYNC model was developed to stimulate theoretical integration in the different literatures on interpersonal synchrony. Moreover, the IN-SYNC model seeks to promote clinical applications that harness the beneficial effects of the patient-therapist relationship.

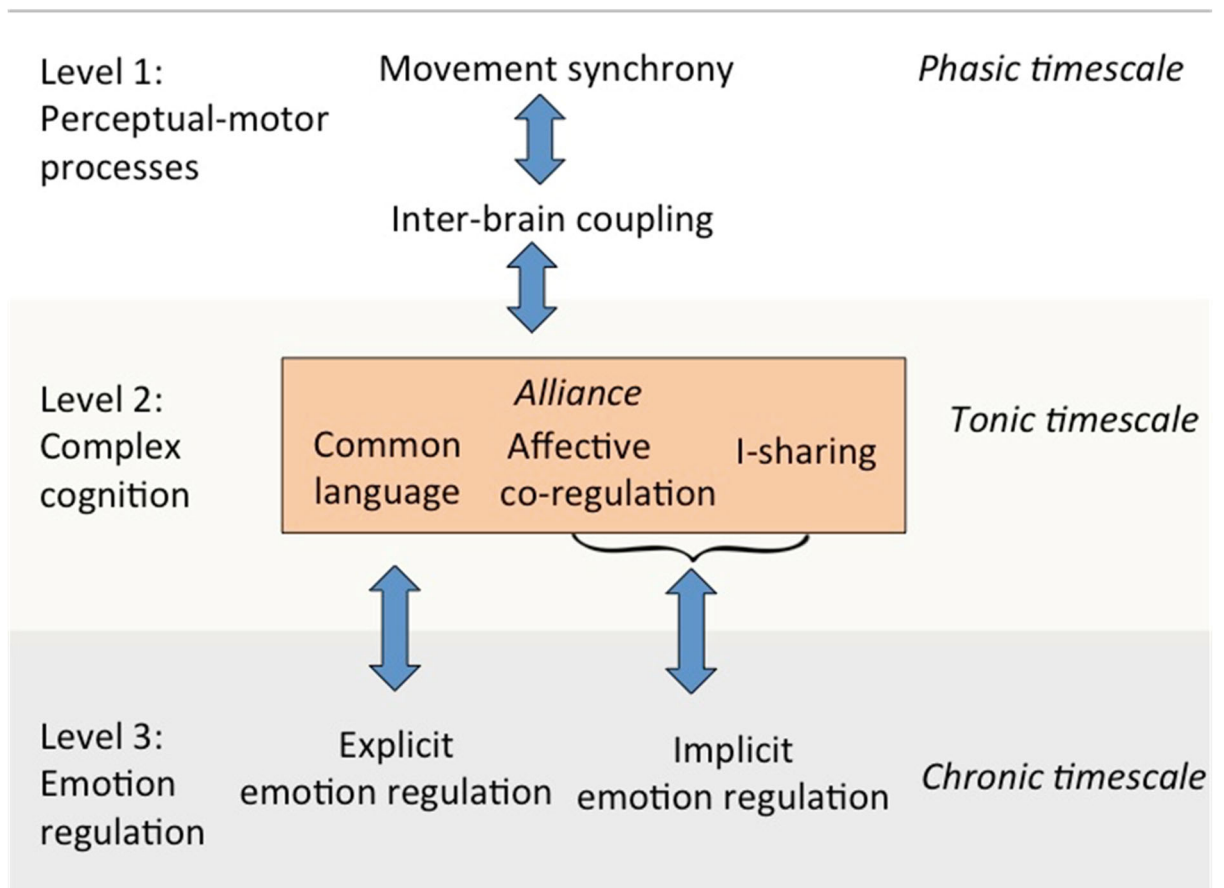


Figure 1: The IN-SYNC Model of Psychotherapy

An overview of the IN-SYNC model is provided in Figure 1. In a nutshell, the model proposes that: 1) moment-to-moment synchronization of movement and physiological responses sets the stage for 2) a good working relationship between patient and therapist, which, across sessions, 3) strengthens patient's emotion-regulatory skills. The In-Sync model thus distinguishes between psychotherapy processes at three different timescales. For the sake of simplicity, our discussion here covers only the causal flow from faster (elementary) to

slower (more complex) levels. In reality, however, higher levels may also regulate the lower levels. Such bidirectional loops are represented as double-sided arrows in Figure-1.

