Title

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Journal

Psychoanalytic Psychology, 36(1)

ISSN

0736-9735

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Publication Date

2019

DOI

10.1037/pap0000177

Peer reviewed

HHS Public Access

Author manuscript

Psychoanal Psychol. Author manuscript; available in PMC 2019 September 27.

Published in final edited form as:

Psychoanal Psychol. 2019 January ; 36(1): 9–18. doi:10.1037/pap0000177.

Therapist–Client Language Matching: Initial Promise as a Measure of Therapist–Client Relationship Quality

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Abstract

While research suggests that the therapeutic alliance is important in predicting outcomes of psychotherapy, relatively little is known about the development of the alliance or the moment-to-moment components of the relationship and how they combine to create an alliance, which may represent a serious limitation in existing methods of measurement. Language style matching (LSM), or the degree to which unconscious aspects of an interactional partner's language mimic that of the other partner, is a promising, unobtrusive measure of interaction quality that could provide novel insight into the therapist–client alliance. In this article, we present a theoretical argument regarding the trajectory of therapist–client LSM across therapy sessions, as well as potential precursors and consequences of LSM. We then report on a pilot test of our hypotheses that examined how LSM, clients' relational histories, and clients' symptoms were associated within a therapeutic context. Using a small sample of substance dependent mothers ($N = 7$, 100% Caucasian women) enrolled in a randomized controlled trial of psychodynamic psychotherapy lasting 12 sessions, we examined client and therapist LSM across 4 of the 12 sessions. We found that, on average, LSM decreases over the course of treatment. Furthermore, greater client interpersonal problems prospectively predict lower early LSM in therapist–client dyads, which in turn predicts greater posttreatment psychiatric distress. Results generate questions for future research and support further investigations of LSM as one index of the quality of interactions between therapist and client.

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Lucas Sohn is now at Department of Psychology and Social Behavior, University of California, Irvine. A portion of these findings was presented at the 2016 meeting of the Society of Research in Adolescence.

Keywords

psychotherapy process; therapeutic alliance; language style matching; mentalization; substance dependence

Decades of research support the central role that the therapeutic alliance plays in predicting outcomes of therapy (e.g., Horvath & Symonds, 1991). Quality of therapeutic alliance is one of the most robust predictors of treatment outcome—which is typically reduction of psychiatric symptoms or impairment—accounting for as much variance as treatment modality, if not more (Green, 2006). Although the concept of alliance stems from psychoanalysis, it is clearly an active contributor to treatment outcome in therapies deriving from different modalities—for instance, alliance accounts for 23% to 57% of change in depressive symptoms across cognitive behavior therapy (Gaston, Marmar, Gallagher, & Thompson, 1991; Gaston, Thompson, Gallagher, Cournoyer, & Gagnon, 1998). While some argue that alliance is a necessary component for therapeutic techniques to be efficacious (Ackerman & Hilsenroth, 2003), others go further by suggesting that alliance is the central catalyst for therapeutic change (Macneil, Hasty, Evans, Redlich, & Berk, 2009; Swift & Callahan, 2010). Importantly, reciprocal effects are also at play—symptom improvement is linked with subsequent increases in alliance (Falk-enström, Granström, & Holmqvist, 2013), which further underscores the import of establishing a strong alliance early in therapy.

Delving Deeper Into the Alliance: Development and Constituent Factors

Although there is little doubt that alliance plays an important role in multiple aspects of psychotherapy process, much remains to be uncovered regarding the therapeutic alliance. For instance, how alliance develops over time is an area of research deserving more attention. Alliance can be conceptualized in terms of its course and role throughout different stages of therapy: formation of an alliance, working toward a specific goal, internalization of lessons learned, and termination. Since these stages have different goals and are characterized by different types of interactions, quality of the alliance ought to change over the course of these stages (Sexton, Hembre, & Kvarme, 1996; Tracey, 1993). Although the developmental trajectory of the alliance over the course of therapy may vary across therapist–client dyads, we theorize that the following course would be most common: a steady strengthening during sessions as the therapeutic relationship develops; a breakdown of the alliance (therapeutic rupture) as therapists and clients tackle tough issues in midtreatment; and either a repair of the relationship or a failure to recover as termination approaches (Horvath & Marx, 1990; Safran, Crocker, McMain, & Murray 1990; Safran, Muran, & Wallner-Samstag, 1992). In the final stage, the impact of looming termination may be more salient for some than others, especially in unconscious, rather than conscious, psychological experiences (Schlesinger, 2013). To date, few studies have explored changes in the quality of the alliance over the course of therapy, although the results of one study suggest that clients with insecure fearful attachment report a decline in the quality of the alliance over the course of treatment (Eames & Roth, 2000). Thus, for higher risk clients in particular, alliance may decrease toward the end of therapy, but this prediction is speculative at this point.

