ABSTRACT

TITLE OF DISSERTATION: FOLLOW YOU, OR FOLLOW ME? EXAMINING THERAPIST RESPONSIVENESS TO CLIENT AND RESPONSIVENESS TO SELF USING DIFFERENTIAL EQUATIONS MODEL AND MULTILEVEL DATA DISAGGREGATION

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This study examined the effects of therapist responsiveness on client's perception of working alliance in their first counseling session, using the Ordinary Differential Equations (ODE) model to quantify the mutual influence and responsiveness dynamics between the therapist-client dyad, and multilevel data disaggregation to disentangle the between-therapist and within-therapist effects. Based on the framework in Interpersonal Theory (Kiesler, 1988), archival video recordings of 111 sessions, coming from the first counseling session from 38 therapists and their 111 clients in a university clinic, were rated by 11 trained undergraduate raters on therapists' and clients' respective levels of Control and Affiliation on 2-minute segments. The rating data were entered into the ODE model to derive the dynamic coefficients capturing therapists' responsiveness to clients and to themselves in that session, which were then disaggregated into between-therapist and within-therapist components. Responsiveness was operationally defined as the extent

to which the therapist changes (increases or decreases) their controlling or affiliative behaviors given the level of the therapist's and client's previous control or affiliation. Using clients' evaluation of the first-session working alliance as the dependent variable, Hierarchical Linear Modeling results indicated that only for the Control dimension at the between-therapist level did therapist responsiveness significantly predict client report of working alliance. Specifically, client working alliance ratings for the first session were highest for therapists who were generally responsive in an anti-complementary way along the Control dimension across their clients on caseload (e.g., working alliance was high when therapist increased their level of control in response to a higher level of client or when therapist decreased their level of control in response to a lower level of client control), were moderate for therapists who were generally non-responsive, and lowest for therapists who were generally responsive with their clients in a complementary way (e.g., working alliance was low when therapist increased their level of control in response to a lower level of client control or when therapist decreased their level of control in response to a higher level of client control). None of the other associations were significant. Theoretical and practical implications, limitations, and future directions were discussed.

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Introduction

Hongyang is a therapist in training in her doctoral program. During her clinical training and practice, she often finds herself struggling with a dilemma she calls "follow you, or follow me". On one hand, she often hears from her instructors and supervisors that to be an effective therapist, she needs to be flexible and responsive to her clients, and should try to go along with the client by constantly adjusting her own behaviors or interventions. On the other hand, she also learns that a therapist should keep a certain level of consistency in presenting themselves or carrying out their interventions with the client, and should not be overly "responsive" to the client's influence. With these seemingly conflicting information, she often wonders whether or how much should she follow the client or follow herself, and how her responsiveness to both the client's and her own influence may be related to client's outcome. With these questions, she approaches her supervisor Dr. Denise for empirically supported recommendations.

As stated in aforementioned clinical vignette, psychotherapy is a responsive interactive process, in which both the therapist and the client "improvise" and constantly adjust their perceptions and behaviors in the emerging contexts while interacting with each other (Stiles, Honos-Webb, & Surko, 1998). In this paper, a nonlinear dynamic model based on the Ordinary Differential Equations system and the multilevel data partitioning will be employed to quantify and examine this nonlinear interactive process, with a particular focus on the effects of therapist responsiveness on the establishment of working alliance in early therapy.

Therapist Responsiveness: Definitions, and Several Important Conceptual Considerations

Stiles et al. (1998) was the first to formally define and investigate responsiveness in psychotherapy. In their seminal paper, responsiveness was defined as "therapist's or client's behaviors that are affected by the emerging context, including the emerging perceptions of the other interactant's characteristics and behaviors (Stiles et al., 1998, p.439)." This conceptualization implies a dynamic relationship between the two interactants and involves bidirectional feedback loops. For example, the therapist may increase her use of affect focused interventions based on the client's receptive reactions to her initial attempts to explore emotions, which further deepens the client's emotional experiential level and facilitates her emotion work. Another therapist whose client is hostile and resistant may get frustrated and perhaps unconsciously becomes more critical and less empathic, which further moves the client towards a more hostile and resistant position.

Several important conceptual considerations should be discussed about the Stiles et al. (1998) conceptualization of responsiveness. First, according to this definition, a responsive therapist is someone who adjusts behaviors and interventions based on the client's characteristics and behaviors, in other words, a responsive therapist's behaviors in the session are constantly impacted by the behaviors and feedback of their client (Stiles & Horvath, 2017). Therefore, the construct of therapist responsiveness depicts a phenomenon that the therapist is receptive of the client's input and susceptible to the client's influence. It is of crucial importance to note that a therapist can be responsive to a certain behavior of the client in multiple different ways (Stiles & Horvath, 2017). For example, the therapist may be responsive to client's dominant behaviors in the session by increasingly becoming more dominant

and controlling as well, or the therapist may go along with the client's power move by adopting a more submissive stance.

Because therapist responsiveness only implies therapist's receptiveness to client's influence and therapists can be responsive in different ways, the term "responsiveness" is technically neutral. Stiles and Horvath (2017) proposed the term of "appropriate responsiveness" to specifically indicate the helpful and facilitative type of therapist responsiveness in terms of providing the correct response or intervention based on the context. This study concurred with the argument in Stiles and Horvath (2017) and conceptualized "responsiveness" in a neutral manner, and maintained that it does not necessarily represent a facilitative construct. For example, in psychodynamic-interpersonal therapy, it is argued that sometimes therapist may need to intentionally counter client's maladaptive interpersonal "pull" (e.g., pulling for constant reassurance from the therapist), thus not being responsive to the client, in order to provide a corrective and therapeutic experience (Kiesler, 1988). In this clinical example, the therapist's being responsive in the way of going along with client's interpersonal "pull" may counterproductively lead to a repetition of the client's maladaptive pattern thus less effective sessions.

Third, responsiveness is proposed to contrast with the linear and ballistic logic and statistics that prevail in psychotherapy research, wherein "an action is often considered or modeled to be determined at its inception and to be carried through regardless of external events (Stiles et al., 1998, p. 440)". As Stiles (2009) pointed out, in many Randomized Controlled Trial designs about psychotherapy effectiveness research, assigning clients to a certain treatment condition (e.g., clients receiving Cognitive Behavioral Therapy) is based on a ballistic logic assuming that clients in the same treatment condition are receiving identical treatments and there is a direct

causal relationship between treatment received and client outcome. However, clinical experiences suggest to us that therapists do (or sometimes may have to) make adjustments or adaptations, even in manualized treatment, in response to varying client characteristics and clinical situations, and such flexibility is empirically found to be positively related to treatment outcome (Owen & Hilsenroth, 2014).

Fourth, the concept of responsiveness in this study and aforementioned earlier writings is intended to be general and inclusive. It depicts the broad phenomenon of therapist and client responding to each other based on the emerging context and each other's responses, and is not confined to imply specific terms of connotations such as maternal responsiveness (Richman, Miller, & LeVine, 1992), emotional responsiveness (Mullin & Linz, 1995), or treatment responsiveness (Pelham et al., 1993). Moreover, responsiveness is also not opposed to other specific terms such as directiveness, because a therapist could use directive interventions responsively (Greenberg, Rice, & Elliott, 1993) when a client's clinical situation requires therapist's active intervention.

Therapist Responsiveness: A Review of Existing Studies

A review of existing literature on therapist responsiveness reveals four broad categories of empirical studies. Studies in the first category operationalized therapist responsiveness as therapist adjusting intervention or providing specific or individualized intervention in response to different client characteristics, including treatment selection and planning based on clients' problems and characteristics, as well as the timing and phrasing of interventions based on clients' level of understanding and emotional state. Results in the first category demonstrated that certain interpersonal variables, such as client attachment (Janzen, 2008), involvement (Hardy, Stiles, Barkham, & Startup, 1998), interpersonal assertiveness (Caspar,

Grossmann, Unmüssig, & Schramm, 2005), or defense mechanisms (Despland, de Roten, Despars, Stigler, & Perry, 2001), may inform or influence the therapist's perceptions of the therapy sessions and choice or adjustment of interventions. Furthermore, such adjustments "responding to" clients' input were found to show positive effects on both the therapeutic process (e.g., building stronger therapeutic alliance) and client outcome (e.g., achieving greater symptom relief). For example, Despland et al. (2001) demonstrated that psychodynamic therapists used more interpretations with clients who showed relatively mature defense mechanisms and more supportive interventions with clients who had relatively immature defense mechanisms. The degree to which therapists adjusted their interventions to patients' level of defensive functioning was found to be associated with the strengths of therapeutic alliance. Caspar et al. (2005) revealed that for clients with low levels of assertiveness, therapists perceived a better complementary therapeutic relationship and used motivation-oriented therapeutic intervention strategies to a greater extent. The extent to which the therapists were able to build the complementary therapeutic relationship was also positively associated with clients' self-reported level of symptom amelioration. Janzen (2008) showed that therapist responded differently to clients with different attachment styles in critical events that contributed to the establishment of a strong therapeutic relationship. Specifically, with clients who showed attachment avoidance and a defensive and distancing stance, therapists in those relationship building events tended to use a mixture of both interventions that facilitate client emotions, which is proximity-seeking, and also interventions that focus on suggestions and support, which appeal to client's intellectual and distancing side.

Several critiques should be noted about this category of studies. First, while

therapist's adjustments or adaptations of intervention alluded to the idea of therapist responsiveness, these studies assumed more a "static" perspective—characteristic X of the client predicts or affects intervention Y of the therapist. This client-level analysis addressed responsiveness to client *characteristics*, but did not capture therapists' responsiveness to clients' *behaviors* in the dynamic interactive process, or the cyclical feedback loops between the client and the therapist (Stiles et al., 1998), which are mostly manifested in the in-session dyadic interactions between the therapist and the client and can only be unveiled when the moment-to-moment within-session interactional dynamics between the therapist and client is examined. Related to this point, many of the studies (e.g., Caspar et al., 2005; Hardy et al., 1998) did not differentiate and investigate the different levels of analysis: the between-therapist level and the between-client within-therapist level, and conducted analyses on the between-client level. Such a statistical treatment creates possible confounding or alternative interpretations for its obtained results, as these results may possibly be understood in the "what treatment for whom" framework—suggesting different clients needing different treatment—rather than therapist's responsiveness in that she or he responds differently with one client in comparison to her or his another client.

The second category in the literature is represented by two studies (Elkin et al., 2014; Richards, Timulak, & Hevey, 2013), in which responsiveness was conceptualized as a type of therapist characteristics or therapist skill/competence. In Richards et al. (2013), five items were developed to operationalize and assess aspects of therapist responsiveness is this study, including "(a) empathy and acknowledgement of emotions, (b) provision of guidance and information, (c) validation of successes, (d) promotion of self-care and social support, and (e) building alliance (p. 187)". However, this study did not relate the responsiveness measure to

the client outcome measures. Elkin et al. (2014) operationalized therapist responsiveness as "the degree to which the therapist is attentive to the patient; is acknowledging and attempting to understand the patient's current concerns; is clearly interested in and responding to the patient's communication, both in terms of content and feelings; and is caring, affirming, and respectful towards the patient (p. 53)". Their "Therapist Responsiveness Scale" had four factors named respectively as attentiveness, early empathic responding, negative therapist behavior, and positive therapeutic atmosphere, together with a global item rating general therapist responsiveness given the aforementioned operational definition. Results suggested that the factor of positive therapeutic atmosphere, as well as the global item, predicted both the patient's positive perception of the therapeutic relationship and the patient's retention in therapy for more than four sessions. The factor of negative therapist behavior factor also predicted early termination. Factors measuring therapist attentiveness and early empathic responding did not predict the outcome variables.

In summary, the two studies in the second category of the literature attempted to operationalize and quantify therapist responsiveness considering it a type of therapist characteristics, skill, or competence. This notion makes theoretical and clinical sense, in that one would agree some therapists are generally more responsive than other therapists. However, the definitions and structures of responsiveness in these two studies may be confounded with other process measures, including therapist empathy, positive regard, supportive therapeutic environment, positive therapeutic atmosphere, etc. Such conflation with other constructs or process measures likely have undermined the construct clarity and validity of these two measures (Kramer & Stiles, 2015). Furthermore, by measuring responsiveness simply as a skill factor about the therapist only, these definitions and conceptualizations similarly do not address

what the term itself and the original definition (Stiles et al., 1998) suggest about the dynamic relationship, the fluid and adaptive process, and the mutual impacts between the therapist and client dyad (Kramer & Stiles, 2015; Stiles, 2009).

The third category encompasses a series of studies using the Actor-Partner Interdependence Modeling (APIM; Cook & Kenny, 2005; Kenny & Ledermann, 2010) in examining the dyadic effects between therapist and client. This model alludes to the concept of responsiveness because it examines how therapist's and client's ratings of outcome variables are predicted by both their own (i.e., an actor effect) and the other interactant's ratings (i.e., a partner effect) of process variables. Findings in this category of studies generally supported the notion that both the therapist and the client were responsive to themselves, because of the significant actor effects found for both these two parties (Kivlighan, Hill, Gelso, & Baumann, 2016; Kivlighan, Marmarosh, & Hilsenroth, 2014; Zilcha-Mano et al., 2016) which showed that their perceptions of session outcomes were indeed responsive to the input of their own perceptions of therapy process (e.g., working alliance). Regarding the partner effect, i.e., the responsiveness of each party to the influence of the other party, the findings were relatively mixed and more findings appeared to support the effect clients exerted on therapist, i.e., the therapist being responsive to the client, in that several studies found significant client partner effects on therapist ratings, but nonsignificant therapist partner effects on client ratings (e.g., Markin, Kivlighan, Gelso, Hummel, & Spiegel, 2014; Zilcha-Mano et al., 2016). For example, Zilcha-Mano et al. (2016) found that changes in patient reported alliance predicted both patient and therapist report on outcome, whereas therapist rated alliance only predicted their own rating of outcome at both the between-patient and within-patient levels. In a more nuanced examination of the partner effects taking into account

possible moderating variables, Kivlighan et al. (2016) further suggested that the presence and strength of the partner effects may be dependent on other possible moderating variables, for example timing in the therapy process.

Several critiques should also be discussed about this category of literature. First, the APIM studies, although by its design allude to the notion of responsiveness, still have not *directly* addressed responsiveness as the term and the original definition (Stiles et al., 1998) suggest. This is because that the APIM reveals how the therapists' and clients' outcome ratings are predicted by the input from both themselves and their partners, which has implications about the mutual influence and receptiveness between the therapist and the client. However, it does not directly model and investigate the dynamic process how the subsequent behaviors of the therapist and the client are influenced by the antecedent behaviors of their own and the other interactant, which further inform their following behaviors. Secondly, while findings in this category of APIM studies provided some empirical bases for speculating a responsive process from the therapist to the client and vice versa, they did not directly quantify and measure the level of responsiveness (as the studies in Category Two attempted to do, for example), nor did they relate the measured "level of responsiveness" to session or therapy outcome. Thirdly, the APIM studies have provided *indirect* support to the notion of responsiveness to self, in that there is some consistency between therapist's and client's ratings of process variables and their own ratings of outcome, however, it does not tap into the question, as asked in the title of this study—"Follow you, or follow me"—regarding the optimal combination between therapist's responsiveness to self and to the client, i.e., how does a therapist's stance in terms of responsiveness to self and responsiveness to client relate to therapy outcome? This question has not been answered by the existing APIM studies.

Studies in the fourth category focused on examining the interpersonal dynamics with regard to reciprocal influence between the therapist and the client in their therapy sessions. This implies responsiveness because one cannot be influential without the other being responsive, and one cannot be responsive without receiving an influence message from the other. Research (Bischoff & Tracey, 1995; Lichtenberg & Semon, 1986; Wampold & Kim, 1989) generated mixed findings regarding whether overall it is the client being influential (defined in various ways) while the therapist being responsive, or the other way around. For example, Bischoff and Tracey (1995) defined influence as whether one's behavior significantly impacted the other interactant's subsequent behavior, and found that therapist directive behavior slightly increased the probability of subsequent client resistant behavior, whereas similar effect of client behavior on subsequent therapist behavior was not supported. Lichtenberg and Semon (1986) measured the level of social influence or relational control between the behaviors of the interactants by the uncertainty of a response behavior Y following a known antecedent behavior X from an information theory perspective. These authors reported that the vast majority of interactions between the therapist and client were neutral in terms of relational control, suggesting that therapists and clients were mostly equal in terms of being influential and responsive. Wampold and Kim (1989) operationalized relational influence or control as one party's response being statistically dependent on the other party's antecedent behavior rather than the other way around. Using sequential analysis, the authors found that the counselor's behavior was more predictable from the client's behavior than the client's behavior was from the counselor's behavior. That is, it was the client, rather than the counselor, who had stronger social influence or was in more relational control.

Some other studies in this category looked into how the mutual influence

pattern between the therapist and client was related to therapy process and outcome. Again, mixed findings were reported. For example, Tracey (1985) operationalized relational influence by statistical dependency, i.e., the extent to which each participant's topical response was predictable based on the other's previous response. Comparing three successful therapy dyads and three unsuccessful therapy dyads, this study documented that therapists were more influential or dominant in the successful dyads, whereas therapist and client influence was equal in the unsuccessful dyads. This finding, however, was not supported in other studies (Lichtenberg & Barké, 1981; Lichtenberg & Kobes, 1992), where researchers found no significant association between the therapist-influential client-responsive type of dynamics and positive therapy outcome, and argued that actually various influence patterns could contribute to therapy success. Furthermore, Tracey (1987) examined therapists' and clients' consistency (within themselves) and mutual influence (to the other) and depicted one possible relational dynamic profile for successful therapy cases: at the initial stage the therapist maintained a "following" stance towards the client's relational control and consistent self-presentation, at the middle stage the therapist did less such "following" and appeared less responsive to clients' influence, and at the late stage both therapist and the client achieved a self-consistent but also mutually influential relational pattern. This study complemented other existing studies by accounting for both the consistency (responsiveness to one's own influence) and mutual influence (to the other) dynamics when examining the influence/responsiveness and outcome association.

A few critiques about studies in the fourth category warrant discussion here. First and most important, existing studies did not specifically define and differentiate the constructs of influence and responsiveness conceptually. As argued earlier, the

dynamics of therapist/client being influential also involves a component of the client/therapist being responsive. Although influence and responsiveness co-exist in the dyadic dynamics between therapist and client, and these studies about therapist/client influence may have direct implications for therapist/client responsiveness in the therapy process, a lack of differentiation between these two different constructs would result in conceptual conflations and confusions. Relatedly, none of the reviewed existing studies adopted appropriate statistical procedures to differentiate the constructs of influence and responsiveness statistically, i.e., to partition the component of one party's influence from the component of the other party's responsiveness, so that influence and responsiveness can be quantified and investigated separately. This will be discussed more thoroughly in later sections where partitioning of dyadic data (Kenny & La Voie, 1984) is introduced. Third, except for the Tracey (1987) study, most existing studies did not consider the effects of responsiveness to oneself, i.e., how the therapist or client responds to the influence from him- or herself, which as suggested in previous APIM studies, is also an important component of the dyadic interactional dynamics.

In summary overall, the reviewed four categories of studies suggested that therapists were often responsive to their clients by adjusting their interventions and treatment in response to specific client characteristics, and such adjustments seemed to have shown a positive effect on both the therapeutic process (e.g., working alliance) and the client outcomes (e.g., symptom relief). Responsiveness was also construed as a type of therapist skill, characteristics, or competency, and one measure of therapist responsiveness was found to positively predict client outcome (Elkin et al., 2014). APIM studies also alluded to the notion of therapist responsiveness, both to themselves and to their clients. These results indirectly supported the proposition that

both therapist and client were responsive to themselves, and more consistent findings about the significant client partner effects on therapist ratings (instead of the other way around) supported the responsiveness of therapist to client's impacts. Lastly, studies concerning the interpersonal dynamics regarding mutual influence/control between the therapist and the client also implied responsiveness of the therapist and the client. These studies produced mixed findings, with only some of these studies showing that in general therapists were responsive to client's influence (e.g., Wampold & Kim, 1989), and that therapist's responsiveness in following client's lead positively related to therapy outcome (e.g., Tracey, 1987).

Several overall critiques also warrant discussion here. First, most of the reviewed studies (except those in the fourth category) did not define and investigate responsiveness in a way consistent with the terminology and the original definition of responsiveness, that it represents a dynamic and dyadic relationship and fluid process in which therapist's and client's behaviors are affected by the emerging context and by each other's characteristics and behaviors (Stiles, 2009; Stiles et al., 1998). Further, no study has specifically developed an appropriate way to quantify and measure the dyadic dynamic responsiveness. Although the second category of the reviewed studies attempted to develop measures for therapist responsiveness, their definitions and measures were criticized for deviating from the original definition of responsiveness (Stiles, 2009; Stiles et al., 1998) and being confounded with other process measures of psychotherapy (Kramer & Stiles, 2015), which masks the unique dyadic dynamic process the concept of responsiveness was proposed to address. Third, existing literature has not sufficiently investigated the potential association between therapist responsiveness and the psychotherapy process (e.g., working alliance) and client outcome. Although a couple of aforementioned studies reported significant and

positive relationships between therapist responsiveness (defined in different ways) and working alliance as well as client outcome, results are still mixed at best, and these studies are limited in number and are undermined due to flawed definition and measurement of therapist responsiveness. Therefore, they only provided preliminary evidence suggesting potential links between therapist responsiveness and working alliance or client outcome, but these associations need to be further tested in future research. Last but not least, most of these studies did not partition the different components of the dyadic dynamics (e.g., studies in the fourth category failed to distinguish between influence and responsiveness) or differentiate the levels of analysis, e.g., between-therapist, or between-client within therapist. Effects at different levels have very different theoretical and practical connotations. For example, high between-therapist responsiveness rating of a therapist may say more about the therapist's characteristics, as he or she shows high responsiveness across all clients on their caseload in comparison to an average therapist; whereas the between-client within-therapist responsiveness rating of a therapist relates more to a combination of the client's main effect (i.e., general characteristics of the client being influential) and the interactive effect of this particular therapist-client dyad, because this represents the responsiveness of the therapist to this client's influence in comparison to their other clients. Unfortunately, these potentially important differentiations have not been made or examined in existing literature. This current study is thus designed to address each of these important limitations in the responsiveness literature.

Therapist Responsiveness from the Interpersonal Theory Framework

The original definition of responsiveness (Stiles et al., 1998) theorized that a therapist is responsive when she or he adjusts her or his behaviors/interventions based

on the client's behaviors/reactions in the session; in other words, the responsive

therapist's behaviors are predicted or impacted by the client's behaviors. However,

this definition did not indicate specifically *how* the therapist responds to the client's

behaviors, or put in the other way, *how* the client's behaviors predict or impact the

therapist's behaviors. Therefore, based on this original definition, a therapist can be

responsive to the client's behaviors in a number of possible different ways. As

illustrated in the earlier example, the therapist can respond to client's dominant

behaviors by becoming increasingly dominant so that they engage in a power

struggle, or by becoming increasingly submissive which goes along with the client's

attempt to gain power or control. The interpersonal theory (Kiesler, 1983, 1988;

Leary, 1957) proposed a framework to conceptualize the interpersonal interactions

between the therapist and the client, and speculated one possible type of "appropriate

responsiveness" (Stiles & Horvath, 2017) that was hypothesized to be facilitative of

their working alliance. Relevant theoretical propositions and empirical findings will

be discussed below.