Level 1: Phasic Processes.

At Level 1, synchrony processes operate at a phasic time-scale, which runs from hundreds of milliseconds to about one minute. Automatic perceptual-motor processes at this level (Hommel, Müsseler, Aschersleben, & Prinz, 2001) give rise to movement synchrony. Most processes at this level are not consciously experienced. Nevertheless, movement synchrony is linked to a sub-linguistic form of brain-to-brain synchrony (Shamay-Tsoory et al., 2019). The latter may be partly experienced as sharing the present moment (Tschacher et al., 2018) or a state of mutual attunement (Geller & Porges, 2014). Although little is known about the physiological effects of movement synchrony, it is already established that movement synchrony fosters emotional security (Tschacher, Rees, & Ramseyer, 2014) and even raises pain thresholds (Tarr et al., 2016). Movement synchrony may thus evoke mutual parasympathetic activation ('the rest-and-digest' system), which represents an important form of physiological synchrony at Level 1.

Level 2: Tonic Processes.

Level 1 set the stage for more complex interpersonal forms of coordination at Level 2, which operate at a tonic time-scale, which lasts from several minutes to one or more hours. Tonic processes are more accessible to conscious awareness, so they may be assessed (in part) by self-report scales that assess the quality of the patient-therapist relationship (Horvath et al., 2011). The IN-SYNC model distinguishes three processes that are presumed to constitute the alliance. The first component is the development of a common language, through linguistic alignment (Pickering & Garrod, 2004), which facilitates the task- and goal-related aspects of the alliance (Bordin, 1979). The second component of the alliance consists

of the sharing of subjective experiences by the patient and therapist, or ‘I-sharing’ (Pinel, Bernecker, & Rampy, 2015), which promotes social bonding and the the personal aspects of the alliance (Bordin, 1979)b. The third and last component of the alliance is co-regulation (Butler & Randall, 2013), and consists of mutual regulation of emotional responses within a stable range. Effective therapists will keep mutual physiological arousal during the therapy within healthy homeostatic limits.

Level 3: Chronic Processes.

Finally, at Level 3, the effects of multiple psychotherapy sessions accumulate at a chronic timescale, over days, weeks, months, and even years. To the extent that the working relationship between patient and therapist was successful, the patient should display notable improvements. The In-Sync model assumes that these improvements particularly pertain to the patient’s capacity for emotion regulation. This is because the interpersonal dynamics of psychotherapy closely parallel how people acquire emotion-regulatory skills in everyday life, through interactions with caregivers (Feldman, 2007) and loved ones (Butler & Randall, 2013).

Summary and Outlook

The IN-SYNC model addresses the role of interpersonal synchrony in psychotherapy. According to the model, interpersonal synchrony in movements, physiology, language, and neural activations (at the phasic timescale) sustain the working relationship of the patient and therapist in psychotherapy (at the tonic timescale). This, in in turn, promotes therapeutic gains (at the chronic timescale), especially with regard to the patient’s emotion-regulatory skills. The IN-SYNC model thus provides an integrative framework for understanding how moment-to-moment exchanges between patient and therapist may translate into more complex forms of social cognition and, eventually, improvements in mental health.

Part 4: Empirical Research on Synchrony in Psychotherapy

In this section, we review the emerging literature that bears key aspects of the IN-SYNC model (Koole & Tschacher, 2016). Our review is selective in four ways. First, we focus only on the most studied relationships within the IN-SYNC model. Second, our discussion only covers the main studies that appeared in our earlier review of 2016. Third, we prioritize research that was published since 2016, so that the present review documents how the literature has advanced since the publication of the IN-SYNC model. Fourth, we highlight the major questions that still need to be addressed in our opinion.