Of additional interest is the impact of alliance at different points in therapy on client outcomes (e.g., alliance in early treatment vs. alliance at termination). Consistent with the argument that the alliance is "a series of windows of opportunity [for connection], decreasing in size with each session" (Horvath & Greenberg, 1994, p. 422), theorists argue that alliance early in therapy has the strongest impact on client outcomes. Indeed, stronger alliance measured early in therapy is a particularly robust predictor of superior therapeutic outcomes (e.g., Horvath, 2001; Horvath & Symonds, 1991; Piper, Azim, Joyce, & McCallum, 1991) and lower levels of dropout (Eames & Roth, 2000). Findings such as these underscore the import of studying alliance early in therapy.

Another topic requiring further elucidation is the active ingredients of the alliance and how they predict treatment outcome. There is disagreement regarding which modes of assessment most accurately assess such a multidimensional construct. Existing methods of measuring alliance may be only partially able to tap into the unconscious aspects of alliance: many psychoanalysts may argue that these aspects of the alliance, which elude conscious awareness, are responsible for the majority of therapeutic action (McWilliams, 2011; but see Beck, Rush, Shaw, & Emery, 1979, for an alternate perspective). If this argument is accurate, it is possible that measures of alliance that tap into unconscious aspects of behavior could yield further insight into the extent to and mechanisms by which alliance predicts treatment outcome.

Lastly, in considering assessments of alliance, we must be mindful of reporter effects. Client, therapist, and observer ratings of alliance can all diverge, likely because each reporter (client, therapist, observer) uses different information to make their assessments. One study found that client and observer ratings of alliance outperform therapist perception of alliances in the prediction of client outcomes (Horvath & Bedi, 2002, effect size difference of .07). These findings underscore the unique utility of observer-based reports of alliance and the need to develop novel ways of unobtrusively assessing alliance from an objective perspective.

Behavioral Matching and the Alliance

In therapist–client relationships, an explicit goal of the therapist is to match the client; for example, the therapist may mirror the client's affective state with facial expressions of distress to convey sympathy (Blairy, Herrera, & Hess, 1999; Freud, 1921/1975; Lipps, 1907; Weil, 1984) or may adopt a client's vernacular (e.g., using the words "rag on" to convey playful teasing). A therapist's matching communicates something very important to the client—that his or her experiences have been seen, are understood, can be safely shared with another person, and can be contained (Fonagy, Gergely, Jurist, & Target, 2002; Lipps, 1907; Merten, Anstadt, Ullrich, Krause, & Buchheim, 1996).

While less commonly discussed in the literature, matching of the unconscious aspects of alliance can affect therapeutic change on a scale similar to, or even greater than, the conscious or observable elements of the alliance itself (McWilliams, 2011). Thanks to novel techniques for assessing nonconscious aspects of behavior, this may soon be a testable hypothesis. This type of behavioral matching, which has yet to be extensively examined in

therapist–client dyads, has been studied in the context of nonverbal interactions between other types of dyads (e.g., parent–child dyads, romantic partners). Matching in dyadic interactions can take a variety of forms, including the matching of language style, intonation, posture, and physiology (Bernieri, 1988; Bernieri, Davis, Rosenthal, & Knee, 1994; Chartrand & Bargh, 1999; Håvås, Svartberg, & Ulvenes, 2015; LaFrance, 1985; Levenson & Gottman, 1983; McFarland, 2001; Niederhoffer & Pennebaker, 2002), with findings generally suggesting that higher levels of matching are associated with better relationship outcomes (Chartrand & Bargh, 1999; Giles & Coupland, 1991; Giles, Coupland, & Coupland, 1992; Håvås, Svartberg, & Ulvenes, 2015).

In what follows, we describe a novel form of behavioral matching, which has yet to be extensively examined in therapist–client dyads, but has yielded initial support in the context of interactions between other types of dyads (e.g., parent–child dyads, romantic partners). We propose that this metric of behavioral matching holds promise in the study of therapist–client alliance.

Language Style Matching: A Novel Metric of Relational Attunement?

Language style matching (LSM; Gonzales, Hancock, & Penne-baker, 2010) assesses similarity in the frequency of use of functional features of language (e.g., pronouns, prepositions, and conjunctions) among members of a dyad. Unlike content words (e.g., nouns, adjectives), function words are produced without conscious awareness and occur at high frequencies in natural language (Gonzales et al., 2010; Ireland & Pennebaker, 2010; Pennebaker & King, 1999). Because these characteristics of language reflect not *what* people say, but *how* they say it (Ireland & Pennebaker, 2010), the extent of matching is thought to be independent of conversation topic. Higher LSM does not suggest agreement in terms of the content of the material being discussed, but a heightened level of attunement to the other (Pennebaker, 2011).

