**In Sync with Your Shrink:**

**Grounding Psychotherapy in Interpersonal Synchrony**

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Draft: July 17, 2019

Invited chapter for: J. Forgas and R. F. Baumeister (Eds.). The Sydney Symposium in Social Psychology.

6,700 words

AUTHOR NOTE

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**Abstract**

The working relationship between patient and therapist is a core aspect of psychotherapy. In This chapter, the authors consider how the therapeutic relationship may be explained by the basic social-psychological mechanism of interpersonal synchrony, defined as the temporal coordination of patient’s and therapist’s mutual behavioral, physiological, and neurological functions. Part 1 reviews clinical-psychological research on psychotherapy. Part 2 discusses social-psychological research on interpersonal synchrony and its relevance to the therapeutic relationship. Part 3 integrates the clinical- and social-psychological literatures in the INterpersonal SYNChrony (IN-SYNC) model of psychotherapy (Koole & Tschacher, 2016). Part 4 review empirical research on the IN-SYNC model. Part 5 summarizes the authors’ main conclusions and considers the broader implications of this work. The authors conclude that interpersonal synchrony has much promise as a basic social-psychology mechanism that may help to understand how psychotherapy works.

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Every day, millions of people turn to psychotherapy to deal with a wide 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 structured interactions between a patient (or patients) and a therapist. The working relationship between patient and therapist is thus a central 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 basic processes of social psychology, the scientific discipline that studies how people relate with one another. In particular, we highlight the significance of *interpersonal synchrony* as a foundational principle to establish 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 functioning, patient and therapist may find themselves ‘on the same wavelength’ and literally ‘in sync’ with another. 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 begin by briefly reviewing 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, zooming in on the question 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. Research on the alliance has a long and rich history, a history that continues to color scientific debates in the present day and age. We therefore briefly consider the historical development of alliance research, after which we review the main findings of modern research on the alliance within clinical psychology.

*Historical Background*

The importance of the patient-therapist relationship has been noted since the first psychotherapies were developed by psychoanalysts, around the start of the 20th century (Elvins & Green, 2008). 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 behavioral treatments 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.

Around the same time that cognitive-behavioral therapy emerged, practitioners outside the mainstream 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 increasingly found its way into mainstream psychology. Two developments are notable here. First, the psychoanalytic and humanistic notions of the alliance were merged into a transactional conception, in which the alliance is 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 elements belonging to a specific therapeutic tradition. In effect, 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 alliance research was broadened and popularized, it 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 processes 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 treatments against the effects of the alliance, which operates across different treatments 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 functions well, patients are much more motivated to adhere with the treatment. Conversely, specific treatments will inevitably affect the alliance, and can thus be viewed as relational acts. Even when specific treatments and the alliance have separate effects, there is no inherent reason why one should come at the expense of the other. Pitting the alliance against specific treatments is thus artificial and 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 endless critiques back and forth, leading to entrenched positions on both sides. The problem has been exacerbated by the complexity of determining what makes psychotherapy work, which requires multiple, very large studies with complicated designs, 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 this can be determined at all.

The foregoing debates do not take away from 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 impossible to randomly assign patients to different levels of the alliance. 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 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. 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, statistically small effects can still be clinically relevant (Cuijpers, Turner, Koole, Van Dijke, & Smit, 2014).

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 after they notice they benefited from the therapy. However, studies using autoregressive cross-lagged modeling and similar analyses have shown that the alliance usually precedes symptom reduction (Zilcha-Mano, 2017). Consequently, the alliance-outcome association seems to be more than just a side effect of therapeutic success.

A second alternative explanation is that patients who are easier to treat may 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, evidence supports 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. At 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 turn to 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) (see also Mikulincer & Shaver, this volume). 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 spontaneously start walking in the same pace (van Ulzen, Lamoth, 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 itself also contributes to the fluency of 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). Interpersonal synchrony thus 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 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 readily recognizable type of interpersonal synchrony emerges in people’s bodily movements. It is well-established that people quickly and efficiently synchronize 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 complemented and 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 are matching the timing of their actions, regardless of which actions are involved. To see if synchrony has effects over and above mimicry, 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). Physiological 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 arousal levels. Emotional contagion can be regarded as a form of interpersonal synchrony. Nevertheless, 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 beneficial 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 in 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 another’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 involves mimicry or synchrony. Nevertheless, it seems fair to say that synchrony is a key aspect of linguistic alignment. Notably, linguistic alignment is complex, in that it occurs simultaneously at multiple levels, 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 (Pickering & Garrod, 2004). 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 seem 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 depended on recent technological innovations. In so-called ‘hyperscanning studies, the conventional neuroimaging techniques of EEG and fMRI have been be 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, though fNIRS can currently only measure cortical activity up to 4 cm into the brain (Ferrari & Quaresima, 2012).

To date, hyperscanning studies have been able to demonstrate that joint action leads to brain-to-brain synchrony, for instance, among guitarists playing together (Müller, Sänger, & 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 is 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.*

Growing research has documented interpersonal synchrony in movements, physiology, language, and neural activations. This work converges on the notion that synchrony is a fundamental mechanism of social coordination. At the same time, synchrony research has been 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 exchange 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 types of interpersonal synchrony in psychotherapy.



Figure 1: The IN-SYNC Model of Psychotherapy

**Part 3: The IN-SYNC Model**

To integrate the different types of 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, and 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 integration of 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.

