

Clients' Emotional Instability and Therapists' Inferential Flexibility Predict Therapists' Session-by-Session Empathic Accuracy

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Clients' emotions often serve as a major focus for therapists' attention. Interestingly, little is known about the factors that facilitate or hinder therapists' accurate assessment of these emotions. We hypothesized that therapists' accuracy would be negatively tied to their clients' emotional fluctuation (i.e., instability) and positively tied to the therapists' own inferential fluctuation (i.e., flexibility) as well as to the clients' emotional intensity. Clients ($N = 98/N = 76$) received weekly psychodynamic psychotherapy at a university-based clinic. Following each session, clients reported their within-session emotions, and therapists provided their own assessment of their clients' emotions. As expected, when clients' emotions were more unstable, therapists were less accurate in tracking these emotions. Additionally, when therapists' assessments of their clients' emotions were more flexible, they were more accurate in tracking them. Our results help identify factors that predict accurate emotion perception within psychotherapy and may translate into actionable ideas for enhancing this accuracy.

Public Significance Statement

We examined psychotherapists' varying levels of accuracy in perceiving their clients' emotions during psychotherapy and explored predictors of these levels. Our findings indicate that clients whose emotions during psychotherapy sessions were more unstable were harder to read by their therapists and that therapists whose inferences of their clients' emotions were more flexible were more accurate in tracking client emotions.

Keywords: psychotherapy, empathic accuracy, emotion dynamics, empathy

Accurate assessment of clients' inner states—their thoughts, feelings, and motivations—is a central task for therapists across different therapeutic approaches (cf., Elliott, Bohart, Watson, & Greenberg, 2011; Watson, 2016). Yet little is known about factors

that may facilitate or hinder the accuracy of such assessments. The present work explores the extent to which three factors play a role in predicting therapists' accuracy: (1) the level of fluctuation in the clients' emotions (i.e., client emotional instability); (2) the level of fluctuation in the therapists' inferences regarding their clients' emotions (i.e., therapist inferential flexibility); and (3) the average intensity of the clients' emotions.

Empathy and Empathic Accuracy in Psychotherapy

Early models of psychotherapy (e.g., Rogers, 1957) as well as contemporary psychotherapy research (e.g., Elliott et al., 2011) have recognized the importance of therapists' empathy for their clients. Most research regarding therapist empathy has focused on a broad and subjective definition of the term and often on clients' and therapists' (typically divergent) experiences of this empathy. Specifically, clients' ratings of therapist empathy (e.g., on the often-used Barrett-Lennard Relationship Inventory; Barrett-Lennard, 1962) have generally been found to be better predictors of positive treatment outcomes than therapists' ratings of their own empathy (e.g., Barrett-Lennard, 1981; for a meta-analysis, see Elliott et al., 2011). Similarly, observers' ratings of therapist

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empathy have also been found to be related to positive treatment outcomes (e.g., Elliott et al., 1982; Watson & Prosser, 2002), an association that does not tend to differ from those between clients' or therapists' ratings on the one hand and therapy outcomes on the other.

Although empathy is often assessed using subjective reports, it can also be assessed using objective comparisons between targets' (i.e., clients) reports of their inner states, and perceivers' (i.e., therapists) inferences of these states. Importantly, one cannot assume that subjective measures of empathy will be tied to objective indices of empathic understanding or attunement. Indeed, the most widely used self-report measure for empathy Davis's *Interpersonal Reactivity Index* (1983) has typically been found to be unrelated to objective measures of accuracy in reading others' mental states (e.g., Stinson & Ickes, 1992; cf., Zaki, Bolger, & Ochsner, 2008). This finding is at the heart of considerable research efforts aimed at delineating the component processes that make up objective empathy—that is, the processes that go beyond the mere subjective feeling of empathy. These efforts have led to a growing recognition for the need to distinguish between two component processes, namely emotional empathy (the sharing of emotions) and cognitive empathy (the accurate perception or understanding of fleeting mental states; Shamay-Tsoory, 2011; see also Zaki & Ochsner, 2016).

Cognitive empathy, often referred to as empathic accuracy (EA), has been studied extensively in the last 3 decades in different relational contexts (although mostly within the domain of romantic relationships) and using various methods (for reviews, see Hall, Mast, & West, 2016; Ickes & Hodges, 2013). The most common operationalization of EA uses a paradigm (Ickes, 2003) in which some dyadic interactions are recorded, and the recordings are then reviewed separately by the two interaction partners who recall their own thoughts and feelings and infer their partners'. Subsequently, objective observers rate the level of agreement between targets' recollections and perceivers' inferences.

Less is known about the role played by EA within psychotherapy. Only a few studies have examined the extent to which therapists are accurate in their inferences regarding their clients' mental states as well as the factors contributing to such accuracy or its outcomes (Duan & Kivlighan, 2002; Kwon & Jo, 2012). The dearth of EA studies in the field of psychotherapy may be due, in part, to the time-consuming nature of research associated with this paradigm (Elliott et al., 2011). It may also stem from the limited generalizability of such methods outside research clinics. Specifically, such laborious and deliberate review of sessions fundamentally changes the therapy itself, making it quite different from most usual practice. One study that did use the traditional dyadic interaction paradigm within psychotherapy (Kwon et al., 2012) did so by obtaining EA indices only from the first three sessions. Findings indicated that more experienced therapists were more empathically accurate and that this accuracy was tied to better outcomes.

A promising alternative way of operationalizing EA (e.g., Howland & Rafaeli, 2010; Overall, Fletcher, Simpson, & Fillo, 2015; Rafaeli, Gadassi, Howland, Boussi, & Lazarus, 2017) relies on repeated dyadic quantitative measurement of targets' inner states and of perceivers' inferences of these states. This approach circumvents the need to review the interaction (or session), or to obtain subjective ratings of empathy. By prespecifying what vari-

ables (e.g., emotions) are assessed, it allows estimating separate EA scores regarding specific aspects of a target's experience. Additionally, it decomposes accuracy into two distinguishable components: mean level bias and tracking accuracy (Fletcher & Kerr, 2010). The former refers to the average difference between targets' reports of a certain variable and perceivers' inferences regarding that variable; the latter refers to the association between the targets' reports and the perceivers' inferences over time.

The firsts to use such quantitative methods to study EA in psychotherapy were Duan et al. (2002), who asked clients to report the extent to which they experienced a list of predetermined emotions in a single midtreatment session. They also asked these clients' therapists to infer the extent to which their clients experienced these emotions. When therapists' inferences of their clients' emotions were similar to their clients' own reports of these emotions, the clients rated the sessions as deeper. Importantly, these single-session data allowed the researchers to examine only one form of accuracy—namely low (vs. high) directional bias.

In a more recent study, Atzil-Slonim et al. (2018) used similar quantitative methods but applied them to data gathered over the entire course of treatment. Such data yield indices both for directional bias (i.e., the difference between a therapist and a client) and for tracking accuracy (i.e., the congruence between a therapist and a client over time). On average, therapists in this study showed significant tracking accuracy alongside directional biases (namely, overestimation of their clients' negative emotions and underestimation of their clients' positive emotions).

An important next step in studying EA within psychotherapy is to identify factors that may predict it. Whereas no studies have examined predictors of EA within psychotherapy (although see Hasson-Ohayon, Kravetz, & Lysaker, 2017; Ofir-Eyal, Hasson-Ohayon, Bar-Kalifa, Kravetz, & Lysaker, 2017 for related work on therapist/client agreement with regard to symptoms), considerable research has investigated such predictors in the context of other interpersonal relationships or interactions. Such work has highlighted the role of two groups of predictors: targets' characteristics and perceivers' characteristics (for a review, see Hodges, Lewis, & Ickes, 2015).