Even in relatively brief interactions, LSM is predictive of relationship outcomes: Higher LSM in 4-min speed-dating conversations predicts the likelihood of the initiation of a relationship and persistence three months later (Ireland et al., 2011). Among groups of strangers asked to complete a challenging cognitive task, higher LSM is associated with greater group cohesiveness and better performance (Gonzales et al., 2010). Finally, higher LSM in parent–child dyads is associated with children's greater attachment security and lower physiological reactivity (Borelli et al., 2017; Rasmussen et al., 2017). Only one study has examined LSM in the therapeutic context, finding evidence that higher matching is associated with higher levels of observer-rated therapist empathy (Lord, Sheng, Imel, Baer, & Atkins, 2015). However, there is both theoretical grounding and empirical precedent for using computerized software to tap into unconscious levels of communication, rather than semantic or content-based levels, albeit not in therapist–client interactions (Bucci, 2001; Mergenthaler & Bucci, 1999). Importantly, a substantial body of work suggests that nonverbal aspects of the therapeutic alliance have an effect on therapeutic outcomes (Ford, 1978; Haase & Tepper, 1972; Horvath & Greenberg, 1994; Merten, Anstadt, Ullrich, Krause, & Buchheim, 1996; Tepper & Haase, 1978). LSM represents matching on only one

dimension—the linguistic dimension—and as such ignores many other aspects of the interaction that have the potential to be equally or more influential than language.

Predictors of Variations in the Alliance

The quality of therapeutic alliance is predicted by client and therapist factors. For instance, clients with secure attachments form stronger alliances with their therapists (Eames & Roth, 2000; Sauer, Anderson, Gormley, Richmond, & Preacco, 2010). On the therapist side, keeping therapist and client goals aligned, displaying empathy, making the client feel like he or she is listened to, and interacting in a warm and accepting manner are associated with a stronger alliance (Swift & Greenberg, 2015).

LSM is thought to reflect the extent to which conversational partners are attuned to one another (Pennebaker, 2011), with high levels of LSM suggesting high levels of connection and low LSM indicative of disconnection between speakers. Thus, as a measure of conversational attunement or connection, LSM may be both predicted by prior relationship experiences and predictive of the quality of future interpersonal processes occurring between therapist and client. Thus, people who *perceive* high levels of conflict or low levels of support in their relationships with others, regardless of the actual level of conflict or support, may be less inclined and able to attune closely to others. Importantly, because the LSM metric measures synchrony in aspects of speech that are produced nonconsciously, variations in LSM may reflect a lack of a connection between conversational partners that is not consciously accessible. Given the strong relationship between quality of alliance and treatment outcome, as a measure of relationship quality, LSM should also predict central treatment outcomes, such as reduced levels of psychological distress (Barber et al., 1999; Gaston et al., 1991).

The Current Pilot Study: Exploratory Analysis of LSM in a Therapeutic Context

In this exploratory pilot study, we provide a preliminary examination of the LSM metric in the context of therapist–client relationships. We examine LSM in a subsample of participants in an outcome study exploring the efficacy of a psychotherapy model designed to improve parenting sensitivity and psychiatric adjustment among mothers with a history of substance dependence (see Suchman et al., 2010, for an overview). We studied LSM in this sample because therapeutic alliance may play a stronger role in the treatment of this population in terms of treatment outcome (Horvath & Bedi, 2002) and prevention of high rates of treatment drop-out (Boog et al., 2014; Suchman, Decoste, Castiglioni, Legow, & Mayes, 2008).

Suchman's therapy for substance dependent mothers is an empirically supported individual psychotherapy for mothers of young children (Suchman et al., 2010, 2017; Suchman, DeCoste, Mc-Mahon, Rounsaville, & Mayes, 2011). The central premise of the treatment is that by enhancing mothers' abilities to mentalize, or to understand that mental states (i.e., thoughts, feelings, and intentions) inform behavior and cause reactions in others, the treatment will improve mothers' own well-being and their ability to parent sensitively. As

compared to a control treatment condition in which parents were provided with education regarding parenting and child development in a one-on-one therapeutic context, Suchman's mentalization-based psychotherapy resulted in greater representational coherence, better caregiving behavior, and greater maternal sensitivity (Suchman et al., 2010).

This 12-session, manualized treatment afforded us the opportunity to examine LSM over the course of therapy. We evaluated LSM during Sessions 1, 3, 9, and 11 in order to understand how LSM changes over the course of therapy. We conceptualized Sessions 1 and 3 as the therapeutic initiation phase, Session 9 as mid- to late-therapy, and Session 11 as termination. Based on theorizing suggesting that alliance increases over the course of treatment but may decline near termination, particularly for higher risk clients (cf. Eames & Roth, 2000), we predicted that LSM would be higher early in therapy and lower by Session 11.

We focused the remainder of our inquiries on LSM during the initiation/solidification phase of therapy (henceforth termed "early LSM"), based on the assumption that forming a strong alliance early in therapy is key in predicting therapeutic outcomes. Consistent with prior work that has linked relational history and attachment to alliance (Diener & Monroe, 2011; Horvath, 2001), we anticipated that clients' prior relational history would predict early client–therapist LSM. In this context, we examined clients' self-reported relational conflict and relational support with respect to their social network, which is a more robust predictor of optimal relational functioning and well-being than objective metrics of social support (Polansky, Gaudin, Ammons, & Davis, 1985; Procidano, 1992). Thus, we hypothesized that lower conflict and higher support would predict higher early LSM.

