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Therapeutic Technique Diversity is Linked to Quality of Working Alliance and Client
Functioning Following Alliance Ruptures

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Abstract

Objective: The current investigation aimed to examine the possible association between therapists' flexibility in use of therapeutic techniques from different therapy orientations (i.e. therapeutic technique diversity; TTD) and subsequent improvement in client-reported (a) global functioning, as well as (b) quality of the working alliance, following sessions in which alliance ruptures occurred. **Method:** Clients ($n = 81$) who received time-limited psychodynamic therapy in a community clinic, completed session-by-session reports of working alliance and global functioning. Therapists ($n=56$) completed session-by-session reports of working alliance and their use of therapeutic techniques across different therapeutic orientations, using the Multitheoretical List of Interventions (MULTI-30). **Results:** We found a curvilinear association between TTD in rupture sessions and client-reported global functioning at the sessions subsequent to rupture sessions, such that moderate levels of TTD were associated with greater subsequent improvement in functioning, compared to low and high levels of TTD. However, TTD was not significantly associated with subsequent changes in the quality of working alliance. **Conclusions:** Our results suggest that moderate levels of TTD in the face of alliance ruptures are tied to clients' global functioning improvement during psychodynamic psychotherapy. These findings highlights the importance of further investigation of a varied delivery of therapeutic techniques, especially in the face of alliance ruptures.

Keywords: therapeutic techniques, working alliance, alliance ruptures, psychotherapy process, psychotherapy integration

Public significance statement: Our findings suggest that moderate levels of psychotherapy integration were most beneficial in the face of alliance ruptures during psychodynamic psychotherapy. As such, our results highlight the importance of incorporating integrative

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treatment models into clinical training and of clinicians' flexibility and use of a moderately varied set of techniques.

Therapeutic Technique Diversity is Linked to Quality of Working Alliance and Client Functioning Following Alliance Ruptures

Therapists' flexibility in the use of diverse therapeutic techniques has attracted growing interest in psychotherapy research over the past decade (e.g., Barber, 2009; Boswell et al., 2013; Solomonov et al., 2017). This sort of diversity may reflect greater therapist responsiveness to nuanced changes in in-session processes and to clients' progress during therapy (Kramer & Stiles, 2015; Stiles, 2009). Alternatively, such diversity (especially when taken to extremes) may reflect a therapist's inconsistency or confusion regarding the optimal choice of techniques (Barber et al., 2006). It may be that moderate levels of diversity in therapists' use of varied techniques (which has been found to characterize the clinical work of experts; Solomonov, Kuprian, Zilcha-Mano, Gorman, & Barber., 2016) is optimal.

In the present work, we sought to examine whether diverse use of the therapeutic technique is differentially tied to therapeutic outcomes as a function of alliance ruptures. We reasoned that therapist flexibility may be particularly crucial when there is tension or breakdown in the collaborative therapeutic relationship (Safran, Muran, & Eubanks-Carter, 2011), and expected that therapists' use of varied techniques drawn from multiple therapeutic orientations would facilitate greater improvements in clients' alliance experience as well as greater improvement in clients' general functioning in the face of alliance ruptures.

Therapist Flexibility in the Use of Therapeutic Techniques

Therapist flexibility has been defined in different ways. One definition focuses on therapist flexibility in applying a single therapeutic orientation. This definition hones in on the therapist responsiveness to the situation while adhering to the instructions or guidelines of a specific therapeutic orientation (“prescribed techniques”). This type of flexibility may involve

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tailoring the length of the treatment (as a whole) or emphasis on a sequence of specific modules or stages within the protocol (e.g., Galovski, Blain, Mott, Elwood, & Houle, 2012). Several studies have operationalized flexibility on the basis of therapists' retrospective ratings of how flexible they had been in administering a particular therapy protocol (Kendall & Chu, 2000), or by asking independent judges to provide such ratings after reviewing recordings of certain sessions (e.g., Chu & Kendall, 2009; Hudson et al., 2014). These studies have yielded mixed results, in which only few studies (e.g., Chu & Kendall, 2009) reported a significant positive association between therapist flexibility and treatment outcome, while others did not (e.g., Hudson et al., 2014). Kendall and Chu (2009) have suggested that a retrospective (post-treatment) ratings by therapists may not suffice to capture therapists' flexibility and that a session-by-session ratings may allow a better methodology to overcome this limitation.

Another way to assess therapist flexibility within a specific treatment modality is to assess fluctuations in therapists' adherence to a specific therapy protocol over the course of several sessions (e.g., Owen & Hilsenroth, 2014; Solomonov et al., 2017). For example, Owen and Hilsenroth (2014) used objective clinical judges' ratings of psychodynamic-interpersonal interventions in a sample of clients undergoing psychodynamic psychotherapy as a therapist adherence indicator (specifically, to psychodynamic psychotherapy principles). Between-session variability in adherence was their chosen index of therapist flexibility. Therapist adherence was found to vary both between clients and within clients (i.e., across sessions of the same client). Importantly, greater within-client variability in adherence (i.e., greater variance in adherence ratings across sessions of the same client) was found to be positively associated with therapy outcomes.

Yet another way to define therapist flexibility is to measure the extent to which therapeutic techniques used by therapists are drawn from different therapeutic orientations (e.g., Solomonov, Kuprian, Zilcha-Mano, Gorman & Barber, 2016). This construct also taps the therapist's responsiveness to the situation, but in this case, it is defined as deviations from the instructions or guidelines of the specific therapeutic orientation (Castonguay, Boswell, Constantino, Goldfried, & Hill, 2010a; Kramer & Stiles, 2015).

This type of flexibility reflects the extent to which therapists who identify with one therapeutic orientation (in the current study psychodynamic orientation) incorporate techniques drawn from other therapeutic approaches ("proscribed techniques") into their clinical practice alongside the "prescribed techniques" of their "home" orientation. According to this view, flexible therapists may incorporate therapeutic techniques from a variety of therapeutic orientations into their "home" orientation when they believe they would be beneficial for a specific client in a specific context (Gibbons, Crits-Christoph & Barber, 2003; McCarthy, Keefe, & Barber, 2016; Solomonov, et al., 2016). This type of practice is often referred to as *assimilative integration* (e.g., Messer, 1992; Gold & Stricker, 2001), and may explain some of the overlap found in the therapeutic techniques used by therapists who identify with seemingly different therapeutic orientations (e.g., Ablon & Jones, 2002). The high prevalence of assimilative integration in clinical practice highlights the importance of further investigation of this construct (e.g., Ziv-Beiman & Shahar, 2015).

To date, most studies which define therapist flexibility in this manner have evaluated techniques drawn from only a few (usually two) therapeutic orientations. In such studies, the index for therapist flexibility is typically defined statistically as the interaction term between two scales (e.g., the interaction between psychodynamic and cognitive-behavioral ratings). For

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example, Defife, Hilsenroth and Gold (2008) found that therapists' use of cognitive-behavioral techniques was positively associated with treatment outcomes among clients undergoing short-term psychodynamic psychotherapy. In a similar manner, Goldman, Hilsenroth, Owen, and Gold (2013) found a significant interaction between psychodynamic and cognitive-behavioral intervention ratings when predicting some facets of the therapeutic alliance early in treatment. Specifically, they found a stronger positive association between psychodynamic techniques and clients' rated quality of working alliance when therapists integrated some cognitive behavioral techniques into their clinical work.

In the current study, we investigated therapist use of therapeutic techniques drawn from more than two approaches by introducing the Multi-theoretical List of Interventions – 30 Items (MULTI-30; Solomonov, McCarthy, Gorman, & Barber, 2018). Since using interaction terms for every possible pair of therapeutic approaches (e.g., behavioral X dynamic; dynamic X dialectical-behavioral therapy etc.) as indices of therapist flexibility would become unwieldy, we opted to use a somewhat different approach; namely, we used a valid omnibus index of the therapeutic technique diversity (TTD), based on Shannon's entropy index (1948).