Target Characteristics as Predictors of EA

Several studies have documented individual differences in targets' readability. For example, Marangoni, Garcia, Ickes, and Teng (1995) asked participants to infer the thoughts and feelings of four women in simulated psychotherapy sessions. They found cross-perceiver consistency in the extent to which each target was easy/hard to read. Similarly, Thomas and Fletcher (2003) asked participants to infer the inner states of strangers, friends, and dating partners and found evidence for the presence of target variability in readability (at least among male targets). Finally, Lewis, Hodges, Laurent, Srivastava, and Biancarosa (2012) found target variability in readability in a study in which the targets were new mothers interviewed on video.

What is it about certain targets that make them more readable? A recent review of the broader target-readability literature (Human & Biesanz, 2013) proposed several sets of target characteristics that may play some part in their readability. Alongside more sociocultural factors (such as social status and gender role), these authors noted the importance of certain psychological features,

which they grouped under the heading, psychological adjustment. These include interpersonal appeal and extraversion (Human & Biesanz, 2011), which increase the perceivers' motivation to seek and utilize information from this target (or the sheer availability of such information). They also involve target expressivity (e.g., Gadassi, Mor, & Rafaeli, 2011; Thomas et al., 2003), which increases the amount of available information. Thus, one possible predictor of readability in the settings of psychotherapy may be the intensity of client emotions—the more intense, the more expressive and readable.

Other psychological features of the target reviewed by Human et al. (2013) include characteristics such as self-knowledge and authenticity, thought to strengthen the association between targets' behaviors and the underlying experience (e.g., personality or affect), which the perceivers are asked to infer. One such feature is the psychological characteristic of coherence, defined as the degree of lawful organization or patterning of one's personality (Cervone & Shoda, 1999); coherent individuals show greater consistency in cognitions, emotions, and behaviors across time and situations. Targets who are coherent demonstrate stronger agreement with close others regarding their own personality traits (e.g., Baird, Le, & Lucas, 2006; Biesanz & West, 2000). Interestingly, the association between coherence and readability of more transient inner states (such as thoughts and feelings) has received only scant scientific attention.

Some evidence regarding the link between coherence and readability can be drawn from a study by Flury, Ickes, and Schweinle (2008), which found targets characterized by borderline personality traits (whose thoughts and feelings were judged by objective raters as more unusual) to be harder to read. Notably, borderline personality is often associated with rapid emotional fluctuations (e.g., Ebner-Priemer et al., 2015) as well as with personality/identity incoherence (e.g., Wilkinson-Ryan & Westen, 2000); thus, it is likely that poor coherence contributed to the targets' lower readability.

Importantly, psychological coherence can also be assessed by examining individuals' emotional patterns across time (i.e., their emotion dynamics; for an overview, see Kuppens, Oravecz, & Tuerlinckx, 2010; for a meta-analytic review, see Houben, Van Den Noortgate, & Kuppens, 2015). To quantify the form and extent of emotional changes, emotion dynamics studies often use repeated measurements of emotions. One particularly relevant emotion dynamic is emotional instability, or the extent to which emotions change across time.¹ Individuals whose emotions fluctuate more can be thought of as less coherent and harder to read. Indeed, Nezlek and Plesko (2001) showed that self-concept clarity is negatively tied to temporal instability in negative and in positive affect. Moreover, a recent study of romantic partners (Lazarus, Bar-Kalifa, & Rafaeli, 2018) found that targets whose moods were less stable—that is, followed less of a lawful pattern—were harder to read accurately.

Clearly, emotion dynamics in general and emotional instability in particular are relevant for our understanding of clients' experiences in psychotherapy. Those clients whose emotional experiences show less session-to-session coherence are likely to tax their therapists' empathic abilities. Specifically, greater emotional instability—that is, lower coherence brings with it idiosyncrasy and makes clients' thoughts or feelings harder to infer.

Perceiver Characteristics as Predictors of EA

If targets' characteristics, and particularly their readability, affect one side of the empathic process, perceivers' characteristics are likely to affect its other side. Indeed, there appear to be substantial individual differences and cross-target consistency in perceivers' EA both within close relationships (e.g., Thomas et al., 2003) and within clinical settings (Marangoni et al., 1995).

Findings from the EA literature have pointed out both trait-level characteristics as well as state-level factors as perceiver-related predictors of EA. At the trait level, Pickett, Gardner, and Knowles (2004) found perceivers with a strong need to belong to have greater EA. Conversely, Overall et al. (2015) found avoidantly attached individuals to have lower EA. Both of these predictors have strong interpersonal motivational underpinnings. Motivational factors may also play a part at the state level; for example, various incentives, including monetary rewards and gender role primes, have been found to enhance accuracy (e.g., Klein & Hodges, 2001; Thomas & Maio, 2008).

Alongside these trait or state motivational factors, other characteristics of the perceivers' inferences themselves may be relevant. Specifically, the inferences' dynamic patterns over time may play a role in their accuracy. For example, Erbas, Sels, Ceulemans, and Kuppens (2016) found that romantic partners who were better able to differentiate between their own negative emotions were more accurate in inferring their partners' feelings. Another dynamic that may be particularly relevant and meaningful is the extent to which the perceivers' inferences change across time—that is, the level of fluctuation they manifest.

Greater fluctuations in perceivers' inferences of targets' emotions are likely to reflect perceivers' sensitivity to targets' immediate emotional cues and thus an adaptive flexibility around their baseline assessment of their target's emotional state. Perceivers who are rigidly fixed on a specific inference of the target's emotions are likely to be less accurate in tracking these emotions over time. Similarly, in the therapeutic setting, therapists' sensitivity and flexibility are likely to manifest in greater fluctuations in their inferences.²

The Present Study

The goal of the present study was to examine the extent to which session-to-session fluctuations in clients' emotional reports as well as in therapists' emotional inferences are tied to therapists' EA. We see the former (i.e., clients' fluctuations) as reflecting emotional instability. In contrast, we see the latter (therapists' fluctuations) as reflecting inferential flexibility. This expectation is premised on the assumption that therapists' fluctuations capture their willingness or ability to adjust their views of the clients' emotions in an adaptive and dynamic manner.

¹ Of note, emotional instability is usually operationalized using short-interval measurements (e.g., hours). In the present case, intervals were longer. Therefore, we cannot assume that emotional instability would have negative associations with well-being measures.

² Relatedly, studies of psychotherapy with persons with serious mental illness have found that therapists' theoretical biases and self-awareness, which are related to sensitivity and rigidity, affect their agreement with their clients (Hasson-Ohayon et al., 2017).

To examine the role of these two factors in predicting therapist EA, after each session, clients reported the intensity with which they experienced various emotions during the sessions. Therapists inferred the intensity of each of these emotions. We utilized the truth-and-bias (T&B) model of West and Kenny's (2011). This allowed us to simultaneously predict two aspects of EA: namely tracking accuracy (i.e., truth force) and directional bias. The former reflects the degree to which therapists' emotional inferences track their clients' own report of their emotions over time. The latter reflects the degree to which therapists over- or underestimate their clients' emotions on average.

Of note, we treat the associations between therapists' inferences and clients' emotions as empathic accuracy, following the tradition of the interpersonal perception literature (for review see Hall et al., 2016), which awards targets' reports of their inner states a higher epistemic position. At the same time, we do not want to imply that clients' reports are the ultimate benchmark for accurate assessment of their own emotions. Indeed, for various reasons, clients may be inaccurate in their reports.

Within the T&B model, client emotional instability and therapist inferential flexibility served as moderators of the magnitude of the truth force and/or the directional bias. As an additional third moderator, we also examined the effect of the clients' mean emotional intensity on the two aspects of EA. Intensity is often highly correlated with variability or instability (and thus should be included as a covariate; see recommendations by Trull, Lane, Koval, & Ebner-Priemer, 2015). Additionally, if we consider emotional intensity as a marker of expressivity, we would expect it to serve as a moderator in its own right (Human et al., 2013): a client whose emotions are experienced (and expressed) more intensely is likely to be easier to read than a more emotionally reserved client.