A visual overview of the IN-SYNC model is provided in Figure 1. In brief, 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 experiences. 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 synchrony sets the stage for more complex interpersonal forms of coordination at Level 2, which operate at a tonic time-scale, 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 constitute the alliance. The first process 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 process 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 process is co-regulation (Butler & Randall, 2013), or 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 has been 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 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**

A growing literature has examined interpersonal synchrony in psychotherapy. In this section, we review this emerging literature using the framework 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 has been published since 2016, the year when we published the IN-SYNC model. Fourth, for each point that we discuss, we highlight key questions that still need to be addressed in future research.

 *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 and patient-rated alliance. Still, movement synchrony was predictive of therapeutic outcomes, but only in combination with dropout rates: The least 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 most 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 finding.

More generally, the Paulick et al. study suggests that movement synchrony in early sessions can predict premature termination of psychotherapy. The latter effect was subsequently replicated in a study among 267 German patients who received cognitive-behavioral therapy or psychodynamic therapy for social anxiety disorder (Schoenherr et al., 2019). These findings suggest that movement synchrony may play an important role in motivating patients to continue treatment. According to the IN-SYN model (Koole & Tschacher, 2016), the latter effect may be due to the improved alliance that is likely to be fostered by movement synchrony.

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. One possibility is 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). 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, larger samples will be needed to statistically disentangle between- and within-patient components and their associations with the alliance and clinical outcomes.

Another possibility is that movement synchrony is not always beneficial. When patients are in a negative emotional state (like the depressed patients in the Paulick et al. (2018b) study), it is conceivable that movement synchrony with the therapist serves to main this negative emotion. Studies showing beneficial effects of movement synchrony may have been limited to patients who were in a better emotional state. To test the viability of this second possibility, future work should jointly study patients’ emotions and movement synchrony. If it turns out that patients’ emotions determine the direction of the effects of movement synchrony, the IN-SYNC model (Koole & Tschacher, 2016) would have to be revised.

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

The IN-SYNC model (Koole & Tschacher, 2016) 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, recent work has begun to make important headway 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 a 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 is its infancy. Nevertheless, a recent study on brain-to-brain synchrony (Zhang, Meng, Hou, Pan, & Hu, 2018) seems potentially relevant here. 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 causual chatting with one of three female professional counsellors. The study showed that brain-to-brain synchrony was enhanced during psychotherapy (versus casual 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 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 is 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.

Another recent study examined synchrony in skin conductance among 31 patients that were treated by 10 therapists across 5 sessions (Bar-Kalifa et al., 2019). The latter study contrasted segments where the therapy used an emotion-focused technique (i.e.., imagery of emotionally charged situations) with segments that involved less emotion-focused techniques (e.g., psycho-education). The results showed that physiological synchrony was strong between patient and therapists during emotion-focused segments, but absent during more neutral segments. Moreover, physiological synchrony during emotion-focused segments was associated with the therapeutic bond aspects of the alliance, but not with the task/goal aspects of the alliance. These intriguing findings suggest that physiological synchrony is especially relevant to the emotionally charged aspects of psychotherapy, as the IN-SYNC model (Koole & Tschacher, 2016) would predict.

An alternative way to assess coregulation may be to assess 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). Future work in this area could benefit from the use of more 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 Levels 1 and 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 address all three 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**

In the present chapter, we have highlighted the importance of interpersonal synchrony to psychotherapy. During psychotherapy, patient and therapist spontaneously synchronize their movements, language, physiological responses, and neural activations. The extent of this patient-therapist synchrony predicts the quality of the therapeutic relationship and therapeutic success. The patient-therapist relationship thus appears to rely on interpersonal synchrony as a fundamental mechanism of social coordination. In this way, psychotherapy can be said to be grounded in interpersonal synchrony.

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 several inroads into identifying which specific social-cognitive skills may be involved, how to assess them, and how to improve them. Along similar lines, the IN-SYNC model may point to new ways of assessing and enhancing clinical-psychological expertise, a topic that has long eluded scientific analysis (Tracey, Wampold, Lichtenberg, & Goodyear, 2014).

In moving forward, one major challenge is formed by the rise of new modalities for social interaction. People increasingly interact with another online, and there are considerable efforts in progress to develop online psychotherapy programs (Donker & Kleiboer, 2018). Online psychotherapy appears to be effective (Karyotaki et al., 2017). Nevertheless, online and face-to-face interaction differ in important respects, including in how they may impact emotion regulation (see Kross & Sandhock, this volume). The IN-SYNC model (Koole & Tschacher, 2016) may provide a framework for analyzing the similarities and differences between that online and face-to-face interaction. Such an analysis could prove useful in understanding how psychotherapy may be optimally administered.

Because synchrony is a fundamental social-psychological principle, insights from research on synchrony in psychotherapy could also be used to inform other kinds of interpersonal relationships. In particular, we see an important potential integrative function for psychotherapy research. Synchrony in movement, physiology, emotion, language, and between brains have so far largely been studied separately. Nevertheless, these types of interpersonal synchrony all converge in psychotherapy. 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 inform interpersonal researchers across many different domains, from close relationships to educational settings and business negotiations.

**Coda**

Throughout this chapter, we have seen that research on interpersonal synchrony is rapidly on its way of becoming a major industry in clinical psychology. If this trend continues, the day may come when interpersonal synchrony will be regarded as primarily a clinical-psychological phenomenon. If the field ever reaches that point, it will be important to remember that interpersonal synchrony was originally conceived as a basic social-psychological mechanism and rigorously investigated using controlled experiments (e.g., Repp & Su, 2013). Research on synchrony in psychotherapy thus testifies to the value of basic social-psychological experiments in generating insights that can inform practical interventions (see also Fiedler, this volume).

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