Shannon's (1948) index emerged from Information Theory, an applied mathematical field, to quantify the entropy (or uncertainty) in strings of text or codes. It relies on the assumption that when text contains many types of letters and that these letters are evenly distributed (or used) it is harder to predict the next letter in the text. Since Shannon's index was first introduced it has been widely used in a variety of disciplines (e.g., computer science, biology, epidemiology, etc.). For example, in biology it is used to assess species diversity (i.e., the variety and relative abundance of species) in a specific ecological system.

Recently there has been a growing use of Shannon's (1948) index in psychological research (e.g., as an index of emotional diversity [see Benson, Ram, Almeida, Zatura, & Ong, 2017; Ong, Benson, Zatura & Ram, 2018; Quoidbach, et al., 2014] or stressor diversity [e.g., Koffer, Ram, Conroy, Pincus, & Almeida, 2016]). For example, Ong, and colleagues (2018) made use of Shannon's index as a measure of emodiversity (i.e., emotional diversity).

Emodiversity was assessed using Likert scales on a daily basis separately for positive and negative emotions; greater emodiversity in positive emotions was found to be associated with lower inflammation processes, above and beyond the mean level of positive emotions experienced.

We find this index well-suited to investigate the use of varied therapeutic techniques drawn from a wide range of therapeutic approaches because it takes into account both the number of different interventions (i.e., how many techniques are used?) as well as the proportion of use of a given technique (i.e., how often were a given technique was used compared to all others?). In addition, it is statistically parsimonious since it enables an investigation of technique integration without adding multiple effects to the statistical model (e.g., separate terms for each technique, multiple 2-way interaction terms, etc.).

Therapist Flexibility as a Predictor of Alliance Rupture-Repair

Therapists' flexibility, as assessed by the TTD, may be especially important to examine when alliance ruptures emerge (e.g., Castonguay, et al, 2004; 2010; Muran, Safran, Eubanks & Gorman, 2018). Alliance ruptures are relational events that emerge in the interpersonal space between therapists and their clients when therapists unwittingly participate in their clients' maladaptive interpersonal cycles (Safran & Muran, 2006), or when the clients' needs are not adequately met by their therapists (Westermen & De Roten, 2017). According to Bordin's (1979)

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definition of alliance, ruptures consist of tension in one or more of the following components; (a) Agreement about the tasks of therapy, (b) agreement about the treatment goals, (c) the client-therapist bond.

Theoretically and clinically, alliance ruptures are meaningful therapeutic events that can provide therapists (and clients) with a window to their clients' inner world, in the here-and-now of therapy (Safran & Muran, 1996). This gives the therapist an opportunity to meet the client's needs and provide corrective experiences which then may be reflected in repair of the rupture, and in turn in the client's symptomatic relief (Westermen & De Roten, 2017). In contrast, when such opportunities are missed, ruptures may also have the opposite effect of reinforcing the client's maladaptive interpersonal schemas (e.g., Ackerman & Hilsenroth, 2001; Castonguay et al., 1996; Castonguay, Constantino, McAleavey, & Goldfried, 2010b; Crits-Christoph & Gibbons, 2002; Waddington, 2002).

Over the last two decades, Safran, Muran, Eubanks and colleagues have systematically investigated the rupture-repair sequence to better understand which therapeutic actions best resolve ruptures (e.g., Safran and Muran, 1996, 2000, 2002). Their theoretical model has led to specific clinical recommendations on ways to address and resolve ruptures, and the development of Brief Relational Therapy (Safran & Muran, 2000). This treatment model has been found to be beneficial across several studies (for a meta-analysis see Safran et al., 2011; Eubanks, Muran, & Safran, 2018), and is particularly useful in handling alliance ruptures. It has been implemented within various therapeutic approaches (e.g., Aspland, Llewelyn, Hardy, Barkham, & Stiles, 2008; Castonguay, et al., 2004).

According to the Brief Relational Therapy model (Safran & Muran, 2000), the first step towards any repair process involves the therapist's recognition of the rupture. When therapists

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recognize an alliance rupture, they may also become aware of an interpersonal cycle or a disagreement between clients and therapists (e.g., about therapy tasks/goals) that underlies the rupture. This awareness allows them to attend to it appropriately, and lays the groundwork for repair. In contrast, unrecognized ruptures may lead to reinforcement of clients' maladaptive interpersonal schemas, which in turn may result in a deterioration in therapeutic processes and outcomes, and ultimately a greater risk of drop-out (Horvath & Bedi, 2002; Martin, Garske, & Katherine, 2000; Rhodes, Hill, Thompson, & Elliott, 1994). One recent investigation found support for this premise by showing that when clients experienced alliance rupture, therapists' low alliance ratings (which served as a proxy of therapist recognition of ruptures) diminished the ruptures' negative effect on clients' alliance and functioning ratings in the following session (Chen, Atzil-Slonim, Bar-Kalifa, Hasson-Ohayon & Rafaeli, 2018a).

Muran and Safran (2002) suggest that once a rupture is recognized, an in-depth exploration of the rupture may uncover the interpersonal, emotional, and cognitive patterns present (see also Aspland et al., 2008; Colli & Lingardi, 2009; Kramer, Pascual-Leone, Despland, & Rotten, 2015; Safran & Muran, 1996). This exploration will often require a flexible use of therapeutic techniques (drawn from different therapeutic orientations). For example, Safran and Kraus (2014) suggested that therapists may want to encourage clients to express their emotional experience, label their clients' emerging emotions, use self-disclosure, and focus on the here-and-now experience of their relationship with their clients. Additionally, others have highlighted the importance of clients' emotional processes during the alliance rupture-repair sequence and suggested therapists to employ various emotion-focused interventions (e.g., empty chair dialogues; Kramer, et al., 2014).

Muran and Safran (2002) also suggest that the flexibility required from the therapists' side should reflect not only in their use of therapeutic techniques but also in their way of relating to the client. Therapists who are relationally flexible may regain the capacity to choose their interventions appropriately (instead of reiterating non-effective techniques) and disconfirm their clients' negative expectations of the other. This may then "break" the clients' mal-adaptive schemas and enable them to have a corrective experience of the other in the here-and-now of therapy, which will hopefully will lead to increased relational and therapeutic outcomes.

The importance of therapist flexibility in cases of rupture has been highlighted by studies showing that when therapists flexibly incorporate psychotherapeutic techniques into their clinical practice, clients show better repair processes and favorable therapy outcomes (e.g., Aspland et al., 2008; Castonguay, et al., 2004; Muran et al., 2018). Additionally, certain studies showed that a lack of flexibility (i.e., rigid adherence to protocol) can impair the development of a strong alliance in general and successful repair processes in particular (e.g., Ackerman & Hilsenroth, 2001; Castonguay et al., 1996; Castonguay et al., 2010; Crits-Christoph & Gibbons, 2002; Mayotte-Blum, et al., 2012; Muran et al., 2009).

The Present Study

The primary aim of this study was to investigate whether TTD (i.e., the diversity of techniques drawn from multiple therapeutic orientations), as measured by applying Shannon's (1948) index to therapists' ratings of the MULTI-30 (Solomonov et al., 2018), would be associated with better therapeutic outcomes, as measured by clients' alliance and global functioning ratings in sessions that follow a rupture. We considered both linear effects and quadratic ones. The latter were included because of recent findings of non-linear effects of certain therapeutic interventions (e.g., Barber et al., 2008; McCarthy et al., 2016), as well as of

the tendency of expert clinicians to adopt moderate (rather than low or high) levels of techniques originating outside of their “home” therapeutic orientation (Solomonov et al., 2016).

Our secondary aim was to support previous findings (e.g., Chen et al., 2018a) regarding the importance of the therapists’ awareness of their own alliance experience when alliance rupture occurs, which we assumed would function as a proxy for therapists’ recognition of such alliance ruptures. Specifically, we investigated whether therapists’ low alliance ratings during alliance ruptures will be associated with better alliance and global functioning reported by clients following such ruptures.