Our analyses addressed negative and positive emotions separately. This distinction was based on several studies demonstrating that EA for positive and negative emotions are quite distinct (Howland et al., 2010; Rafaeli et al., 2017; Sened, Lavidor, Lazarus, Bar-Kalifa, & Rafaeli, 2017). Specifically, EA was found to be greater and more consequential when directed toward negative affective states. It is also in line with recent studies (e.g., Chui, Hill, Kline, Kuo, & Mohr, 2016) highlighting the distinction of positive versus negative emotions within psychotherapy and specifically of the divergence between accuracy regarding positive versus negative emotions in this context (Atzil-Slonim et al., 2018).

The following hypotheses guided our work.

Hypothesis 1: Client emotional instability. We expected therapists whose clients showed greater emotional instability over time to show lower tracking accuracy. Clients who are less stable emotionally present a less coherent picture of their emotional world. Their emotional responses may tend toward the atypical and the peculiar and hence be less predictable to their therapists. These clients' lability may thwart their therapists' attempts to build a coherent affective conceptualization, reducing their inferences to mere guesses.

We did not expect a comparable association between clients' emotional instability and therapists' directional bias; therapists attempting to infer the emotions of moving targets are just as likely to underestimate as they are to overestimate these emotions and thus would not be expected to show a particular directional bias.

Hypothesis 2: Therapist inferential flexibility. We expected therapists who show greater inferential flexibility to have higher tracking accuracy. Therapists whose assessments show greater fluctuations are likely to be more sensitive to clients' differential emotional responses. Furthermore, they are likely to be less constrained by overly rigid or pegged assessments of their clients' emotions. As with client emotional instability, we expected this association to be limited to tracking accuracy and not to apply to directional bias.

Hypothesis 3: Client emotional intensity. We expected therapists whose clients reported more intense emotions on average to have higher tracking accuracy (Hypothesis 3a). Clients' reported emotions (i.e., the experiential facet of emotion) are likely to have behavioral correlates (e.g., Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). Hence, a client's intense emotions should constitute a stronger signal and may serve as a proxy measure for expressivity, which is tied to higher readability (e.g., Human et al., 2013; Thomas et al., 2003).

When it comes to the association between clients' emotional intensity and therapists' directional bias, our predictions were valence specific because therapists in general overestimate clients' negative emotions but underestimate clients' positive emotions (Atzil-Slonim et al., 2018). We expected therapists whose clients reported more intense negative emotions to show less overestimation—that is, a smaller (positive) directional bias. Conversely, we expected therapists whose clients reported more intense positive emotions to show more underestimation—that is, a larger (negative) directional bias (Hypothesis 3b).

Method

Participants and Treatment

Clients. The analyses were based on two samples of clients who were in individual psychotherapy at a large university outpatient clinic. Sample 1 consisted of 97³ clients treated between August 2014 and August 2015, and Sample 2 consisted of 76 clients⁴ treated between August 2015 and August 2016. The clients included in the analysis had at least six pairs of immediate successive sessions to allow the computation of the instability index (described below). Sample 1 clients received a mean of 25.0 treatment sessions ($SD = 10.0$), and 83.0% of these were available for analysis ($N = 2010$). Sample 2 clients received a mean of 24.6 treatment sessions ($SD = 8.6$), and 83.5% of these were available for analyses ($N = 1562$).

The clients were all older than 18 years (Sample 1: $M_{age} = 41.3$, $SD = 14.0$, range 19–79; Sample 2: $M_{age} = 38.7$, $SD = 13.6$, range 20–70), and the majority were women (Sample 1: 56.7%; Sample 2: 54.0%). Of the clients in Samples 1/2, 19.6%/14.9% completed less than 12 years of schooling or did not complete matriculation examinations; 31.5%/27.0% completed 12 years of

³ An earlier paper (Atzil-Slonim et al., 2018) used this sample to examine therapists' empathic accuracies for clients' positive and negative emotions (although not these accuracies' predictors). That paper has slightly different inclusion criteria but obtained essentially the same results for the unmoderated T&B models used to compute the EA indices.

⁴ Some clients were included in both samples, provided that they were treated by different therapists.

schooling with matriculation examinations; 48.9%/58.1% completed some postsecondary degree(s). For relationship status, 41.9%/43.2% of the clients reported being single; 8.6%/10.8% were in a committed relationship; 34.4%/29.7% were married; and 15.1%/16.3% were divorced or widowed. The Mini-International Neuropsychiatric Interview version 5.0 (Sheehan et al., 1998) was used to establish *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) Axis I diagnoses. The interview was conducted before therapy started by intensively trained independent clinicians. All intake sessions were audiotaped, and a random 25% of the interviews were sampled and rated again by an independent clinician. The mean kappa value for Axis I diagnoses was excellent (Sample 1: $k = 0.97$; Sample 2: $k = 0.95$).

Most clients (in Sample 1/Sample 2) were diagnosed with affective disorders⁵ (30.0%/35.5%) or anxiety disorders⁶ (16.5%/15.8%) as the primary diagnosis. Some (13.4%/31.6%) received a single diagnosis; others received two (20.6%/10.5%) or more (15.5%/19.7%) diagnoses. A sizable group of the clients (50.5%/38.2%) reported experiencing relationship problems, academic/occupational stress, or other problems but did not meet the criteria for an Axis I diagnosis.

Therapists. Sample 1 clients were treated by 60 therapists and Sample 2 clients were treated by 54 therapists in various stages of their clinical training. Clients were assigned to therapists in an ecologically valid manner based on real-world issues, such as therapist availability and caseload. Most therapists (in Sample 1/Sample 2) treated one client each (31/29 therapists), but some treated two (20/17) or more (5/4) clients. Each therapist received 1 hour of individual supervision every 2 weeks and 4 hr of group supervision on a weekly basis. All therapy sessions were audiotaped for use in supervision. Supervisors were senior clinicians. Individual and group supervision focused heavily on reviewing of audiotaped case material and technical interventions designed to facilitate the appropriate use of therapists' interventions.

Individual psychotherapy consisted of once- or twice-weekly sessions. The dominant approach in the clinic includes a short-term psychodynamic psychotherapy treatment model (e.g., Blagys & Hilsenroth, 2000; Shedler, 2010; Summers & Barber, 2010). The key features of the model include: (a) a focus on affect and the experience and expression of emotions; (b) exploration of attempts to avoid distressing thoughts and feelings; (c) identification of recurring themes and patterns; (d) an emphasis on past experiences; (e) a focus on interpersonal experiences; (f) an emphasis on the therapeutic relationship; and (g) exploration of wishes, dreams, or fantasies (Shedler, 2010). Treatment was open ended in length; however, given that psychotherapy was provided by clinical trainees at a university-based outpatient community clinic, the treatment duration was often restricted to 9 months to 1 year.

Procedure

The study procedures were part of the routine assessment and monitoring process in the clinic. Clients were asked to sign consent forms and were told that they could choose to terminate their participation in the study at any time without jeopardizing treatment. They were also told that their responses would not be shown to their therapist and their anonymity would be preserved. Therapists were also promised anonymity and asked to sign consent forms. The study was conducted in compliance with the university ethical review board.

Session-by-session questionnaires were completed by the participants using computers located in the clinic rooms and software that time stamped their responses. The measures were administered in Hebrew; all instruments were translated and backtranslated to ensure consistency with the English versions. Here we describe only measures relevant to the current report.

Measures. Immediately following each session, clients were asked to evaluate how they felt during the session using the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1992), a widely used measure for assessing emotional states. Therapists were asked to use the same instrument to evaluate how their clients felt during the session. Responses were provided on a 5-point Likert scale that ranged from *not at all* to *extremely*.