The interpersonal theory (Kiesler, 1983, 1988; Leary, 1957) posits that all

interpersonal behaviors may be represented by a combination of two motivations: the

need for control, power, or dominance, i.e., the Control dimension; and the need for

affiliation, or friendliness, or warmth, i.e., the Affiliation dimension (Leary, 1957).

Persons in interpersonal interactions are continually negotiating how friendly or

hostile they will be with each other, and how much in charge or control each will be in

their encounters. This theory also maintains that a reaction towards one's

interpersonal act is likely not random, nor likely will it cover the entire range of

possible interpersonal responses. Rather, Kiesler (1988) proposed the concept of

complementarity to conceptualize this phenomenon, in which an interpersonal

response tends to be confined in a relatively narrow range of interpersonal responses, elicited and evoked by the initial interpersonal act. For example, when one interactant A is very hostile towards the other interactant B, B is less likely to remain friendly and warm towards A, but feels a pull to become also hostile.

Based on these two basic underlying dimensions and the concept of complementarity, the model of Interpersonal Circle was developed (Kiesler, 1983, 1988; Leary, 1957), in which scholars placed Control (from Dominant to Submissive) along the vertical axis, and Affiliation (from Friendly to Hostile) along the horizontal axis, and categorized interpersonal behaviors into 16 segments based on the combination of their Control and Affiliation levels for each category of behaviors. For example, the category Sociable is high on Affiliation, and moderate on Dominance; whereas the category Deferent is high on Submission, and moderate on Affiliation. Under this framework, complementarity then occurs on the basis of (a) reciprocity on the Control dimension, that is, dominance elicits submission, and submission pulls for dominance; and (b) correspondence on the Affiliation dimension, that is, hostility begets hostility, and friendliness invites friendliness.

The interpersonal theory (Kiesler, 1988) also offered propositions regarding the association between complementarity and the process and outcome of psychotherapy. In his conceptualization of the interpersonally "hook and unhook" stages, Kiesler (1988) explicitly hypothesized that therapist's responsiveness in terms of providing complementary reactions to client's interpersonal "pulls" during the "hooked stage" (Kiesler, 1988, p.33) may give the client the familiar support, reinforcement, and validation about their subjective experiences and schemata, and are necessary first steps to create a bond and establishing a working alliance with the client in the early stage of therapy (Kiesler, 1983, 1988). With this working alliance as

a therapeutic foundation, and with therapist's personal experiential understanding of the client's interpersonal pattern, therapist in later stage of the therapy may intentionally refrain from being responsive in a "complementary" way to client's maladaptive interpersonal "pulls", and may metacommunicate about this interpersonal process and provide a corrective experience for the client during the "unhooked stage" (Kiesler, 1988, p.34). Therefore, in the early phase of therapy, therapist's responsiveness in terms of being complementary interpersonally may be associated with client's perception of increased working alliance.

A number of empirical studies investigated the basic propositions of the interpersonal theory regarding complementarity. A subset of these studies (Gurtman, 2001; Kiesler & Goldston, 1988; Strong et al., 1988; Tracey, 1994) examined whether complementarity is manifested in interpersonal interactions, that is, whether dominance from one interactant would really pull for submission in the other interactant, or friendly/hostile behaviors would predict the friendliness/hostility of subsequent behaviors from the other party. In general, support was found for the complementarity hypothesis (Gurtman, 2001; Strong et al., 1988; Tracey, 1994), whereas some inconsistencies with the theoretical predictions were also reported (Kiesler & Goldston, 1988). Another subset of studies (Chen & Bernstein, 2000; Kiesler & Watkins, 1989; Ryan, 2001; Samstag et al., 2008; Shim & Chung, 1998; Tiedens & Fragale, 2003; Tracey, 2004, 2005; Tracey, Heck, & Lichtenberg, 1981; Tracey & Ray, 1984; Tracey, Sherry, & Albright, 1999; Watson, Daffern, & Thomas, 2017) investigated interpersonal complementarity in relation to some outcome variables, both in and out of therapy contexts. Empirical results in these studies suggested partial evidence that interpersonal complementarity was associated with positive outcome variables defined differently in different studies, while mixed

findings were existent. For example, Tracey (2004) studied a sample of psychotherapy dyads and a sample of college student research participants. He reported that base-rate corrected complementarity of the therapist and client, respectively, positively predicted the session satisfaction of the client and the therapist; similarly, base-rate corrected complementarity of the student A and student B in a randomly paired dyad, respectively, showed positive prediction effects on the post-interaction positiveness of student B and student A. In a more nuanced examination, Tracey et al. (1999) revealed that successful therapy dyads that had greater reduction in the number and severity of clients' reported symptoms, demonstrated a pattern of complementarity change from initial high levels of complementarity, to decreased levels in the middle of treatment, and then increased levels at the late stage. This finding suggested that while there was a positive effect of complementary interpersonal interaction, such effect may differ at different stage/time in therapy. Specifically regarding the association between interpersonal complementarity and therapy relationship, Kiesler and Watkins (1989) found preliminary support for the claim that interpersonal complementarity was positively associated with working alliance during the early stage of therapy. However, in Watson et al. (2017) no significant correlation was found between the therapeutic alliance ratings and the complementarity in interpersonal styles between therapists and their sex offender clients. A number of other studies (Chen & Bernstein, 2000; Ryan, 2001; Shim & Chung, 1998) investigated complementarity only along the Affiliation dimension (in terms of positive/friendly or negative/hostile complementarity), and mostly found support for the positive association between higher working alliance and a greater level of positive/friendly complementary interactions and a lower level of negative/hostile complementarity, especially at early stage of therapy.

Taken together, results from empirical studies provided some evidence that the notion of complementarity (one's responses to another person's interpersonal act tend to be "pulled" towards a certain range) did occur in interpersonal interactions both in everyday and psychotherapy contexts, and that complementary interactions were found in some studies to associate with positive conversation or psychotherapy outcomes. However, studies specifically testing the complementary hypothesis regarding its association with working alliance at the early stage of psychotherapy (Kiesler, 1988) were limited and only provided some preliminary examination in this important proposition with mixed/inconsistent findings. One limitation in these existing studies lies in their "static" assessment of interpersonal complementarity by only globally measuring the interactants' interpersonal styles and calculate complementarity based on the general measures, which would miss the moment-to-moment changes in the dynamic interactional processes. Moreover, many studies (e.g., Ryan, 2001) only examined positive/friendly versus negative/hostile types of complementarity and did not address complementarity along the Control dimension. Another limitation of these studies is that none of them examined the relationships at different levels, which as argued earlier, has very different theoretical and conceptual implications. It is believed that the employment of a multilevel model and the data partitioning approaches would allow researchers to partial out the effects from each party of the interactional dyad, which would further our understanding of these dyadic effects.

New Quantitative Methodology in Investigating Responsiveness

Ordinary Differential Equations Model in Depicting Nonlinear Dynamics

One difficulty in studying therapist responsiveness, one specific type of which is therapist being responsive in a complementary way, lies in the limitation of

traditional quantitative methods used in counseling psychology research that are mostly linear and "ballistic" (Stiles, 2009). Though scholars have noted the nonlinear nature of psychotherapy process, and though likely no researchers or practitioners would overlook the highly individualized and variable interactional processes within the therapy sessions (e.g., CBT treatment for depression would not be the same for different therapists or clients), traditional quantitative methods fall short of systematically and dynamically quantifying, depicting, modeling, and investigating these interactive, dynamic, and nonlinear processes (Kramer & Stiles, 2015).

The nonlinear dynamic models based on Ordinary Differential Equations (ODE) may provide promising ways to address this methodological issue (Peluso, Liebovitch, Gottman, Norman, & Su, 2012; Perry et al., 2017). These ODE models are derived to depict and study nonlinear dynamic systems mathematically (Teschl, 2012), and have been applied in a wide variety of fields including physics, meteorology, engineering, ecology, pharmacology, and so on.

Specifically for application in counseling psychology research, Peluso et al. (2012) proposed a general form of Equation 1 in depicting the nonlinear process in psychotherapy.

$$\begin{cases} \frac{dX_T}{dTime} = b_{0T} + b_{T2T}X_T + b_{C2T}X_C \\ \frac{dX_C}{dTime} = b_{0C} + b_{T2C}X_T + b_{C2C}X_C \end{cases} \qquad \text{(Equation 1)}$$

In this model, X_T and X_C represent the ratings of therapist (denoted as "T") and client (denoted as "C") on a construct X respectively (e.g., how dominant/controlling, or friendly/affiliative the therapist and the client each is in a given speaking turn as rated by observers). The operator $d/dTime$ is the first-order differential of X_T and X_C over time, and represents the change slope of X_T and X_C at each time point t.

For a given therapist-client dyad, the four parameters b_{T2T}, b_{C2C}, b_{C2T}, and b_{T2C} provide a comprehensive representation of the nonlinear dynamics between the two interactants. Specifically, the coefficient b_{T2T} quantifies the effect of therapist's rating of variable X at time t on how much the therapist's rating changes, in other words, how much therapist's change from a given time point t to the next time point $t+1$ may be explained by their own rating at time point t, thus captures the therapist's consistency, or their responsiveness to him- or herself. Similarly, coefficient b_{C2C} quantifies the effect of client's rating of variable X at time t on how much the client's rating changes, thus similarly captures the client's consistency, or their responsiveness to him- or herself. The coefficient b_{C2T} represents the effect of client's rating of variable X at time t on how much the therapist's rating changes, quantifying the contribution of client's rating at time point t to therapist's rating change from time point t to the next time point $t+1$. This represents the responsiveness of the therapist to the influence of the client. Similarly, the coefficient b_{T2C} represents the effect of therapist's rating of variable X at time t on how much the client's rating changes from time point t to the next time point $t+1$, and captures the responsiveness of the client to the influence of the therapist. Under the framework of this nonlinear differential equation model, these four parameters provide a way to characterize and quantify the nonlinear dynamics between a given therapist-client dyad about a certain construct X over the course of therapy, in terms of how much the therapist and client are responsive to the influences from both themselves and the other party.

It is important to note that the APIM and the ODE models bear some structural similarities in that they both have an "actor" and a "partner" term (dependent variable being predicted by both one's own rating and the other party's rating). However, the actor and partner effects obtained in the APIM would not be

viewed as a good representation to quantify the responsiveness, because of the construction of the model and the differences in the dependent variable in these two models. In ODE, it was the change slope being predicted by one's own and the other party's rating—in this way, the actor coefficient, e.g., the b_{T2T} coefficient, would clearly indicate the effect of therapist's previous behavior on the change/adjustment of the therapist's own subsequent behavior; whereas the partner coefficient, e.g., the b_{C2T} coefficient would represent the change of the therapist's subsequent behavior based on the client's previous behavior. Because traditional APIM model is not constructed in this way (specifically due to the difference in the dependent variable and the collapsing of data over time in ODE), although it shares the structural similarity with the ODE, and although the actor and partner effects have some implication regarding the relative strengths of influence between the therapist-client dyad, the APIM actor and partner coefficients are not the best quantification of influence and responsiveness dynamics in comparison to the ODE parameters.

The ODE models (in the Form of Equation (1) or other forms based on ODE or ODE system) have seen some application in studies on couples and family interactions (Gottman et al., 2003; Gottman, Swanson, & Murray, 1999; Gottman, Swanson, & Swanson, 2002; Madhyastha, Hamaker, & Gottman, 2011). Employing this methodology, researchers were able to specifically depict the interactional dynamics and mutual influence patterns between couples, and relate the parameters about the couples' dynamics to their marriage and life outcome. However, though potentially promising and applicable in modeling the dynamic dyadic interactions between the therapist and client in a way that is parallel to a couple, this model has rarely been used in the research on the process and outcome of psychotherapy (Perry et al., 2017). The only studies (Liebovitch, Peluso, Norman, Su, & Gottman, 2011;

Peluso et al., 2012; Perry et al., 2017) that employed this method used simulated data

to illustrate this model and explore how the different combinations of these four

dynamic parameters (assigned by the researchers hypothetically) would be related to

the different relational dynamics and developmental pattern between the therapist and

the client. Unfortunately, no existing studies to date applied the ODE model in the

quantification and investigation of therapist-client dyadic dynamics, i.e., their mutual

influence and responsiveness both to themselves and to the other party, which is

reflected in the dynamic, interactive, and nonlinear interactional processes in

psychotherapy (Peluso et al., 2012).

Social Relations Model and Multilevel Data Decomposition: Disentangling the

Dyadic Effects

The aforementioned four parameters obtained from the differential equation

system have provided a way to quantify the nonlinear dynamics between a given

therapist-client dyad that is derived from the ratings of their actual interactions.

According to the Social Relations Model (Kenny & La Voie, 1984), a dyadic

interaction rating can be decomposed into three major types of effects: an actor effect,

a partner effect, and a relationship effect. Using one dynamic parameter in this study

as an example, the coefficient b_{C2T} quantifies the therapist T's responsiveness to the

client C's influence, and consists of the following three components. The actor effect

in this case is the general level of influence of this particular client C (whether C is a

dominant or influential person in general with every interactant), the partner effect in

this case is the general level of responsiveness of this particular therapist T (whether T

is responsive in general with every client), and the relationship effect in this case is

the unique combination and interaction of this particular T-C dyad (the distinct ways

in which this therapist and client interact that differ from how they respectively reacts

to other people).

Specific statistical procedures exist to decompose the dyadic rating into these three components so that the actor, partner, and relationship effects can be disentangled and investigated (Kenny & La Voie, 1984). However, this requires special research designs (e.g., Round Robin design) that psychotherapy data often do not satisfy. For example, because a client usually only sees one therapist for treating a certain problem (rather than intentionally rotating to see multiple therapists), pure client effects cannot be disaggregated and will then be conflated with the relationship effect. This being said, with multilevel data partitioning (Curran & Bauer, 2011; Kenny & La Voie, 1984), one can still obtain an unconfounded therapist effect due to the fact that each therapist sees multiple clients. The data partitioning into between-therapist and within-therapist between-client components also provides further clarity on the conceptual implications of these four dynamic parameters. Specifically, between-therapist b_{T2T} represents the therapist's responsiveness to him- or herself in general across all clients on the caseload, in comparison to an average therapist; whereas within-therapist b_{T2T} represents the therapist's responsiveness to him- or herself, when working with a particular client in comparison to an average client under this therapist's caseload. After decomposing the between-therapist b_{T2T}, this component is only attributed to the client effect and the relationship effect. Between-therapist b_{C2T} represents a therapist's general level of responsiveness across all clients on their caseload, in comparison to an average therapist; whereas within-therapist b_{C2T} represents the level of therapist's responsiveness to the client's influence, and is a combination of the client's main effect (how this client is generally influential) and the dyadic relationship effect (how much client is influential and therapist is responsive in this particular dyad's dynamics). Between-therapist b_{T2C} indicates the

therapist's general level of influence across all clients on their caseload, in comparison to an average therapist; whereas within-therapist b_{T2C} captures the client's level of responsiveness to this therapist's influence, which is a combination of the client's main effect (how responsive this client generally is) and the dyadic relationship effect (how much therapist is influential and client is responsive in this particular dyad's dynamics). Within-therapist b_{C2C} represents the consistency level, or responsiveness to oneself, of a client on a therapist's caseload in comparison to an average client of that therapist. This includes the combination of the effect of this client and the relationship effect. Between-therapist b_{C2C} represents the consistency level, or responsiveness to oneself, of all the clients under a particular therapist. Because b_{C2C} is a client-level construct, when it's disaggregated into the therapist level, it does not have specific clinical implication but would be important to be controlled in later multilevel models.

Such partitioning can allow researchers to examine the nonlinear dyadic dynamics (i.e., influence and responsiveness to oneself and the other party) at the between-therapist and within-therapist levels respectively while controlling for the effects at the other level. Of particular interest in this study is the therapist responsiveness to both self and client at the between-therapist level, which represents how much a therapist is responsive to the impacts of him- or herself, and to the impacts of their clients generally across their entire caseload. Such between-therapist effects are unconfounded (whereas within-therapist effects are confounded as discussed previously), and may have direct implications on the general style or characteristics of a therapist. It may also directly address the question the trainee Hongyang raised in the opening vignette about the balance between "follow you" versus "follow me". Of secondary interest in this study is the therapist responsiveness

(to both self and client) at the between-client within-therapist level, which depicts the level of client being influential and therapist being responsive in this particular dyad's dynamics. Although it is not possible to disentangle whether this type of dynamics is *coming from* the client's characteristics or from the distinct interaction of this therapist-client dyad, it may still have implications about the nuanced associations between *this type of therapeutic dynamics* and therapy outcome, controlling for the therapist's general style.

Contextualizing these parameters in the framework of interpersonal theory and complementarity, a therapist who is more responsive to him- or herself in general in comparison to another therapist (or with one client in comparison to another client on their caseload) on both the Control and Affiliation dimensions would display a larger between-therapist (or between-client within-therapist) b_{T2T} absolute value, regardless of its positive or negative sign. When the b_{T2T} coefficient is negative and takes a larger absolute value (thus smaller b_{T2T}), for either Control or Affiliation dimension, it indicates that the therapist responds to their previous behavior (e.g., dominant, or friendly) by markedly decreasing that behavior, thus being responsive to self in an *inconsistent* way. When the b_{T2T} coefficient is positive and takes a larger absolute value (thus larger b_{T2T}), for either Control or Affiliation dimension, it indicates that the therapist responds to their previous behavior (e.g., dominant, or friendly) by increasing that behavior, thus being responsive to self in a *consistent* way. Similarly, a therapist who is more responsive to their client in general in comparison to another therapist (or with one client in comparison to another client on their caseload) on both the Control and Affiliation dimensions would display a larger between-therapist (or between-client within-therapist) b_{C2T} absolute value, regardless of its positive or negative sign. Specifically with regard to the complementary type of responsiveness

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(i.e., being responsive in a complementary way), a therapist highly complementary to their client on the Control dimension, in general in comparison to another therapist (or with one client in comparison to another client on their caseload), would display a negative between-therapist (or between-client within-therapist) b_{C2T} value with a large absolute value (thus smaller b_{C2T}). A therapist highly complementary to their client on the Affiliation dimension, in general in comparison to another therapist (or with one client in comparison to another client on their caseload), would display a positive between-therapist (or between-client within-therapist) b_{C2T} value with a large absolute value (thus larger b_{C2T}).

In sum, the application of the ODE model provides a different way of assessing therapist responsiveness. Rather than using "static" items from a self-report or observer rating scale as the Elkin et al. (2014) study attempted, this new method quantifies and derives responsiveness of the therapist to both self and the other party by modeling the dynamic patterns extracted from therapist and client's actual therapy process. Such an approach is more closely related to the original definition and the intuitive notion of responsiveness, and may potentially address the conceptual and analytical problems brought about by the "elusive" concept of responsiveness (Kramer & Stiles, 2015; Stiles, 2009).

Summary: Construct Definitions, Research Questions, and Hypotheses

In summary, this study investigated the construct of therapist responsiveness, which was defined in Stiles et al. (1998) as therapist adjusting their behaviors based on the emerging contexts, including the current behaviors of each member of the dyad. Specifically as expressed in the ODE model (Equation (1)), the level to which the therapist adjusted their behaviors was captured by the change score from the current time point to the next time point in therapist's level of behavioral Control or

Affiliation, i.e., how much the therapist adjusted (increased or decreased) their level of Control or Affiliation. The "emerging context" was operationally defined as the levels of Control or Affiliation for both the therapist and the client at the current time point, which were the two sources of "current contexts" that informed the therapist's change. The coefficient b_{T2T} quantifies the amount of effect therapist's own current behavior informed their behavioral change from current to the next time point, and is an *index* measuring the therapist's responsiveness to self. The coefficient b_{C2T} quantifies the amount of effect client's current behavior informed therapist's changes in behavior from current to the next time point, and is an *index* measuring the therapist's responsiveness to the client.

Integrating the ODE model (Peluso et al., 2012) and multilevel data partitioning (Curran & Bauer, 2011; Kenny & La Voie, 1984), the primary aim of this study is to investigate how therapist's responsiveness to self and responsiveness to client respectively predicts working alliance early in therapy at the between-therapist and between-client within-therapist levels. This study is both exploratory and confirmatory in nature. Because a therapist can be responsive to the client's input/behavior in a variety of ways, we did not hypothesize the association between the general construct of therapist responsiveness (which was argued to be technically neutral) to working alliance. Rather, this study aims to explore what *type* of responsiveness (to self and to client at both the therapist and client levels) would have a positive effect in facilitating early working alliance. Based on Kiesler (1988)'s theory, however, the confirmatory test this study also attempts to examine is whether the specific type of therapist responsiveness to client in the way of responding complementarily would positively relate to the formation of working alliance early in therapy in the first formal counseling session at both the between-therapist and

between-client within-therapist levels. Specifically with reference to the aforementioned dynamic coefficients, for the Control dimension, it is hypothesized that between-therapist and between-client within-therapist b_{C2T} would be negatively associated with client's early working alliance rating (because more complementary the therapist is on the Control dimension, the smaller the b_{C2T} value); for the Affiliation dimension, it is hypothesized that between-therapist and between-client within-therapist b_{C2T} would be positively associated with client's early working alliance rating (because more complementary the therapist is on the Affiliation dimension, the larger the b_{C2T} value).

This study, in sum, may have a number of potential contributions to the existing literature about therapist responsiveness. First, it uses an operational definition of responsiveness that closely fits with its intuitive notion as well as original conceptualization (Kramer & Stiles, 2015; Stiles et al., 1998), since it captures and quantifies both the dynamic dyadic process and the mutual influence and feedback loop suggested in the concept of responsiveness. Moreover, it shows clear differences from the operational definitions used in previous studies (for example, in Elkin et al., 2014) that are confounded with other psychotherapy process variables. Second, the use of ODE model provides a direct measure of responsiveness that is derived from the actual interactional process between the therapist and the client, which would be less susceptible to the biases attributable to using the same measurement method, e.g., asking the client to rate both their perceptions of therapist responsiveness and their working alliance. Third, the integration of multilevel data partitioning with the ODE model further distinguishes the therapist effects from the client effects and relationship effects (the latter two often cannot be differentiated due to the nature of psychotherapy data), which as argued earlier, has important

conceptual and practical implications.

Methods

Data Set

This study used archival de-identified video recordings previously collected in a psychotherapy clinic at a Mid-Atlantic university in USA. The clinic served clients from the community for individual low-fee therapy. Institutional Review Board approved ongoing research was part of the clinic's major activities, and all participating therapists and clients were informed and gave written consent to researchers in this clinic to use their session recordings and survey data in psychotherapy research projects. Therapists in this clinic were licensed psychologists or advanced doctoral students in counseling psychology. Weekly individual and biweekly group supervision were provided to the unlicensed doctoral students.