To do so, we developed two different statistical models, one model predicting the clients’ alliance ratings and the other predicting clients’ global functioning ratings. We hypothesized:

Hypothesis 1a. When ruptures occur, high (rather than low) TTD levels will be associated with higher client alliance ratings in the session subsequent to the rupture session.

Hypothesis 1b. When ruptures occur, high (rather than low) TTD levels will be associated with higher client functioning ratings in the session subsequent to the rupture session.

Hypothesis 2a. When ruptures occur, low (rather than high) therapist alliance ratings will be associated with higher client alliance ratings in the session subsequent to the rupture session.

Hypothesis 2b. When ruptures occur, low (rather than high) therapist alliance ratings will be associated with higher client functioning ratings in the session subsequent to the rupture session.

Method

Participants and treatment

Clients. The sample consisted of 81 clients who received psychodynamic individual psychotherapy at a large university outpatient clinic between August 2015 and August 2016

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(based on previously used data in Atzil-Slonim et al., 2019). On average, the clients received 23 ($SD = 9.1$) treatment sessions ($N = 1816$) of which, eighty six percent were available for analysis¹. The clients included in the analyses had at least 5 successive sessions (with no missing data) of individual psychotherapy. This was done because our rupture definition allowed us to detect ruptures from the fourth session and our outcomes could be examined from the fifth session onwards. All clients gave informed consent prior to data collection.

The clients were over the age of 18 ($M_{age} = 39$ years, $SD = 14$, age range 19-70 years), and the majority were female (56%). Forty- five percent of the clients were single, 15% were divorced or widowed, and 40% were married or in a permanent relationship. In addition, 57% had at least a bachelor's degree, and 82% were fully or partially employed. The Mini-International Neuropsychiatric Interview version 5.0 (M.I.N.I.; Sheehan et al., 1998) was used to establish an Axis I diagnosis. The interview was conducted at baseline by trained independent clinicians. All intake sessions were audiotaped, and 25% of the interviews, selected at random, were sampled and rated again by an independent clinician. The mean kappa value for the Axis I diagnoses was excellent ($k = 0.974$).

Of the total sample, 39% had a single diagnosis, 13% had two diagnoses, and 25% had three or more diagnoses. Approximately 23% of the clients did not meet the criteria for an Axis I diagnosis but reported experiencing relationship problems, academic/occupational stress, or other problems. Most clients were diagnosed with affective disorders² (50%) or anxiety disorders³ (18%) as the primary diagnosis.

¹ we explored whether missing data were associated with the occurrence of ruptures. To do so, we ran a series of chi-square tests with binary variables (0 – no missing data, 1 – missing data) for each of the main variables in our study (i.e., clients' functioning ratings, clients' alliance ratings, therapists' alliance ratings, and therapists' TTD reports). We found no significant association between rupture occurrence and missing data for any of these variables.

² The following DSM-IV diagnoses were included in the affective disorder cluster: 296.31, 296.32, 296.63, 300.4, and 296.05.

³ The following DSM-IV diagnoses were included in the anxiety disorder cluster: 300.01, 300.02, 300.21, 300.22, and 300.23.

Therapists. Clients were treated by 56 therapists (45 women and 11 men) at different stages of advanced clinical training (Masters or Doctoral level in Clinical Psychology). The clients were assigned to therapists in an ecologically valid manner based on therapist availability and caseload. Thirty-two therapists treated one client and 24 treated two or more clients. Each therapist received one hour of individual supervision and four hours of group supervision, provided by 10 supervisors on a weekly basis. All therapy sessions were audiotaped for use in supervision. Individual and group supervision, conducted by senior clinicians, focused on review of audiotaped case material and technical interventions designed to facilitate the appropriate use of therapeutic interventions.

Treatment. Individual psychotherapy consisted of once or twice weekly sessions. The dominant approach in the clinic is short-term psychodynamic psychotherapy treatment model based on a combination of object relations, self-psychology, and relational theories (Kohut, 1971; Mitchell, 1988; Winnicott, 1971). The key features of the treatment model include: (1) Focus on affect and experience and expression of emotions; (2) exploration of attempts to avoid distressing thoughts and feelings; (3) identification of recurring themes and patterns; (4) emphasis on past experiences; (5) focus on interpersonal experiences; (6) emphasis on the therapeutic relationship; and (7) exploration of wishes, dreams, or fantasies (e.g., Blagys & Hilsenroth, 2000; Shedler, 2010; Summers & Barber, 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 up to 1 year.

Measures

Working Alliance Inventory (WAI-SR; Hatcher & Gillaspy, 2006). The 12-item short form of the Working Alliance Inventory (WAI; Horvath & Greenberg, 1989) is based on

Bordin's (1979) conceptualization of the client–therapist relationship, which includes the development of an affective *bond* between the client and therapist, as well as client-therapist *agreement* on treatment goals and on the *tasks* required to achieve the goals. At the end of each session, participants were asked to use a 7-point Likert scale to rate how accurately each item described their current therapy experience. The current study utilized Cranford et al.'s (2006) method of estimating the between- and within- person reliabilities for repeated within-person measures; these were high for both clients ($R_C = 0.84$, $R_{KF} = 0.98$) and therapists ($R_C = 0.85$, $R_{KF} = 0.97$).

Outcome Rating Scale (ORS; Miller & Duncan, 2003). The ORS is a four-item scale developed as a brief alternative to the OQ-45. The ORS is designed to assess changes in three areas of client functioning that are widely considered valid indicators of progress in treatment: individual (or symptomatic) functioning, interpersonal relationships, and social role performance. Clients completed the ORS at the beginning of each session by stating their agreement with four statements on a visual analog scale anchored at one end by the word Low and at the other end by the word High. This yields four separate scores between 0 and 10 using a centimeter for scale measurement. These four scores sum to one score ranging from 0 to 40, *where higher scores indicate better functioning*. The between- and within-person reliabilities for the scale were high ($R_C = 0.90$, $R_{KF} = 0.99$).

The Multi-theoretical List of Interventions – 30 Items (MULTI-30; Solomonov, McCarthy, Gorman, & Barber, 2018). The MULTI-30 is a short form of the MULTI (McCarthy & Barber, 2009), designed to decrease completion time and burden. The MULTI-30 is a 5-point Likert scale measure that assesses 30 therapist techniques divided into eight subscales representing seven therapeutic orientations (i.e., psychodynamic therapy, process-experiential

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psychotherapy, interpersonal psychotherapy, person-centered psychotherapy, behavioral psychotherapy, cognitive psychotherapy, and dialectical-behavioral therapy) and an additional ‘common factors’ subscale. Previous studies have found these eight subscales of the MULTI-30 to be reliable and internally consistent (Solomonov et al., 2018).

Due to the need to further decrease participant burden in the session-by-session data collection in our clinic, we included six out of the eight subscales, after consultation with the MULTI-30 developer (Solomonov, personal communication, August 2015). Specifically, we excluded the cognitive scale (3 items), as these techniques are infrequently used in our clinic and have a strong documented overlap with the behavioral scale (e.g., $r = 0.93$; e.g., McAleavey & Castonguay, 2013; McCarthy & Barber, 2009). Additionally, we excluded the person-centered scale (3 items), given its high documented overlap with the process-experiential scale (e.g., $r = 0.86$; e.g., McAleavey & Castonguay, 2013; McCarthy & Barber, 2009). Notably, earlier research has shown that, given these overlaps, the MULTI scales can be merged into larger subcategories (i.e. directive and exploratory, respectively; Boswell, Castonguay & Wasserman, 2010; McAleavey & Castonguay, 2013).