Next, based on studies suggesting that better therapeutic alliance predicts better treatment outcomes, we predicted that higher early LSM would be associated with more optimal treatment outcomes. We utilized assessments of one of the targeted outcomes of the intervention, psychiatric distress, to operationalize treatment outcome. Thus, we predicted that higher early LSM would prospectively predict lower posttreatment psychiatric distress after controlling for pretreatment levels of distress. Finally, we predicted that early LSM would mediate the association between pretreatment client relational characteristics (perceived relational conflict, perceived relational support) and posttreatment psychiatric distress.

Method

Mothers were recruited from a local outpatient drug addiction treatment program via routine intake procedures, advertisement at clinic groups and medication dispensation areas by the research staff, flyers and cards posted in waiting areas and childcare rooms, clinician referrals, and self-referrals. We randomly selected seven mothers (M_{age} = 33.71 years, SD_{age} = 4.61 years) from a total sample of 23 receiving the active mentalization-based treatment. These mothers all had a history of substance dependence and a child between the ages of 11 and 60 months in their care. The majority of the mothers examined in our study were unemployed (71%), cohabitated with a romantic partner (43%), and had only one child living at home (43%). All were Caucasian, and 2 (28%) were living in supervised settings (e.g., assisted living). All of the mothers in the treatment study were currently receiving

outpatient drug treatment; nonetheless, relapse during treatment is not unexpected. Based on urine toxicology screens (assessing for the presence of cannabis, opiates, opioids, and cocaine) collected as part of their treatment, 43% showed positive screens at baseline, and 29% showed positive toxicology screens at the end of the follow-up. Most (86%) of the mothers showed at a positive toxicology screen at least once during the study. A minority of the mothers were enrolled in methadone maintenance treatment (43%). Many (71%) of the mothers were diagnosed with opioid dependence and/or cocaine abuse (57%), with a minority diagnosed with cannabis abuse (29%) and alcohol dependence (14%). Most (71%) of the mothers were diagnosed by clinicians at their outpatient clinics as having comorbid psychiatric diagnoses, including dysthymic disorder (29%), bipolar disorder (14%), posttraumatic stress disorder, and borderline personality disorder (14%).

Procedures

This protocol was approved by the Human Investigation Committee, and participants were informed they could decline to participate in this study at any point and still receive the standard outpatient treatment program. Participants completed informed consent for participating in the study and for videotaping therapy sessions. Next, the participants came into the laboratory to complete a 1.5 hour long psychosocial intake interview that included demographic information as well as relational history; they also reported on their psychopathology symptoms.

The participants then entered the treatment phase of the protocol, attending 12 weekly, 1-hr individual therapy sessions with PhD or Masters level therapists trained by the principal investigator of the RCT. These sessions were all videotaped. At the end of the 12 sessions, the participants completed posttreatment assessments of psychiatric symptoms.

Measures

Relational problems.—Mothers responded to the following question to indicate the number of people they were currently experiencing relationship problems with at pretreatment assessment: “Have you had significant periods in which you have had serious problems in the past 30 days with (mother, father, brothers/sisters, sexual partner/spouse, children, other significant family, close friends, neighbors, or co-workers)?” Total number of relationships selected was used in analyses as a relational problems score.

Relational support.—Mothers reported on the total number of people in their lives that were supportive of them by answering the following question: “Who in your life is supportive of you? (mother, father, partner, sibling, adult child, minor child, grandparent, relative, friend, counselor, god/higher power, other clients at clinic, self-help group)?” Total number of relationships selected was used in analyses as a relational support score.

Language style matching.—Trained researchers transcribed 4 of the 12 therapy sessions for each client (Session 1, 3, 9, and 11) to capture LSM between therapist and client. Following transcription, researchers separated therapist utterances from client utterances into separate documents and edited the transcripts per protocol (Pennebaker, Francis, & Booth, 2001). The overall linguistic analysis program calculates a percentage of words per text

sample for 70 different word categories, including nine function-word categories that are used in the calculation of LSM: auxiliary verbs (e.g., *might*, *would*), articles (e.g., *the*), common adverbs (e.g., *always*, *naturally*), personal pronouns (e.g., *I*, *you*), indefinite pronouns (e.g., *another*, *someone*), prepositions and relative pronouns (e.g., *of*, *which*), negations (e.g., *not*), conjunctions (e.g., *and*, *but*), and quantifiers (e.g., *every*, *most*).

The LSM algorithm developed by Gonzales and colleagues (2010) was used to measure the degree of verbal synchrony within the therapist–client dyads. The algorithm compares how frequently participants use each type of function word. Next, a composite score was created to reflect the degree of similarity in function word use.