We used a shortened version of the POMS, which was adapted for intensive repeated measurements (Cranford et al., 2006) and which has been used in session-by-session psychotherapy studies (e.g., Atzil-Slonim et al., 2018). In Sample 1, it consisted of 18 words describing current emotional states, and two aggregated scores for positive and negative emotion were computed. The negative emotions scales included words tapping depression (three items), anxiety (three items), and anger (three items). The positive emotions scales consisted of words tapping contentment (three items), vigor (three items), and calmness (three items). To reduce participant burden, Sample 2 completed shorter subscales comprising only two items each (for a total of 12 words).

The between- and within-person reliabilities for the scale were computed following procedures described in Cranford et al. (2006) for estimating reliabilities for repeated within-person measures. The internal consistencies of the negative and positive emotions subscales in Sample 1 were high and in Sample 2 were moderate. Specifically, for clients' negative emotions, within- and between-person reliabilities in Sample 1 were .83 and .90, respectively; in Sample 2 these were .75 and .80, respectively. For clients' positive emotions, the Sample 1 estimates were .86 and .95, respectively, and the Sample 2 estimates were .81 and .89, respectively. For therapists' inferences of negative emotions, the Sample 1 estimates were .82 and .85, respectively, and the Sample 2 estimates were .74 and .79, respectively. Finally, for therapists' inferences of positive emotions, the Sample 1 estimates were .85 and .89, respectively, and the Sample 2 estimates were .80 and .73, respectively.

Analytic approach. We followed the recommendations of Jahng, Wood, and Trull (2008; see also Trull et al., 2015) by using the root mean squared successive differences (RMSSD) as an index of emotions and emotions' inferences fluctuation, which takes into account both variability and temporal dependence. To do so, we first calculated a difference score between the client-reported (or therapist-inferred) emotions on each two successive sessions. We then squared this score and averaged the squares for each participant. Finally, we squared rooted these averages to keep our fluctuation indices on the same metric as the emotions themselves.

⁵ The following DSM-IV diagnoses were included in the affective disorder cluster: major depressive disorder, bipolar disorder, and dysthymic disorder.

⁶ The following DSM-IV diagnoses were included in the anxiety disorder cluster: panic disorder, agoraphobia, generalized anxiety disorder, and social phobia.

To examine the split-half reliabilities of these fluctuation measures, we divided each client's successive differences into two, based on even versus odd sessions, and calculated the clients' RMSSD (based on their reported emotions) and therapists' RMSSD (based on their inferences) indices separately for each half. In Sample 1, the Spearman-Brown corrected split half reliabilities for client RMSSD were 0.94 and 0.89 for negative and positive emotions, respectively. The split half reliabilities for therapist RMSSD were 0.88 and 0.79 for negative and positive inferences, respectively. In Sample 2, the corresponding client reliabilities were 0.92 and 0.92 and the corresponding therapist reliabilities were 0.85 and 0.80, respectively.

Because our data have a multilevel structure (session nested within clients⁷), we used multilevel models (MLMs; SAS Institute, 2003). Such models allow estimation of two levels (a within-client level and a between-client level) and accommodate nonbalanced data (see Bolger & Laurenceau, 2013).

To test our hypotheses, we used West et al.'s (2011) T&B model and simultaneously assessed therapists' tracking accuracy (i.e., the correlation between therapists' inferences and clients' emotions across sessions) and mean directional bias (i.e., mean difference between therapists' inferences and clients' emotions). Clients' reported negative/positive emotions served as the Truth variable. We centered all variables by subtracting the mean of each client's reported emotions from their emotion report in each session as well as from the therapists' reported inferences in each session. This approach renders the intercept into an index of directional bias (i.e., the extent to which the therapist overestimated or underestimated the client's emotion, when both the client's report and the therapist's inference were at their average). Additionally, we centered all level 2 predictors (i.e., all RMSSD variables) around the sample's mean to ease the interpretation of the results.

Split-half reliabilities for the EA indices were similarly obtained by dividing our data in two, based on even versus odd sessions and calculating the tracking accuracy and directional bias indices in two unmoderated models, one for each half. In Sample 1, the split half reliabilities for tracking accuracy were 0.62 and 0.48 for negative and positive emotions, respectively. The split half reliabilities for directional bias were 0.95 and 0.97 for negative and positive emotions, respectively. In Sample 2, the corresponding values were 0.55 and 0.88 for tracking accuracy and 0.92 and 0.97 for directional bias.

To examine the extent to which therapists' accuracy was moderated by their clients' emotional instability and by their own inferences' flexibility, we included both RMSSD indices as level 2 predictors and as cross-level moderators (i.e., in interaction with the truth variable—i.e., with the client's reported emotion). Additionally, we included the clients' mean emotional intensity and its interaction with the truth variable.⁸ The level 1 equation was:

$$\text{Inference}_{sc} = \beta_{0c} + \beta_{1c} \times \text{Truth}_{sc} + e_{sc}$$

where the therapist's inference in session *s* with client *c* was predicted by the directional bias (i.e., intercept) for this dyad (β_{0c}), by the truth force slope for this dyad (β_{1c}) multiplied by the truth variable itself, and by a level 1 residual term (e_{sc}) quantifying the session's deviation from these effects (i.e., the random effect at

level 1). A first-order autoregressive structure was imposed on the within-client residual covariance matrix.

The level 2 equations were:

$$\begin{aligned} \beta_{0c} &= \gamma_{00} + \gamma_{01} \times \text{Client emotions RMSSD} \\ &+ \gamma_{02} \times \text{Therapist inferences RMSSD} \\ &+ \gamma_{03} \times \text{Client mean emotion} + u_{0c} \\ \beta_{1c} &= \gamma_{10} + \gamma_{11} \times \text{Client emotions RMSSD} \\ &+ \gamma_{12} \times \text{Therapist inferences RMSSD} \\ &+ \gamma_{13} \times \text{Client mean emotion} + u_{1c} \end{aligned}$$

where the directional bias intercept (β_{0c}) is predicted by the average directional bias intercept (γ_{00}), the average (i.e., fixed) effects of the level 2 predictors (γ_{01} – γ_{03}), and the client's deviation from these effects (u_{0c}). Similarly, the truth force slope (β_{1c}) is predicted by the average truth force slope (γ_{10}), the average effects of the level 2 predictors (γ_{11} – γ_{13}), and the client's deviation from these effects (u_{1c}).

The model was tested once for negative emotions and once for positive emotions. Significant cross-level interaction effects were probed by estimating simple intercepts and slopes for RMSSDs scores, which were 1 *SD* above and below the samples' mean.

Results

Descriptive Statistics and Zero-Order Correlations

Table 1 presents descriptive statistics of (and intercorrelations among) the clients' emotional instability, the therapists' inferential flexibility, and the clients' emotional intensity indices. Notably, both fluctuation indices (i.e., client emotional instability and therapist inferential flexibility) showed high cross-valence correlations ($0.43 < r < .70$). Additionally, client instability in negative emotions was strongly correlated with client emotional intensity ($0.55 < r < .59$). No such correlations were found for positive emotions ($-0.18 < r < -0.16$), a contrast that proved to be significant ($p < .001$ for both samples).

Therapists' Accuracy in Perceiving Their Clients' Emotions

Negative emotions.

Sample 1. An unmoderated T&B model revealed significant tracking accuracy ($b = 0.54, SE = 0.04, p < .001$) as well as a significant positive directional bias ($b = 0.49, SE = 0.06, p < .001$). Therapists were accurate in tracking changes in their clients' negative emotions while also overestimating these emotions. Importantly, the random variances around the tracking accuracy fixed

⁷ We used two-level MLM (sessions nested within patients) and not three-level MLM (sessions nested within clients nested within therapists) because therapist level did not explain significant variance, probably because of a limited number of patients per therapist (1.7 and 1.6 clients per therapist in average for Sample 1 and Sample 2, respectively).