We administered the common factors scale but decided to exclude it from the calculation of TTD, as our study focused specifically on integration of non-psychodynamic therapeutic techniques (“proscribed techniques”) into psychodynamic treatment model (i.e., assimilative integration; Castonguay, Eubanks, Goldfried, Muran, & Lutz, 2015; Gold & Stricker, 2001; Messer, 1992). We reasoned that the TTD scores would become somewhat muddled if it comprised the common factors items as well, as they represent a different sort of psychotherapy integration which is the of supportive techniques that are shared by all therapeutic orientations (i.e. the common factor approach of psychotherapy integration; Rosenzweig, 1936).

Therapists completed the MULTI-30 items at the end of each session. Similar to McCarthy et al.'s (2016) findings in a sample of experienced psychodynamic therapists, we found that the highest rated scale was common factors ($M=3.9$, $SD =0.67$) followed by psychodynamic psychotherapy ($M=2.9$, $SD =0.8$), process-experiential ($M=2.7$, $SD =0.8$), interpersonal ($M=2.7$, $SD =1$), and the combined behavioral/dialectical-behavioral ($M=2.6$, $SD =0.7$). These last two scales were combined into one scale with greater reliability [$ICC=.83$] than that obtained each of the separate scales [$ICC=.70$ and $ICC=.74$ respectively]; see McCarthy & Barber, 2009 & Solomonov et al., 2018 for rationale). All subscales showed 'good' to 'excellent' reliability ($.76 \leq ICC \leq .83$).

Procedure

The procedures were part of the routine data collection procedure 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. Clients were also told that their anonymity would be preserved. Clients completed the ORS before each therapy session and the WAI immediately after each therapy session. Therapists completed the WAI and the MULTI immediately after each therapy session. The treatment of human participants was in accordance with the ethical standards of the American Psychological Association. All research materials were collected after securing the approval of Bar-Ilan University ethics committee.

Statistical analysis

Rupture detection. To identify rupture sessions, we followed the lead of previous investigations which have made use of clients' fluctuations in alliance ratings (e.g., Gumz, Brähler, Geyer & Erices, 2012; for review see Eubanks-Carter, Gorman & Muran, 2012). Specifically, we built on previous work (Chen et al., 2018a) and computed a mean square

successive difference score (MSSD; von Neuman, Kent, Bellinson, & Hart, 1941) for each client's alliance ratings across treatment. The square root of the MSSD (i.e., RMSSD) served as the unit of the client's fluctuation. A rupture session was defined as one in which the alliance rating was lower than the average of the three preceding sessions by 1 fluctuation unit⁴. This comparison to the mean of the preceding sessions (rather than solely the previous session) ensured that a session would not be identified as a rupture simply because the previous one had an increase in alliance. Using this criterion rupture sessions could only be identified from the fourth session onwards. Overall, 120 sessions (6%) were identified as rupture sessions.

Therapeutic Technique Diversity. We applied Shannon's (1948) entropy index on the therapists' ratings of 20 different interventions (represented by twenty MULTI items) from five different therapeutic approaches (psychodynamic, process-experiential, interpersonal, behavioral, and dialectical-behavioral). Prior to the calculation of TTD, we recoded all MULTI ratings to range on a 0 to 4 scale as previously suggested when using Shannon's entropy index on a Likert scale data (e.g., Ong, et al., 2018). Therapeutic technique diversity was calculated in the following manner:

$$TTD_i = - \sum_{j=1}^m p_{ij} (\ln p_{ij})$$

Where m is the number of discrete techniques used in a given session (i.e., MULTI items that were originally rated above 1), and p_{ij} is the proportion of a therapist's use of a specific technique (j) in the same given session. TTD can range from 0 to $\ln(m)$ with higher scores indicating greater TTD.

As the formula implies, minimum value of TTD (i.e., $TTD = 0$) can be obtained for

⁴ We lowered Chen and colleagues (2018a) rupture criterion of 1.65 RMSSD units to ensure identification of more subtle ruptures as has been suggested by several authors (e.g., Eubanks-Carter, Gorman & Muran, 2012; Gumz, Brähler, Geyer & Erices, 2012).

sessions in which a therapist rated only one technique (i.e., MULTI-item) above 1 (e.g., rated 19 techniques as 1 [“not at all typical of the session”] and one technique as 3 [“somewhat typical of the session”]). In this case $p_{ij} = 1$ and $\ln p_{ij} = 0$, thus TTD equal 0. A maximum value of TTD (i.e., $RTT = 2.99$) can be obtained for sessions in which a therapist evenly rated all 20 techniques represented in the MULTI above 1 (e.g., rated all techniques as 3). As stated earlier, the use of Shannon’ entropy index allowed us to take into account both the number of different techniques used and their relative use (i.e., proportion) compared to other techniques.

Statistical models. To test our hypotheses, we used SAS 9.4 PROC MIXED to estimate multilevel models, since the data had a hierarchical structure in which sessions were nested within clients and clients were nested within therapists. We selected 2-level models in light of recent findings showing that when therapists carry a relatively small caseload (up to 10 patients), there is a risk of inflation of the third level effects (i.e., therapist level; see Schiefele, et al., 2016). Additionally, the level-3 (i.e., therapist level) accounted for less than five percent of the variance in the current data, and was not significantly different from zero for either alliance ($Z=0.58$, ns) or functioning ($Z=0.71$, ns)⁵.

To test hypotheses 1a (when ruptures occur, higher TTD levels will be associated with higher *client alliance ratings* in the session after the one in which the rupture occurred) and 2a (i.e., when ruptures occurred, lower levels of therapists’ alliance ratings will lead to higher *client alliance ratings* in the session after the one in which the rupture occurred), we estimated the following 2-level model:

⁵ To further explore the 3-level (i.e., therapist level) we re-ran the models but found no changes in the model results

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$$\begin{aligned} \text{client's alliance}_{si} = & \beta_{0i} + \beta_{1i} * \text{Rupture}_{(s-1)i} + \beta_{2i} * \text{Therapist's alliance}_{(s-1)i} + \beta_{3i} * \text{Rupture}_{(s-1)i} * \\ & \text{Therapist alliance}_{(s-1)i} + \beta_{4i} * \text{TTD}_{(s-1)i} + \beta_{5i} * \text{Rupture}_{(s-1)i} * \text{TTD}_{(s-1)i} + \\ & \beta_{6i} * \text{TTD}_{(s-1)i}^2 + \beta_{7i} * \text{Rupture}_{(s-1)i} * \text{TTD}_{(s-1)i}^2 + \beta_{8i} * \text{Client's alliance}_{(s-1)i} + e_{si} \end{aligned}$$

The level-1 equation modeled the reported alliance of client i in session s as a function of clients' intercept (β_0); Rupture occurrences (β_1); Therapists' mean-centered alliance ratings (β_2); TTD (β_4); and Quadratic TTD (β_6), along with the interaction terms of the occurrence of rupture with these three predictors (i.e., β_3 ; β_5 ; β_7 , respectively). All of the above-mentioned ratings were taken from the previous session (i.e., the session of rupture occurrence, noted as $s-1$). Finally, we used the clients' alliance ratings (β_8) in the previous session as a predictor. We did so for two main reasons: (a) By adjusting for previous alliance we reduce the risk for reverse causation (see Shrout, Bolger, Iida, Burke, Gleason, & Lane, 2010). (b) Our adjustment allowed us to treat the outcome as a change score indicating an increase/ decrease in the outcome following sessions in which alliance ruptures occurred (e.g., Chen et al., 2018a). At level-2, the intercept of each client and therapists' alliance ratings (at session $s-1$) were modeled as random effects⁶. The other estimates were only modeled as fixed effects since their random effects were not significant and did not improve the model fit.

Next, we set up a similar model to examine hypotheses 1b (when ruptures occur, higher TTD levels will be associated with higher *client functioning ratings* in the session after the one in which the rupture occurred) and 2b (i.e., when ruptures occur, lower levels of therapists' alliance

⁶ It is worth noting that the current investigation focused on the within-client effects of ruptures on the clients' subsequent alliance and functioning ratings. However, given recent findings on treatment-level associations between ruptures and outcomes (see Rubel, Zilcha-Mano, Feils-Klaus, & Lutz, 2018), we also examined the client-level association between a rupture index (aggregated across sessions) on the one hand, and alliance and functioning ratings on the other. None of these associations were significant, nor did their inclusion alter the effects of the current investigation. Thus, we only retained the within-client analyses.