Frequency is operationalized as the proportion of function word use compared to total word use. Verbal synchrony is calculated by subtracting the respective proportions of function word use for client and therapist. This score is standardized by taking the absolute value and subtracting it from 1, yielding a range of 0 to 1, where higher numbers indicate greater synchrony. These operations are carried out for each of the nine categories of function word and then averaged, yielding one total verbal synchrony score. In our sample, LSM ranged from .84 to .91, a range comparable to values found in all published studies of LSM (Borelli et al., 2017; Ireland et al., 2011; Lord et al., 2015; Rasmussen et al., 2017; see Table 1 for excerpts from low and high scoring transcripts). Due to our interest in LSM during the initiation of therapeutic relationships, we calculated the mean of LSM at Sessions 1 and 3 to create an “early LSM” variable.

Psychiatric distress.—The Brief Symptom Inventory (BSI; Derogatis & Spencer, 1993) is a well-established, 53-item self-report measure. Using a 5-point scale, participants rate the extent to which they have experienced a wide range of symptoms (e.g., depression, anxiety, interpersonal sensitivity). The Global Severity Index (GSI) is a composite score that represents the overall psychiatric symptoms of the participant, with high scores suggesting high symptom levels. We computed *t*-scores for participants’ GSI scores, which were subsequently used in analyses.

Data Analytic Plan

To correct for the fact that the LSM variable was negatively skewed, largely due to an outlier, we winsorized the outlier (80%), which reduced it to the 90th percentile of the distribution. Next, we adopted a two-pronged approach for analyzing our data to account for our small sample. First, we examined the simple associations between our independent (relational conflict and support, early LSM) and dependent variables (early LSM, posttreatment psychological distress) using nonparametric tests (Wilcoxon’s signed ranked tests, Spearman correlations). Second, we retested our hypotheses using hierarchical regressions. Finally, in evaluating our hypotheses, we present data on both statistical significance and effect sizes.

Due to the nature of the data within our subsample ($n = 7$ different clients, $n = 3$ different therapists), we focus exclusively on client-level factors as predictors and dependent variables; however, given that LSM is a dyadic-level construct, we acknowledge that therapist factors are equally likely to be associated with LSM and should be explored in

future investigations. To account for the role of therapist characteristics on therapist–client LSM, we statistically control for therapist in all analyses.

Results

Table 2 reports descriptive statistics and zero-order correlations. Early LSM was associated with fewer relational problems and lower pretreatment psychiatric distress. Early LSM was not associated with clients' marital status, age, income, or years of education.

Hypothesis One: Change in LSM Over the Course of Treatment

A related-samples Wilcoxon signed-ranks test revealed that LSM declined significantly from Session 3 to 11, $Z(7) = -2.37$, $p = .018$ (Figure 1).

Hypothesis Two: Relational Functioning at Intake as a Predictor of Early LSM

A Spearman's rank order correlation showed that participants' relational problems at intake were negatively correlated with early LSM, $r_s(7) = -.95$, $p = .001$, but the effect was not significant for relational support, $r_s(7) = .64$, $p = .12$. A hierarchical linear regression showed that relational problems accounted for 77% of the variance in early LSM (Table 3). The more people participants endorsed as having relational problems with, the lower the early LSM, $\beta = -1.01$, $p = .006$. Relational support was not associated with early LSM, $\beta = 0.62$, $p = .22$.

Hypothesis Three: Early LSM as a Predictor of Posttreatment Adjustment

A Spearman's rank order correlation showed that early LSM was not significantly correlated with posttreatment GSI, $r_s(7) = -.29$, $p = .54$. But a hierarchical linear regression controlling for baseline GSI found that early LSM accounted for 83% of the variance in posttreatment GSI (Table 3). Higher LSM predicted lower posttreatment GSI, $\beta = -1.50$, $p = .03$.

Hypothesis Four: Early LSM as a Mediator

Controlling for therapist and pretreatment BSI, the indirect effect was significant, $b = 13.82$, 95% Confidence Interval (CI) [11.7, 69.77], suggesting that LSM mediates the association between relational problems and posttreatment GSI (see Figure 2). The Kappa-squared coefficient, .71, indicates a large effect size (Preacher & Kelley, 2011), although some argue that this method of effect size calculation is fallible (Wen & Fan, 2015). To account for this concern, we present data from another method of calculating effect size, the completely standardized effect—when accounting for direct and indirect effects, an increase of one standard deviation in relational problems predicted a 1.072 increase in psychiatric distress. However, the total effect seems to be driven by the indirect effect, as the completely standardized indirect effect was 2.402 (Hayes, 2013). LSM was not a significant mediator of the link between relational support and GSI, $b = -.85$, 95% Cl [−3.49, 2.11].

Discussion

Our intention in this paper was to describe and test the LSM metric for its potential uses in psychotherapy process research. We provided a theoretical framework in which to situate the potential utility of the LSM construct and explored our hypotheses within a pilot study.

Among a small sample of mothers with histories of substance dependence, we found that LSM first increased and then decreased over the course of therapy. In the early stages of therapy, alliance may build as the therapist and client become acquainted, with decreases toward the end of therapy suggesting preparations for termination. These changes in LSM may be driven by unconscious dyadic forces, but they may also be impacted by intentional therapist and client behaviors. Given that we examined LSM during select sessions, future work measuring LSM in all therapy sessions may yield important insights regarding LSM trajectory.