⁸ Similar models in which therapist assessment mean was also included have shown convergence problems when residuals were allowed to correlate. When residuals were not allowed to correlate, results were identical to the ones reported in the text.

Table 1

Descriptive Statistics of (and Intercorrelations Among) the Clients' Emotional Instability, Therapists' Inference Flexibility, and Clients' Emotional Intensity Indices

Variable	1	2	3	4	5	6
1. C. Neg. emotions RMSSD		.70***	.18	.08	.55***	-.21 [†]
2. C. Pos. emotions RMSSD	.53***		.16	.16	.35**	-.16
3. T. Neg. inference RMSSD	.21*	.24*		.43***	.11	-.08
4. T. Pos. inference RMSSD	.10	.22*	.61***		-.03	-.04
5. C. Neg. emotions intensity	.59***	.1709	.08	-.08		-.44***
6. C. Pos. emotions intensity	-.37***	-.18 [†]	-.37***	-.05	-.50***	
Sample 1 Mean	.55	.61	.61	.56	1.75	3.10
Sample 1 <i>SD</i>	.30	.27	.23	.21	.52	.75
Sample 2 Mean	.60	.70	.69	.62	1.71	3.39
Sample 2 <i>SD</i>	.29	.34	.25	.21	.48	.65

Note. C. = client; T. = therapist; Neg. = negative; Pos. = positive. Sample 1 correlations are below the diagonal; RMSSD = root mean squared successive differences; Sample 2 correlations are above the diagonal. $N = 97/76$ for Samples 1 and 2, respectively.

[†] $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

effect (est. = 0.07, $SE = 0.02$, $p < .001$) and around the directional bias intercept (est. = 0.33, $SE = 0.05$, $p < .001$) were significant.

Sample 2. Similar analyses revealed very similar results to those found in Sample 1, including significant tracking accuracy ($b = 0.44$, $SE = 0.04$, $p < .001$), positive directional bias ($b = 0.72$, $SE = 0.06$, $p < .001$), and significant random variance around these fixed effects (for tracking accuracy: est. = 0.05, $SE = 0.02$, $p = .006$; for directional bias: est. = 0.26, $SE = 0.04$, $p < .001$).

Positive emotions.

Sample 1. An unmoderated T&B model revealed significant tracking accuracy ($b = 0.37$, $SE = 0.03$, $p < .001$) as well as a significant negative directional bias ($b = -0.52$, $SE = 0.08$, $p < .001$). Thus, therapists were accurate in tracking changes in their clients' positive emotions and also underestimated these emotions. Importantly, the random variance around the tracking accuracy fixed effect (est. = 0.05, $SE = 0.01$, $p < .001$) and around the directional bias intercept (est. = 0.55, $SE = 0.08$, $p < .001$) were significant.

Sample 2. An unmoderated T&B model revealed significant tracking accuracy ($b = 0.32$, $SE = 0.03$, $p < .001$) as well as a

significant negative directional bias ($b = -0.74$, $SE = 0.08$, $p < .001$). Thus, therapists were accurate in tracking changes in their clients' positive emotions and also underestimated these emotions. Importantly, the random variance around the tracking accuracy fixed effect (est. = 0.02, $SE = 0.01$, $p = .012$) and around the directional bias intercept (est. = 0.50, $SE = 0.08$, $p < .001$) were significant.

Emotion Parameters as Predictors of EA

Tables 2 and 3 present the results of the T&B moderated model, respectively, for negative and positive emotions.

Client emotional instability.

Negative emotions.

Sample 1. In line with Hypothesis 1, clients' emotional instability moderated therapists' tracking accuracy. Therapists whose clients' negative emotion instability was high had lower tracking accuracy (+1 *SD*; $b = 0.46$, $SE = 0.04$, $p < .001$) than therapists whose clients' emotional instability was low (-1 *SD*; $b = 0.63$, $SE = 0.05$, $p < .001$). We did not expect such moderation with regard to directional bias, and indeed, none was found.

Table 2

Fixed Effects of the Moderated Truth-and-Bias Model for Negative Emotions

Fixed effects ^a	Sample 1				Sample 2			
	Estimate (<i>SE</i>)	95% CI	<i>t</i> (<i>df</i>)	Effect size ^b	Estimate (<i>SE</i>)	95% CI	<i>t</i> (<i>df</i>)	Effect size
D.B.	.49 (.05)	[.39, .58]	10.13 (93.6)	.72	.72 (.05)	[.62, .82]	14.67 (72.5)	.86
T.A.	.54 (.03)	[.48, .61]	16.55 (136)	.82	.47 (.04)	[.39, .55]	12.14 (133)	.73
D.B. × C. E. RMSSD	.04 (.21)	[-.36, .45]	.22 (94.3)	.02	.2 (.2)	[-.20, .61]	.99 (72.7)	.12
D.B. × T. I. RMSSD	.63 (.22)	[.20, 1.05]	2.90 (95.5)	.28	.4 (.2)	[.00, .80]	1.99 (73.3)	.23
D.B. × C. E. intensity	-.67 (.12)	[-.9, -.44]	-5.76 (92.7)	.51	-.7 (.12)	[-.95, -.46]	-5.70 (71.8)	.56
T.A. × C. E. RMSSD	-.28 (.11)	[-.49, -.07]	-2.65 (49.4)	.35	-.3 (.12)	[-.54, -.06]	-2.50 (38.6)	.37
T.A. × T. I. RMSSD	.94 (.14)	[.66, 1.22]	6.60 (105)	.54	.82 (.15)	[.52, 1.13]	5.37 (79.4)	.52
T.A. × C. E. intensity	-.13 (.07)	[-.26, .00]	-2.00 (71)	.23	-.16 (.08)	[-.32, .01]	-1.88 (79.3)	.21

Note. D.B. = directional bias; T.A. = tracking accuracy; C. = client; T. = therapist; E. = emotion; I. = inference; RMSSD = root mean squared successive differences. Client emotion RMSSD is based on client-reported negative emotions. Therapist inference RMSSD is based on therapist inferences regarding the clients' negative emotions. Client emotion intensity is the mean of the client's negative emotions.

^a Confidence intervals (CIs) for fixed effects were based on two-tailed *t* tests with the Satterthwaite approximation method for computing degrees of freedom. ^b Approximate effect sizes were calculated using the formula $\sqrt{r^2/(r^2 + df)}$ (see Rosenthal, Rosnow, & Rubin, 2000).

Table 3
Fixed Effects of the Moderated Truth-and-Bias Model for Positive Emotions

Fixed effects ^a	Sample 1				Sample 2			
	Estimate (SE)	95% CI	t (df)	Effect size ^b	Estimate (SE)	95% CI	t (df)	Effect size
D.B.	-.52 (.05)	[-.62, -.43]	-10.87 (93.6)	.75	-.74 (.05)	[-.83, -.65]	-16.35 (72.5)	.89
T.A.	.39 (.03)	[.34, .44]	15.56 (105)	.84	.32 (.03)	[.27, .37]	12.52 (115)	.76
D.B. × C. E. RMSSD	.15 (.18)	[-.22, .51]	.81 (95.5)	.08	-.02 (.14)	[-.29, .26]	-.11 (72.7)	.01
D.B. × T. I. RMSSD	.16 (.24)	[-.32, .64]	.66 (96.1)	.07	.3 (.22)	[-.14, .75]	1.36 (73.6)	.16
D.B. × C. E. intensity	-.77 (.07)	[-.91, -.64]	-11.78 (93)	.77	-.92 (.07)	[-1.06, -.78]	-13.09 (72.3)	.84
T.A. × C. E. RMSSD	-.38 (.08)	[-.54, -.21]	-4.56 (52.3)	.53	-.09 (.06)	[-.21, .03]	-1.51 (30.5)	.26
T.A. × T. I. RMSSD	.89 (.12)	[.64, 1.13]	7.27 (84.7)	.62	.53 (.1)	[.33, .73]	5.32 (36.4)	.66
T.A. × C. E. intensity	-.04 (.03)	[-.1, .03]	-1.15 (75.5)	.13	-.06 (.04)	[-.13, .02]	-1.56 (46.4)	.22

Note. D.B. = directional bias; T.A. = tracking accuracy; C. = client; T.= therapist; E. = emotion; I. = inference; RMSSD = root mean squared successive differences. Client emotion RMSSD is based on client-reported negative emotions. Therapist inference RMSSD is based on therapist inferences regarding the clients' negative emotions. Client emotion intensity is the mean of the client's negative emotions.