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ratings will be associated with higher *client functioning ratings* in the session after the one in which the rupture occurred). We estimated the following 2-level model:

$$\begin{aligned} \text{client's functioning}_{si} = & \beta_{0i} + \beta_{1i} * \text{Rupture}_{(s-1)i} + \beta_{2i} * \text{Therapist's alliance}_{(s-1)i} + \beta_{3i} * \text{Rupture}_{(s-1)i} * \\ & \text{Therapist alliance}_{(s-1)i} + \beta_{4i} * \text{TTD}_{(s-1)i} + \beta_{5i} * \text{Rupture}_{(s-1)i} * \text{TTD}_{(s-1)i} + \\ & \beta_{6i} * \text{TTD}^2_{(s-1)i} + \beta_{7i} * \text{Rupture}_{(s-1)i} * \text{TTD}^2_{(s-1)i} + \beta_{8i} * \text{Client's alliance}_{(s-1)i} + \\ & \beta_{9i} * \text{Client's functioning}_{(s-1)i} + e_{si} \end{aligned}$$

The level-1 equation modeled the reported functioning of client *i* in session *s* as a function of the clients' intercepts (β_0); Rupture occurrences (β_1); Therapist's mean-centered alliance ratings (β_2); TTD (β_4); and Quadratic TTD (β_6), along with the interaction terms of the occurrence of rupture with these three predictors (i.e., β_3 ; β_5 ; β_7 , respectively). All of the above-mentioned ratings were taken from the previous session (i.e., the session of rupture occurrence, noted as *s-1*). Similar to the previous model (which aimed to investigate Hypotheses 1a and 2a), we used clients' mean-centered alliance (β_8) and clients' functioning (β_9) ratings in the previous session as predictors to reduce the risk for reverse causation (see Shrout, Bolger, Iida, Burke, Gleason, & Lane, 2010) and to allow us to treat the outcome as a change score (e.g., Chen et al., 2018a). At level-2, the intercept of each clients' and the clients' alliance ratings at session *s-1* were modeled as random effects. The other estimates were only modeled as fixed effects since their random effects were not significant and did not improve the model fit.

[Table 1]

Results

The results of our first model which examined hypotheses 1a and 2a (predicting clients' alliance ratings in the sessions after the rupture) are presented in Table 1. We found a positive

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association between rupture occurrence and clients' alliance ratings in the following session (i.e., β_7). This finding suggests that on average, clients' ratings tended to increase after the rupture session. In contrast to our predictions (Hypothesis 1a) there was no significant interaction between either the linear nor quadratic terms of TTD (i.e., β_5 , β_7 respectively) and rupture occurrence when predicting the clients' alliance ratings in the session after the rupture. However, the results suggested a marginal main effect for the *quadratic term* of TTD (i.e., β_6 ; $p = 0.06$). That is, moderate levels of TTD marginally predicted greater increase in clients' alliance ratings in the following session regardless of rupture occurrence.

[Figure 1]

With regards to Hypothesis 2a, as predicted, there was a significant interaction between rupture occurrence and therapists' alliance ratings (i.e., β_3). To further examine this interaction, we estimated simple slopes for high and low therapist alliance ratings (see Figure 1). There was a significant increase in clients' alliance ratings after the rupture session when therapists' alliance ratings were low ($b = 2.43$, $SE = 0.42$, $p < 0.001$) but not when therapists' alliance ratings were high ($b = 0.46$, $SE = 0.57$, *ns*).

[Table 2]

The results of the second model which examined hypotheses 1b and 2b (predicting clients' functioning ratings in the next session after the rupture occurrence) are presented in Table 2. There was no main effect for the occurrence of rupture on clients' functioning ratings after rupture sessions (i.e., β_7). However, as predicted, there was a significant interaction between the *quadratic term* of TTD and the occurrence of rupture in predicting clients' functioning ratings after these ruptures (i.e., β_7). To further examine this interaction, we estimated simple slopes for high, low and moderate levels of TTD. As shown in Figure 2,

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moderate levels of TTD were associated with higher clients' functioning ratings following a rupture. In other words, after a rupture session, when TTD was low, there was a positive association between TTD and client functioning ($b = 3.1$, $SE = 1.2$, $p < 0.05$), but when TTD was high there was a negative association ($b = -2$, $SE = 0.9$, $p < 0.05$).

[Figure 2]

Finally, as predicted, therapist alliance ratings interacted with the occurrence of rupture (i.e., β_3). To further examine this interaction, we estimated simple slopes for high and low therapist alliance ratings, as shown in Figure 3. We found that the increase in clients' functioning ratings following rupture sessions was significant when therapists' alliance ratings were low ($b = 1.88$, $SE = 0.70$, $p < 0.01$) but was not when therapists' alliance ratings were high ($b = -0.8$, $SE = 0.93$, *ns*). Moreover, we found that when rupture occurred, high therapists' alliance ratings (compared to low therapist alliance ratings) were associated with deterioration ($b = -2.2$, $SE = 0.99$, $p < 0.05$) in the clients' functioning ratings in the next session.

[Figure 3]

Discussion

The primary aim of the current study was to investigate whether therapists' use of varied techniques drawn from multiple therapeutic orientation facilitates clients' functioning and alliance experience following alliance ruptures. It thus expands previous works (e.g., Defife, Hilsenroth, & Gold, 2008; Goldman, et al., 2013) by exploring therapists' use of techniques drawn from multiple therapeutic approaches simultaneously, and by applying a novel index derived from Information Theory; namely Shannon's (1948) entropy index as a measure of TTD.

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To the best of our knowledge this is the first study to utilize Shannon's entropy index to assess the diversity of therapeutic techniques.

We found that moderate – rather than high or low – levels of TTD in rupture sessions were associated with subsequent improvement in client functioning. When therapists implemented a very narrow or very wide range of techniques (i.e. high or low TTD), their clients' functioning ratings decreased in the sessions that followed the ruptures. These results suggest the importance of adequate therapist responsiveness (Ackerman & Hilsenroth, 2001; Castonguay et al., 1996; Castonguay et al., 2010) and sensitivity to their clients' emerging needs (Kramer & Stiles, 2015; Stiles, 2009). For example, therapists who incorporate “too many” kinds of techniques may leave their clients feeling somewhat confused or overwhelmed. This may result in deterioration rather than improvement in functioning. Conversely, therapists who utilize “too few” kinds of techniques might not be addressing the multiple needs of their clients when ruptures occur.

The curvilinear pattern of our results is consistent with earlier findings of non-linear associations between therapist intervention use and therapy outcomes (termed the “Goldilocks effect”), with therapists' moderate use of interventions being most effective, or “*just right*”, so to speak (e.g., McCarthy et al., 2016; Barber, et al., 2006). In a similar vein, our results may suggest that when ruptures occur, clients likely benefit from moderate levels of therapist varied use of therapeutic techniques. This likely helps both client and therapist address and process multiple and complicated therapeutic goals and needs through different therapeutic strategies (e.g., interpersonal, emotional and cognitive).

These results are also in line with the theoretical concept of *assimilative integration* (i.e. therapists' allegiance to more than one therapeutic orientation; e.g., Messer, 1992, Gold &

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Stricker, 2001) as one of the leading forms of therapeutic integration (e.g., Ziv-Beiman & Shahar, 2015). As Messer suggests, *assimilative integration* occurs when therapists who identify with one therapeutic orientation implements “prescribed techniques” alongside some “proscribed techniques” in harmonic manner. Consequently, good practice of *assimilative integration* necessitates contextualization of the “proscribed technique” based on characteristics of the “home” therapeutic orientation. Meaning, they draw techniques from other similar approaches but implement them in a way that is consistent with and well-integrated into their ‘home’ orientation. Thus, therapists may want to regulate their use of “proscribed techniques” as it may be hard to contextualize too many of them into the “home” approach in harmonic manner (e.g., Solomonov, et al., 2016).