LSM was not related to client demographic factors, but it was lower among dyads in which mothers reported more pretreatment relational problems. Our confidence in these findings is limited by our methods for assessing relational support and conflict, which were single item measures obtained from a very small sample. However, we note that similarly impressive findings have been demonstrated with other single item measures in other subfields of psychology (e.g., Hooley & Teasdale, 1989). Ultimately, we hope these findings inspire subsequent examination of these links. Researchers should also evaluate whether other client characteristics (e.g., borderline personality disorder diagnosis), which have previously been associated with poorer alliance (Gunderson et al., 1989; Pereira, Lock, & Oggins, 2006), are associated with lower LSM.

Importantly, higher early LSM was a prospective predictor of clients' posttreatment symptoms after controlling for their pretreatment symptoms. Dyads with high early LSM yielded better outcomes in terms of the reduction of psychological distress. Furthermore, early LSM mediated the association between pretreatment relational conflict and posttreatment psychological distress, controlling for pretreatment distress. These effect sizes were large, enhancing our confidence in their practical significance despite the small sample size. Higher early LSM may be a reflection of superior therapeutic alliance, potentially as a result of better therapist–client fit, which could in turn result in greater willingness and/or more opportunities for the client to engage in meaningful therapeutic work, resulting in better treatment outcomes. In therapist–client dyads with higher LSM, the attunement of the therapist to the client (and potentially of the client to the therapist) may be higher, which may result in the client feeling better understood by the therapist. In future studies it will be important to assess how therapist–client LSM compares to other measures of alliance and therapist–client attunement, such as the client's perceptions of the relationship.

Future Research Questions Regarding LSM and Therapist–Client Alliance

Our pilot data generate numerous questions that could be examined in future investigations. Although our examination of LSM occurred at a macroscopic level, we suspect that LSM changes from minute to minute across interactions, depending on factors such as emotional intensity, ambient distractors, and memory activation in both therapists and clients. Although

Ireland and Pennebaker (2010) initially argued that LSM does not vary across context, the results of one study suggested that only LSM derived from relationship interviews was associated with children's attachment security and emotion, while LSM derived from discussion of topics unrelated to the parent–child relationship was not (Borelli et al., 2017). Therefore, additional investigations aimed at determining the extent to which conversation topic influences LSM, if at all, are important. Evidence for the import of conversation- or emotion-specific LSM in therapist–client relationships could speak to the importance of specific therapeutic techniques in predicting treatment outcome. In contrast, if the topic/emotional tone of the interaction does not moderate the association between LSM and treatment outcome, this could suggest that LSM is a stable, trait-like aspect of the relationship.

Furthermore, it is possible that therapist–client LSM may have stronger predictive power when examined in the context of topics that are highly relevant to the target of the treatment. This is consistent with the theoretical underpinnings of some models of treatment, which argue that therapeutic change happens during moments of emotional arousal (Bucci, 2013; Diamond, Shahar, Sabo, & Tsvieli, 2016; Fosha, 2000). This is also consistent with Christian, Safran, and Muran's (2012) reconceptualization of corrective emotional experiences, which posits that the unconscious process of mutual enactment of, and disembedding from, client expectations is a vehicle for therapeutic change. For instance, in a treatment program such as Suchman's mentalization-based therapy, in which a central focus is mentalization in parenting, examining the trajectory of LSM during discussions of the child's thoughts and feelings may be an exceptionally powerful predictor of posttreatment maternal sensitivity; similarly, assessing LSM during discussions of substance use may be more strongly predictive of posttreatment use.

In future work, it will be important to examine LSM in the context of therapies that do not view the therapist–client alliance as central to the psychotherapy change process. Suchman's therapy model is rooted in psychodynamic theories (attachment and mentalization theories), and underscores the importance of the therapist–client relationship as being a central agent of change as well as a prerequisite that is necessary in order for the other therapeutic techniques to result in change. We note that this argument is contested in the literature. For instance, some researchers argue that studies proposing a causal link between therapeutic alliance and treatment outcomes have not accounted for temporal precedence and that therapeutic alliance, rather than being a predictor of more optimal treatment outcomes, is a byproduct of it (DeRubeis & Feeley, 1990; Feeley, DeRubeis, & Gelfand, 1999). These researchers point to studies wherein changes in alliance follow changes in symptom reduction, or show no relation to symptom reduction at all (DeRubeis & Feeley, 1990; Feeley et al., 1999). Furthermore, Beck and other colleagues (Beck et al., 1979) noted that overemphasizing therapists' warmth and empathy, which is essential in building therapeutic alliance, can be disruptive in therapy. Even though cognitive therapists note the importance of therapeutic alliance to a certain degree, in this theoretical tradition, the treatment techniques are the central active agents of change. It will be interesting to ascertain whether therapist–client matching is similarly predictive of clients' outcomes in therapies that do not explicitly hold the alliance responsible for change processes or whether matching only

predicts outcomes among therapists working within treatment modalities that privilege the role of the alliance.