^a Confidence intervals (CIs) for fixed effects were based on two-tailed *t* tests with the Satterthwaite approximation method for computing degrees of freedom. ^b Approximate effect sizes were calculated using the formula $\sqrt{t^2/(t^2 + df)}$ (see Rosenthal et al., 2000).

Sample 2. In line with our Hypothesis 1, clients' emotional instability moderated therapists' tracking accuracy. Therapists whose clients' negative emotion instability was high had lower tracking accuracy (+1 *SD*; $b = 0.38, SE = 0.04, p < .001$) than therapists whose clients' emotional instability was low (-1 *SD*; $b = 0.56, SE = 0.06, p < .001$). We did not expect such moderation with regard to directional bias, and indeed, none was found.

Positive emotions.

Sample 1. In line with our Hypothesis 1, clients' emotional instability moderated therapists tracking accuracy. Therapists whose clients' positive emotion instability was high had lower tracking accuracy (+1 *SD*; $b = 0.29, SE = 0.03, p < .001$) than therapists whose clients' emotional instability was low (-1 *SD*; $b = 0.50, SE = 0.04, p < .001$). As before, no moderation was found with regard to directional bias.

Sample 2. In contrast to Hypothesis 1, clients' emotional instability did not significantly moderate therapists' tracking accuracy (although the effect was on the expected direction). No moderation was found with regard to directional bias.

Therapist inferential flexibility.⁹

Negative emotions.

Sample 1. In line with Hypothesis 2, therapists' inference flexibility moderated their tracking accuracy. Therapists who had high inferential flexibility regarding negative emotions had higher tracking accuracy (+1 *SD*; $b = 0.76, SE = 0.04, p < .001$) than therapists who had low inferential flexibility regarding negative emotions (-1 *SD*; $b = 0.33, SE = 0.05, p < .001$). Although not predicted, we also found that therapists whose inferences regarding negative emotions were more flexible had a stronger positive directional bias (i.e., overestimated the client's negative emotions more).¹⁰

Sample 2. In line with Hypothesis 2, therapists' inferential flexibility moderated their tracking accuracy. Therapists who had high inferential flexibility regarding negative emotions had higher tracking accuracy (+1 *SD*; $b = 0.67, SE = 0.06, p < .001$) than therapists who had low inferential flexibility regarding negative emotions (-1 *SD*; $b = 0.26, SE = 0.05, p < .001$). Although not predicted, we also found that therapists whose inferences regarding

negative emotions were more unstable had a stronger positive directional bias (an effect approaching significance¹⁰).

Positive emotions.

Sample 1. In line with Hypothesis 2, therapists' inferential flexibility moderated their tracking accuracy. Therapists who had high inferential flexibility regarding positive emotions had higher tracking accuracy (+1 *SD*; $b = 0.58, SE = 0.04, p < .001$) than therapists who had low inferential flexibility regarding positive emotions (-1 *SD*; $b = 0.21, SE = 0.04, p < .001$). No effect was found with regards to therapists' directional bias.

Sample 2. In line with Hypothesis 2, therapists' inferential flexibility moderated their tracking accuracy. Therapists who had high inferential flexibility regarding positive emotions had higher tracking accuracy (+*SD*; $b = 0.43, SE = 0.03, p < .001$) than therapists who had low inferential flexibility regarding positive emotions (-*SD*; $b = 0.21, SE = 0.03, p < .001$). No effect was found with regard to therapists' directional bias.

Clients' emotional intensity.

Negative emotions.

Sample 1. In contrast to Hypothesis 3a, clients' negative emotional intensity moderated their tracking accuracy in an unexpected way. Therapists whose clients' negative emotional intensity was high had lower tracking accuracy (+1 *SD*; $b = 0.48, SE = 0.04, p < .001$) than therapists whose clients' emotional intensity was low (-1 *SD*; $b = 0.61, SE = 0.05, p < .001$). In contrast, and in line with Hypothesis 3b, clients' negative emotional intensity moderated therapists' directional bias in the expected way. Therapists whose clients' negative emotional intensity was high had a smaller directional bias (+1 *SD*; $b = 0.14, SE = 0.08, p = .07$)

⁹ Importantly, because of the risk for confounding therapists' real inferential flexibility with a mere avoidance of using extreme values (a form of response bias), we reran all analyses while including the therapists' range of inferences in our models. Results remained mostly unchanged and are available as Tables B and C online at osf.io/8w7ax.

¹⁰ To further probe this unexpected finding, we included in a different model the therapists' mean emotion inference as a covariate. Once this covariate was included, the therapist RMSSD moderation of directional bias disappeared; all other effects were unchanged. We therefore see this finding as spurious and do not explore it further.

than those whose clients' negative emotional intensity was low (-1 SD; $b = 0.84$, $SE = 0.08$, $p < .001$).

Sample 2. In contrast to Hypothesis 3a, clients' negative emotional intensity moderated their tracking accuracy (an effect approaching significance) in an unexpected way. Therapists whose clients' negative emotional intensity was high had lower tracking accuracy ($+1$ SD; $b = 0.39$, $SE = 0.04$, $p < .001$) than therapists whose clients' negative emotional intensity was low (-1 SD; $b = 0.54$, $SE = 0.05$, $p < .001$). In contrast, in line with Hypothesis 3b, clients' negative emotional intensity moderated therapists' directional bias. Therapists whose clients' negative emotional intensity was high had smaller directional bias ($+1$ SD; $b = 0.38$, $SE = 0.08$, $p < .001$) than therapists whose clients' negative emotional intensity was low (-1 SD; $b = 1.06$, $SE = 0.08$, $p < .001$).

Positive emotions.

Sample 1. In contrast to Hypothesis 3a, clients' positive emotional intensity did not moderate therapists tracking accuracy; indeed, it was in the unexpected direction, although it did not reach significance. In contrast, in line with Hypothesis 3b, clients' positive emotional intensity moderated therapists' directional bias. Therapists whose clients' positive emotional intensity was high had negative directional bias ($+1$ SD; $b = -1.10$, $SE = 0.07$, $p < .001$), whereas therapists whose clients' positive emotional intensity was low had no significant directional bias (i.e., overestimation -1 SD; $b = 0.05$, $SE = 0.07$, $p = .425$).

Sample 2. In contrast to Hypothesis 3a, clients' positive emotional intensity did not moderate therapists tracking accuracy; indeed, it was in the unexpected direction, although it did not reach significance. In contrast, in line with Hypothesis 3b, clients' positive emotional intensity moderated therapists' directional bias. Therapists whose clients' positive emotional intensity was high had larger directional bias ($+1$ SD; $b = -1.34$, $SE = 0.06$, $p < .001$) than therapists whose clients' positive emotional intensity was low (-1 SD; $b = -0.14$, $SE = 0.06$, $p = 0.038$).

Discussion

The study of empathic processes within the therapeutic setting has been extensive and fruitful yet focused mostly on clients' and therapists' subjective experiences of therapists' empathy. Recent developments in data collection methods (namely, session-by-session reports) and in data analysis procedures (e.g., multilevel modeling) lend themselves to the exploration of more objectively defined empathy and its role in psychotherapy. These developments allow us to examine the extent to which therapists are actually (i.e., objectively) accurate in inferring their clients' mental states along the treatment. Specifically, we sought to investigate the extent to which dynamic features of the clients' emotions (i.e., their intensity and instability) and the therapists' inferences regarding these emotions (i.e., their flexibility) are tied to levels of empathic accuracy.