While our prediction regarding the effect of TTD on clients’ functioning in sessions subsequent to rupture session was supported, our prediction regarding the association between TTD and clients’ alliance experience in sessions subsequent to rupture session was not. This may have stemmed from the relative long elapsed time between the alliance assessment and the occurrence of rupture. Specifically, unlike client functioning that was measured at the beginning of each session, alliance was assessed at the end of each session. Thus, therapist techniques in the subsequent session (to rupture session) may have masked the association between TTD in the (preceding) rupture session and client alliance ratings in the following session. Accordingly, future studies may want to estimate client alliance at the beginning of each session as well as at the end of each session.

It may also be that in times of rupture, relational factors may be more consequential than technical factors in their association with relational outcomes (such as the working alliance). Such relational factors may include therapists’ relational flexibility (which we did not measure in

the current study). As Muran and Safran (2002) noted, when therapists recognize a rupture during the therapeutic hour, they may want to be flexible not only in their use of techniques but also in their relational stance toward their clients, and thus (re)act differently than the clients' maladaptive expectations.

Therapists' flexibility in their relational stance may not involve therapeutic interventions per se. Instead, it may involve therapist movement between different interpersonal stances; these could be modeled using repeated assessment of the therapist's position on the interpersonal circumplex (e.g., moving between dominant and affiliative behaviors). Such shifts may allow the therapist to disconfirm their client's mal-adaptive characteristic expectations of "the other" and thus break the client's mal-adaptive interpersonal cycles (e.g., Karpiak & Benjamin, 2004). Thus, future studies should assess therapists' technical as well as relational flexibility and their possible association with clients' experience following rupture sessions.

Another relevant relational factor may be the therapist's own alliance experience when rupture occurs. As mentioned earlier, the secondary aim of the current study was to obtain further support for the importance of the therapist's own experience when alliance ruptures occur. As expected, our findings were consistent with those reported by Chen and colleagues (2018a). Specifically, we found a significant interaction between client rupture experiences and therapist alliance reports; when therapists reported low alliance within rupture sessions, there were significant increases in client alliance as well as global functioning ratings in the next session. Conversely, when therapists reported average or high alliance in rupture session, there were no increases in clients' alliance or functioning ratings in the following session.

These results echo those of previous studies which have indicated that when clients perceive the alliance as low, they evaluate the session more positively if their therapists also

perceive the alliance as low (e.g., Marmarosh & Kivlighan, 2012). As Marmarosh and Kivlighan suggested, therapists' perception that the alliance was low may serve as an indicator of a rupture, and thus guide them to explore the therapist-client relationship in the here-and-now of therapy. Further support for this notion arises from previous studies which found overlap between therapists' ratings of some aspects of their own alliance (e.g., Bachelor, 2013) or emotional experience (e.g., Atzil-Slonim et al., 2019) and their view of their clients' perception of these aspects. Such findings lend support to the suggestion that therapists' experience of therapeutic processes may well represent how therapists think their clients experience these processes.

Accordingly, our findings are also consistent with Safran and Muran's (1996; 2000; 2002) premise that a crucial first step in rupture repair involves the therapist's recognition that a rupture has taken place. As noted earlier, ruptures often emerge when therapists unwittingly participate in their clients' maladaptive interpersonal cycles. Thus, it is crucial for the therapist to gain awareness of the interpersonal schemas underlying the rupture, which in turn may provide opportunities to behave in a way that is not in line with the client's negative expectations of the other in an interpersonal conflict.

Departure from the client's expectations may then be experienced by the client as a corrective experience and may lead to preferable treatment outcomes (e.g., Aspland et al., 2008; Cash et al., 2014; Safran & Kraus, 2014). It should be noted, however, that our study's therapists were not asked to recognize their clients' (or their own) rupture experience per se; instead, they were merely asked to rate their own alliance experience. Thus, even when therapists and clients rated their alliance as low, they may not necessarily be referring to the same within-session event (or rupture).

Consistent with Chen and colleagues (2018a), we found no significant effects of rupture per se on clients' subsequent functioning. By contrast, an effect on clients' subsequent alliance ratings did emerge after controlling for the immediate effect of the rupture on the (same-session) alliance. As Chen and colleagues argued, this may be a spurious finding, stemming from the way ruptures (and rupture-repair sequences) are defined in studies using repeated measures of the alliance. Specifically, studies that identifying ruptures as the characteristic V-shape patterns indicative of an abrupt drop followed by an increase in the alliance (see Stevens, Muran, Safran, Gorman, & Winston; Stiles et al., 2004; Strauss, et al., 2006). Thus, this finding may simply reflect clients' regression to the mean in their alliance ratings. This highlights the importance of investigating the experience of ruptures directly by using self-reports (e.g., Rubel et al., 2018) or external clinical judgments (e.g., the Rupture Resolution Rating System; 3RS; Eubanks, Muran, & Safran, 2015).

Limitations, Clinical Implications, and Future Directions

Several limitations of this study should be noted. First, this study was designed as naturalistic field exploration. This design may allow greater external validity as it better reflects the clinical work carried out in public clinics (as opposed to randomized control trials; e.g., Ablon, Levy, & Katzenstein, 2006; Bond & Perry, 2004). However, the internal validity of such a design is limited. Specifically, we could not control for some potentially intervening factors such as clients' (e.g., Miller-Bottome et al., 2019) or therapists' (e.g., Chen et al., 2018b; Kline et al., 2018; Talbot et al., 2019) characteristics that can be associated with rupture occurrences or that may have prompted the therapists to implement a certain variety of therapeutic techniques, independent of changes in the alliance.

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One example for such an intervening factor may be the therapists' own emotional states.

As previous studies suggest, when ruptures arise, they may lead therapists to feel wary of the ruptures' consequences (e.g., Coutinho, Riberio, Hill, & Safran, 2011; Kline et al., 2018). Thus, it may be that therapists who found it difficult to regulate their own emotional states when ruptures occurred were those who applied overly wide range of therapeutic techniques.

Alternatively, it may be that therapist traits, such as their own attachment style, led them to better identify ruptures and thus avoid their recurrence (e.g., Marmarosh et al., 2015; Talbot et al., 2019). Future studies may benefit from investigating certain therapists' and clients' characteristics to further explore these intervening factors. Furthermore, such studies are needed to replicate the present study's findings in more controlled settings (e.g., within manually based treatments).

In a similar manner, our reliance on post-session ratings (of the alliance and TTD) did not allow us for a rich investigation of the dynamics between therapists' use of techniques and clients' experience. That is, in the current study we could not establish time precedence (and hence causality) between therapists' use of TTD and rupture occurrence. Thus, one interpretation of our results may be that therapists responded to ruptures with (appropriate) increases in TTD. However, it may also be that ruptures were triggered by high or low levels of TTD and therefore were associated with lower clients' alliance and functioning ratings. In such case, the ruptures that occurred with moderate levels of TTD may be different than those which were triggered by too low or too high TTD and reflect clients' and therapists' relational patterns rather than faulty delivery of therapeutic techniques. Additionally, it may have been that both ruptures and TTD levels were affected by a third variable such as therapist characteristics. Thus, we encourage future studies to utilize moment-to-moment analyses of therapists' use of techniques as well as

clients' and therapists' alliance/rupture experiences. Future studies may also benefit of examining the therapists' explicit narrative about their chosen techniques to allow for a better examination of conscious use of techniques.

An additional limitation is that we defined alliance ruptures using patterns in time-series data. This definition may mask the occurrence of certain ruptures. For instance, the threshold we set for identifying a rupture (namely, 1 RMSSD) may have meant that subtle ruptures, or ruptures that have been fully repaired in the same session were overlooked. Eubanks-Carter and colleagues (2012) found that the use of a similar (time-series based) definition identified substantially fewer ruptures than alternative algorithms for identifying ruptures (e.g., within-session reports or ratings by objective observers; e.g., the Rupture Resolution Rating System [3RS; Eubanks et al., 2015]). Future studies should make use of such methodologies which allow more objective definition of rupture occurrences.