There were totally 38 therapists by the time of the data collection of this study, and among the available video recordings of their client sessions, they each saw from 2 to 13 clients ($M = 8.04$, $SD = 2.43$) for from 1 to 182 sessions ($M = 27.31$, $SD = 31.31$). Specifically, 3 out of the 38 therapists had video recordings available from only 2 clients, and the remaining 35 therapists had 3 or more clients. Following the recommendation of Maas and Hox (2005), to minimize the estimation bias, we opted to maximize the sample size on the highest level (i.e., the therapist level), and decided to use data from all the 38 therapists. For a therapist who had seen more than three clients, a random sample of three clients were selected from their overall available recordings. Therefore, the final participant pool included 35 therapists with their 105 clients (3 clients randomly selected from the caseload of each therapist), and the 3 therapists with their 6 clients (2 clients each therapist)—totally 38 therapists and 111

clients. Video tapes of each therapist-client dyad's first counseling session after the

intake (totally 111 sessions) were rated and analyzed in this study.

Participants

Therapists. For the 38 therapists, their age ranged from 25 to 60 years old (*M*

= 31.08, *SD* = 7.22). In terms of gender, 11 therapists identified as cisgender male

(28.9%), and 27 identified as cisgender female (71.1%). Regarding race/ethnicity, 20

therapists identified as White (52.6%), 2 identified as Black (5.3%), 7 identified as

Asian (18.4%), 3 identified as Multiracial (7.9%), and the remaining 6 therapists

identified as international (15.8%). With regard to theoretical orientation, all

therapists were administered the Theoretical Orientation Profile Scale-Revised

(TOPS-R; Worthington & Dillon, 2003) after joining the clinic to assess their

endorsement of theoretical orientations (not a part of this study). The TOPS-R

contains 18 items describing 6 theoretical schools anchored on 10-point Likert scales,

with higher scores indicating higher endorsement of a statement about a certain

theoretical orientation. Descriptive statistics showed that across all therapist, their

mean endorsement for Psychoanalytic or Psychodynamic orientation was 7.94 (*SD* =

1.06), for Humanistic-Existential orientation was 6.30 (*SD* = 1.74), for Cognitive-

Behavioral orientation was 4.17 (*SD* = 1.54), for Family Systems orientation was 2.95

(*SD* = 1.73), for Feministic orientation was 4.26 (*SD* = 2.00), and for Multicultural

orientation was 643 (*SD* = 1.60). Specifically, 28 therapists identified most strongly

with psychodynamic-interpersonal approach (73.7%), 6 identified most strongly with

humanistic-existential approach (15.8%), 1 identified most strongly with feministic

theories (2.6%), and 3 identified most strongly with multicultural orientation.

Clients. For the 111 clients, their age ranged from 18 to 69 years old (*M* =

32.80, *SD* = 12.00). In terms of gender, 50 clients identified as cisgender male

(45.0%), 55 identified as cisgender female (49.5%), and 6 did not report gender.

Regarding race/ethnicity, 51 clients identified as White (45.9%), 24 identified as

Black (21.6%), 4 identified as Asian (3.6%), 5 identified as Latinx (4.5%), 1

identified as middle-eastern (0.9%), 11 identified as multiracial (9.9%), 4 identified as

international (3.6%), and the remaining 11 clients identified as other or did not report

race/ethnicity (9.9%).

Raters. A total of 12 raters were initially recruited from an undergraduate

counseling psychology class to watch and rate the 111 psychotherapy sessions (details

about this process is illustrated in the Video Recording Rating Procedures section). To

realistically manage the workload, the 12 raters were randomly assigned to form three

groups (4 raters each group), and each group was assigned one third of all the videos

(37 videos) to watch and rate. Prior to the start of the formal rating process, one of the

12 raters dropped out of the project due to unexpected emergent personal reasons, and

the final rater pool consisted of the remaining 11 raters. The 11 raters were all junior

or senior year psychology major students; 3 were men and 8 were women; 7 were

White, 2 were African American; 1 was Latinx; and 1 was Asian.

Measures

The Working Alliance Inventory-Short Revised (WAI-SR; Hatcher & Gillaspy,

2006) was used to assess the strengths of the working alliance as perceived by the

client. It is a 12-item measure, adapted from the original 36-item Working Alliance

Inventory (Horvath & Greenberg, 1989), and assesses tasks, goals, and bond

dimensions of the working alliance on a 5-point scale that ranges from 1 (seldom) to 5

(always). Higher scores for the subscales indicate stronger bond between the therapist

and client, and greater agreement between the therapist and the client on therapeutic

goals and tasks. WAI total scores are also often used, with higher scores representing

a stronger overall working alliance between the therapist and the client. In Horvath and Greenberg (1989), the reported internal consistency coefficients for the original WAI subscales and total scores ranged from .68 to .88. In Hatcher and Gillaspy (2006), internal consistency was reported to be .90, and in Kivlighan et al. (2016), internal consistency alphas ranged from .93 to .99. These studies provided support to the reliability of this scale.

Procedures

Typically, a therapist in the clinic conducts an intake session with incoming clients before absorbing them into their caseload. The first formal counseling session after intake is the second encounter between a therapist and client dyad, and there is no session number upper limit imposed by the clinic. After each session, both the therapist and the client complete a battery of measures. The archival data used in this study included the WAI-SR forms completed by the clients for their first formal counseling sessions (i.e., their second encounter after their initial intake session) with their respective therapists.

Video Recording Rating Procedure

The 11 raters received an initial screening interview before being recruited to participate in this study as a rater. They reportedly all had some previous experiences and training in psychology research, and had all received and passed the online research ethics training as required by the university's Institutional Review Board. Credit to a psychology research course was provided to these students to acknowledge their participation in this research project.

Before the raters were assigned the selected videos to be rated, they were required to attend a three-hour training session conducted by the primary researcher where they were introduced to the project and were trained on the needed theory and

skills for the rating tasks. In this training session, the primary researcher first provided a one-hour lecture to all the raters in a big group format about the Interpersonal Theory and the model of the Interpersonal Circle (Kiesler, 1983, 1988). In the lecture, the primary researcher presented and explained the Control-Affiliation framework of interpersonal interactions, and provided examples from the Check List of Psychotherapy Transactions-Revised (CLOPT-R; Kiesler, 1984) to illustrate typical behaviors of the two dimensions. For example, on the Dominant end of the Control dimension, "the therapist/client dominates the flow of conversation, or changes the topic, or interrupts and 'talks down'"; whereas on the Submissive end, "the therapist/client finds it almost impossible to take the lead, or to initiate or change the topic of discussion" (reverse item). On the Friendly end of the Affiliation dimension, "the therapist/client expresses appreciation, delight, or satisfaction about the client/therapist, their situation, or their task"; whereas on the Hostile end, "the therapist/client is openly antagonistic, oppositional, or obstructive to the client's/therapist's statements, suggestions, or purposes". Role plays were used in the lecture to demonstrate each of these typical behaviors to facilitate the raters' understanding and quick identification of these behaviors.

The rating scales and anchors for their subsequent rating task were also specifically explained in the training. On the Control dimension, raters were asked to rate the therapist and client in a segment unit from being "very submissive (score = -3)", "moderately submissive (score = -2)", "mildly submissive (score = -1)", to being "neutral (score = 0)", to being "mildly dominant (score = 1)", "moderately dominant (score = 2)", or "very dominant (score = 3)"; similarly, on the Affiliation dimension, raters were asked to rate the therapist and client in a segment unit from being "very hostile (score = -3)", "moderately hostile (score = -2)", "mildly hostile (score = -1)",

to being "neutral (score = 0)", to being "mildly friendly (score = 1)", "moderately friendly (score = 2)", or "very friendly (score = 3)". To operationally decide on the score from -3 to 3 on the Control and Affiliation dimensions, raters were instructed to evaluate to what extent did the therapist or the client display the typical behaviors of being dominant (or submissive), and friendly (or hostile), introduced in the previous section of the training lecture.

After the lecture, all the raters were given four 2-minute segments to watch and rate in the class, and their ratings were discussed thoroughly in the whole group to calibrate the raters. Any discrepancies in raters' evaluation of the extent or level of therapist/client behaviors of Control and Affiliation was brought up, discussed, and reconciled until all raters reached consensus. Then the raters were given another 8-minute video clip (not from the video clips for formal rating process) to rate independently on therapist's and client's levels of Control and Affiliation on 2-minute segments (totally 4 segments to be rated in this clip), and their interrater reliability was examined using the Intra-Class Correlation (ICC) coefficients. Results indicated sufficient absolute agreement between the 11 raters on the same video clip (ICCs ranged from .86 to .98).

At the completion of the training session, the 11 raters were randomly assigned to form 3 groups to split up the 111 sessions to be rated. Because of the dropout of the 12th rater, the first and second groups each had 4 members but the third rating group had only 3 members. Following the group assignment, the 111 sessions to be formally rated were assigned to each group of raters (37 sessions each group). One of the 111 sessions was randomly selected to be rated by all 11 raters in the three groups at the middle point of the rating process as a rater reliability check to ensure that raters did not deviate from their initial consensus in the rating process. The ICCs

of the 11 raters for that mid-point reliability check session ranged from .68 to .90 for the different targets of rating (therapist Control, therapist Affiliation, client Control, and client Affiliation), suggesting that the raters remained sufficiently in agreement through the rating process.

For each of their assigned sessions, every rater was asked to independently evaluate the level of Control and Affiliation for the therapist and client respectively in each 2-minute segment of the session. Because each session was around 45 minutes to 50 minutes in length, it yielded 22 to 25 ratings of Control and Affiliation scores for both the therapist and the client in that session. The procedure of asking trained raters to evaluate the overall level of Control and Affiliation in interpersonal interactions has been administered in previous studies (Lizdek, Sadler, Woody, Ethier, & Malet, 2012; Lizdek, Woody, Sadler, & Rehman, 2016). In these studies, researchers asked trained raters to provide moment-by-moment continuous ratings of interactants' Control and Affiliation levels by drawing a continuous line on the Control-by-Affiliation plane using a joystick on a computer program. With three to four raters, the average interrater moment-to-moment rating reliability was reported to range from .60 to .77 in Lizdek et al. (2012), and .67 to .84 in Lizdek et al. (2016), and the average interrater overall rating reliability was reported to range from .78 to .92 (Lizdek et al., 2012). These results suggested that it is possible to ask trained raters to provide overall moment-to-moment ratings of Control and Affiliation on the two interactants of a conversation, and their ratings generally yielded reliable results. With regard to the unit of time interval to be rated, Kiesler (2004) reported that optimal reliabilities in the rating of interpersonal interactions based on the Control-Affiliation framework were obtained for video samples ranging from 1 minute to 3 minutes in lengths. Therefore, this study adopted a 2-minute time segment as the unit of rating.

For every group of raters in this study, their ICC coefficients were computed after they all completed their rating tasks. For the four raters in the first group, their ICC coefficients for the four ratings (therapist Control, therapist Affiliation, client Control, and client Affiliation) ranged from .60 to .84; for the four raters in the second group, their ICC coefficients ranged from .61 to .78; and for the three raters in the third group, their ICC coefficients ranged from .64 to .77. These interrater reliability estimates were similar to those in previous studies (Lizdek et al., 2012; Lizdek et al., 2016), which supported the agreement of the raters in all three groups, and the combination of their individual ratings to generate the overall averaged therapist Control, therapist Affiliation, client Control, and client Affiliation scores for all of the 111 sessions. The average ratings for the randomly selected one session used in mid-point interrater reliability check were obtained by averaging the ratings of all the 11 raters.

Analysis and Results

After combining and averaging the ratings from different raters, each session had four ratings (therapist Control, therapist Affiliation, client Control, and client Affiliation) for each 2-minute segment. Overall descriptive statistics of these ratings were presented in Table 1. Noting that rating scales for the Control dimension ranged from -3 (very submissive) to 0 (neutral) to 3 (very dominant), the mean values indicated that across all therapists, clients, and segments in sessions, the therapists showed a slight inclination towards the dominant side (therapist Control $M = 0.35$, $SD = 0.47$; $t = 9.31$, $p = .000$), with a grand mean rating of 0.35 located between $0 =$ "Neutral" and $1 =$ "mildly dominant" on the original rating scale; whereas the clients also displayed a tendency towards the dominant side (client Control $M = 0.60$, $SD =$

0.61; $t = 9.38$, $p = .000$), with a grand mean rating of 0.60 also located between 0 = "Neutral" and 1 = "mildly dominant" on the original rating scale. Regarding the Affiliation dimension, the rating scale was anchored from -3 (very hostile) to 0 (neutral) to 3 (very friendly). The mean values suggested that averaging all therapists, clients, and segments in sessions, the therapists remained on the friendly side (therapist Affiliation $M = 0.75$, $SD = 0.54$; $t = 14.57$, $p = .000$), with a grand mean rating of 0.75 located between 0 = "Neutral" and 1 = "mildly friendly" on the original rating scale; whereas the clients were also rated as leaning towards the friendly side (client Affiliation $M = 0.45$, $SD = 0.53$; $t = 10.86$, $p = .000$), with a grand mean rating of 0.45 similarly located between 0 = "Neutral" and 1 = "mildly friendly" on the original rating scale.

At this stage, the data set had a three-level nesting: the therapists at the third (highest) level, the clients at the second (middle) level, and their 2-minute interval ratings at the first (lowest) level. The four parameters depicting the nonlinear dynamics between the therapist and the client in the differential equations model (Equation 1) were obtained respectively for the Control dimension and the Affiliation dimension. Below outlines how this was done based on the Control dimension; the analysis for the Affiliation dimension was an exactly parallel process.

As the first step, the first-order differentials—in other words change rates—from time t to $t+1$ were obtained by subtracting therapist's and client's Control scores at time point t from their respective Control scores at time $t+1$. Then, these change slopes for both the therapist and the client were regressed on both therapist's and client's Control ratings as formulated in the ODE Equation 1. This step generated the four parameters b_{T2T}, b_{C2C}, b_{C2T}, and b_{T2C} for Control dimension, which captured the nonlinear dynamics between each therapist-client dyad in terms of how they adjust

their behaviors, in terms of the level of Control, based on both their own and their interactant's behaviors. Because of the scope of this study (as stated in the Summary of Research Questions), only the b_{T2T} and b_{C2T} coefficients for the Control dimension were used in subsequent analysis. When this step was completed for both the Control and Affiliation dimensions, each session from a therapist-client dyad had two parameters (b_{T2T} and b_{C2T}) for Control and two parameters (b_{T2T} and b_{C2T}) for Affiliation for their first post-intake counseling session; and the data had a two-level nesting: the four parameters for the first counseling session for each therapist-client dyad at the lower Level-1, and all clients nested within their therapists at the higher Level-2. Descriptives of these dynamics coefficients were tabulated in Table 1. The grand means of b_{T2T} for both the Control and Affiliation dimensions were negative (for Control, $M = -0.91$, $SD = 0.28$; for Affiliation, $M = -0.86$, $SD = 0.25$), and their distributions were mostly on the negative side (with $M + 3SD < 0$). This indicated that averaging all clients and therapists, the more the therapist was controlling or affiliative in the current interaction segment, the greater decline in levels of control or affiliation the therapist displayed from the current interaction segment to the next segment. That is to say, from the grand average values, the therapists generally showed a "regression to the mean" way of responsiveness to themselves in their levels of Control and Affiliation. Regarding therapists' responsiveness to the client, as captured in the dynamic coefficient of b_{C2T}, the grand means of b_{C2T} for both Control and Affiliation were close to the zero point with relatively equal distribution on both sides (regarding Control, $M = -0.01$, $SD = 0.34$, for grand mean $t = -0.34$, $p = .733$; regarding Affiliation, $M = 0.02$, $SD = 0.28$, for grand mean $t = 0.75$, $p = .461$). That the two grand means for Control and Affiliation were not statistically different from 0 showed that averaging all clients and therapists, the therapists' changes in Control and

Affiliation were not associated with their clients' level of Control and Affiliation in the current moment, i.e., the therapists appeared nonresponsive to their clients in Control and Affiliation. However, there appeared to be individual differences such that some therapists were responsive to client Control in a complementary way by decreasing their own level of Control (i.e., having negative b_{C2T} value), whereas some other therapists were responsive to client Control in an anti-complementary way by increasing their own level of Control (i.e., having positive b_{C2T} value).

In the second step, the two parameters (b_{T2T} and b_{C2T}) were decomposed into between-therapist, and between-client within-therapist levels. According to Curran and Bauer (2011) and Kenny and La Voie (1984), the between-client within-therapist components were represented by the deviation of each client's two parameters with their therapist from the mean values of the two parameters averaged across all clients working with that therapist (i.e., group-mean centering). The between-therapist components were represented by the deviation of the therapist's mean values of the two parameters (averaged across all of their clients) from the grand mean value of the two parameters across all therapists.

In the third step, the obtained decomposed components of therapist responsiveness to self and to client were related to client's WAI scores using the Hierarchical Linear Modeling (HLM; Raudenbush, Bryk, & Congdon, 2002) Software 6.0. The specific 2-level model fitted was:

Level-1: Within-therapist between-client

Client 1st Session WA Score = B0 + B1×(Rating Group Dummy1) + B2×(Rating Group Dummy2) + B3×(Between-Client b_{T2T} for Control) + B4×(Between-Client b_{C2T} for Control) + R

Level-2: Between-therapist

B0 = G00 + G01×(Between-Therapist b_{T2T} for Control) + G02×(Between-Therapist b_{C2T} for Control) + U0

Bj = Gj0 (j = 1, 2, 3, 4)

A second 2-level model was fitted parallel to the above for the Affiliation dimension. It's important to note that to control for potential differences between the three rater groups, the groups were coded into two dummy variables, and were entered as control variables in the Level-1 equation. Moreover, because each therapist only had three clients (with three of them only having two clients), there were not enough degrees of freedom to estimate three or more random effects on Level-2. Therefore, only the random effect for the intercept was retained and the random effects for the slopes were fixed. Set up this way, in the final estimated model the estimations of G30 and G40 will quantify the associations between the client's evaluation of first-session WA and the therapist's responsiveness to him-/herself and to the client at the between-client within-therapist level; and the estimations of G01 and G02 will represent the associations between client's evaluation of first-session WA and the therapist's responsiveness to him-/herself and to the client at the between-therapist level.

Prior to analyzing and interpreting the final model results, statistical assumptions of the HLM were tested. One key statistical assumption of HLM is that the regression residuals are normally distributed (Raudenbush et al., 2002; Snijders & Bosker, 2012). To test this, residual files at both Level-1 and Level-2 were saved and examined. Shapiro-Wilk test of distribution normality indicated that the Level-1 residuals for both the Control dimension and Affiliation dimension were normally distributed ($W(111) = 0.99$, $p = .687$ for Control; $W(111) = 0.99$, $p = .700$ for Affiliation). For Level-2, the random effect residual was estimated only for the

intercept, and the Shapiro-Wilk test suggested that they were also not significantly different from a normal distribution for both the Control and Affiliation dimensions ($W(38) = 0.98$, $p = .802$ for Control; $W(38) = 0.96$, $p = .254$ for Affiliation). The second key statistical assumption is homoscedasticity, i.e., the variances of the residuals are homogenous (Raudenbush et al., 2002; Snijders & Bosker, 2012). Chi-square test statistics obtained from the HLM software indicated that the residual variances were homogenous for the Control dimension ($\chi^2(37) = 6.93$, $p > .50$) as well as the Affiliation dimension ($\chi^2(37) = 7.45$, $p > .50$).

Since all statistical assumptions for the HLM model were met, the formal HLM analysis of the proposed 2-Level model was run and the model estimation results are presented in Table 2. Among all the fixed effects that were of interests in this study, which included the slopes of between-therapist and between-client within-therapist b_{T2T} and b_{C2T} for both Control and Affiliation in predicting client WA, only the between-therapist b_{C2T} slope for the Control dimension was significant (G02 = 0.57, $t(35) = 2.59$, $p = .014$), with an effect size as represented by completely standardized regression coefficient (Stapleton, 2015) $\beta = .15$, while none of the other fixed effects reached significance. To aid understanding this result, recall that from Table 1 the coefficient b_{C2T} for Control ranged from -1.08 to 1.01 with a grand mean of -0.01 and an SD of 0.34 (i.e., its values evenly distributed on both sides of the neutral point). Also recall that as discussed in the Introduction section, negative b_{C2T} value indicated therapist responding to high client control by decreasing their control, or low client control by increasing therapist's level of control, i.e., being responsive in a complementary way; close to zero b_{C2T} value indicated therapist's change in behavioral control being not associated with how controlling the client was, i.e., therapist being non-responsive; and positive b_{C2T} indicated therapist responding to

high client control by increasing their control, or low client control by decreasing his/her own control, i.e., being responsive in an anti-complementary way. Therefore, the significant and positive fixed effect G02 suggested that clients' WA ratings for the first session were highest for therapists who were generally responsive in an anti-complementary way across their clients on caseload regarding the Control dimension (i.e., stronger working alliance when therapists increased their control when previous client control was high and decreasing control when previous client control was low), were middle for therapists who were generally non-responsive, and lowest for therapists who were generally responsive with their clients in a complementary way.

To explore possible reasons for the non-significant estimation results, a post-hoc multilevel power analysis was also conducted to evaluate the statistical power of the two proposed HLM models for Control and Affiliation dimensions respectively. Following the procedures as recommended in Muthén and Muthén (2002) and Stapleton (2015), Monte Carlo simulation was utilized in the Mplus 7.0 software (Muthén & Muthén, 2012) to generate a large number of random samples based on the estimated population parameters (from the previous HLM estimation results), from which bias rates for the fixed effect estimates of interest and the percentage of obtaining significant coefficient estimates (i.e., statistical power—the probability of rejecting the null hypothesis when it is false) could be computed. Simulation results for the current sample size in this study were tabulated in Table 3. Muthén and Muthén (2002) recommended that ideally the sample size should be large enough so that the bias rates of parameter estimates are no larger than 10%, the 95% coverage estimates are no smaller than .90 (indicating that the 95% confidence intervals of more than 90% of the simulation replications included the specified population parameter), and the statistical power should reach at least .80 (Cohen, 1992). From

Table 3, it can be seen that all but one fixed effect estimate (the between-client within-therapist b_{T2T} slope for the Affiliation dimension) had a bias rate more than 10%, and that all 95% coverage estimates reached .90. However, only two of the eight effects of interest had statistical power estimates greater than .80 (the between-therapist b_{C2T} slope for Control, and the between-therapist b_{T2T} slope for Affiliation). These post-hoc power analyses indicated that, while more confidence can be placed on the estimation accuracy of the fixed effects of interest in this study, the limitation in sample size resulted in a lack of statistical power to accurately detect potential significant effects of the dynamic coefficients, especially for ones with small effect sizes.

Discussion

In this study, we examined the predicting effects of therapist responsiveness on client's perception of working alliance in their first counseling session. To address the limitations in the operational definition and measurement of therapist responsiveness in previous research, this study used the ordinary differential equations model (Peluso et al., 2012; Teschl, 2012) to quantify the mutual influence and responsiveness dynamics between the therapist-client dyad, and the multilevel data disaggregation method (Curran & Bauer, 2011; Wang & Maxwell, 2015) to disentangle the intertwining constructs of mutual influence and responsiveness when relating them to client working alliance ratings. The findings were expected to contribute to the literature on therapist responsiveness by addressing the existing limitations and gaps as aforementioned, and testing the hypothesis that "complementary responsiveness" was the "appropriate responsiveness" (Stiles & Horvath, 2017) in early psychotherapy sessions as proposed in the Interpersonal Theory (Kiesler, 1988).