The IN-SYNC model emphasizes nonverbal processes like movement dynamics, psychophysiological and neurological responses. These kinds of nonverbal processes have traditionally received little attention from clinical psychologists. One important reason for this was that they had to be coded manually, which is a time-consuming and laborious affair. This has changed, however, with the recent development of automated methods for movement analysis, and improvements in physiological and neuro-imaging equipment. Furthermore, the resulting data, which have complex interdependencies can be analyzed with sophisticated statistical models and increasingly powerful computational tools (Gates & Liu, 2016; Thorson, West, & Mendes, 2018; Wilderjans, Ceulemans, Van Mechelen, & van den Berg, 2011). These various technological and scientific advances have converged to render the study of dynamic nonverbal processes in psychotherapy increasingly efficient and cost-effective.

Level 1: Movement Synchrony.

The first comprehensive study of movement synchrony in psychotherapy was conducted by Ramseyer and Tschacher (2011). These researchers selected 104 sessions from an archive of videotaped psychotherapies at the outpatient psychotherapy clinic in

Switzerland. Patients suffered from a wide range of problems, including anxiety disorders and affective disorders. Automated video analyses showed that movement synchrony between patient and therapist was significantly higher than would be expected by chance. Moreover, movement synchrony, assessed at the start of the psychotherapy, was predictive of the quality of alliance, as rated by patients at the end of each session. Finally, movement synchrony between patient and therapist was a longitudinal predictor of symptom reduction at the end of psychotherapy. These findings provide strong evidence for the contribution of movement synchrony to the alliance and therapeutic outcomes.

In a conceptual replication of Ramseyer and Tschacher (2011), Paulick and associates conducted an automated video analysis of 136 videotapes sessions between 27 psychotherapists and 143 German patients who received integrative cognitive-behavioral therapy (Paulick, Deisenhofer, et al., 2018). As in Ramseyer and Tschacher (2011), movement synchrony occurred at above-chance levels between patients and therapists. However, there was no relation between movement synchrony patient-rated alliance. Still, movement synchrony was predictive of therapeutic outcomes, but only in combination with dropout rates: The lowest level of movement synchrony was found among non-improved patients who dropped out of therapy. A medium level of movement synchrony was found among improved patients. Finally, the highest level of movement synchrony was found among non-improved patients who consensually terminated treatment. The latter could mean that patient and therapist can overdo it in synchronizing their movements, although more research is needed to confirm this findings. More generally, the Paulick et al. study suggests that movement synchrony in early sessions can predict premature termination of psychotherapy. The latter effect has been confirmed in a study among 267 German patients who received cognitive-behavioral therapy or psychodynamic therapy for social anxiety disorder (Schoenherr et al., 2019).

Another study (Paulick, Rubel, et al., 2018) examined movement synchrony in 173 cognitive-behavioral therapy sessions between 23 therapists-in-training and patients diagnosed with either depressive disorders ($N = 68$) or anxiety disorders ($N = 25$). Again, movement synchrony emerged within the psychotherapy sessions at levels that were significantly above chance. However, associations between movement synchrony and outcomes were not as expected. The association was statistically non-significant (though in the predicted direction) for patients with anxiety disorders, which could have been due to the small sample size of 25 patients. For patients with depressive disorders, the association was statistically significant, but in the opposite direction was expected: Less movement synchrony at the start of psychotherapy was associated with greater symptom reduction.

The findings of Paulick, Rubel, et al. (2018) are admittedly puzzling. If they reflect a genuine psychological phenomenon, the IN-SYNC model (Koole & Tschacher, 2016) will have to be revised to include adverse effects of movement synchrony. It is possible, however, that the findings resulted from a statistical confound. In the Paulick et al. (2018b) study, movement synchrony scores from when patient began psychotherapy were used to assess its association with therapeutic outcomes. This analysis confounds between-patient differences, which are personality-based, and within-patient dynamics, which are a relationship-specific reflection of the alliance (Zilcha-Mano, 2017). In fairness, it should be noted that this confound also applies to Ramseyer & Tschacher (2011). As far as we know, there has been only one study of within-patient variations in movement synchrony: A single-case study (Ramseyer & Tschacher, 2016) observed that patient-therapist synchrony of hand movements (assessed by an accelerometer) during 27 psychotherapy session was greater than chance, and positively associated with post-session therapeutic progress. This is a first indication that within-patient dynamics may drive the therapeutic benefits of movement synchrony. However, much larger samples will be needed to statistically disentangle

between- and within-patient components and their associations with the alliance and clinical outcomes (see Zilcha-Mano, 2017, on relevant methods).