Similarly, all of our measures (including both clients' and therapists' alliance ratings, as well as therapists' use of techniques) were self-reports. Such measures have their known disadvantages (e.g., social desirability and recall bias) which may have masked some of the process-outcome associations. For example, therapists may selectively recall their use of techniques which are drawn from their theoretical perspective.

In addition, because all of our measures were self-reports, and because of the need to reduce participant burden, we excluded two of the MULTI-30 scales (cognitive and person-centered therapies). As we noted earlier, the cognitive scale overlaps with the behavioral and dialectical behavioral scales; in contrast, the person-centered scale tap a distinct type of interventions – namely, ones that may directly draw on deep exploration of the rupture, such as focusing on clients' personal meaning (e.g., “The therapist encouraged the client to explore the

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personal meaning of an event or a feeling”) and consistent with BRT approach (Safran & Muran, 2002) to rupture resolution. Thus, the exclusion of the PC scale may very well have been a mistake. Future research would benefit from including such items in assessing technical diversity, especially within the context of ruptures.

Moreover, clients diagnosed with personality disorders are characterized by pervasive difficulties in interpersonal relationships. As such, the higher risk for alliance rupture is inherent in the treatment of clients with personality disorders (Levy, Beeney, Wasserman, & Clarkin, 2010; Muran, Samstag, Safran, & Winston, 2005). Unfortunately, the current study did not assess any personality disorder diagnoses and specifically borderline personality features. The unique patterns of alliance rupture emergence and resolution for clients diagnosed with personality disorders (e.g., Coutinho, Riberio, Hill & Safran, 2011; Coutinho, Riberio, Fernandes, Sousa, & Safran, 2014; Muran, Eubanks, Safran, & Gorman, 2018; Boritz, Barnhart, Eubanks, & McMains, 2018) requires further attention and some caution when interpreting our results.

It is possible that therapists who treated clients with personality disorders may have been influenced by recurring ruptures with their clients and may have had greater difficulty to recognize the occurrence of the ruptures. Moreover, therapists who treated clients with personality disorders may have found it more difficult to flexibly apply different techniques as they were caught in their clients’ rigid and maladaptive interpersonal cycles. Future studies may benefit from comparing clients with and without personality disorders with regard to their therapists’ ability to recognize ruptures and response to it in an appropriate and flexible manner.

Furthermore, our reliance on trainee therapists may also have limited our ability to generalize the results to therapies conducted by experienced clinicians. Solomonov and

colleagues (2016) argued that more experienced therapists tend to implement fewer interventions from “outside the family”, suggesting that in samples of more experienced therapists, the curvilinear association observed in the current study may not replicate. Instead, there may be a positive linear association between TTD and therapy outcomes when ruptures occur, reflecting the optimal range of the curvilinear pattern found here.

Finally, although the implementation of Shannon’s entropy (1948) index as a measure of TTD may be statistically parsimonious, it also has disadvantages. In particular, it does not retain information on the specific interventions used. Future studies could explore specific combinations of interventions (e.g., psychodynamic and experiential vs. psychodynamic and cognitive-behavioral) and their association with repair processes. Alternatively, future studies may examine both TTD (as an omnibus measure of therapeutic integration) and specific indices tapping the ratios of particular intervention combinations.

These limitations notwithstanding, the present study expands previous research on factors, which may promote more effective repair processes. The results highlight the importance of therapists’ own alliance experience in the face of alliance ruptures, as well as the utility of integrative implementation of interventions drawn from multiple therapy orientations when dealing with alliance ruptures. Our findings are also consistent with the growing body of research supporting the utility of providing routine feedback to therapists to increase timely and effective recognition of ruptures. Feedback to therapists is especially important when therapy is not progressing as expected (e.g., Lambert & Shimokawa, 2011; Lutz et al., 2002).

Additionally, our findings contribute to the growing literature on the importance of responsiveness (e.g., Stiles, 2009) and diverse use (or integration) of different therapeutic techniques drawn from different therapeutic orientations needed in effective clinical work (e.g.,

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Barber, 2009; Solomonov et al., 2017), particularly following ruptures (e.g., Castonguay et al., 1996; Safran & Kraus, 2014). These findings, if replicated across different studies and samples, highlight the need for clinical training models which include use of therapeutic techniques from a range of therapeutic orientations. Such training models may allow clinicians to expand their clinical tool box and shift more flexibly between techniques to meet the client's changing needs, thus providing more personalized therapy. Finally, our findings underscore the importance of ruptures as meaningful therapeutic events which can present opportunities for improved therapy processes and outcomes.

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Table 1.

Multilevel model predicting clients' alliance

Parameter estimates	Estimate (SE)	Effect size ^a	CI (95%)
Fixed effects			
Intercept (β_0)	13.7 (0.8)***		
Lagged rupture (β_1)	1.4 (0.3)***	0.4	[0.7,2.1]
Lagged therapists' alliance (β_2)	0.04 (0.02)	0.09	[-0.01, 0.09]
X Lagged rupture (β_3)	-0.2 (0.1)**	0.2	[-0.34, -0.05]
Lagged TTD (β_4)	-0.4 (0.4)	0.1	[-1.17, 0.32]
X Lagged rupture (β_5)	0 (1.7)	0.0	[-3.35, 3.27]
Lagged TTD ² (β_6)	-0.7 (0.4) ^b	0.17	[-1.5,0.03]
X Lagged rupture (β_7)	0.6 (2.1)	0.03	[-3.5,4.68]
Lagged clients' alliance (β_8)	0.5 (0.02)***	2.25	[0.43,0.54]
Random effects			
Level 1 (sessions)			
Residual	6.9(0.3)***		
Level 2 (therapist/client dyads)			
Intercept	3.1(0.7)***		
Lagged therapists' alliance	0.01(0.008)*		
Model summary			
-2 Log L	6861		
# Estimated parameters	12		

Note. CI = 95% confidence interval. * $p < .05$. ** $p < 0.01$, *** $p < .001$. a - Effect sizes were calculated Effect sizes were calculated by standardizing the raw variables and rerunning the models, and thus can be regarded as an approximation of standardized betas (see Baldwin, Imel, Braithwaite, & Atkins, 2014). b - $p = 0.06$.

Table 2.

Multilevel model predicting clients' functioning

Parameter estimates	Estimate (SE)	Effect size ^a	CI (95%)
Fixed effects			
Intercept (β_0)	11.9(1.3)***		
Lagged rupture (β_1)	0.6(0.6)	0.10	[-0.50, 1.65]
Lagged therapists' alliance (β_2)	0.04(0.03)	0.08	[-0.03, 0.11]
X Lagged rupture (β_3)	-0.3(0.1)*	0.24	[-0.5, -0.02]
Lagged TTD (β_4)	0(0.6)	0.02	[-1.26, 1.2]
X Lagged rupture (β_5)	1.7(2.8)	0.10	[-3.85, 7.2]
Lagged TTD ² (β_6)	-0.9(0.6)	0.43	[-2.15, 0.35]
X Lagged rupture (β_7)	-10.7(3.5)**	0.70	[-17.5, -3.8]
Lagged clients' alliance (β_8)	0.19(0.04)***	0.92	[0.1, 0.29]
Lagged clients' functioning (β_9)	0.32(0.02)***	2.51	[0.27, 0.37]
Random effects			
Level 1 (sessions)			
Residual	19.6(0.7)***		
Level 2 (therapist/client dyads)			
Intercept	7.7(4.2)*		
Lagged clients' alliance	0.01(0.006)*		
Model summary			
-2 Log L	8508		
# Estimated parameters	13		

Note. CI = 95% confidence interval. * $p < .05$. ** $p < 0.01$, *** $p < .001$. a - Effect sizes were calculated Effect sizes were calculated by standardizing the raw variables and rerunning the models, and thus can be regarded as an approximation of standardized betas (see Baldwin, Imel, Braithwaite, & Atkins, 2014). b - $p = 0.06$.