Therapist Responsiveness to Client Predicting Working Alliance

The "follow you" question trainee Hongyang proposed in the beginning vignette is related to therapists' responsiveness to their clients. The Interpersonal Theory (Kiesler, 1988) and the "hook-unhook" stage model predicted that early in therapy, following and "going along" with the client's interpersonal characteristics and "pulls" on the Control and Affiliation dimensions, and responding complementarily to the client would help facilitate a good WA. Put into the context of this research study, because this study sampled the first formal counseling session between the therapists and clients, the complementary type of responsiveness was speculated to be associated with higher client WA. This was hypothesized to be true on both the between-therapist and between-client within-therapist levels: when a therapist was generally more responsive in a complementary way than another therapist in his/her early session with clients, or when the relationship dynamics was characterized by therapist being responsive in a complementary way with one client in comparison to another client of the same therapist, the client would provide higher WA ratings for that session. HLM results indicated that only for the Control dimension at the between-therapist level did therapist responsiveness significantly relate to client's WA rating for their first session. Specifically, clients' WA ratings for the first session were highest for therapists who were generally responsive in an anti-complementary way along the Control dimension across their clients on caseload, were moderate for therapists who were generally non-responsive, and lowest for therapists who were generally responsive with their clients in a complementary way. None of the other associations were significant. The findings were in contrary to the hypotheses predicted in the Interpersonal Theory (Kiesler, 1988), and were also different from a set of existing studies (Tracey, 1987, 2004; Tracey et al., 1999)

reviewed previously that examined therapist-client dynamics under the Interpersonal Theory framework, where a complementary type of responding was associated with better therapy outcome.

An observation of the raw rating data and the clinical practice of therapists in this clinic may provide one possible explanation of the obtained results that were contrary to the hypothesis. Clinicians in this clinic were generally trained under the Hill (2014) three-stage model (exploration, insight, and action), which emphasizes using a client-centered approach in their first couple of sessions to explore the client's presenting concerns and relevant history. Therapists were generally encouraged to follow the clients' lead and allow them enough space to fully present and discuss their thoughts and feelings. With such an approach, the first sessions (which this study sampled) were usually characterized by therapists listening to clients' narratives without much guidance or structure, but also asking probing questions from time to time to re-focus, emphasize, or "zoom in" on some topics, thoughts, or feelings that could be important in reaching deeper levels of exploration. According to the operational definitions of the Dominant and Submissive ends on the Control dimension, segments in which therapist listened to client's narratives without interruption was rated as therapist being neutral to mildly submissive, and client being neutral or mildly dominant, while segments where the therapist asked a probing question to redirect or "zoom in" on client's exploration were rated as therapist being neutral to mildly dominant and client being neutral to mildly submissive. By the nature of the ODE model, these transitions from therapist listening to therapist asking probing questions were captured as therapist responding to client dominance with increasing dominance. Given numerous existing research findings (Goates-Jones, Hill, Stahl, & Doschek, 2009; Hill, 1992; Hill et al., 1988) suggesting the positive

effects of such therapist probes (e.g., by using restatements, open questions, etc.) in facilitating client's depth of exploration, working alliance, and perception of session outcome, we speculated that it may be due to the use of such probing questions in gently guiding client's exploration while the client was taking lead in his/her narratives that therapist's anti-complementary responsiveness along the Control dimension was found to contribute to higher working alliance. This suggested that, while it is important to allow the client space to fully express and state his/her stories, not going along with the client's lead in story-telling all the time, and having a gently anti-complementary stance to use some mildly dominant probing questions to facilitate deeper or broader exploration, may in fact be perceived by the client as helpful. This result also echoed the findings in Tracey (1985) that certain level of therapist dominance in directing the session was related to better therapy outcome. The positive association between client working alliance and therapist responsiveness in an anti-complementary way along the Control dimension also suggested that, when client was submissive, pulling the therapist to be dominant, withholding from this interpersonal pull to be more directive or guiding, and remaining a non-dominant stance to provide space for the client to take lead, was also related to better client-perceived working relationship. To help further illustrate the types of therapist-client interactions (complementary and anti-complementary) described above, two clinical vignette examples are presented in Appendix B.

It is important to note, however, that such a positive effect of anti-complementary responsiveness was only found at the between-therapist level but not at the between-client within-therapist level. Because between-therapist level addresses the general style of the therapist (across all clients on caseload) in comparison to another/an average therapist, whereas the between-client within-therapist level

compares one client with another/an average client under the same therapist, results on the two levels could potentially be different and have different implications. While results in this study suggested the positive effect of therapist adopting a general stance of being anti-complementarily responsive in the first session across the caseload (between-therapist finding), it also revealed that a dynamic pattern in which the therapist responds more anti-complementarily to a client, in contrast to another client, would not necessarily be appreciated by that client (because the between-client within-therapist level effect was not significant). This finding disconfirmed the hypothesis proposed earlier based on the Interpersonal Theory (Kiesler, 1988) that therapist responsiveness in a complementary way could be helpful regardless of the level of focus, and in fact added more nuances to the theoretical texts as well as existing empirical studies that had not considered or differentiated possibly different effects of therapist approach/intervention at different levels, as suggested earlier in the Introduction section as one important gap this study attempted to address. The non-significant between-client within-therapist effect suggested that, holding the therapist constant, clients had individual differences regarding how they perceived or experienced the therapist's anti-complementary responses on levels of control in their first sessions—this corresponded with the notion of client specificity (Teyber & Teyber, 2010; Teyber & Teyber, 2014) that each individual client is specific in his/her way of responding to the same therapeutic approach, and that therapist should carefully consider the individual circumstance and context with one particular client when applying any intervention. It is important to reiterate that without disaggregating the effects into the between-therapist and within-therapist levels and decomposing the dynamic coefficients, the effects at the two levels would be confounded and the nuanced findings would not be possible.

Regarding the Affiliation dimension, therapist responsiveness coefficients at neither of the two levels significantly predicted client ratings of WA. Similar with the Control dimension, the results for the Affiliation dimension did not provide support to the hypothesis in the Interpersonal Theory (Kiesler, 1988) that therapist's responding to client friendliness with friendliness or responding to client hostility with hostility related to client WA. Also, these results did not align with previous studies (Tiedens & Fragale, 2003; Tracey, 1987, 2004; Tracey et al., 1999) which supported Kiesler (1988)'s theoretical hypotheses on interpersonal complementarity, although it's important to note that the existing empirical tests of the complementarity hypothesis either focused only on the Control dimension (e.g., Tiedens & Fragale, 2003; Tracey et al., 1981) or used both the Control and Affiliation dimensions (e.g., Tracey, 2004; Tracey et al., 1999) to operationalize and measure complementarity, rather than just using the Affiliation dimension alone. One possible explanation for the non-significant findings is the limited statistical power to detect significance for these effects due to the relatively small sample size, as presented in Table 3. Another possibility could be due to the relatively narrow range for the ratings of Affiliation for both the therapist and the client. From the descriptive statistics in Table 1, on average therapists and clients all interacted (with one standard deviation above and below the mean) in the "neutral" to "mildly friendly" range. Therefore, whether therapists responded to client's increased friendliness complementarily with increased friendliness, or anti-complementarily with decreased friendliness, they were most likely still presented as somewhat neutral or mildly friendly. It is possible that such small changes in level of friendliness within the neutral to mildly friendly range may not be a markedly significant factor to show significant impacts on clients' perceptions of working alliance, given that clients in general were reported to expect

their therapists to be friendly and objective/neutral (Ekberg, Barnes, Kessler, Malpass, & Shaw, 2016).

Therapist Responsiveness to Self Predicting Working Alliance

The "follow me" idea trainee Hongyang mentioned in the beginning vignette relates to therapists' responsiveness to the input from themselves. This notion represents the extent to which the therapist remains consistent in carrying out specific interventions, or being in a specific state. It is of crucial importance to differentiate two different ways to conceptualize therapist's being consistent. The first conceptualization is the therapist's remaining stable in a particular state (e.g., being emotionally neutral), which is *in reference to a specific equilibrium point or status* (Teschl, 2012) of that therapist. A practical example of this type of "consistency" is when a therapist gets irritated by a borderline client, that therapist quickly manages his negative emotions and returns to an equilibrium state of emotional neutrality. The second way of conceptualizing therapist consistency is the therapist's keeping consistent in their presence, approach, or intervention, which is *in reference to the therapist' own previous presence or behavior* (Peluso et al., 2012) rather than the equilibrium point. A clinical example of this second type of consistency is that in the "unhook" stage proposed in the Interpersonal Theory model (Kiesler, 1988), the therapist counters a highly controlling client's maladaptive interpersonal "pulls" for the therapist to be always submissive, and follows the therapist himself in remaining consistently mildly dominant and carries through his intervention of using process comments to explore the immediate therapy relationship. In this study, the construct of therapist responsiveness to self, as quantified by the b_{T2T} dynamic coefficient in the ODE, corresponds to the second conceptualization, and indicates how therapists are consistent, inconsistent, or unaffected in reference to their antecedent behaviors. This

conceptualization of therapist consistency is similar to the operational definition of consistency (intrachain dependency) in Tracey (1987).

From the descriptive statistics in Table 1 for the b_{T2T} for both the Control and Affiliation dimensions, the b_{T2T} grand means were both negative, and the distributions of their values (from three standard deviations below the mean to above the mean) were all in the negative side. This suggested that averaging all clients and therapists, overall the therapists showed a trend of "regression to the mean"—a tendency to return to the equilibrium point along both the Control and Affiliation dimensions, meaning that when a therapist had an elevated level of control in a segment, for example, the therapist was likely to have a decrease in level of control from this segment to the next segment. A therapist who was more responsive to herself with a larger b_{T2T} value (less negative value) would thus be more consistent in reference to maintaining her previous level of control and would return to the set point slower than a therapist who was less responsive to herself with a smaller b_{T2T} value (more negative value). This way, therapist's responsiveness to self reflected the notion of therapist "following oneself" as often talked about in clinical practice.

Due to a lack of existing theoretical framework or consistent empirical findings, this study did not propose specific hypotheses regarding the associations between the dynamic coefficients representing therapist responsiveness to him- or herself and client's evaluation of WA at the between-therapist and within-therapist between-client levels, and opted to preliminarily explore the effects of therapists' responsiveness to the influence of their previous state over the course of the first session. No significant results were found for either the Control or the Affiliation dimension at any of the two levels, thus providing no support to the potential associations between therapist responsiveness to self and client's WA rating.

These non-significant findings were not in line with those in Tracey (1987), where therapist consistency (intrachain dependency) with regard to topic initiation and following significantly related to therapy outcome, with different association patterns at different stages of therapy. There are several possible factors that might explain the non-significant results in this study. First, as presented in Table 3, the relatively small sample size available in this study limited the statistical power for detecting potential significant differences for the effects of therapist responsiveness to self, especially in light of the small effect sizes of the b_{T2T} slopes. Specifically, even with hypothetically 50 therapists and 30 clients under each therapist (which was not available at the clinic) and their 1500 session recordings rated, the power for between-client b_{T2T} slope for the Affiliation dimension would still only be .31 while other coefficients could have adequate or close to adequate power. The power estimation for this hypothetical larger sample is presented in Table 3 as well. Moreover, the bias rate for one of the coefficients, the between-client b_{T2T} slope, was beyond the commonly suggested acceptable bias rate of 10%, so the estimated parameter for that slope should be taken with caution. In addition to statistical factors, another possible clinical explanation is that therapist consistency may be more impactful in the longer course of therapy (rather than just in the first session), or may be a more salient impact factor in later stages of therapy. As suggested in the Interpersonal Theory (Kiesler, 1988), later in therapy at the "unhook" stage, therapists need to counter client's interpersonal pulls from their maladaptive interpersonal patterns, and consistently carry out corrective interventions. Therefore, therapist responsiveness to self, or consistency in their behaviors or interventions, may be particularly important and therapeutic later in therapy. It's also possible that therapist consistency could be more needed when the client shows stronger variations in emotional or interpersonal presence, which could

be less likely to happen in the very first session, than in multiple sessions sampled across the course of therapy. Therefore in sum, the limited statistical power and the sampling of only the first session may be possible reasons accounting for the non-significant findings for the effects of therapist responsiveness to self.

Taken together, to address aforementioned limitations in existing literature on therapist responsiveness, this study, based on the Interpersonal Theory (Kiesler, 1988) framework, applied the ODE model to quantify therapist responsiveness from actual therapy process data, and used multilevel data disaggregation to decompose the therapist-client dynamics coefficients to clearly differentiate them in different levels of analyses. Results preliminarily suggested that benefit of therapist being generally responsive in an anti-complementary way to clients across caseload with regard to relational control in the first session, i.e., appropriately taking control and probing for deeper exploration while the client was taking lead in telling their stories. However, no support was found for the complementary type of therapist responsiveness to client as hypothesized in the Interpersonal Theory (Kiesler, 1988), nor for the therapist responsiveness to self on any of the two levels.

Limitations and Future Directions

The first limitation of this study is that the obtained four parameters, though being able to capture the nonlinear dynamics between the therapist and client dyad, cannot conceptually and statistically differentiate the sources of the within-therapist between-client effects. As stated earlier, because each client only sees one therapist in this study, the between-client effect is a combination of both the client's main effect (that is due to the client's own characteristics) and the therapist-client relationship effect (that is due to the distinct interaction in this particular dyad). Therefore, one

cannot identify the source of the within-therapist effects—whether it is coming from the client or from the therapist-client interaction. Interpretations of such within-therapist findings may have to be limited to depicting the types of dynamics between the therapist and the client (e.g., the therapist being highly responsive to the client's influence) and how one type might be correlated with client's session outcome. The between-therapist components, however, are unconfounded and purely represent the general characteristics of the therapist, which this study will focus mostly on.

Secondly, due to the scope of this study, only two of the four dynamic coefficients that capture therapist responsiveness to self and responsiveness to client are used in the subsequent multilevel data partitioning and multilevel modeling analysis. This aligns with the research question of this study and what the trainee Hongyang asks in the opening clinical vignette, but misses out on another two important aspects of the therapist-client dyadic dynamics: client's responsiveness to therapist's influence and client's responsiveness to him- or herself, i.e., the client's consistency or stability. Future studies may expand the research topic and explore how all four types of therapist-client dyadic dynamics (therapist consistency, therapist responsiveness to client, client consistency, client responsiveness to therapist) may be associated with client outcome.

Thirdly, the sample sizes at both of the two levels of this study are relatively small. Though we used the maximum possible sample size of therapists (all 38 therapists with available video recordings) in this clinic, and the sample size of this study was larger than many other HLM studies on therapy process (e.g. , Kivlighan, Gelso, Ain, Hummel, & Markin, 2015; Kivlighan et al., 2016; Kivlighan et al., 2014), post-hoc power analysis showed that while most of the estimates were accurate, there was a lack of power to detect potential significance for some prediction effects,

especially for therapist responsiveness to self. Also, due to practical and administrative limitations, sessions from only three clients under each therapist were coded and analyzed. Although Maas and Hox (2005) suggested through their simulations that it was the sample size at the highest level (i.e., the therapist level in this study) that determined whether fixed effects and random effects were estimated without bias, the small number of clients within each therapist did impose limitations on the *generalizability* of the within-therapist between-client findings in this study. It is recommended that future studies examine sessions from more clients under each therapist, and use a larger sample of therapists to test whether the findings in this study could be replicated.

The fourth limitation of this study lies in its sampling of only the first session of each therapist-client dyad, and its focus only on the Control and Affiliation dimensions. As discussed previously, the examined session being the first formal session between the therapist and client (beyond the intake interview session) may be one reason for the specific interactional pattern (therapist mostly listened to client narratives with occasional probing questions/reflections) between the therapy dyad, which could have potentially explained the finding that was contrary to the predictions in the Interpersonal Theory (Kiesler, 1988). Therefore, it is very important to note that results in this study may not be generalized as representing a full test of Kiesler (1988)'s theoretical propositions due to this limitation of sampling only the first therapy session. Results could possibly be different if more sessions, or segments from more than one session, were sampled where the therapists' and clients' interactional patterns would show more variance. Moreover, future research may also include time or stage of therapy as a potential moderator, as different interactional dynamics between the therapist and client may have different effects at different times

across the whole therapy process. In addition, as aforementioned therapist responsiveness can also be manifested in different aspects beyond interpersonal dynamics of mutual Control and Affiliation. The use of this theoretical framework in this study limited the investigation of therapist responsiveness just in terms of the dominance and friendliness between therapist and client, and future studies on responsiveness can also expand the scope to measure other aspects of behaviors between the therapy dyads.Last but not least, in the video rating process, this study decided to split the sessions into 2-minute segments, and asked raters to provide ratings based on each 2-minute segment as rating units. This decision was based on previous reliability evidence (Kiesler, 2004), as well as from the actual practice of the rating process. However, this decision was somewhat arbitrary and may have left out changes in short interactions within the 2-minute time span. Future research may use other intervals for the video rating, or use the joystick method (Lizdek, et al., 2012) for obtaining continuous ratings, and examine whether findings in this study could be replicated.

Table 1.

Descriptive Statistics of Ratings for Therapist and Client Control and Affiliation, the

Dynamic Coefficients, and Client Working Alliance.

	Min	Max	M	SD	Skewness	Kurtosis
Therapist Control	-2.00	2.00	0.35	0.47	0.57	1.68
Client Control	-3.00	2.00	0.60	0.61	-0.76	4.65
Therapist Affiliation	-0.25	3.00	0.75	0.54	0.44	-0.19
Client Affiliation	-1.33	3.00	0.45	0.53	0.96	1.16
Control dimension b_{T2T}	-1.66	-0.01	-0.91	0.28	-0.10	0.37
Control dimension b_{C2T}	-1.08	1.01	-0.01	0.34	-0.04	1.27
Affiliation dimension b_{T2T}	-1.53	-0.29	-0.86	0.25	0.13	0.10
Affiliation dimension b_{C2T}	-1.09	0.88	0.02	0.28	0.44	0.92
Client Working Alliance	1.33	5.00	3.34	0.79	0.11	-0.42

Table 2.

Estimation Results for the Final HLM Model.

Fixed Effects	Coefficient	SE	t	df	p	ES[a]
For Control Dimension:						
Grand Intercept, G00	3.52	0.15	24.15	35	0.000	---
Between-Therapist b_{T2T} Slope, G01	-0.26	0.41	-0.65	35	0.522	-.06
Between-Therapist b_{C2T} Slope, G02	0.57	0.22	2.59	35	0.014	.15
Dummy1 Slope, G10	-0.17	0.18	-0.91	104	0.364	---
Dummy2 Slope, G20	-0.39	0.18	-2.20	104	0.030	---
Between-Client b_{T2T} Slope, G30	0.43	0.37	1.17	104	0.246	.12
Between-Client b_{C2T} Slope, G40	-0.33	0.30	-1.10	104	0.273	-.11
For Affiliation Dimension:						
Grand Intercept, G00	3.59	0.14	24.95	35	0.000	---
Between-Therapist b_{T2T} Slope, G01	0.45	0.50	0.90	35	0.373	.09
Between-Therapist b_{C2T} Slope, G02	-0.15	0.48	-0.32	35	0.754	-.03
Dummy1 Slope, G10	-0.25	0.18	-1.38	104	0.172	---
Dummy2 Slope, G20	-0.49	0.17	-2.83	104	0.006	---
Between-Client b_{T2T} Slope, G30	0.05	0.35	0.15	104	0.879	.01
Between-Client b_{C2T} Slope, G40	0.27	0.26	1.04	104	0.300	.08

Random Effects	SD	VC[b]	df	χ^2	p
For Control Dimension:					
Between-Therapist Intercept: U0	0.04	0.002	35	31.40	>.500
Between-Client Intercept: R	0.77	0.587	---	---	---
For Affiliation Dimension:					
Between-Therapist Intercept: U0	0.04	0.002	35	31.99	>.500
Between-Client Intercept: R	0.78	0.605	---	---	---

Note. [a]: ES = Effect Size (as represented by completely standardized regression coefficient estimates). [b]: VC = Variance Component.

Table 3.

Post-hoc Power Analysis Using Monte Carlo Simulation for the Final HLM Model.

Fixed Effects	Population Parameter	Average Estimate	Bias Rate	95% Coverage	Power	Power (Larger N)
For Control Dimension:						
Between-Therapist b_{T2T} Slope, G01	-0.26	-0.2774	0.07	.91	.24	.87
Between-Therapist b_{C2T} Slope, G02	0.57	0.5631	0.01	.92	.81	1.00
Between-Client b_{T2T} Slope, G30	0.43	0.4504	0.05	.97	.64	1.00
Between-Client b_{C2T} Slope, G40	-0.33	-0.3428	0.04	.98	.54	1.00
For Affiliation Dimension:						
Between-Therapist b_{T2T} Slope, G01	0.45	0.4498	0.00	.90	.97	1.00
Between-Therapist b_{C2T} Slope, G02	-0.15	-0.1506	0.00	.93	.14	.68
Between-Client b_{T2T} Slope, G30	0.05	0.0643	0.29	.95	.04	.31
Between-Client b_{C2T} Slope, G40	0.27	0.2717	0.01	.95	.37	1.00

Note. The Power column presents the actual post-hoc power estimates for the Final HLM model. The Power (Larger N) column presents

the power analysis for the same final HLM model, assuming a hypothetical 50 therapists, 30 clients each therapist, and totally 1500

sessions being rated.

Appendix A: Comprehensive Literature Review

Chapter One. Literature Review about Responsiveness in Psychotherapy

Definitions and Conceptual Considerations

Psychotherapy is considered as a nonlinear responsive process (Stiles et al., 1998), where feedback and mutual influence can happen at all aspects and stages of its course. This includes treatment assignment, case conceptualization, intervention planning and delivery, and outcome evaluation (Stiles et al., 1998). In a seminal paper, Stiles et al. (1998) formally proposed the term of responsiveness in psychotherapy, and defined it as therapist's or client's behaviors that are affected by the emerging context, including the emerging perceptions of other interactant's characteristics and behaviors (Stiles, 2009; Stiles et al., 1998). This conceptualization implies a dynamic relationship between the two interactants and involves bidirectional feedback loops. For example, the therapist may increase her use of affect focused interventions based on the client's receptive reactions to her initial attempts to explore emotions, which further deepens the client's emotional experiential level and facilitates her emotion work. Another therapist whose client is hostile and resistant may get frustrated and perhaps unconsciously becomes more critical and less empathic, which further moves the client towards a more hostile and resistant position.

Several important conceptual considerations should be discussed about the Stiles et al. (1998) conceptualization of responsiveness. First, according to this definition (Stiles et al., 1998), a responsive therapist is someone who adjusts behaviors and interventions based on the client's characteristics and behaviors, in other words, a responsive therapist's behaviors in the session are constantly impacted by the behaviors and feedback of their client (Stiles & Horvath, 2017). Therefore, the construct of therapist responsiveness depicts a phenomenon that the therapist is

receptive of the client's input and susceptible to the client's influence. It is of crucial importance to note that a therapist can be responsive to a certain behavior of the client in multiple different ways (Stiles & Horvath, 2017). For example, the therapist may be responsive to client's dominant behaviors in the session by increasingly becoming more dominant and controlling as well, or the therapist may go along with the client's power move by adopting a more submissive stance.