Unfortunately, in this study we were unable to evaluate the effect of therapist characteristics on early LSM, which we argue is likely to be an important predictive factor. It would be interesting to examine other factors that have been linked to therapeutic alliance and treatment outcome, such as therapists' education, years in clinical practice, theoretical orientation, and relational history/attachment, in terms of whether they predict LSM. Researchers should also examine aspects of therapist–client fit (e.g., racial/ethnic/gender matching) in terms of their contribution to LSM.

Future work could also examine whether, as compared to people without clinical training, therapists are more skilled at co-creating interactions with higher LSM. Although therapists are trained to be sensitive to clients' internal states, it is unclear whether co-creating relationships with high LSM is a trainable skill and whether this capacity improves with experience. It would also be interesting to assess whether moments of peak LSM are identified by therapists and/or outside observers as moments involving higher levels of connection or attunement to clients; the answer to this question would illustrate the degree to which LSM taps aspects of the interaction that are consciously accessible to those participating in or witnessing the interaction. Finally, we note that LSM captures but one of a host of behaviors that may impact treatment outcome (e.g., Merten et al., 1996)—in future studies, it may be profitable to assess nonverbal indicators of empathy, warmth, and attunement in addition to LSM in the hope of strengthening the predictive power of our models regarding psychotherapy process.

Clinical Implications

These preliminary findings provide a tantalizing rationale for deeper examinations of LSM as a measure of therapist-client alliance. Enthusiasm for the generalizability of the pilot study findings is limited by the small sample size and specificity of the population, but given the time-intensive transcription and editing process necessary for the computation of therapist–client LSM across therapy sessions, initial data supportive of the potential utility of LSM is important.

With further exploration and evidence supportive of its utility, therapist–client LSM may become a useful tool for enhancing our understanding of therapeutic relationships, assisting in our ability to predict eventual treatment outcome by early LSM and to better understand the psychotherapeutic process. It may also prove fruitful to evaluate the correspondence between LSM variability and clients' and therapists' feelings regarding the alliance. Perhaps clients who are more sensitive to interpersonal rejection (such as clients with personality disorders) would be more sensitive to these momentary fluctuations in LSM, whereas those clients with more robust pretreatment psychological functioning would have more stable assessments of the alliance. The same could be true for therapists. In this way, utilization of the LSM metric could afford more fine-grained analyses regarding moment-to-moment interpersonal dynamics in psychotherapy.

Conclusion

We argue that the novel LSM metric may create unique opportunities for the examination of therapist–client relationships, particularly aspects that elude conscious awareness of the therapist, client, or outside observer, that nonetheless exert an influence on treatment outcome. The findings from our pilot data suggest that LSM changes over the course of therapy and that higher LSM measured early in therapy predicts lower posttreatment psychological distress and is predicted by clients' pretreatment relational functioning. Our data provide initial evidence suggesting the utility of LSM as a way of understanding therapist–client relationships.

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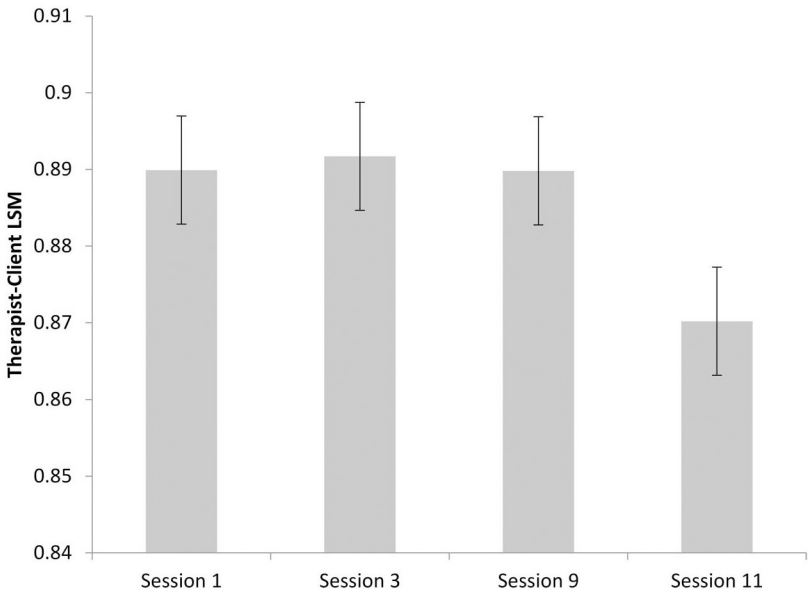

Figure 1.
Therapist–client LSM across the course of therapy.