Therapeutic Technique Diversity

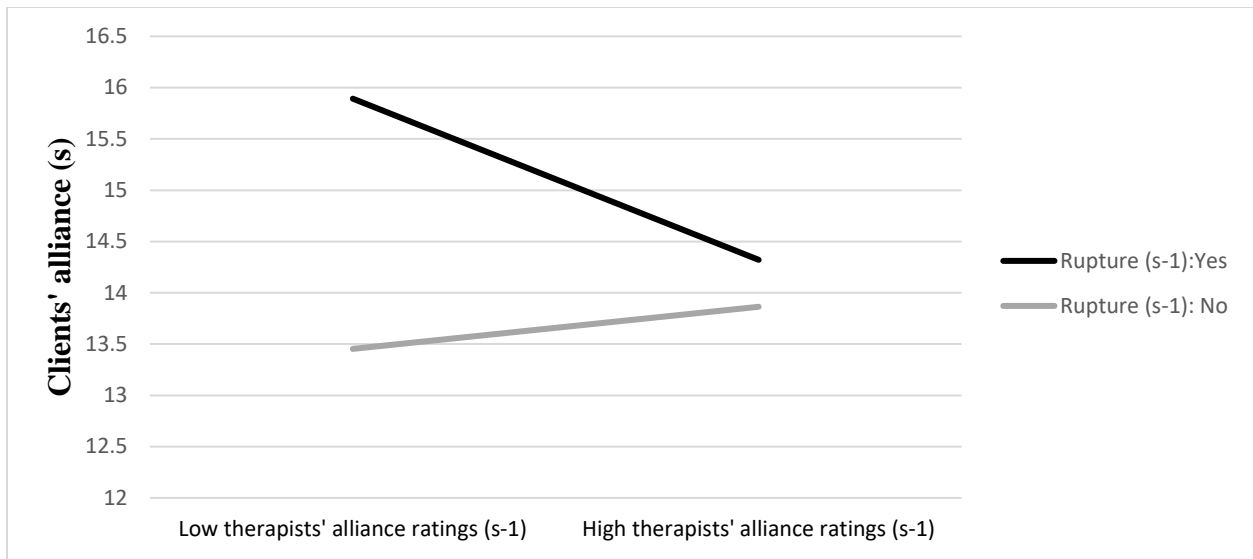


Figure 1. Clients' alliance ratings in session s as a function of therapists' alliance ratings and rupture occurrence in the previous session.

Therapeutic Technique Diversity

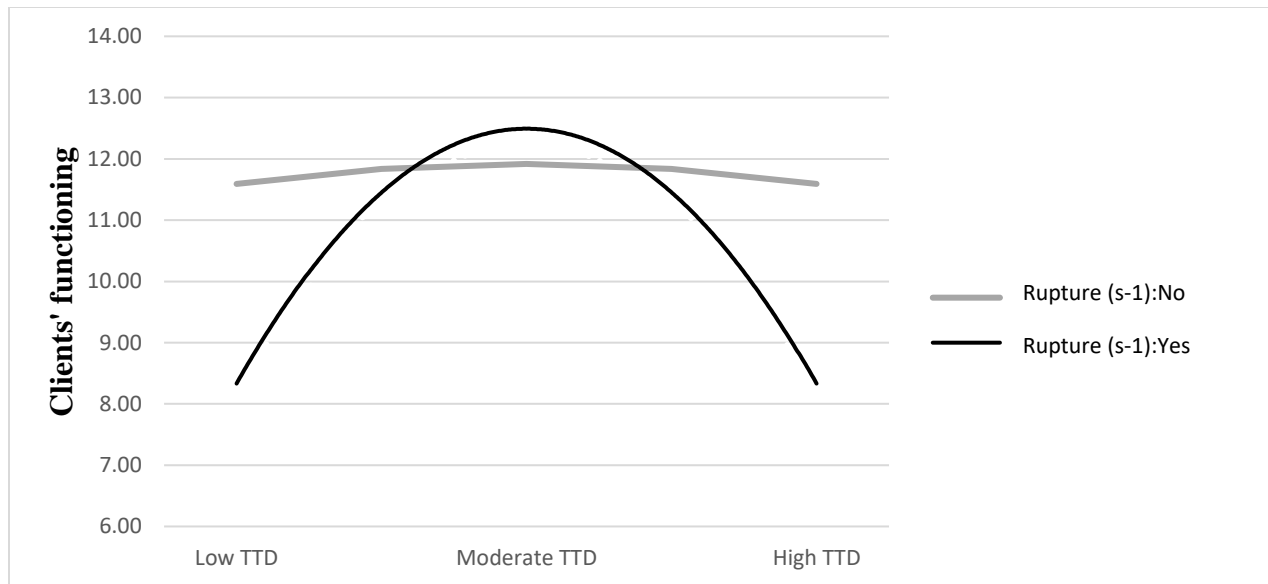


Figure 2. Clients' functioning ratings in session s as a function of TTD and rupture occurrence in the previous session.

Therapeutic Technique Diversity

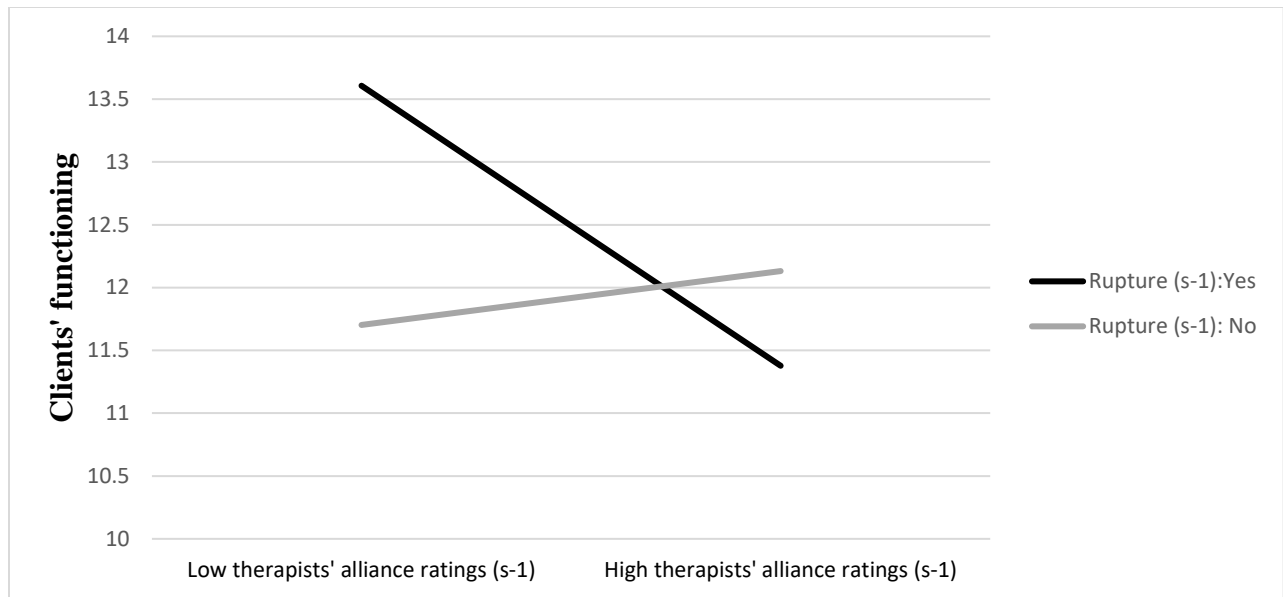


Figure 3. Clients' functioning ratings in session s as a function of therapists' alliance ratings and rupture occurrence in the previous session.