Because therapist responsiveness only implies therapist's receptiveness to client's influence and therapists can be responsive in different ways, the term "responsiveness" is technically neutral. Stiles and Horvath (2017) proposed the term of "appropriate responsiveness" to specifically indicate the helpful and facilitative type of therapist responsiveness in terms of providing the correct response or intervention based on the context. This study concurred with the argument in Stiles and Horvath (2017) and conceptualized "responsiveness" in a neutral manner, and maintained that it does not necessarily represent a facilitative construct. For example, in psychodynamic-interpersonal therapy, it is argued that sometimes therapist may need to intentionally counter client's maladaptive interpersonal "pull" (e.g., pulling for constant reassurance from the therapist), thus not being responsive to the client, in order to provide a corrective and therapeutic experience (Kiesler, 1988). In this clinical example, the therapist's being responsive in the way of going along with client's interpersonal "pull" may counterproductively lead to a repetition of the client's maladaptive pattern thus less effective sessions.

Third, responsiveness is proposed to contrast with the linear and ballistic logic and statistics that prevail in psychotherapy research, wherein "an action is often considered or modeled to be determined at its inception and to be carried through regardless of external events (Stiles et al., 1998, p. 440)". As Stiles (2009) pointed

out, in many RCT designs about psychotherapy effectiveness research, assigning clients to a certain treatment condition (e.g., clients receiving Cognitive Behavioral Therapy) is based on a ballistic logic assuming that clients in the same treatment condition are receiving identical treatments and there is a direct causal relationship between treatment received and client outcome. However, clinical experiences suggest to us that therapists do (or sometimes may have to) make adjustments or adaptations, even in manualized treatment, in response to varying client characteristics and clinical situations, and such flexibility is empirically found to be positively related to treatment outcome (Owen & Hilsenroth, 2014).

Fourth, the concept of responsiveness in this study and aforementioned earlier writings is intended to be general and inclusive. It depicts the broad phenomenon of therapist and client responding to each other based on the emerging context and each other's responses, and is not confined to imply specific terms of connotations such as maternal responsiveness (Richman et al., 1992), emotional responsiveness (Mullin & Linz, 1995), or treatment responsiveness (Pelham et al., 1993). Moreover, responsiveness is also not opposed to other specific terms such as directiveness, because a therapist could use directive interventions responsively (Greenberg et al., 1993) when a client's clinical situation requires therapist's active intervention.

Existing Literature Related to Responsiveness in Psychotherapy

A review of existing literature on therapist responsiveness reveals three broad categories that empirical studies relevant to this topic may be categorized into. These categories of studies will be specifically reviewed below.

Category One. Studies in the first category operationalized therapist responsiveness as therapist adjusting intervention or providing specific or

individualized intervention in response to different client characteristics, including treatment selection and planning based on clients' problems and characteristics, as well as the timing and phrasing of interventions based on clients' level of understanding and emotional state. A proportion of these studies looked at how such adjustments related to session outcome or therapy outcome.

Hardy et al. (1998) studied 114 clients seen by five clinical psychologist therapists. In two time-limited manualized treatments (psychodynamic-interpersonal and cognitive-behavioral), researchers assigned the clients to one of three interpersonal style categories based on the clients' predominant interpersonal style (over-involved, under-involved, or balanced). Therapists were not told about the clients' interpersonal styles, but were found to differ systematically in responding to their clients in different interpersonal style categories. Specifically, therapists tended to use more affective and relationship-oriented interventions (e.g., encouraging emotional experiencing) with over-involved clients, particularly in psychodynamic-interpersonal treatment. However, therapists tended to use more cognitive-behavioral interventions (e.g., identifying irrational thoughts) with under-involved clients, particularly in cognitive-behavioral treatment (CBT). In spite of these differences in therapist interventions for different client interpersonal style categories, treatment outcomes of these three interpersonal style groups were not significantly different, which researchers argued to be in support of a view that the differences in treatment implementation reflected appropriate responsiveness to clients' interpersonal styles, which yielded equivalent outcomes.

Lowe (2005) investigated the role of collectivism and how therapists responded in alignment with this cultural orientation in career counseling with a sample of 103 university students in the US who self-identified as Asian American or

Pacific Islander (AAPI). Four European American female doctoral students were recruited as counselors in this study, and received training on cultural orientations, specifically individualism and collectivism, and multicultural competency. Then researchers randomly assigned the counselors into an individualism-oriented group and a collectivism-oriented group, and instructed the counselors to make at least five reflections, statements, or questions consistent with their designated orientation, and to minimize expressions of the other orientation in their career exploration sessions with clients. Clients rated their therapists' cross-cultural competence after the sessions, and it was found that clients' collectivistic orientation scores and the collectivism-oriented treatment positively predicted therapists' cross-cultural competence. The researchers argued that these results highlighted the importance of therapist responsiveness in terms of providing treatments that align with clients' cultural orientation.

Janzen (2008) investigated client's attachment styles and therapist's responsiveness in relationship building incidents. With Study 1 using a sample of 30 clients working with novice therapists and Study 2 using a sample of 26 clients working with 24 therapists in training, this study found out that relationship building events contributed to the early development of therapeutic alliance, and therapist responded differently to clients with different attachment styles in these relationship building events. Specifically, for clients with attachment avoidance who generally protect themselves from expected rejection by taking a defensive, distancing stance, therapists in this study tended to use more interventions that reflect emotions and balanced them with suggestions and support. This approach was argued to be both proximity-seeking in terms of pursuing client emotions but also appealing to client's intellectualizing and distancing side. For clients with attachment anxiety who fear

abandonment, in relationship building events therapist refrained from actively fostering a collaborative relationship in early sessions, used less transference interpretations, and were less emotionally expressive.

Anderson, Knobloch-Fedders, Stiles, Ordoñez, and Heckman (2012) investigated therapists' responses to clients in low-hostile versus moderate-hostile interpersonal episode in time-limited psychodynamic psychotherapy. Researchers analyzed 62 cases by categorizing them based on clients' interpersonal hostility and coded these sessions using a taxonomy of speech acts (Stiles, 1992). Results suggested that compared with low-hostility episode, therapists in moderate-hostility episode used more interpretation and educational interventions and less questions and reflections with the client. This study provided another piece of evidence that therapists' interventions in the session could be shaped by the context of the session and the nature of interaction between the therapist and the client, which indirectly implied therapist's responsiveness to the therapy dynamics.

Despland et al. (2001) examined the associations between defense mechanisms, therapist interventions, and working alliance in therapy. Sampling 12 patients receiving brief psychodynamic treatment (4 sessions) with five participating therapists, this study revealed that the degree of therapists' adjustment of interventions based on clients' level of defensive functioning was associated with the quality of their therapeutic alliance. Specifically, therapists' responsiveness in intervention adjustment involved using more interpretations facing clients with mature defense mechanisms and using more supportive interventions facing clients with immature defense mechanisms.

Finally, Caspar et al. (2005) explored whether therapists' responsiveness to clients' interpersonal pattern by developing a complementary therapeutic relationship

with the clients was associated with improved psychotherapy outcome. According to the tenet of interpersonal psychotherapy, therapists are expected to help establish a complementary therapeutic relationship to each patient, which is an individually "customized" relationship that is based on the patient's predominant interpersonal pattern and suits their most important therapeutic goals. Using a sample of 22 inpatient clients with major depression and 8 therapists with psychodynamic-interpersonal orientation, this study found out that for clients with low levels of assertiveness, therapists were more able to develop a complementary therapeutic relationship and use more motivation-oriented therapeutic intervention strategies, compared to therapist working with clients who were cold and vindictive where the therapist's use of motivation-oriented relationship interventions was rare. The extent to which the therapists were able to build the complementary therapeutic relationship based on their Plan Analysis case formulation was also positively associated with clients' self-reported level of symptom amelioration.

Summary and Critique about Studies in Category One. The reviewed studies in the first category jointly suggested several propositions. First, one way therapists show responsiveness in the psychotherapy process can be manifested in their planning and adjustments of interventions based on their clients' input and the immediate therapeutic context. For example, clients' attachment styles (Janzen, 2008), relational involvement (Hardy et al., 1998), interpersonal assertiveness (Caspar et al., 2005), cultural orientation (Lowe, 2005), and defense mechanisms (Despland et al., 2001) were all found to inform or influence the therapist's choice and adjustment of intervention strategies. The session context, e.g., interpersonal hostility (Anderson et al., 2012), also shaped therapists' interpersonal responses and interventions. Second, a couple of studies in this category further demonstrated that therapists' adjustments in

response to clients' input was associated with positive effects on both the therapeutic process, e.g., working alliance (Despland et al., 2001; Janzen, 2008), and therapy outcome (Caspar et al., 2005).

Several important limitations and critiques should also be noted about this category of studies. First and foremost, therapist responsiveness was manifested in all these studies as (1) therapist adjusting or adapting interventions based on their perception of clients' characteristics or their interactive dynamics with the client, or as (2) therapist being influenced by clients' input or their session contexts. While this may allude to the idea of therapist responsiveness, these studies assumed more a "static" perspective and studied the responsiveness only at the client level, i.e., characteristic X of the client or of the session context impacts intervention Y of the therapist, which, in fact, did not capture the dynamic relationship and the cyclical feedback loops between the client and the therapist as suggested by the definition of responsiveness (Stiles et al., 1998) that may be unveiled at the within-session level. Furthermore, this "static" perspective could confound results in these studies (e.g., Lowe, 2005) with the "what treatment for whom" framework. Because therapist responsiveness was "implied" rather than *directly measured* and modeled, it is not clear whether it was the construct of therapist responsiveness (e.g., therapist providing collectivism-oriented interventions in response to client's cultural background in Lowe, 2005) that predicted the outcome, or it was the treatment modality for that client characteristics or population (e.g., collectivism-oriented interventions for collectivistic AAPI clients). Third, none of the reviewed studies in this category differentiated different levels of analyses both conceptually and statistically, but conducted analyses on the between-client level. This between-client approach introduced conceptual ambiguities regarding the construct of responsiveness. For

instance, at the between-client level, therapist responsiveness is also a reflection of client's influence. Without properly decompose the effects into the between-therapist and within-therapist between-client levels, one cannot disentangle how much it is coming from the general level of the therapist's responsiveness, the general level of the client's influence, and the specific interactive effects between this therapist-client dyad (Kenny & La Voie, 1984). This lack of differentiation of effects on the therapist and client levels also potentially contributed to its confound the "what treatment for whom" framework, alternatively suggesting different clients needing different treatment rather than therapist being responsive in a way that she or he responds differently with one client in comparison to her or his another client.

Category Two. Studies in the second category considered responsiveness as a type of therapist competence. As stated in the critique of studies in Category 1, none of them directly measured therapist responsiveness in a way that is aligned with the original definition and conceptualization of this construct (Stiles et al., 1998). The two studies located and categorized into Category 2 attempted to address this issue by developing measures for therapist responsiveness and relating it to therapy outcome. These two studies are reviewed below.

Richards et al. (2013) compared the efficacy of two online CBT programs (self-administered online CBT and therapist-assisted email CBT) and investigated the role of therapist responsiveness in facilitating treatment outcome. Researchers in this study developed five items "from the previous experience of the therapists in online counselling (p. 187)" to assess five aspects of therapists' responsiveness using a dichotomous nominal scale ('Present' or 'Absent'): (a) empathy and acknowledgement of emotions, (b) provision of guidance and information, (c) validation of successes, (d) promotion of self-care and social support, and (e) building

alliance. Raters were asked to review a random subsample of therapists' written responses and rate the presence or absence of each of these five aspects for each segment of therapists' responses. The interrater reliability as measured by Cohen's Kappa (Landis & Koch, 1977) was reported to range from .48 to .66. Interestingly however, the researchers did not report the association between this responsiveness measure to the treatment outcome for any of the two CBT programs.

A later study by Elkin et al. (2014) more specifically investigated the construct of therapist responsiveness by developing a measure and testing its relationship with client outcomes. These researchers operationalized therapist responsiveness as "the degree to which the therapist is attentive to the patient; is acknowledging and attempting to understand the patient's current concerns; is clearly interested in and responding to the patient's communication, both in terms of content and feelings; and is caring, affirming, and respectful towards the patient (p. 53)". Their measure "Therapist Responsiveness Scale" had three components. Part 1 had totally eleven items rated at 5-minute intervals on a 0 to 4 scale. This part included eight positive items (e.g., makes eye contact, focuses on and demonstrates interest in the patient, responds to verbally expressed feelings, etc.) to reflect the presence of therapist responsiveness, and three negative items (e.g., disrupts the flow of the session, etc.) to reflect the absence of responsiveness. Part 2 consisted of items that are rated globally on a scale from 0 to 4 based on the entire session, including, for example, "therapist exhibits compatible level of discourse", "therapist exhibits appropriate level of emotional quality and intensity", "therapist is caring, compassionate, and respectful", "patient exhibits resistant and/or hostile behavior", etc. Part 3 of the scale has only one item asking the rater for a global rating of the therapist's responsiveness after providing the rater with the aforementioned definition of therapist responsiveness in

Elkin et al. (2014).

Elkin et al. (2014) used Principle Axis Factoring to conduct Exploratory Factor Analysis and identified a four-factor structure of the scale, named as: attentiveness, early empathic responding, negative therapist behavior, and positive therapeutic atmosphere; plus a global therapist responsiveness item. Relating this structure to therapy outcome, results suggested that the factor of positive therapeutic atmosphere, as well as the global item of therapist responsiveness, predicted both the patient's positive perception of the therapeutic relationship after the second session and the patient's retention in therapy for more than four sessions. The factor of negative therapist behavior factor also predicted early termination. Factors measuring therapist attentiveness and early empathic responding did not predict the outcome variables.

Summary and Critique about Studies in Category Two. In summary, the two studies in the second category of the literature attempted to operationalize and quantify therapist responsiveness considering it a type of therapist characteristics, skill, or competence. Researchers in both these two studies strived to identify and operationally define important aspects or components of therapist's responsiveness, and to develop measures to capture these aspects. Shared in these two measures are therapists' empathy, attentiveness, appropriate and compatible response to clients, and a positive alliance relationship. This notion makes theoretical and clinical sense, in that one would agree some therapists are generally more responsive—demonstrating higher levels of these aspects—than other therapists. However, the definitions and measures of responsiveness in these two studies are also subject to a number of important critiques. Firstly, the operational definition and measurement structure of responsiveness in these two studies are conceptually entangled with many other psychotherapy process measures, for example therapist empathy and attentiveness,

supportive therapeutic environment, positive therapeutic alliance, etc. Some aspects

may also be confounded with specific therapist techniques/interventions, for instance

the "provision of guidance and information" aspect in the Richards et al. (2013)

measure. Such conflation with other constructs or process measures likely have

undermined the construct clarity and validity of these two measures as pointed out in

Kramer and Stiles (2015) as well. Secondly, by measuring responsiveness simply as a

skill factor about the therapist only, these definitions and conceptualizations similarly

do not address what the term itself and the original definition (Stiles et al., 1998)

suggest about the dynamic relationship, the fluid and adaptive process, and the mutual

feedback and impacts between the therapist and client dyad (Kramer & Stiles, 2015;

Stiles, 2009). Thirdly, although the Elkin et al. (2014) measure had one item "patient

exhibits resistant and/or hostile behavior" to address the role of client in this

interactive process, this does not reflect therapist's responsiveness and cannot

differentiate how much the therapist's responsiveness assessed by the measure can be

attributed to therapist's general overall responsiveness capability, or to the client's

characteristics and the distinct interaction and relationship between this dyad. Lastly,

some measurement issues were also present for these two therapist responsiveness

scales. For example, the Richards et al. (2013) scale had relatively low interrater

reliability as measured by Cohen's Kappa (Landis & Koch, 1977); while Elkin et al.

(2014) did not find support for the predictive validity of two of its four subscales.

Category Three. The third category encompasses a series of studies using the

Actor-Partner Interdependence Modeling (APIM; Cook & Kenny, 2005; Kenny &

Ledermann, 2010) in examining the dyadic effects between therapist and client. The

APIM proposes and models four types of effects. Therapist actor effect means how

therapist's own rating on construct X predicts their own rating on construct Y.

Similarly, client actor effect means how client's own rating on construct X predicts their own rating on construct Y. Therapist to client partner effect means   how therapist's rating on construct X predicts client's rating on construct Y. And client to therapist partner effect means how client's rating on construct X predicts the therapist's rating on construct Y. This model alludes to the notion of responsiveness by examining how one party's rating may be predicted by the other party's rating, while accounting for one's own rating at the same time.

Seven studies were located that can be categorized into this category. Using a sample of 74 clients being treated by 29 therapists, Kivlighan et al. (2014) employed APIM to examine the relationship between the therapist's and client's ratings of working alliance and session outcome, and how the actor-partner effects were moderated by clients' treatment outcome. The authors found significant actor effects for both client and therapist alliance ratings on their own session outcome ratings. Significant partner effects were also discovered: client ratings of alliance predicted therapist ratings of session depth. For clients having made reliable change in treatment, i.e., obtaining better treatment outcome, increase in client-reported alliance was related to therapist reporting higher level of after-session arousal, a factor of therapist's evaluation of the therapy session.

Markin et al. (2014) applied APIM to investigate the relationship between client- and therapist-rated real relationship and session quality over time. Using a sample of 25 therapists and their 87 clients, this study found that therapists' current session quality ratings were significantly predicted by (a) their real relationship rating in the previous session, (b) their client's real relationship rating in the previous session, (c) session number, i.e., time during the treatment process, and (d) interaction between their own real relationship and session number, and interaction between their

clients' real relationship and session number. Simple slope analyses revealed that earlier in therapy therapist's own previous rating of real relationship positively predicted their current session quality and later in therapy this trend became nonsignificant. A similar pattern was also observed for the client to therapist partner effect, such that client's previous rating of real relationship was positively predictive of therapist's current session quality only during earlier phase of therapy. Regarding clients' rating of current session quality, it was significantly predicted only by their own real relationship in the previous session, suggesting that there only existed a client actor effect.

Zilcha-Mano et al. (2016) utilized APIM to examine therapists' and clients' ratings of working alliance and how they interactively predicted session outcome at the within-patient and between-patient levels. With a sample of 181 therapists and the 241 clients they treated, this study found that patient reported alliance predicted patient report of session outcome at both the between-patient and within-patient levels (actor effects on both levels), as well as therapist reported session outcome at the within-patient level (patient to therapist partner effect). For therapist rated alliance, only actor effects were significant, i.e., it only predicted their own rating of outcome at both the between-patient and within-patient levels.

Kivlighan (2007) utilized APIM to investigate the relationships between therapists' and clients' ratings of working alliance and session outcome, and how the actor and partner effects differed across different roles (therapist versus client). Moreover, this study also explored how client-therapist agreement on their ratings of the working alliance might correlate with session outcome. Data was collected from 53 therapist-client dyads (each therapist saw only one client), and results indicated that there were significant actor effects for both the therapist and the client so that

their rating of working alliance predicted their own rating of session outcome. There was a significant partner effect by role interaction, which suggested that the partner effects were not uniform across the therapist and client roles. Specifically, higher levels of therapist-rated working alliance were associated with higher levels of client-rated session depth. However, higher levels of client-rated working alliance predicted lower levels of therapist-rated session depth.

Similarly, Gelso et al. (2012) explored the associations between clients' and therapists' perceptions of real relationship with each other and with the outcome of brief psychotherapy under the APIM framework. This study also attempted to examine whether changes over time in therapists' and clients' ratings of real relationship as well as their convergence in perception predicted therapy outcome. Sampling 19 therapists and their 42 clients, this study revealed that client-rated real relationship with all sessions combined positively related to both clients' and therapists' ratings of treatment outcome, suggesting significant client actor and partner effects; whereas therapists' ratings of the real relationship were unrelated to outcome as assessed by either clients or therapists. Moreover, increases over time in therapists' ratings of real relationship, as well as increasing convergence between therapists' and clients' ratings of the real relationship, did positively relate to therapist rating of outcome.

Kivlighan et al. (2015) re-analyzed the data from the Gelso et al. (2012) study reviewed above. Researchers in this study attempted to disaggregate therapists' and clients' real relationship ratings into between-therapist and within-therapist (between-client) components and explore their associations with therapy outcome using the APIM method. They found that clients whose therapists on average were rated by clients as having established a better real relationship across all clients on the caseload

had better therapy progress ratings from both themselves and their therapists; however, clients whose therapists built higher average levels of real relationship as reported by the therapist across all the clients on caseload, had worse progress ratings from the therapists. These results suggested that on the therapist level, clients' perceptions of real relationship significantly and positively predicted both therapists' and clients' outcome rating; whereas therapists' perceptions of real relationship significantly predicted therapists' outcome ratings but did not predict clients' outcome ratings.

Finally, Kivlighan et al. (2016) conducted a study aiming at more specifically examine the actor-partner effects at different points of time during therapy regarding therapists' and clients' evaluations of working alliance, real relationship, session quality, and client improvement. Using a sample of 22 therapists and their 74 clients whom they worked with for at least 8 sessions, these researchers found significant actor effects for both therapists and clients, with each party's own ratings of working alliance and real relationship independently predicting their own evaluation of session quality. In terms of partner effects, client ratings of working alliance and real relationship independently predicted their therapists' evaluations of session quality, with a stronger partner effect for real relationship in later sessions than in earlier sessions. Therapists' real relationship ratings showed stronger predicting effects on clients' session quality ratings in later sessions than in earlier sessions, while therapists' working alliance ratings showed stronger predicting effects on clients' session quality ratings when clients made greater improvement than when clients made less improvement. These results showed consistent significant actor effects of therapists' and clients' relationship ratings on their own outcome ratings, and provided support to partner effects for both the client to therapist direction as well as the

therapist to client direction. Moreover, potential moderators (timing during the treatment, overall client progress, etc.) that need to be further explored and replicated.

Summary and Critique about Studies in Category Three. Taken together, the APIM studies reviewed above allude to the concept of responsiveness and may provide implications for responsiveness research because these findings suggested that therapist's and client's ratings of session or therapy outcome were indeed influenced by both their own and the other interactant's ratings of process variables (working alliance, real relationship, etc.), in other words, they can be considered as "responsive" to the input of their own perception, as well as the other party's perception. Specifically regarding the partner effect, i.e., mutual influence or the responsiveness of each party to the influence of the other party, the findings are relatively mixed but evidence does exist to support the responsiveness of both the therapist to the client's influence, and the client to the therapist's influence. Specifically, more findings appeared to support the effect clients exerted on therapist, i.e., the therapist being responsive to the client, in that several studies found significant client partner effects on therapist ratings, but nonsignificant therapist partner effects on client ratings (e.g., Kivlighan et al., 2014; Zilcha-Mano et al., 2016). However, other studies also yielded inconsistent findings contrary to this claim (e.g., Kivlighan, 2007; Markin et al., 2014). Furthermore, the Kivlighan et al. (2016) further suggested that the presence and strength of the partner effects may be dependent on other possible moderating variables, including timing in the therapy process and overall progress of the client, which call for more nuanced examinations.