The findings supported our first hypothesis, that clients who are more emotionally unstable from one session to the next would prove harder for their therapists to read. Across both samples, clients' emotional instability in negative emotions (and in Sample 1, also in positive emotions) predicted lower therapist tracking accuracy. Our second hypothesis, that greater flexibility in therapists' inferences will be associated with greater tracking accuracy, was also supported across samples and valence. The first part of

our third hypothesis, that clients whose emotions are more intense will be easier for their therapists to read, was not supported. Contrary to our expectation, clients' negative emotional intensity was associated with reduced therapist tracking accuracy in Sample 1. This effect approached significance in Sample 2. Moreover, clients' positive emotional intensity was unrelated to tracking accuracy in either sample. Finally, the second part of our third hypothesis was supported because therapists of clients who had greater negative emotional intensity had smaller directional bias (i.e., lower overestimation; in general, therapists overestimated clients' negative emotions), and therapists of clients who had greater positive emotional intensity had larger directional bias (i.e., had greater underestimation; in general, therapists underestimated clients' positive emotions).

Client Emotional Instability

Client emotional instability was found to be tied to lower therapists' tracking accuracy. Clients whose emotional experience was less coherent across the treatment were less readable for their therapists. We certainly cannot conclude any directional causality from this association; nonetheless, if we consider client emotional instability as a marker of personality (in)coherence (cf., Human et al., 2013), we are more likely to see it as a cause rather than an effect. The argument would be that unstable (i.e., less coherent) targets may be harder to conceptualize accurately and that such absence of a good case conceptualization may hinder therapists' ability to attend to the clients' emotions. Additionally, unstable clients may serve as moving targets: Their therapists may face a greater challenge trying to keep track of their emotions. Of course, the association between therapists' accuracy and clients' emotional instability may also reflect a shared (third factor) underlying cause. For example, more unstable client emotions may result from a rockier therapeutic process, in which the therapist and the client fail to form a good working alliance.

Causality aside, therapists who recognize a client's emotional instability need to be particularly alert to the increased risk that their understanding of the client's emotions may be inaccurate. Such recognition may prompt them to devote greater attention to tracking a client's moment-to-moment emotional shifts and to explore the client's unstable emotional experience (e.g., Whelton, 2004), its causes, and its consequences.

Outside therapeutic settings, emotional instability has generally been shown to be tied to poor psychological health (for a meta-analysis, see Houben et al., 2015). Such instability may reflect difficulties in emotion regulation (e.g., Kuppens, Allen, & Sheeber, 2010), as is the case among individuals with borderline personality disorder (for a review, see Ebner-Priemer et al., 2015). However, emotional instability may also reflect flexible emotional responses to changing internal and external factors (e.g., Hollenstein & Lewis, 2006; for review, see Hollenstein, 2015). It is possible that both phenomena (i.e., emotion regulation difficulties and flexible responsiveness) could be at play for certain individuals, each obscuring the other's effects.

This finding joins a small but growing recent crop of studies exploring clients' emotion dynamics. For example, Husen, Rafaeli, Rubel, Bar-Kalifa, and Lutz (2016) found that lower negative emotion instability and a greater ratio of positive to negative emotions predicted better early treatment responses, above and

beyond baseline distress. Fisher and Newman (2016) used spectral analyses of diurnal fluctuations in anxiety levels during treatment for general anxiety disorder and found that the stability of periodic fluctuations (an index of symptom rigidity) lessened over the course of treatment; these reductions predicted reliable change from before to after treatment.

Therapist Inferential Flexibility

Therapist inferential flexibility was found to be tied to greater tracking accuracy. Again, we must be cautious in interpreting these results as indicative of directional causality. However, it seems reasonable to assume that therapists who allow their inferences to fluctuate more from one session to the next are less rigid in their perception of their clients' emotions and have the potential to better track these clients' emotions (e.g., Hasson-Ohayon et al., 2017).

We consider flexibility in therapists' inferences of their clients' emotions as a proxy for their flexibility in the way they feel their clients or think about them. Thus, the greater accuracy of more flexible therapists demonstrates a possible benefit of forming a flexible conceptualization of the client's inner emotional world. Indeed, such flexibility is in line with the common recommendation of expert clinicians who call for therapists to keep their conceptualization of their clients flexible and dynamic (for review, see Eells, 2007).

Of note, our flexibility index, which was based on session-to-session fluctuations, runs the risk of being an artifact of therapists' variable tendencies to avoid using extreme values. This risk was largely allayed using models that included therapists' inference ranges as covariates. Still, future work should expand the operationalization of inference flexibility; it could do so, for example, by assessing inferential changes in response to particular events in therapy. Moreover, future work may examine whether therapists whose inferences of their clients' inner states are more flexible and use more diverse and suitable interventions across the treatment (e.g., more responsive; Kramer & Stiles, 2015). After all, flexible inferences will exert little effect if they are dissociated from actual flexible engagement with the client.

Client Emotional Intensity

The predicted associations between client emotional intensity and therapist tracking accuracy were not obtained, and the unexpected association that was found for negative emotions approached significance only in sample 2; thus, we must be cautious in interpreting it. Nonetheless, the results appear to indicate that clients whose mean negative emotional intensity throughout the treatment was higher were, if anything, harder to track.

We had predicted that more intense emotions will serve as a stronger and clearer signal for therapists to read. The unexpected results may be explained by the well-known Weber-Fechner law (Fechner, 1860/1966), according to which small changes that appear against a backdrop of strong signals (i.e., minor changes in the level of powerful emotions) may actually be harder to recognize and track than similar changes on the backdrop of weaker signals. Thus, the relative difference between scores of 1 and 2 on a 1–5 emotion scale is likely to be perceived as much larger and more salient than the relative difference between scores of 3 and 4

on the same scale. Moreover, it is possible that the nonconsistent associations are due to relatively low coherence between clients' subjective reports and behavioral manifestations of emotions (Mauss et al., 2005). Future research may explore the extent to which clients' emotions in psychotherapy indeed demonstrate coherence across different response systems (i.e., experiential, behavioral, and physiological).

With regard to therapists' directional bias, our results supported our valence-specific predictions. As expected, therapists of clients who had greater negative emotional intensity had a smaller directional bias (i.e., lower overestimation), and therapists of clients who had greater positive emotional intensity had a larger directional bias (i.e., greater underestimation). These effects may mean that therapists' inferences overutilize stereotypical information and are thus based, to a considerable extent, on the average client (Ames, 2004; Lewis & Hodges, 2011); to some degree, therapists fail to attend to their clients' unique emotions when making inferences. This becomes more evident when the client's emotions are more intense.

Therapists' overreliance on stereotypical information, the resulting biases in therapist inferences, and the growing evidence that such biases are tied to poorer therapy outcomes (e.g., Atzil-Slonim et al., 2018) call for some corrective action. One form of correction involves feedback aimed at increasing therapist accuracy. To date, feedback provided to therapists based on clients' session-by-session reports has focused on the clients' symptoms and/or on therapeutic alliance (e.g., Lambert, & Shimokawa, 2011). Future studies should test the benefits of providing therapists with feedback about clients' in-session emotional states.

Strengths, Limitations, and Future Directions

Research on emotion dynamics is a growing and exciting field (for review see Kuppens & Verduyn, 2017), which has yet to be applied widely to psychotherapy. The field has proposed several meaningful parameters for describing the vicissitudes of emotion over time and has linked these parameters to psychopathology and well-being (for review see Trull et al., 2015). The present study exemplifies the potential for deriving meaningful indices of emotion dynamics from session-by-session reports within psychotherapy.