Level 2: Language, I-Sharing, and Co-Regulation.

The In-Sync model distinguishes three objective components of the patient-therapist alliance: Common language, I-sharing, and co-regulation. Because clinical psychologists usually assessed the alliance only with self-report scales, the objective components of the alliance have been understudied. Nevertheless, some preliminary work has begun to develop in this area.

The first objective component of the alliance is linguistic alignment between patient and therapist. At a basic level (closely related to the perceptual-motor processes of Level 1), this linguistic alignment may become apparent in the synchronization of patient and therapist's rates of speaking. To test this idea, one study examined speaking rates within thirty clinical sessions among five patients at psychological facility in Italy (Rocco et al., 2018). As expected, speaking rates of patient and therapist speech became synchronized over the course of the sessions. At a more abstract level, patient and therapist may synchronize their word use. This notion was tested in a study of written transcripts of 122 sessions by 122 therapists in the USA (Lord, Sheng, Imel, Baer, & Atkins, 2015). Patient and therapist were found to converge in their use of similar function words (e.g., personal pronouns, prepositions) at each conversational turn. Moreover, this form of linguistic style synchrony was positively correlated with observer-rated empathy of the therapist.

The second objective component of the alliance is I-sharing, that is, the sharing of deeply felt experiences (Pinel et al., 2015). The assessment of I-sharing in psychotherapy is still in its infancy. Nevertheless, a recent study on brain-to-brain synchrony (Zhang, Meng, Hou, Pan, & Hu, 2018) seems potentially relevant to I-sharing. Using fNIRS (see section 2),

this study examined brain-to-brain synchrony among 34 participants who were randomly assigned to engage in either psychotherapy or chatting with one of three female professional counsellors. The study showed that brain-to-brain synchrony was enhanced during psychotherapy (versus chatting) in the right temporo-parietal junction, a region associated with social connectedness and mentalizing (Cacioppo & Cacioppo, 2012). Notably, greater brain-to-brain synchrony was associated with a better quality of the quality alliance, as rated by the patients. Through preliminary, these results suggest that measures of brain-to-brain synchrony during psychotherapy may be useful in assessing the quality of I-sharing.

Finally, the third objective component of the alliance is coregulation, mutual regulation of emotions within a stable range (Butler & Randall, 2013). A pioneering study observed that patient-therapist congruence in skin conductance of 20 patient-therapist dyads associated with higher therapist empathy and more positive interactions between patients and therapists (Marci, Ham, Moran, & Orr, 2007). A more recent study found statistically significant physiological synchrony across various cardiovascular indexes recorded in 55 psychotherapy sessions with 4 clients and one female psychotherapist (Tschacher & Meier, 2019). Moreover, alliance rated by the client or therapist was positively associated with physiological synchrony. Alternatively, coregulation be operationalized as the degree to which patients and therapists converge in their experienced emotions. A recent study examined such emotional convergence between 109 Israeli patients who were treated by 62 therapists (Atzil-Slonim et al., 2018). Ratings of patients' and therapists' emotions were obtained after each session. When patients and therapists displayed incongruent emotions, this predicted a worsening in the patients' symptoms during the next session.

Other studies, however, have observed that congruency in patient-therapist emotional responding is negatively associated with therapist empathy and therapeutic outcomes (Reich, Berman, Dale, & Levitt, 2014). The congruency pattern (see in Atzil-Slonim et al., 2018;

Marci et al., 2007; Tschacher & Meier, 2019) and the incongruency patterns (as in Reich et al., 2014) superficially seem to be at odds. However, both patterns fit with a coregulation account, which suggests that effective therapists are emotionally attuned to their patients, while sometimes dampening the patient's emotions to prevent emotional escalation (Butler & Randall, 2013). Nevertheless, future work in this area should capitalize on sophisticated statistical models, which are capable of distinguishing coregulation from alternative patterns like emotional contagion and stress buffering (e.g., coupled oscillator models; see Butler, 2017).