Several critiques should also be discussed about this category of literature. First, the APIM studies, although by its design allude to the notion of responsiveness, still have not *directly* addressed responsiveness as the term and the original definition

(Stiles et al., 1998) suggest. This is because that the APIM reveals how the therapists' and clients' outcome ratings are predicted by the input from both themselves and their partners, which has implications about the mutual influence and receptiveness between the therapist and the client. However, it does not directly model and investigate the dynamic process how the subsequent behaviors of the therapist and the client are influenced by the antecedent behaviors of their own and the other interactant, which further inform their following behaviors. Secondly, while findings in this category of APIM studies provided some empirical bases for speculating a responsive process from the therapist to the client and vice versa, they did not directly quantify and measure the level of responsiveness (as the studies in Category Two attempted to do, for example), nor did they relate the measured "level of responsiveness" to session or therapy outcome. Thirdly, the APIM studies have provided indirect support to the notion of responsiveness to self, that there is some consistency between therapist's and client's ratings of process variables and their own ratings of outcome, however, it does not tap into the question, as asked in the title of this study—"Follow you, or follow me"—regarding the optimal combination between therapist's responsiveness to self and to the client, i.e., how does a therapist's stance in terms of responsiveness to self and responsiveness to client relate to therapy outcome? This question has not been answered by the existing APIM studies.

Category Four. Studies in the fourth category focused on examining the interpersonal dynamics with regard to reciprocal influence/control between the therapist and the client in their therapy sessions. This implies responsiveness because one cannot be influential without the other being responsive, and one cannot be responsive without receiving an influence message from the other.

One subset of studies examined the question "what is the relational control

pattern in therapy", in other words, who is in control or who influences the other more. Bischoff and Tracey (1995) examined the relationship between client's resistant behaviors and therapist's use of directive interventions in a sample of 10 therapy sessions. Relational control was operationalized as the extent to which the behavior of one party was impacted or shaped by the antecedent behavior of the other party. The researchers coded the therapists' and clients' speaking turns, which categorized clients' behaviors into resistant and non-resistant categories, and therapists' behaviors into directive and non-directive categories. Sequential analysis was conducted to examine the transition matrix from therapists' behaviors to clients' behaviors and the other way around. Results indicated that in an overall trend, therapist directive behavior slightly increased the probability of subsequent client resistance whereas similar effect of client behavior on subsequent therapist behavior was not found. According to the operational definition of relational control in this study, this study suggested that therapist was more in relational control since their behaviors significantly impacted the client's subsequent behaviors, rather than the other way around.

Lichtenberg and Semon (1986) investigated the dynamics of social influence and relational control using a single case study design consisting of 12 sessions between one therapist and one client. The authors conceptualized therapist-client dynamic relationships as "one-up" or dominant, "one-down" or subordinate, and "one-across" or neutral in dominance. The level of social influence or relational control between the behaviors of the interactants was measured by an "ambiguity index", which quantified the uncertainty of a response behavior Y following a known antecedent behavior X. The larger the ambiguity index for a given antecedent behavior X, the greater the uncertainty of the subsequent behavior Y, thus the less

influential or controlling the antecedent behavior X was. Results indicated the vast majority of responses in this case were one-across which minimized or neutralized the relational control aspect of communication. The therapist appeared to be slightly more in the "one-up" position, though not necessarily dominant, than the client. The authors did not consider therapy outcome in this study.

Wampold and Kim (1989) used sequential analytic methods (Wampold, 1984; Wampold & Margolin, 1982) and investigated the relative influence of counselor and client verbal responses on the immediate responses of the other. Relational control was operationalized as one party's response being statistically dependent on the other party's antecedent behavior instead of the other way around. It was found that the counselor's behavior was more predictable from the client's behavior than the client's behavior was from the counselor's behavior. That is, it was the client, rather than the counselor, who was relatively in more relational control. The authors also did not relate the relational control pattern to the therapy outcomes.

Another subset of studies in Category Four specifically examined the association between the mutual influence/control patterns between the therapist and the client and therapy process or outcome. Tracey (1985) investigated the assertion that successful therapy was characterized by higher level of therapist control or dominance (Haley, 1963). The three best and the three worst dyads in terms of both client- and therapist-rated outcome were selected for analysis. Control was operationalized by statistical dependency, i.e., the extent to which each participant's topical response was predictable based on the other's previous response. Results demonstrated that therapists were dominant in the successful dyads, whereas dependency was equal in the unsuccessful dyads. Furthermore, this study also found that therapist dominance was found only in the middle, conflict stage of the overall

therapy process. These findings provided preliminary support to the hypothesis that higher level of therapist influence was associated with better therapy outcome.

Lichtenberg et al. (1998) examined seven psychotherapy cases to test the association between relational control of the therapist/client and the therapeutic relationship and therapy outcome. The authors conceptualized relational control as "the extent to which the responses of one speaker (therapist or client) increased the predictability of the other's subsequent responses (p. 326)". For example, the more a client's response is predictable from, or conditional on, the response of the therapist, the more the client's response is influenced or controlled by the response of the therapist, thus the more influential and controlling the therapist. Results of this study indicated that overall, client evidenced more relational control than therapists did. However, in successful cases with better treatment outcomes, the difference in relational control between the client and the therapist was smaller than that of cases with unsuccessful outcome. In other words, while overall client exerted more control than therapists, successful cases seemed to be characterized by a relatively lesser degree of client control and a higher degree of therapist control.

Lichtenberg and Kobes (1992) similarly investigated the assertion that successful therapy was characterized by higher level of therapist control (Haley, 1963). They defined relational control in terms of whether the therapist or the client was initiating or following on the selection of session topics. After having trained raters code therapist-client transactions across 18 full-case transcripts of actual therapy interviews, researchers obtained findings that did not support the notion that across successful dyads therapists exert a greater topic control than clients; nor the hypothesis that across successful and unsuccessful therapists, successful therapists are more in control of the topics. Regarding the clients, no support was found that across

successful and unsuccessful clients, unsuccessful clients exhibit a greater level of topic control. Further, it was also not supported that across unsuccessful dyads, clients exhibit greater topic control than therapists.

Lichtenberg and Barké (1981) analyzed the transcripts of initial interviews by three established therapists each with the same client and each with a different client, and examined how the dynamic relational patterns in terms of relational symmetry or relational complementarity were related to therapy outcome. Relational symmetry was conceptualized as both the therapist and the client mirror each other or exchange the same types of behaviors (e.g., both therapist and client initiate interactions, or both therapist and client are friendly and collaborative with the other); whereas relational complementarity was defined as therapist and client exchanging different types of behaviors such that the behavior of each complements the behavior of the other (e.g., the therapist provides advice and the client takes advice; the therapist is dominant and the client is submissive, etc.). Results of this study did not support the notion that successful counseling is characterized by a complementary relationship pattern between the therapist and the client with the counselor in the control position (Haley, 1963); rather, the relational patterns in these successful cases tended to be interactionally defined and other types of relationship patterns were also manifested in successful therapy. The authors further found no support for the argument that there is consistency of counseling relationship patterns across different clients (Haley, 1963) in successful therapy.

One study in Category Four accounted for the notion of consistency within oneself while looking at the control/influence pattern between therapist-client dyads in psychotherapy sessions. Tracey (1987) examined therapists' and clients' consistency (within themselves) and mutual influence (to the other) using 16 therapy

cases each consisting of five or more sessions. The author differentiated the 16 cases into 8 successful ones and 8 unsuccessful ones based on outcome measures. These 16 cases came from 8 therapists who each contributed a successful case with one client and an unsuccessful case with another client. Tracey (1987) operationally defined two constructs in terms of topic initiation and topic following sequences to capture the therapist-client dynamics. The first was termed as the "intrachain dependency", i.e., whether one's topic initiation/following behavior depended on their own previous behavior. In this way, if one person had high intrachain dependency, that person was deemed as having high consistency within him- or herself. The other construct was termed as the "interchain dependency", i.e., whether one's topic/initiation/following behavior was dependent on the other party's previous behavior. Thereby, a high interchain dependency of the therapist, for example, would represent the therapist being influenced by the client and following the lead or control of the client.

Based on this operational definition, results of this study indicated that in successful counseling cases, therapist-client interactions at the late stage of treatment was characterized by mutual influence, i.e., high levels of both intra- and interchain dependency for both the therapist and client. Moreover, in successful cases therapists had high self-consistency (intrachain dependency) only in the late stage of treatment, whereas in other stages of successful cases the therapists "were acting on the basis of previous client behavior alone (p. 129)". In terms of the clients however, they had high intra- and interchain dependencies across all therapy stages regardless of the outcome. Third, successful therapists followed their clients the most (i.e., had the highest levels of interchain dependency) in the early and late stages and followed their clients the least in the middle sessions. Taken together, these findings seemed to have depicted one possible relational dynamic profile for successful therapy cases in which

at the initial stage the therapist maintained a "following" stance towards the client's consistent self-presentation, at the middle stage the therapist did less such "following" and appeared less responsive to clients' lead, and at the late stage both therapist and the client achieved a self-consistent but also mutually influential and dependent relational pattern.

Summary and Critiques about Studies in Category Four. Studies in this category focused on examining the interpersonal dynamics with regard to reciprocal influence/control between the therapist and the client in their therapy sessions. This implies responsiveness because one cannot be influential without the other being responsive, and one cannot be responsive without receiving an influence message from the other. Mixed findings existed regarding whether overall it is the client being influential or in control (defined in various ways) while the therapist being responsive, or the other way around (Bischoff & Tracey, 1995; Lichtenberg & Semon, 1986; Wampold & Kim, 1989). Also, mixed results were reported regarding how the relational control or mutual influence pattern between the therapist and client was related to therapy process and outcome, with studies suggesting a therapist-in-control dynamics more facilitative (e.g., Tracey, 1985) while other studies (e.g. Lichtenberg & Barké, 1981; Lichtenberg & Kobes, 1992) arguing that various types of control/influence patterns could contribute to therapy success.

A few critiques about studies in the fourth category warrant discussion here. First and most important, existing studies did not specifically define and differentiate the constructs of influence and responsiveness conceptually. As argued earlier, the dynamics of therapist/client being influential also involves a component of the client/therapist being responsive. Although influence and responsiveness co-exist in the dyadic dynamics between therapist and client, and these studies about

therapist/client influence may have direct implications for therapist/client

responsiveness in the therapy process, a lack of differentiation between these two

different constructs would result in conceptual conflations and confusions. Relatedly,

none of the reviewed existing studies adopted appropriate statistical procedures

(Kenny & La Voie, 1984; Wang & Maxwell, 2015) to differentiate the constructs of

influence and responsiveness statistically, i.e., to partition the component of one

party's influence from the component of the other party's responsiveness, so that

influence and responsiveness can be quantified and investigated separately. Third,

except for the Tracey (1987) study, most existing studies did not consider the effects

of consistency within oneself, i.e., how the therapist or client responds to the

influence from him- or herself, which as suggested in previous APIM studies, is also

an important component of the dyadic interactional dynamics.

Overall Summary and Critique about Existing Literature on Responsiveness

In summary overall, the reviewed four categories of studies suggested that

therapists were often responsive to their clients by adjusting their interventions and

treatment in response to specific client characteristics, and such adjustments seemed

to have shown a positive effect on both the therapeutic process (e.g., working

alliance) and the client outcomes (e.g., symptom relief). Responsiveness was also

construed as a type of therapist skill, characteristics, or competency, and one measure

of therapist responsiveness was found to positively predict client outcome (Elkin et

al., 2014). APIM studies also alluded to the notion of therapist responsiveness, both to

themselves and to their clients. These results indirectly supported the proposition that

both therapist and client were responsive to themselves, and more consistent findings

about the significant client partner effects on therapist ratings (instead of the other

way around) supported the responsiveness of therapist to client's impacts. Lastly, studies concerning the interpersonal dynamics regarding mutual influence/control between the therapist and the client also implied responsiveness of the therapist and the client. These studies produced mixed findings, with only some of these studies showing that in general therapists were responsive to client's influence or control (e.g., Wampold & Kim, 1989), and that therapist's responsiveness in following client's lead positively related to therapy outcome (e.g., Tracey, 1987).

Several overall critiques also warrant discussion here. First, most of the reviewed studies (except those in the fourth category) did not define and investigate responsiveness in a way consistent with the terminology and the original definition of responsiveness, that it represents a dynamic and dyadic relationship and fluid process in which therapist's and client's behaviors are affected by the emerging context and by each other's characteristics and behaviors (Stiles, 2009; Stiles et al., 1998). Further, no study has specifically and appropriately developed a way to quantify and measure the dyadic dynamic responsiveness. Although the second category of the reviewed studies attempted to develop measures for therapist responsiveness, their definitions and measures were criticized for deviating from the original definition of responsiveness (Stiles, 2009; Stiles et al., 1998) and being confounded with other process measures of psychotherapy (Kramer & Stiles, 2015), which masks the unique dyadic dynamic process the concept of responsiveness was proposed to address. Third, existing literature has not sufficiently investigated the potential association between therapist responsiveness and the psychotherapy process (e.g., working alliance) and client outcome. Although a couple of aforementioned studies reported significant and positive relationships between therapist responsiveness (defined in different ways) and working alliance as well as client outcome, results are still mixed

at best, and these studies are limited in number and are undermined due to flawed

definition and measurement of therapist responsiveness. Therefore, they only

provided preliminary evidence suggesting potential links between therapist

responsiveness and working alliance or client outcome, but these associations need to

be further tested in future research. Last but not least, most of these studies did not

partition the different components of the dyadic dynamics (e.g., studies in the fourth

category failed to distinguish between influence and responsiveness) or differentiate

the levels of analysis, e.g., between-therapist, or between-client within therapist.

Effects at different levels have very different theoretical and practical connotations.

For example, high between-therapist responsiveness rating of a therapist may say

more about the therapist's characteristics, as he or she shows high responsiveness

across all clients on their caseload in comparison to an average therapist; whereas the

between-client within-therapist responsiveness rating of a therapist relates more to a

combination of the client's main effect (i.e., general characteristics of the client being

influential) and the interactive effect of this particular therapist-client dyad, because

this represents the responsiveness of the therapist to this client's influence in

comparison to their other clients. Unfortunately, these potentially important

differentiations have not been made or examined in existing literature. This current

study is thus designed to address each of these important limitations in the

responsiveness literature.

Chapter Two. Therapist Responsiveness and Working Alliance Development in

Early Therapy: An Interpersonal Theory Perspective

Working Alliance in Psychotherapy

      Working alliance is perhaps one of the most studied variables in

psychotherapy research (Orlinsky, Ronnestad, & Willutzki, 2004). Though this concept was first proposed from the psychoanalytic orientation by Sigmund Freud (Doran, 2016), Bordin (1979) first conceptualized it from a pan-theoretical perspective. In this definition, working alliance was defined as a collaborative relationship between the therapist and client, as manifested in their agreement on therapeutic *goals*, agreement on therapeutic *tasks*, and the quality of their relational *bond*. This definition has been widely used in later literature for the development of working alliance measures and investigation of the associations between working alliance and other psychotherapy process and outcome variables (Elvins & Green, 2008).

In this proliferating line of research, Doran (2016) concluded in a systematic review that working alliance is "the most robust factor to date (p. 148)" among a number of common factors (Imel & Wampold, 2008) identified in existing studies. Numerous studies have consistently supported a stable positive association between working alliance and psychotherapy outcome, arguing that strong working alliance is an important significant predictor of treatment success across varieties of treatment conditions (Doran, 2016; Horvath & Bedi, 2002). In meta-analyses aggregating the results of these studies (hundreds of them to date) on working alliance in individual therapy, Horvath and Symonds (1991) integrated results from 24 studies examining the working alliance to therapy outcome link, and found a moderate aggregated effect size between working alliance and different psychotherapy outcome measures, as represented by Pearson correlation coefficient, $r = .26$. Martin, Garske, and Davis (2000) synthesized results from 79 studies (58 published, 21 unpublished) and similarly obtained a moderate overall alliance-outcome association ($r = .22$). In a more recent meta-analysis, Horvath, Del Re, Flückiger, and Symonds (2011) included

totally 211 studies (158 published studies and 53 unpublished studies) based on 190 independent data sets, and again obtained a moderate aggregated effect size for the working alliance to individual therapy outcome link (r = .275, 95% confidence interval [.249, .301]).

Similar to the aforementioned meta-analytic findings on individual psychotherapy, meta-analyses examining the strengths of association between working alliance and treatment outcome for other types of therapy (Burlingame, McClendon, & Alonso, 2011; Friedlander, Escudero, Heatherington, & Diamond, 2011; Shirk & Karver, 2011) yielded similar results. Specifically, Shirk and Karver (2011) synthesized 29 studies on psychotherapy with children and adolescents and reported an overall effect size of working alliance on treatment outcome r = .19, 95% confidence interval [.15, .23]. Integrating 24 studies regarding couples and family therapy, Friedlander et al. (2011) reported a combined effect size of r = .26, 95% confidence interval [.20, .33]. In a meta-analysis of 40 studies on group psychotherapy, Burlingame et al. (2011) obtained an aggregated effect size of r = .25, 95% confidence interval [.17, .32] for the association between treatment outcome and group cohesion—the counterpart of working alliance for group therapy.

These meta-analytic findings have provided consistent support to the robust moderate association between working alliance (group cohesion for group therapy) and psychotherapy outcome across a variety of different factors, and showed that the association "is ubiquitous irrespective of how the alliance is measured, from whose perspective it is evaluated, when it is assessed, the way the outcome is evaluated, and the type of therapy involved (Horvath et al., 2011, p. 13)." Based on this, researchers have concluded that the working alliance is an essential component in facilitating positive therapeutic changes, and recommended that one central goal for

psychotherapists is to focus on establishing a strong and positive working relationship with their clients throughout the treatment process (Elvins & Green, 2008; Horvath & Bedi, 2002; Horvath et al., 2011; Lambert & Barley, 2001).

One factor is particularly noteworthy in the alliance-outcome meta-analytic studies: the timing of working alliance assessment, i.e., whether it is assessed at the beginning or early phase, at the middle phase, or at the late phase of the treatment process. Horvath and Symonds (1991) classified the individual studies included in its meta-analysis as measuring early alliance from first to fifth session, late alliance at or near the end of therapy, and averaged alliance summed across multiple sessions. The authors found that aggregated from 12 independent studies, the overall effect size for the early alliance to outcome link was $r = .31$; aggregated from 3 independent studies, the overall effect size for late alliance to outcome link was $r = .30$; and the eight studies investigating averaged alliance measures to therapy outcome yielded an aggregated effect size of .21. The later meta-analysis by Martin et al. (2000) did not find significant differences between effect sizes at different time points of working alliance assessment, suggesting that they were all statistically similar to the overall effect size of $r = .22$. In the most recent meta-analysis (Horvath et al., 2011) including the largest sample of 211 studies, effect sizes of working alliance on therapy were investigated across four different time points of working alliance assessment (early treatment, middle treatment, late treatment, and averaged measure). It was found that the 113 independent studies examining early treatment working alliance and therapy outcome generated a combined effect size $r = .25$, the 33 independent studies examining middle treatment working alliance and therapy outcome yielded an overall effect size $r = .25$, the 36 independent studies examining late treatment working alliance to therapy outcome produced an aggregated effect size $r = .39$, and the 52

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independent studies exploring averaged working alliance and treatment outcome yielded an overall effect size $r = .31$. Although in this meta-analysis (Horvath et al., 2011) the aggregated effect size was found to be larger for late treatment working alliance in predicting therapy outcome than for early treatment working alliance, which is contradictory to the earlier meta-analytic results (Horvath & Symonds, 1991; Martin et al., 2000), the authors argued that it is to be expected "the closer the alliance was assessed to termination the higher the correlation between alliance and outcome became (p. 14)" because therapy outcome is usually also assessed at the termination of therapy. They further emphasized the importance of fostering working alliance at early stages of therapy since the quality of the working relationship, as early as in the first or the first couple of sessions, was found to have such a robust positive effect on final therapy outcome. This viewpoint is echoed by a number of other writers from both theoretical (e.g., Gelso & Hayes, 1998), empirical (e.g., Kivlighan & Shaughnessy, 2000), and meta-analytical (e.g., Shirk & Karver, 2011) perspectives.

Predictors of Early Working Alliance

Given the significant and robust positive relationship between early working alliance and treatment outcome, it is important to identify predictors that may contribute to the establishment of early working alliance. A review of the literature in this area yielded a number of studies tapping into this important research question, which will be briefly reviewed below.

Client Predictors. One line of these research studies explored the associations between client variables to the formation and quality of early working alliance. A subset of them focused on client variables related to the pre-treatment symptomatology and functioning. Specifically, Barowsky (2012) found a significant

negative relationship between working alliance and client's initial level of depression, borderline features, paranoia, and somatic complaints. Chu, Skriner, and Zandberg (2014) found that client pretreatment anxiety severity predicted higher initial alliance levels as rated by therapists. Ekeblad, Falkenström, and Holmqvist (2016) found that client's lower levels of pretreatment general reflective functioning and depression-specific reflective functioning predicted significantly lower therapist-rated initial working alliance. General reflective functioning was not predictive of patient-rated early alliance, but lower depression-specific reflective functioning predicted lower patient-rated alliance. Wittorf et al. (2009) investigated the association between baseline symptoms and early working alliance in patients with schizophrenia. The researchers reported that patients' insight about psychosis significantly predicted higher patient ratings of early working alliance. Less positive and negative symptoms were significant predictors of higher therapist alliance ratings. Jung, Wiesjahn, and Lincoln (2014) reported that lower negative symptoms significantly predicted higher patient and therapist rated working alliance early in the treatment of psychosis. The global functioning variables, symptom depression, theory of mind, and medication compliance did not predict either therapist or patient rated working alliance in the multiple regression model.

Another subset of studies focused on client variables related to intrapersonal traits or states. Specifically, Meier, Donmall, Barrowclough, McElduff, and Heller (2005) observed that for clients who were seeking treatment for drug misuse, those who had higher motivation, better coping strategies, stronger social support and more secure attachment style were more likely to develop good early working alliances with their therapists. Constantino, Arnow, Blasey, and Agras (2005) found that across both the cognitive-behavioral and interpersonal therapies, patient expectation of

improvement was positively associated with early- and middle-treatment alliance quality. Garner, Godley, and Funk (2008) reported that for adolescents seeking psychotherapy for substance abuse, those with higher levels of social support, greater problem recognition, and more reasons for quitting substance abuse also reported higher therapeutic alliance ratings. Patterson, Uhlin, and Anderson (2008) indicated that clients' personal commitment to psychotherapy predicted the task, bond, and goal dimensions of early working alliance as rated by the client. However, clients' expectations for facilitative conditions and counselor expertise did not predict clients' perceptions of the alliance. Frühauf, Figholi, Böck, and Caspar (2015) reported that therapist's rating of early working alliance was positively related to client's impression management strategy of agenda setting (e.g., controlling the topics and process of therapy) and self-promotion (e.g., highlighting one's achievements or competence), but negatively associated with client supplication (e.g., report of difficulties, complaining). However, for client's rating of early working alliance, client's agenda setting showed a significant negative association while client's self-promotion displayed a positive correlation. Lastly, Hersoug, Høglend, Havik, and Monsen (2010) observed that higher client expectation of change was associated with improving working alliance, whereas the combination of higher severity of client's presenting concerns and lower client expectation of change was associated with deteriorating alliance. Also, worse overall adjustment (i.e., higher distress level) was associated with deteriorating alliance.