The indices on which we focused—namely clients' emotional instability and therapists' inferential flexibility—were found to be relatively stable across treatment and thus seem to reflect meaningful and reliable individual differences.¹¹ They also exhibited substantial predictive validity. It will be intriguing to follow up on this work with analyses examining the role of other indices identified in emotion dynamics research. For example, we wonder whether clients' and therapists' emotion differentiation (for review see Kashdan, Barrett, & McKnight, 2015) may prove to be good indices of complex emotional experience and would be tied to

¹¹ Interestingly, we were able to examine this claim with the data of those therapists ($N = 25/18$ in Samples 1/2) who had more than one client. As expected, therapists who had more flexible inferences regarding one client also tended to show such flexibility toward their other clients. Therapists were responsible for 27.2%/69.9% of the variance in the flexibility of inferences regarding negative emotions and for 34.9%/22.9% in the flexibility of inferences regarding positive emotions. This finding should be taken cautiously because of the small sample size.

psychotherapy processes or outcomes. Similarly, we wonder whether an index of emotional inertia (e.g., Kuppens et al., 2010) can provide new insights into the tendency of some emotions (or of some patients) to be slow to change across sessions. These valuable indicators go beyond simple self-report measures to capture unique facets of clients' and therapists' emotional worlds as it is manifested during psychotherapy. Importantly, the applicability of the dynamics of clinically relevant variables is not limited to affective ones. Meaningful insights may emerge from the exploration of indices such as the dynamics of the therapeutic alliance or of therapist interventions.

An additional strength of the present work is its reliance on an objective performance-based index of therapist empathic accuracy, rather than on subjective reports of therapist empathy. Exploring the ties of this objective index to other constructs allows researchers to allay the risk of finding halo effects (e.g., Forgas & Laham, 2017; Nisbett & Wilson, 1977), in which a global evaluation of an entity (in this case, the therapy or the therapist) exerts undue influence on the evaluation of more specific attributes (in this case, therapist empathy). Importantly, a performance-based index of EA may differ from both parties' subjective feeling of empathy and may be more amenable to training. For example, training clinics in which routine feedback is obtained (for review see Boswell, Kraus, Miller, & Lambert, 2015) can incorporate measurement of clients' affect and, through targeted feedback, help therapists improve their EA. Indeed, Barone et al. (2005) have demonstrated improvement in graduate-level psychology students' EA following a feedback given by interviewees in the context of a course.

Alongside these strengths, several limitations of the current study should be acknowledged. First, both clients' emotions and therapists' inferences were assessed only once at the end of each session. Thus, our data lack the granular resolution required to model or test emotion fluctuations that can (and probably do) occur within session. Resolution was further reduced by our use of valence-based scales (instead of scales based on specific emotions), a choice made for the sake of increasing measurement reliability and validity. Moreover, we relied on clients' self-reports as an index of their experience during the session. These emotion reports might be influenced by limited emotional awareness or various distortions known to be more prevalent in clinical populations (e.g., Boden & Thompson, 2015; Vine & Aldao, 2014) and hence become less accurate. Thus, our decision to treat clients' reports of emotions as the criteria for establishing the truth within therapists' inferences should be considered exploratory. Although many studies of EA and affect more generally take subjective self-report at face value, we (and others) run the risk of confounding these reports with truth and thus conflating agreement about these reports with accuracy. More work is needed to understand the strengths and limitations of such an approach.¹²

Thus, although we believe that therapists' ability to assess the client-rated overall emotional tone of a session holds great importance, future studies may go beyond this work by assessing clients' emotions during sessions using measures other than self-reports. Specifically, objective raters could infer patients' and therapists' emotions using recorded sessions. Additionally, vocal tone (e.g., Imel et al., 2014) and physiological measures (e.g., Marci, Ham, Moran, & Orr, 2007) could serve as indices of emotional arousal. Finally, automatic face-reading methods (e.g., Happy & Routray, 2015), which have become increasingly efficient in recognizing

emotions, could be used. The use of such measures would help increase both the temporal resolution and the specificity of the therapist EA indices. Furthermore, it would allow researchers to investigate the relative contribution of verbal versus nonverbal channels (e.g., Zaki, Bolger, & Ochsner, 2009) to empathy-related processes in psychotherapy. Understanding the channels through which clients communicate their emotions can guide therapeutic interventions targeted at clients' interpersonal difficulties.

Second, the predictive validity of our performance-based empathy measure requires further study. Atzil-Slonim et al. (2018) provided initial evidence for its role, demonstrating that EA for positive emotions predicts symptomatic improvement on the session level. Still, despite EA's intuitive appeal, additional research of the conditions under which it plays a role, and the exact nature of this role in psychotherapy process, is still in need.

Third, the therapists in this study were trainees in a program emphasizing psychodynamic principles and techniques. Thus, they were trained to focus on emotional processes and their expressions. The centrality of emotions in the psychodynamic treatment model and the explicit focus on emotions in the supervision of these trainees creates a relatively unique combination that may limit our ability to generalize the results to therapists of greater experience and ones from other orientations. It would be important to extend research on therapist EA to more experienced therapists from a variety of therapeutic orientations to build an accurate account of this construct and the factors that influence it.

Fourth, our data did not lend themselves to examining therapist effects because the majority of therapists treated only one client. Outside the clinic, studies in which perceivers inferred the inner states of several targets have found consistent individual differences between perceivers, although factors predicting these differences have proven hard to find (e.g., Thomas et al., 2003). Moreover, EA may be influenced by an interaction between clients' and therapists' characteristics (e.g., shared background or specific patterns of dispositional characteristics). To examine this in the context of psychotherapy, future studies should strive to include several clients per therapist, which will permit a distinction between perceiver (i.e., therapist) and target (i.e., client) effects on EA.

The results should be considered with the specific social and demographic breakdown of our samples in mind. Specifically, despite some variance in factors such as socioeconomic status, employment, and country of origin, both therapists and clients in these samples were Jewish Israelis, conversant or fluent in Hebrew.

As previous research has indicated, cultural similarity and majority/minority status (as well as differences) play a role in the delivery and effectiveness of psychotherapy. It is quite likely that some of the effects of these constructs will be mediated by the therapists' ability to accurately read clients who come from different cultural backgrounds, speak different languages, or have different emotional norms (e.g., Hayes, McAleavey, Castonguay, & Locke, 2016; for review, see Sue et al., 1999).

¹² One factor reducing this concern is the fact that we examined therapists' accuracy by detecting session-to-session fluctuations in affect levels, using person-centered data. By doing so, we stripped our data of any systematic biases or response sets.

Finally, it is important to note that even when client emotion instability was high or when therapist inference flexibility was low, therapists' EA remained positive and significant. Notwithstanding, the interactions' effect sizes were moderate, pointing to meaningful effects of the moderating variables. Thus, although real-life therapists whose clients are emotionally unstable or who are inferentially rigid still track their clients' emotions with some accuracy, they do so with considerably lower acuity.

Clinical Implications

If we accept the premise that greater therapist awareness of their clients' mental states is useful in conducting therapy, the present work has three central clinical implications. First, our findings highlight the risk for emotion-related misunderstandings when treating emotionally unstable clients (and possibly also ones who are high in emotional intensity). The early identification of these clients can help therapists allocate the resources (i.e., clinical attention and/or specific interventions) needed to attain a sufficient level of understanding. Second, our findings stress the importance for therapists to maintain a dynamic and flexible outlook regarding their clients' emotional experience. Such flexibility allows therapists to track their clients' emotions in a significantly more accurate manner. Third, therapists' limited ability to gauge clients' baseline emotional levels indicates a failure to attend to some unique client features and emphasizes a need for greater attention to the matter.

Importantly, these clinical implications are premised on the idea that greater EA benefits therapists and clients. This is by no means a foregone conclusion. As we've noted earlier, we see this future direction (or further examining the processes and outcomes of EA) as a high priority goal for psychotherapy process research.

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