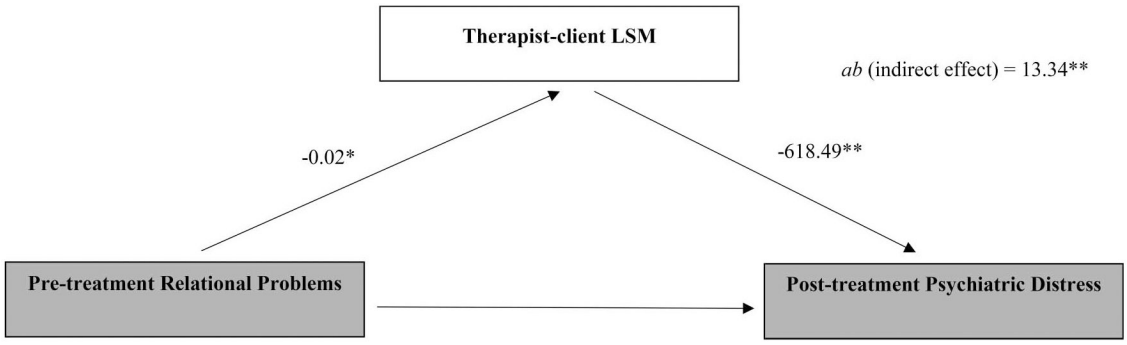

Figure 2.

Therapist–client LSM mediates the association between clients' pretreatment relational problems and posttreatment psychiatric distress, controlling for clients' pretreatment psychiatric distress and therapist.

Table 1

Sample Excerpts From Session Transcripts of Low and High LSM Scoring Therapist–Client Dyads

LSM	Excerpt
Low LSM, .84	**So you feel angry and resentful because** … Because I just want my mother …. I want my mother to take the baby and spend some more time with her. **So you want** So I can so I can have a break. **So you want her to be there for you, you want her to support you.** Yeah. And she doesn't. **Does she ever?** All her life. **Has she been supportive?** My mother's like my mother was like my enabler when I was using drugs. My mother's been through the good and the bad with me, ten times over. 44- check **So your mother, like you has had trouble setting limits some of the time with you, like you with [ChildName].**
High LSM, .91	**So what's going through your mind when you decided he was kind of done?** … I dunno what else to do **uh huh** I dunno what else to **uh huh** show him ta **uh huh**, to show him how to do this **okay** you know I think it would take a couple of days **okay** or a couple of weeks to really **okay** get him to **okay** be able to **okay okay**. Like if I showed him, every day for you know five minutes **okay** then maybe he would get it. **Right so that then, so the session was um ended like he was** right yeah **and that was it** and then I'll try again **yuh** the next day and then **yeah** one day he'll squeak it. **Yeah sort of like following his time frame** mmhm **yeah** … Yeah I was nervous about how he wasn't talking when I went to the doctors they said they'll just keep an eye on it **mhm** but he wasn't makin any vowel sounds or anything **mhm?** And now he just started about maybe three weeks ago **mhm** and they said we'll check it his next visit we're not too concerned **mhm** they said but we'll just follow it **mhm** and now he is **mhm** so it's just whenever he's ready **mhm mhm** a lot of stuff **right** just whenever he's ready **uh huh** ……. ahah ha huh a bald spot…..**ahh, oh, mm……..**yeah he likes that rug

Note. LSM = language style matching.

Table 2

Descriptive Statistics of and Bivariate Associations Between Key Variables (N = 7)

Measures	Pretreatment Mean (*SD*)	Posttreatment Mean (*SD*)	Variable	1	2	3	4
Psychiatric distress	54.29 (10.22)	54.57 (5.62)	1. Relational problems	—			
Relational problems	.86 (.90)	—	2. Relational support	−0.65	—		
Relational support	1.71 (1.50)	—	3. Early LSM	−.93**	0.65	—	
LSM Session 1	.889 (.024)	—	4. Tl Psychiatric distress	.82*	−0.73	−.79*	—
LSM Session 3	.891 (.021)	—	5. T2 Psychiatric distress	0.28	0.02	−0.52	−0.05
LSM Session 9	.889 (.018)	—					
LSM Session 11	.879 (.020)	—					
Early LSM	.891 (.024)	—					

Note. LSM = language style matching.

* $p < .05$.

** $p < .01$.

Table 3

Regressions Examining Links Between Pretreatment Relational Problems, Early LSM, and Posttreatment Psychiatric Distress

	Dependent variables					
	GSI			LSM		
	***b*/ΔR^2**	***SE***	**95% CI**	***b*/ΔR^2**	***SE***	**95% CI**
Step 1 ΔR^2	.12			−.25	5.82	[−16.42, 15.91]
Therapist	−0.10	0.37	[−0.84, 0.44]	−0.02	0.30	[−0.87, 0.82]
Pre-Tx BSI	—	—	—	0.83*		
Step 2 ΔR^2	.77**			−401.91	105.21	[−736.73, −67.10]
Early LSM	—	—	—	—	—	—
Pre-Tx relational problems	−.02	.004	[−0.04, −0.01]	.99*		

Note. CI = confidence interval; Pre-Tx = pretreatment; LSM = language style matching.

* $p < .05$.

** $p < .01$.