The third subset of studies focused on client's interpersonal relationships or patterns. Specifically, Kokotovic and Tracey (1990) found that client reported hostility, quality of current interpersonal relationships, and quality of past family relationships were all related to the establishment of early working alliance. The more

hostility and the poorer current and past relationships, the worse the working alliance. Hersoug, Monsen, Havik, and Høglend (2002) reported that client's diagnostic variables (symptom severity and pretreatment functioning) did not predict quality of working alliance, but client's quality of both current and past relationships was associated with working alliance as rated by therapists. Levin, Henderson, and Ehrenreich-May (2012) found that the perceived social support of the adolescent clients in their study predicted observer rated working alliance between the adolescents and their therapists.

Attachment is one variable that received quite some research attention in this line of studies. The above Levin et al. (2012) study also reported that adolescent clients' attachment security positively predicted client ratings of early working alliance. Bachelor, Meunier, Laverdiere, and Gamache (2010) documented that total and subscale alliance scores were positively correlated with client's secure attachment to the therapist and negatively associated with avoidant–fearful attachment to the therapist. The relationship between preoccupied–merger attachment and the alliance was moderated by the extent to which clients were distressed, such that the preoccupied–merger attachment negatively predicted early working alliance for clients with lower overall distress. Folke, Daniel, Poulsen, and Lunn (2016) reported that client attachment security was found to be a significant predictor of alliance levels at early, middle, and late therapy sessions, with clients higher on attachment security developing stronger alliances with their therapists in both cognitive-behavioral and psychoanalytic treatments. Inconsistently, Coyne, Constantino, Ravitz, and McBride (2017) stated that they failed to replicate the negative main effects of the insecure attachment dimensions on client-rated alliance. However, there was a significant avoidant attachment by social support interaction such that when client's

satisfaction with social supports was low there was a positive association between attachment avoidance and quality of early alliance, whereas when client's satisfaction with social supports was high the association between avoidant attachment and early alliance became negative. Finally, Mallinckrodt and Jeong (2015) conducted a meta-analysis on studies using the Client Attachment to Therapist Scale (CATS; Mallinckrodt, Gantt, & Coble, 1995) to explore the aggregated association between client *attachment to therapist* (rather than general client attachment style) and their working alliance. From the included 13 studies, the authors obtained a very strong positive effect ($r = .76$, $p = .001$) for the relationship between secure attachment and working alliance, and a strong negative effect for avoidant attachment ($r = -.63$, $p = .001$). The effect size for preoccupied attachment with working alliance was not significant ($r = .02$, $p = .70$).

Summary of Client Predictors of Early Working Alliance. Integrating findings from the client predictors studies reviewed above, three types of client variables have been generally investigated in existing literature. The first type concerns client's pre-treatment symptomatology and functioning, specifically including diagnosis, level of psychological distress or symptom severity, and general functioning or overall adjustment (e.g., Barowsky, 2012). Consistently, results suggested that the less severe client's pre-treatment symptoms and distress are, the more likely they will have a stronger early working alliance with the therapist. The second type concerns client's intrapersonal traits, characteristics, or states, including motivation and commitment for treatment, expectation for treatment and positive change, reflective functioning, impression management strategies, and coping strategies (e.g., Meier et al., 2005). Results generally suggested that higher client motivation and commitment or more positive client characteristics (e.g., better

reflective functioning and coping strategies) are related to stronger early working alliance. The third type concerns client's interpersonal patterns or relationships, including quality of current interpersonal relationships, quality of original family relationships, general interpersonal functioning, and attachment styles (e.g., Coyne et al., 2017; Kokotovic & Tracey, 1990). Overall, findings appear to support that when clients are able to establish better interpersonal relationships elsewhere and function better interpersonally and socially, they tend to have better initial working alliance with therapists as well. Regarding general client attachment, results seem to point to the direction that more secure attachment relates positively to working alliance and attachment insecurity relates negatively to working alliance, however, inconsistencies or mixed findings exist (e.g., Coyne et al., 2017). Lastly, meta-analysis (Mallinckrodt & Jeong, 2015) revealed a strong positive effect of client's secure attachment to therapist and their working alliance, a strong negative effect was found for client's avoidant attachment, and a nonsignificant (thus mixed) effect emerged for preoccupied attachment.

Therapist Predictors. Two lines of research seem to emerge from a review of literature on therapist predictors of working alliance. The first line of studies explored therapist personal characteristics as well as specific clinical skills or interventions. For example, Hersoug, Høglend, Monsen, and Havik (2001) reported that therapists' training and skill were positively related to early working alliance as rated by therapists but not clients. Moreover, therapist's interpersonal style on the cold–warm dimension had a moderate and positive effect on both clients' and therapists' alliance ratings, with interpersonally warmer therapists more likely to have stronger working alliance rated by both parties. Duff and Bedi (2010) explored how a list of 15 counselor behaviors related to client-reported working alliance with the therapist. It

was found that three particular counselor behaviors (making encouraging statements, making positive comments about the client, and greeting the client with a smile) outperform the other behaviors in a multiple regression analyses in predicting client's ratings of working alliance. The authors argued that seemingly small, strengths-fostering therapist behaviors could potentially strengthen their working alliances. Jung, Wiesjahn, Rief, and Lincoln (2015) documented that client ratings of therapist qualities of empathy, genuineness, positive regard, convincingness, and competence all significantly correlated with client perceptions of working alliance early in the therapy session. In the subsequent multiple regression analysis with all these therapist variables, only the genuineness was significantly predictive controlling for all the other characteristics. Lastly, Meier et al. (2005) reported "not clear cut" findings with regard to how therapist characteristics related to client ratings of working alliance in the treatment of drug misuse. They noted that clients rated their relationships with ex-user therapists (i.e., therapists who used drugs themselves previously), experienced therapists, and male therapists as better, but more experienced therapists rated their alliances with clients as worse.

The second line of research focused on therapist's interpersonal traits or patterns, particularly therapist's attachment style. Black, Hardy, Turpin, and Parry (2005) found that therapist-reported attachment styles generally predicted working alliance quality above and beyond the variances explained by general personality variables. Therapist self-reported secure attachment style was significantly and positively related with therapist ratings of alliance. Therapist's anxious attachment styles were significantly and negatively associated with good alliance. Similarly, Bruck, Winston, Aderholt, and Muran (2006) reported that therapist's self-reported secure attachment positively related to therapist perception of working alliance but

did not predict client perception of working alliance. Dunkle and Friedlander (1996) used another attachment measure and observed that therapist's self-reported comfort with close relationships, one that corresponded with attachment security, showed significant positive prediction on the bond dimension of working alliance. Somewhat inconsistently, Dinger, Strack, Sachsse, and Schauenburg (2009) found that therapists' attachment security was not related to client-rated working alliance and its development. Schauenburg et al. (2010) similarly did not find significant main effects of therapist's attachment security on the establishment of early working alliance. However, these researchers discovered a significant interaction effect between therapist attachment security and client's severity of interpersonal distress, such that therapist attachment security was significantly and positively correlated with client's rating of working alliance when the therapist was treating more interpersonally distressed clients. This finding suggested that the effects of therapist's attachment security in establishing strong working alliance may more likely be seen in more complicated cases with more impaired clients.

Regarding insecure therapist attachment styles, Dinger et al. (2009) reported that higher attachment preoccupation (or attachment anxiety) of therapists was associated with lower levels of client reported alliance quality. Similarly, Sauer, Lopez, and Gormley (2003) observed that anxiously attached therapists had a significant positive effect on the client working alliances after the 1st session but over time the effects became significantly negative. Tyrrell, Dozier, Teague, and Fallot (1999) analyzed the attachment styles of both the therapist and the client and investigated how their match in attachment might relate to working alliance. The authors reported that therapists with a preoccupied or anxious attachment style established a stronger alliance with dismissing or avoidant patients, whereas therapists

with a dismissing or avoidant attachment style obtained a better alliance with preoccupied patients. These results provided preliminary support to their hypothesis that a dissimilar matching of the attachment status between the therapist and the client could positively predict helping alliance. Petrowski, Nowacki, Pokorny, and Buchheim (2011) took the same line of inquiry and documented similar findings, that patients with highly preoccupied and disorganized attachment styles evaluated the relationship with a more dismissing therapist as more helpful than that with a more preoccupied therapist.

Summary of Therapist Predictors of Early Working Alliance. Integrating findings from the studies reviewed above, some tentative preliminary speculations may be made about therapist factors contributing to early working alliance. Specifically, therapist's provision of or characteristics associated with the facilitative conditions (Rogers, 1985), e.g., empathy, genuineness, or warmth, was reported in a couple of studies as being positively associated with working alliance development (e.g., Jung et al., 2015). Furthermore, the competence and experiences of the therapist, particularly as perceived by the client, seemed also predictive of working alliance (e.g., Hersoug et al., 2001). Regarding therapist interpersonal variables, specifically attachment styles, a number of studies supported the positive association between therapist attachment security and the establishment of working alliance, especially in more challenging cases when clients' distress severity was high (Schauenburg et al., 2010). However, inconsistent findings of nonsignificant relationship also existed (Dinger et al., 2009). Therapist insecure attachment, particularly attachment anxiety, was found to be negatively related to working alliance, especially as therapy progresses (Sauer et al., 2003). Furthermore, some studies also suggested that the interplay between client's and therapist's attachment styles may jointly predict

working alliance, and that a dissimilarity "matching" between their attachment styles was found to positively relate to working alliance (e.g., Tyrrell et al., 1999).

Overall Critiques of Research on Early Working Alliance Predictors. Several important critiques are noteworthy about existing research on the predictors of early working alliance. Firstly, most of the working alliance predictor studies focused on exploring pre-treatment *factors* of both the therapist and the client, and very few examined the in-treatment *process* between the therapist and client that may relate to establishment of working alliance. Therefore, we know more about what characteristics and types of therapist and client tend to have stronger working alliance, but much less about how the interaction process between the therapist and the client relates to the establishment of working alliance. Second, with a few exceptions (e.g., studies looking at the match between the therapist and the client attachment styles), client and therapist predictors of working alliance are mostly examined separately. One potential limitation of this approach is that separation of therapist and client factors may overlook the interplay between these two parties in affecting the establishment and development of working alliance, which by nature is a dyadic construct. Thirdly, although the previously reviewed studies on responsiveness suggested preliminary evidence that therapist responsiveness may relate to the quality of working alliance (e.g., Despland et al., 2001), responsiveness has not been clearly defined and identified as a potential contributing factor to the establishment of early working alliance, and its role has not been specifically investigated.

Interpersonal Theory: An Interpersonal Approach towards Working Alliance Development

In fact, the interpersonal theory (Kiesler, 1988) has provided a theoretical

framework for hypothesizing the relationship between therapist responsiveness and development of working alliance. This will be reviewed below.

Interpersonal Theory and the Interpersonal Circle. The interpersonal theory (Kiesler, 1983, 1988; Leary, 1957) concerns the conceptualization of interpersonal interactions between two parties. It posits that, in the case of dyadic interactions, the needs and acts of both parties will jointly determine the interactional outcome, and interpersonal behaviors must be understood from a perspective that includes both interactants as a dynamic system with a focus on the mutual influence and bidirectional causality between the two interacting parties. Furthermore, the theory proposes that the basic unit of human interactional behavior is the interpersonal act (Kiesler, 1988), or interpersonal reflex (Leary, 1957), and any interpersonal act is delivered to "elicit from a respondent reactions that confirm, reinforce, or validate a person's self-presentation and cause that person to repeat similar interpersonal acts (Kiesler, 1988, p. 8)."

One important concept in the interpersonal theory is "reciprocity", also termed "complementarity" (Kiesler, 1983). This concept suggested that because interpersonal acts are designed to evoke certain reactions from the other interactant to confirm and reinforce one's mental presentations about oneself and the others, responses to these interpersonal acts likely will not be random, nor will they include the entire range of theoretically possible reactions. Unless the respondent is consciously aware of and intentionally resistant to such "interpersonal pulls", he or she by automatic or unconscious responses will likely react in a relatively narrow range of ways, which usually are what the original interpersonal acts are pulling for (Kiesler, 1988). For example, if interactant A is hostile towards interactant B, B is less likely to automatically and consistently respond very kindly and may be pulled to be

hostile as well; if interactant A keeps sending dependent messages "crying for help", B's automatic responses will be elicited to appear more dominant, controlling, protective, or care-taking.

To provide a theoretical framework in conceptualizing the interpersonal transactions and the notion of complementarity or reciprocity, the model of Interpersonal Circle was developed (Kiesler, 1983, 1988; Leary, 1957). This circular model theorizes that all interpersonal behaviors may be represented by a combination of two motivations: the need for control, power, or dominance, i.e., the Control dimension; and the need for affiliation, or friendliness, or warmth, i.e., the Affiliation dimension (Leary, 1957). Persons in interpersonal interactions are continually negotiating how friendly or hostile they will be with each other, and how much in charge or control each will be in their encounters. The Interpersonal Circle (Kiesler, 1983, 1988; Leary, 1957) places the Control dimension (from dominance to submission) along the vertical axis, and the Affiliation dimension (from friendliness to hostility) along the horizontal axis, and categorized interpersonal behaviors into 16 quadrants based on the combination of their levels of control and affiliation for each category of behaviors. A specific figural illustration about the Interpersonal Circle can be found in Kiesler (1988, p.11). As some examples, the names of categories in the first quadrant on the circle, listed clockwise from high on Dominance and mid-point between Friendly-Hostile to mid-point on Dominance-Submission and high on Friendly, are: Dominant, Assured, Exhibitionistic, Sociable, and Friendly. The categories in the third quadrant, listed clockwise from high Submission and mid-point between Friendly-Hostile to mid-point between Dominance-Submission and high on Hostile are: Submissive, Unassured, Inhibited, Detached, and Hostile.

Under this framework, the interpersonal theory operationally defined the

concept of complementarity. Kiesler (1988) stated that complementarity occurs on the basis of (a) reciprocity on the Control dimension, that is, dominance elicits submission, and submission pulls for dominance; and (b) correspondence on the Affiliation dimension, that is, hostility begets hostility, and friendliness invites friendliness. For example, a complementary response towards an interpersonal act of medium Dominance and high Friendliness would be a response of medium Submission and high Friendliness, whereas an act of high Dominance and high Hostility pulls for a complementary response of high Submission and high Hostility.

The concept of responsiveness as defined in Stiles et al. (1998) and adopted in this study, at the behavioral level, bears critical similarities with the notion of complementarity in the interpersonal theory (Kiesler, 1988). As stated earlier in the definition and conceptual considerations of responsiveness, it is in nature a neutral (rather than positive) and general (rather than specific) construct that depicts the degree to which therapist's and client's behaviors are influenced by their emerging environment, particularly the behaviors of the other party (Stiles et al., 1998). Putting this operationalization to the Interpersonal Circle framework, a therapist who is highly responsive to the client would be someone who quickly picks up the message from the client's interpersonal act, and responds in a complementary way. This captures the extent to which the therapist's behaviors are influenced by the therapeutic context, particularly the client's behaviors, thus corresponds to the notion of therapist responsiveness to client. Therefore, in this study, we operationalize and quantify therapist's behavioral responsiveness based on the concept of complementarity under the interpersonal theory framework, i.e., the extent to which the therapist's change in levels of Control and Affiliation are impacted by the previous levels of Control and Affiliation from both him- or herself, and their client.

Responsiveness and Early Working Alliance: Propositions from the Interpersonal Theory. Several propositions proposed by Kiesler (1988) regarding the use of metacommunication (also termed as immediacy or process comment) under the Interpersonal Theory framework may also shed light on the relationship between therapist responsiveness and early working alliance development. In Kiesler (1988)'s process stage model, two general stages of using metacommunication in therapy were specified. The first stage is named the "Engaged or Hooked Stage" (p. 31). This usually occurs in the early phase of therapy, in which the client sends the therapist a series of interpersonal messages throughout their interactions that are based on the client's internalized representations about themselves and others and are aligned with their general interpersonal patterns. The therapist, being an empathetic respondent, receives consistent elicitations to react in a complementary stance. Therapist's responsiveness in terms of providing complementary reactions to client's interpersonal "pulls" during the "hooked stage" confirms the client's own role definition or identity, poses the least threat to client's inured intrapersonal representations and interpersonal patterns, and gives the client the familiar support, reinforcement, and validation about their subjective experiences and schemata. Thereby, this therapist responsiveness in terms of being complementary to client's interpersonal presence is argued to be the "necessary first steps to create a bond and establishing a working alliance with the client (Kiesler, 1988, p. 33)" at the beginning phase of psychotherapy.

With this working alliance as a therapeutic foundation, treatment gradually moves to the second general stage, the "Disengaged or Unhooked Stage" (Kiesler, 1988, p. 33). In this stage, the therapist consults their personal experiences of the client's interpersonal pattern to help conceptualize client's core issues in intrapersonal

and interpersonal representations and develop needed intervention strategies with the therapeutic relationship. At this time, the therapist will (a) attempt to disengage him- or herself from client's interpersonal dynamic patterns, (b) intentionally refrain from being "responsive" and "complementary" to client's interpersonal "pulls" that are maladaptive, and (c) metacommunicate about this interpersonal process with the client and provide an intellectual understanding and a corrective experience for the client (Kiesler, 1988).

From these theoretical propositions in interpersonal therapy, it may be hypothesized that therapist's behavioral responsiveness, operationalized as being complementary interpersonally on the Interpersonal Circle, would be associated with client's perception of increased working alliance in the early phase of therapy. This hypothesis about therapist responsiveness has not been specifically examined in existing literature, and will be investigated in this current study.

Empirical Review: Complementarity in the Interpersonal Circle Model and the Therapy Process

Presence of Interpersonal Complementarity. A number of empirical studies investigated the basic propositions of the interpersonal theory regarding complementarity. One subset of these studies (Gurtman, 2001; Kiesler & Goldston, 1988; Strong et al., 1988; Tracey, 1994) examined whether complementarity is manifested in interpersonal interactions, that is, whether dominance from one interactant would in fact pull for submission in the other interactant, or friendly/hostile behaviors would predict the friendliness/hostility of subsequent behaviors from the other party.

Kiesler and Goldston (1988) studied three demonstration films of

psychotherapy in which famous therapists from different theoretical orientations, i.e., Ellis, Perls, and Rogers, sequentially conducted initial therapy sessions with the same client (Gloria). These researchers applied the Interpersonal Circle model to examine the interpersonal behavior of Gloria, her three therapists, and their respective transaction patterns. Analyses of Interpersonal Circle axes and segment scores revealed that the three therapists interacted with Gloria in significantly different ways, and Gloria also responded to each of them differently. Complementarity was measured by comparing the predicted response of Gloria from the antecedent therapist behavior and Gloria's actual behavior. Results indicated significant departures of Gloria's behaviors from the perfect complementary behavior, especially for behaviors located on the hostile half of the Interpersonal Circle. The authors cautioned about the assumed validity of the complementarity proposition in the Interpersonal Circle Model and called for more future studies.

Strong et al. (1988) empirically tested the hypotheses proposed in the Interpersonal Theory and the Interpersonal Circle Model regarding complementarity outside of the psychotherapy contexts. Researchers recruited 80 university psychology students and recorded their interactions with 17 research confederates in a task where each dyad collaborated to complete a given task. Confederates were asked to perform scripted roles that fitted with one of eight interpersonal behaviors, and the participants' subsequent behaviors were coded and analyzed based on the geometric properties of the Interpersonal Circle. Results demonstrated that one person's interpersonal behavior towards another systematically affected how the other responded toward the person. Specifically, the directions of impact were generally consistent with the dynamic relations between interpersonal behaviors as suggested in the Interpersonal Circle Model and the notion of complementarity, that

complementarity was found along the Control dimension and correspondence was found along the Affiliation dimension. These results provided empirical support to the complementarity hypothesis of the Interpersonal Circle Model.

To replicate the above findings and address some methodological concerns, Tracey (1994) reanalyzed the data collected in Strong et al. (1988) using the randomization test of hypothesized order relations and correspondence analysis method. After controlling for the base rates of the interpersonal behaviors corresponding with each octant on the Interpersonal Circle, this study found clear support for the interpersonal complementarity as hypothesized in the Interpersonal Circle Model. Similarly, in the Study 2 of Gurtman (2001), the author also reanalyzed the Strong et al. (1988) data controlling for base rates using a different quantification method of complementarity (i.e., the angle between the corresponding vectors), and again found general support for complementarity. Although the effects of complementarity were not especially large in absolute magnitude (.22 vs. 0 for the null model), the complementarity model provided a better fit than a plausible competing model (i.e., the similarity model) or the base-rate prediction.

Interpersonal Complementary and Therapy Outcome. Under this category, one subset of studies (Tiedens & Fragale, 2003; Tracey, 2004, 2005; Tracey et al., 1981; Tracey & Ray, 1984; Tracey et al., 1999) investigated interpersonal complementarity in relation to some outcome variables, both in and outside of psychotherapy contexts. Tracey et al. (1981) examined twenty-five tape-recorded initial therapy interviews to test the hypothesis that a complementary relationship, as determined by a high degree of topic determination, would be related to matched client-therapist role expectations. The researchers defined topic determination as the ratio of successful topic changes to topic change initiations, and defined a

complementary relationship between the therapist and the client as having a high degree of topic determination. It was found that matched client-therapist role expectations was associated with a greater degree of topic determination, thus a higher level of relationship complementarity as defined in this study, in contrast to non-matched client-therapist role expectations.

Tracey (2004) investigated the associations among different measures of interpersonal behavior and complementarity using data from two samples: one came from 26 sessions of 26 psychotherapy dyads (one session for each dyad) and another came from recorded interactions between 54 dyads randomly paired from 108 college students. Moment-to-moment behavioral complementarity was operationalized as the Euclidean distance between the actual point of a subsequent behavior on the Control-Affiliation space and the "perfectly complementary" point of that subsequent behavior as designated by the antecedent behavior. Results of this study showed further support to the notion of interpersonal complementarity in both the therapy and the college student samples. Moreover, base-rate corrected complementarity of the therapist and client, respectively, positively predicted the satisfaction of the client and the therapist; similarly, base-rate corrected complementarity of the student A and student B, respectively, showed positive prediction effects on the post-interaction positiveness of student B and student A.

Tiedens and Fragale (2003) conducted two studies examine interpersonal complementarity versus mimicry of nonverbal behaviors (i.e., postural stance) along the Control dimension. In the first study, 98 participants interacted with research confederates who displayed either interpersonal dominance through postural expansion, or interpersonal submission through postural constriction. Results supported the complementarity proposition that participants exposed to a dominant

confederate decreased their postural stance, whereas participants exposed to a submissive confederate increased their stance. Furthermore, participants who showed complementary responses to the research confederates reported liking their partner more and were more comfortable than did those who mimicked the research confederates. In the second study, researchers manipulated participants' complementarity or mimicry responses to research confederates, and the complementarity manipulation resulted in more liking and comfort than the mimicry manipulation.