Level 3: Long-term Therapeutic Outcomes.

Throughout our discussion of Level-1 and Level 2 research, we observed that several studies of synchrony in psychotherapy have been related to therapeutic outcomes, in either cross-sectional or longitudinal studies. The results of these studies offer preliminary support for some of the core tenets of the IN-SYNC model (Koole & Tschacher, 2016). However, the available research on clinical outcomes has so far been limited in important respects. First, outcome studies so far have assessed only one type of synchrony at a time. On the basis of the IN-SYNC model, it is likely that different synchrony types (i.e., movement, physiology, language, emotion, brain-to-brain) make separate (though inter-related) contributions to psychotherapy. It is therefore important to assess multiple synchrony types in a single study. Second, outcome studies so far have been conducted over a limited time span, usually several weeks or months. It would be important to study the effects of synchrony in psychotherapy over longer timespans. Third, outcome studies so far have used relatively small samples, which limits their informational value (Lakens & Evers, 2014).

Future researchers should ideally overcome all three of the aforementioned limitations in a single study. An example of such a study can be found in developmental research that

tracked the associations between various social-cognitive outcomes and multiple types of synchrony between children and their caregivers over a period of 10 years (Feldman, 2015). It stands to reason that conducting analogous work among adult psychotherapy patients would afford profound new insights into the role of interpersonal synchrony in psychotherapy.

Summary and Outlook

Synchrony in psychotherapy has been the focus of a growing amount of research. There is now strong evidence that patients and therapists display significant amounts of synchrony in their movements, physiological responding, language, emotions, and brain activations. These different types of synchrony have been found to have meaningful (usually positive) relations with the patient-therapist alliance and therapeutic benefits. These findings provide preliminary evidence for the validity of the IN-SYNC model (Koole & Tschacher, 2016)

Part 5: Conclusions and Outlook

Every day, millions of people turn to psychotherapy to deal with a variety of mental health problems. As we have seen in this chapter, principles from social psychology may be used to understand the working relationship between patient and therapist in psychotherapy. More specifically, the patient-therapist relationship seems to rely to an important degree on interpersonal synchrony as a fundamental mechanism of social coordination.

Explicating the role of synchrony in psychotherapy is not only beneficial for scientific reasons, but it may also lead to new ways for improving psychotherapy. For instance, there are currently large differences between psychotherapists in how much success they achieve with their patients (Wampold & Imel, 2015). The reasons for these differences are poorly

understand. From the present perspective, it seems likely that these differences in the effectiveness of psychotherapists are due to differences in the ability to synchronize optimally with patients. The IN-SYNC model (Koole & Tschacher, 2016) offers many inroads into identifying which specific social-cognitive skills might be involved, how to assess them, and how to improve them. Along similar lines, the IN-SYNC model may provide a useful framework for assessing and enhancing clinical-psychological expertise, a topic that has long eluded scientific analysis (Tracey, Wampold, Lichtenberg, & Goodyear, 2014).

As a fundamental social-psychological principle, interpersonal synchrony pertains not only to the patient-therapist relationship, but to all interpersonal relationships. Because interpersonal synchrony has been studied across various (sub)disciplines, the scientific literature on this topic has often remained somewhat fragmented. Here, research on synchrony in psychotherapy may play a vital bridging function. All the different types of synchrony -in movement, physiology, emotion, language, and between brains- converge in psychotherapy, when the patient and therapist are interacting at multiple points in time. Psychotherapy may thus allow synchrony researchers from different disciplines to join forces, so that they can develop and test ideas about the interplay of various types of interpersonal synchrony. The resulting insights may be used to understand interpersonal behavior across many different domains, from close relationships to educational settings and business negotiations.

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