Tracey (2005) investigated the associations between individuals' interpersonal rigidity, their complementarity in social interactions, and their interpersonal distress. The researcher conducted two studies: one consisting of a sample of 214 undergraduates who viewed videotapes depicting different interactions and were asked to provide their responses, and the other consisting of 122 undergraduates who were asked to interact in randomly paired dyads on a mutual task. Students' responses or interactions were coded and analyzed in these two studies. Obtained results were consistent, and evidenced that individual's interpersonal rigidity was negatively related to their act-by-act complementarity in interpersonal interactions, which was further associated with higher levels of reported interpersonal distress.

Another two studies (Tracey & Ray, 1984; Tracey et al., 1999) examined complementarity change over time and how the change patterns were associated with therapy outcome. Specifically, Tracey and Ray (1984) explored how the interactional complementarity patterns between the therapist and the client differed in successful versus unsuccessful therapy, using three most successful cases and three least successful cases. The sequence of topic-following/topic-initiation responses was operationalized as an index of interactional complementarity, and was subjected to a

Markov chain model analysis. The authors hypothesized that successful counseling dyads would progress along a path from high to low and then again to high levels of complementarity between therapist and client, which unsuccessful counseling dyads would not demonstrate. Results indicated that the three successful dyads loosely fitted this general pattern, with marked individual variation in the length of each stage of complementarity. However, all three unsuccessful dyads had constant levels of complementarity over the course of counseling.

Tracey et al. (1999) studied 20 clients seeing 4 experienced therapists in a university counseling center setting to explore the pattern of complementarity between therapist and client and its relation to outcome. Complementarity was measured by the fit index between the actual transitional matrix (which tables frequencies of interactions from the antecedent behavior to the subsequent behavior) and the hypothesized complementary transitional matrix. Results of growth curve analyses revealed that more successful therapy dyads, in terms of greater reduction in the number and severity of clients' reported symptoms, demonstrated a pattern of complementarity change from initial high levels of complementarity, to decreased levels in the middle of treatment, and then increased levels at the late stage not as high as at the beginning stage. However, less successful dyads did not demonstrate this pattern.

A final subset of studies (Chen & Bernstein, 2000; Kiesler & Watkins, 1989; Ryan, 2001; Samstag et al., 2008; Shim & Chung, 1998; Watson et al., 2017) specifically focused on the association between therapist-client complementarity and their working alliance, especially in the early stage of therapy.

Kiesler and Watkins (1989) investigated the association between working alliance and interpersonal complementarity during the early stage of psychotherapy

using 36 dyads of patients and their therapists. Participants reported their perceptions of working alliance for a session early in therapy, and also rated each other's behaviors on the Checklist of Interpersonal Transactions. Complementarity was assessed along the Interpersonal Circle, and the authors found significant positive associations between therapist-client interpersonal complementarity and the perceptions of the alliance as rated by both of them.

In a more recent study, Watson et al. (2017) looked at how working alliance was associated with the interpersonal styles of the therapist and client, as well as the complementarity between their interpersonal styles. This study sampled 75 clients who were sex offenders and their respective therapists, and asked them to rate each other's interpersonal styles, and then working alliance after 3 weeks of treatment. Interpersonal complementarity was computed along the Control/Affiliation dimensions respectively by the extent to which the interpersonal style ratings of the dyad were contrary to (for Control) or similar with (for Affiliation) each other. Results indicated that working alliance was correlated positively with therapist friendliness, negatively with therapist control, and its association with interpersonal complementarity was non-significant.

Samstag et al. (2008) examined the relationships between therapy outcome, working alliance, and interpersonal complementarity. The authors studied 48 patient-therapist dyads in 30-session therapies, and classified these cases into three outcome groups of premature dropout, poor outcome, or good outcome using reliable change scores. Researchers defined positive complementarity as responding positively/friendly to positive or friendly behaviors from the other interactant, and negative complementarity as responding negatively or with hostility to negative or hostile behaviors. Results indicated that positive/negative complementarity was

associated with treatment outcome groups, with the poor outcome group demonstrating the highest negative interpersonal complementarity.

Similarly, Ryan (2001) investigated the association between friendly and hostile interpersonal complementarity and working alliance, analyzing the third therapy session for 24 therapist-client dyads at three university counseling centers. The author used the Interpersonal Communication Rating Scale-Revised (Strong et al., 1988) to rate each audiotaped session and measure levels of total, friendly and hostile complementarity. These ratings of complementarity were correlated with therapists' and clients' report of working alliance. Results indicated therapist total and friendly complementarity ratings were significantly associated with therapist ratings of the working alliance, while no significant relations were found between client ratings of the working alliance and therapist or client complementarity.

Shim and Chung (1998) explored the association between complementarity and working alliance considering the different stages of therapy. In their Study 1 sampling 64 patients and 20 counselors in Korea, it was found that in the early stage of therapy, working alliance was positively correlated with positive/friendly complementarity and also negatively correlated with negative/hostile complementarity. In their longitudinal Study 2 on "successful" and "unsuccessful" cases, a low-high-low negative complementarity and a high-low-high positive complementarity pattern was found in "successful" cases, whereas "unsuccessful" cases demonstrated a generally high negative complementarity from the early sessions.

Lastly, Chen and Bernstein (2000) conducted a comparative analysis of two supervision cases with graduate student supervisor-supervisee dyads, one characterized by high supervisor-supervisee working alliance and the other

characterized by low alliance, with an aim to explore the effects of complementary communications and supervisory alliance formation. A case study method was used to collect participant and rater perspectives on the process and outcome of these two cases, and it was found that higher degree of complementary interaction was present in the high-alliance dyad than in the low-alliance dyad.

Taken together, results from empirical studies provided some evidence that the notion of complementarity (one's responses to another person's interpersonal act tend to be "pulled" towards a certain range) did occur in interpersonal interactions both in everyday and psychotherapy contexts, and that complementary interactions were found in some studies to associate with positive conversation or psychotherapy outcomes. However, studies specifically testing the complementary hypothesis regarding its association with working alliance at the early stage of psychotherapy (Kiesler, 1988) were limited and only provided some preliminary examination in this important proposition with mixed/inconsistent findings. One limitation in these existing studies lies in their "static" assessment of interpersonal complementarity by only globally measuring the interactants' interpersonal styles and calculate complementarity based on the general measures, which would miss the moment-to-moment changes in the dynamic interactional processes. Moreover, many studies (e.g., Ryan, 2001) only examined positive/friendly versus negative/hostile types of complementarity and did not address complementarity along the Control dimension. Another limitation of these studies is that none of them examined the relationships at different levels, which as argued earlier, has very different theoretical and conceptual implications. It is believed that the employment of a multilevel model and the data partitioning approaches would allow researchers to partial out the effects from each party of the interactional dyad, which would further our understanding of these dyadic

effects.

Chapter Three. Ordinary Differential Equations Model: A Potential Method to Quantify and Investigate Nonlinear Dynamics

Differential Equations Model: Mathematically Modeling Nonlinear Dynamic Systems

The critiques discussed earlier at the end of Chapter One about existing literature on responsiveness, at least in part, can be attributed to the limitation of traditional quantitative methods used in counseling psychology research that are mostly linear and "ballistic" (Stiles, 2009), meaning that an action is modeled as being determined at its inception and carrying through regardless of external events (Stiles et al., 1998). Though for long scholars have noted the nonlinear nature of psychotherapy process, rarely have psychotherapy researchers used specific quantitative methods to address, model, and investigate the nonlinearity (Kramer & Stiles, 2015).

The nonlinear dynamic models based on Ordinary Differential Equations (ODE) may provide promising ways to address this methodological issue (Peluso et al., 2012; Perry et al., 2017). These ODE models are derived to depict and study nonlinear dynamic systems mathematically (Teschl, 2012), and have been applied in a wide variety of fields including physics, chemistry, meteorology, engineering, ecology, pharmacology, etc., when quantification and investigation about the dynamics between two or more variables are needed. The most general form of ODE in modeling a dynamic system (Gottman et al., 2002; Teschl, 2012), involving two variables of X and Y, which interact with each other and evolve over time, can be expressed as Equation 0.

$$\begin{cases} \frac{dX}{dt} = f(X, Y, t) \\ \frac{dY}{dt} = g(X, Y, t) \end{cases} \qquad \text{(Equation 0)}$$

In this ODE system, the operator dX/dt and dY/dt respectively represents the first-order differential of X and Y at time point t, that is, the rate or slope of change of variable X and variable Y at time t. The f and g can be any functions of variables X, Y, and t, and quantifies how the change of X and Y at time t is influenced by the values or levels of X and Y, and the specific time point t. For example, in studying the nonlinear dynamics of population change in ecology, if X represents the number of tiger (predator) and Y represents the number of deer (prey) in a certain geological region, then the above ODE system depicts the rates of change in the number of tiger and number of deer (dX/dt and dY/dt) at a given time point t depending on the current number of tiger X, current number of deer Y, and the time.

Though promising in quantifying and studying nonlinear dynamic systems, these methods unfortunately have rarely been used in counseling psychology research (Perry et al., 2017). However, scholars argued that they may be potentially suitable for the examination of responsiveness (Stiles, 2009), which is reflected in the dynamic, interactive, and nonlinear process in psychotherapy (Peluso et al., 2012). Some tentative methodological explorations will be illustrated below.

Differential Equations Model: Adaptation to Psychotherapy Research

In the field of counseling psychology, Peluso et al. (2012) attempted to introduce the above differential equation models to examine the nonlinear and dynamic interactive process of psychotherapy. The authors proposed a more specific form of Equation 0 (see Equation 1) to depict the nonlinear process in psychotherapy.

$$\begin{cases} \frac{dX_T}{dTime} = b_{0T} + b_{T2T}X_T + b_{C2T}X_C \\ \frac{dX_C}{dTime} = b_{0C} + b_{T2C}X_T + b_{C2C}X_C \end{cases}$$ (Equation 1)

In this model, X_T and X_C represent the ratings of therapist (denoted as "T") and

client (denoted as "C") on a construct X respectively (e.g., evaluation of working

alliance for a session as reported by therapist and client respectively, or how dominant

the therapist and the client each is in a given speaking turn as rated by observers). The

operator *d/dTime* is the first-order differential of X_T and X_C over time, and represents

the change slope of X_T and X_C at each time point *t*.

For a given therapist-client dyad, the four parameters b_{T2T}, b_{C2C}, b_{C2T}, and b_{T2C}

may then provide a comprehensive representation of the nonlinear dynamics between

the two interactants. Specifically, the coefficient b_{T2T} quantifies the effect of

therapist's rating of variable X at time *t* on how much the therapist's rating changes, in

other words, how much therapist's change from a given time point *t* to the next time

point *t*+1 may be explained by their own rating at time point *t*. This captures the

therapist's consistency, or their responsiveness to him- or herself. Similarly,

coefficient b_{C2C} quantifies the effect of client's rating of variable X at time *t* on how

much the client's rating changes, thus similarly captures the client's consistency, or

their responsiveness to him- or herself. The coefficient b_{C2T} represents the effect of

client's rating of variable X at time *t* on how much the therapist's rating changes,

quantifying the contribution of client's rating at time point *t* to therapist's rating

change from time point *t* to the next time point *t*+1. This represents the responsiveness

of the therapist to the influence of the client. Similarly, the coefficient b_{T2C} represents

the effect of therapist's rating of variable X at time *t* on how much the client's rating

changes from time point *t* to the next time point *t*+1, and captures the responsiveness

of the client to the influence of the therapist. Under the framework of this nonlinear differential equation model, these four parameters provide a way to characterize and quantify the nonlinear dynamics between a given therapist-client dyad about a certain construct X over the course of therapy, in terms of how much the therapist and client are responsive to the influences from both themselves and the other party.

Existing Studies Using the Differential Equation Models

The ODE models (in the Form of Equation (1) or other forms based on ordinary differential equation or equations system) have seen some application in studies on couples and family interactions (Gottman et al., 2003; Gottman et al., 1999; Gottman et al., 2002; Madhyastha et al., 2011). For example, Gottman et al. (1999) used the ODE Model to operationalize and quantify the dynamic parameters of the interaction between newlywed couples, and predicted their divorce after a 6-year span with these dynamic parameters. They studied several constructs derived from the Differential Equations Model: (a) emotional inertia, i.e., the extent to which each party's subsequent emotional state was predicted by their own previous emotional state; (b) uninfluenced steady state, i.e., each spouse's average level of emotional positivity or negativity, when the other spouse's was equally positive and negative; (c) positive threshold and negative threshold in the influence functions, i.e., the threshold point of the husband/wife at which the other spouse's positivity or negativity would start to have an impact on his/her immediately following behavior; (d) influenced steady state, i.e., the stable state at the end of the husband-wife communication after their mutual influence. Results indicated that couples who eventually divorced had more negative initial uninfluenced husband and wife steady states, more negative influenced husband steady state, and lower negative threshold. These results suggested that in contrast to couples remaining in marriage after 6 years, for divorced

couples both husband and wife showed a more negative emotional state at the beginning of their conversation when the other spouse' emotional state was neutral, was evoked to be negative more easily by the other partner, and ended the conversation in a state with higher husband negativity.

Gottman et al. (2003) studied two samples of committed gay and lesbian domestic couples and two samples of married heterosexual couples. The participants were asked to engage in a day conversation, a conflict resolution conversation, and a pleasant topic conversation. The observational data were coded regarding the interactants' specific emotions, and the time-sequential data were then modeled with the ODE. Parameters were estimated that quantified uninfluenced steady state, influenced steady state, emotional inertia, and the power of positive and negative affect of one partner to affect the other partner. These parameters allowed researchers to compare the differences in interactional characteristics (as represented by the aforementioned parameters) across heterosexual versus homosexual partners, topic types, and topic initiators.

Madhyastha et al. (2011) examined interactional data from a group of married couples (N = 124) and newlyweds (N = 130) and explored the relative effects of the couples' initial states and emotional inertia (i.e., their individual state/input) versus their mutual interactional process in a conflict discussion and resolution conversation. Results showed that the mutual influence effect was statistically significant, but only slightly greater than what would be expected by random association. The authors suggested that for many people initial state and emotional inertia might dictate the outcome of the conflict discussion, more than the moment-to-moment emotions of the spouse through the mutual influential interactional process. This finding was in conflict with most models of couples' interaction, which suggested that the outcome

of conflict discussions were determined by the nature of the couples' mutual influence processes.

Taken together, employing this methodology, researchers were able to specifically depict the interactional dynamics and mutual influence patterns between couples, and relate the parameters about the couples' dynamics to their marriage and life outcome. The systematic depiction and quantification of the nonlinear interactive dynamics between multiple interacting parties is a major strength of the ODE model (Perry et al., 2017) in comparison to a limited number of other nonlinear models (e.g., Marcov Chain Analysis, Lag Sequence Analysis, Information Theory, etc.) that have been used previously in some counseling psychology research studies (Lichtenberg & Heck, 1986). However, though potentially promising and applicable in modeling the dynamic dyadic interactions between the therapist and client, this model has rarely been used in the research on the process and outcome of psychotherapy (Perry et al., 2017). The only couple of studies (Liebovitch et al., 2011; Peluso et al., 2012; Perry et al., 2017) that were located talking about this method in the context of psychotherapy research used simulated data to introduce and illustrate this model and to explore how the different combinations of these four dynamic parameters (assigned by the researchers hypothetically) would be related to the different relational dynamics and developmental pattern between the therapist and the client. To date, no existing studies applied the differential equations model in the quantification and investigation of therapist-client dyadic dynamics, i.e., their mutual influence and responsiveness both to themselves and to the other party, which is reflected in the dynamic, interactive, and nonlinear interactional processes in psychotherapy (Peluso et al., 2012).

Social Relations Model and Multilevel Data Partitioning: Disentangling the Dyadic

Effects

It is of crucial importance to note that what the aforementioned dynamic coefficients (b_{T2T}, b_{C2C}, b_{C2T}, and b_{T2C}) obtained from the differential equations system capture are *dyadic* rather than *individual* effects (Kenny & La Voie, 1984). For example, the coefficient b_{C2T} as stated earlier represents the responsiveness of therapist to the client's influence in therapy. It quantifies a type of dynamics of this *dyad* rather than of any of the two interacting individuals, i.e., the extent to which in this particular dyad the client is influential and the therapist is responsive, rather than only the level of influence of the client, or the level of responsiveness of the therapist.

The Social Relations Model (Kenny & La Voie, 1984) has provided a way to specifically address this type of dyadic relationships. The model maintains that a dyadic interaction can be decomposed into three major types of effects: an actor effect, a partner effect, and a relationship effect. The actor effect means the general main effect of the actor or the initiator of the interaction, the partner effect means the general main effect of the partner or the receiver of the interaction, and the relationship effect means the distinct ways in which the actor and partner interact that differ from how they respectively reacts to other people. Table 1 provides hypothetical examples to help illustrate these three types of effects. For example, four individuals Jack, Matt, Victor, and Joe are asked to rate how much they like each other on a 1 = do not like at all to 5 = like very much scale. Table 1(a) displays a situation where only actor effects are present: as one can see, Jack as an actor generally likes other people and gives everyone a rating 5 indiscriminately. Matt as an actor generally does not like other people and gives everyone a rating 1 indiscriminately. Similarly for Victor and Joe. Such a pattern shows that variances only come from the actor but not

the partner, and indicates only actor effects. In the contrary, Table 1(b) displays the situation with only partner effects. As shown, Jack as the partner is least liked by everyone (receiving ratings of 1 from whoever rates him), whereas Matt as the partner is the most liked by everyone (receiving ratings of 5 from whoever rates him). This pattern has variances only coming from the partner but not the actor thus represents only partner effects. Lastly, Table 1(c) presents the situation with only relationship effect. As is shown, Matt and Jack seems to have a very good relationship and they each rates the other a 5; Victor and Joe appears to have really bad relationship and they each rates the other a 1. All other ratings are paired within each dyad, suggesting that the ratings are only based on the relationship between the two members of each dyad thus there is only a relationship effect.

Putting the Social Relations Model in the framework of this study, the dynamic coefficient, for example b_{C2T}, quantifies the therapist T's responsiveness to the client C's influence, and consists of the following three components. The actor effect in this case is the general level of influence of this particular client C (how much C is a dominant or influential person in general with every interactant), the partner effect in this case is the general level of responsiveness of this particular therapist T (how much T is responsive in general with every client), and the relationship effect in this case is the unique combination and interaction of this particular T-C dyad (the distinct ways in which this therapist and client interact that differ from how they respectively interacts with other people).

Specific statistical procedures exist to decompose the dyadic rating into these three components so that the actor, partner, and relationship effects can be disentangled and investigated (Kenny & La Voie, 1984). However, this requires special research designs (e.g., Round Robin design) that psychotherapy data often do

not satisfy. For example, because a client usually only sees one therapist for treating a certain problem (rather than intentionally rotating to see multiple therapists), pure client effects cannot be disaggregated and will then be conflated with the relationship effect. This being said, with multilevel data partitioning (Curran & Bauer, 2011; Kenny & La Voie, 1984), one can still obtain an unconfounded therapist effect due to the fact that each therapist sees multiple clients. Furthermore, the data partitioning into between-therapist and within-therapist between-client components also provides further clarity on the conceptual implications of these four dynamic parameters. Specifically, between-therapist b_{T2T} represents the therapist's consistency, or responsiveness to him- or herself in general across all clients on the caseload, in comparison to an average therapist; whereas within-therapist b_{T2T} represents the therapist's consistency, or responsiveness to him- or herself, when working with a particular client in comparison to an average client under this therapist's caseload. After decomposing the between-therapist b_{T2T}, this component is only attributed to a combination of the client effect and the relationship effect. Between-therapist b_{C2T} represents a therapist's general level of responsiveness across all clients on their caseload, in comparison to an average therapist; whereas within-therapist b_{C2T} represents the level of therapist's responsiveness to the client's influence, and is a combination of the client's main effect (how this client is generally influential) and the dyadic relationship effect (how much client is influential and therapist is responsive in this particular dyad's dynamics). Between-therapist b_{T2C} indicates the therapist's general level of influence across all clients on their caseload, in comparison to an average therapist; whereas within-therapist b_{T2C} captures the client's level of responsiveness to this therapist's influence, which is a combination of the client's main effect (how responsive this client generally is) and the dyadic

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relationship effect (how much therapist is influential and client is responsive in this particular dyad's dynamics). Within-therapist b_{C2C} represents the consistency level, or responsiveness to oneself, of a client on a therapist's caseload in comparison to an average client of that therapist. This includes the combination of the effect of this client and the relationship effect. Between-therapist b_{C2C} represents the consistency level, or responsiveness to oneself, of all the clients under a particular therapist. Because b_{C2C} is a client-level construct, when it's disaggregated into the therapist level, it does not have specific clinical implication but would be important to be controlled in later multilevel models.

Such partitioning can allow researchers to examine the nonlinear dyadic dynamics (i.e., influence and responsiveness to oneself and the other party) at the between-therapist and within-therapist levels respectively while controlling for the effects at the other level. Of particular interest in this study is the therapist responsiveness to both self and client at the between-therapist level, which represents how much a therapist is responsive to the impacts of him- or herself, and to the impacts of their clients generally across their entire caseload. Such between-therapist effects are unconfounded (whereas within-therapist effects are confounded as discussed previously), and may have direct implications on the general style or characteristics of a therapist. Of secondary interest in this study is the therapist responsiveness (to both self and client) at the between-client within-therapist level, which depicts the level of client being influential and therapist being responsive in this particular dyad's dynamics. Although it is not possible to disentangle whether this type of dynamics is *coming from* the client's characteristics or from the distinct interaction of this therapist-client dyad, it may still have implications about the nuanced associations between *this type of therapeutic dynamics* and therapy outcome,

controlling for the therapist's general style.

In sum, the application of nonlinear differential equation model provides a different way of assessing therapist responsiveness. Rather than using "static" items from a self-report or observer rating scale as the Elkin et al. (2014) study attempted, this new method quantifies and derives responsiveness of both the therapist and the client to both themselves and the other party by modeling the dynamic patterns extracted from therapist and client's actual therapy process. Such an approach is more closely related to the original definition and the intuitive notion of responsiveness, and may potentially address the conceptual and analytical problems brought about by the "elusive" concept of responsiveness (Kramer & Stiles, 2015; Stiles, 2009).

Table 1.

Hypothetical Examples Showing the Actor, Partner, and Relationship Effect in the

Social Relations Model.

(a) Actor Effect Only				
Partner / Actor	Jack	Matt	Victor	Joe
Jack	--	5	5	5
Matt	1	----	1	1
Victor	3	3	--	3
Joe	4	4	4	--

(b) Partner Effect Only				
Partner / Actor	Jack	Matt	Victor	Joe
Jack	--	5	3	2
Matt	1	--	3	2
Victor	1	5	--	2
Joe	1	5	3	--

(c) Relationship Effect Only				
Partner / Actor	Jack	Matt	Victor	Joe
Jack	--	5	3	2
Matt	5	--	3	4
Victor	3	3	--	1
Joe	2	4	1	--

Appendix B. Clinical Vignette Examples

The two clinical vignettes below aimed to help illustrate example scenarios in which the therapist was being responsive in (a) an anti-complementary way, or (b) a complementary way. In these examples, the scripts or descriptions of the session process were presented in the second column, and the ratings of therapist control, therapist affiliation, client control, and client affiliation were presented in the next four columns. The rating scales were anchored from -3 to 0 to 3: for Control dimension, -3 = Very submissive, 0 = Neutral, 3 = Very Dominant; for Affiliation dimension, -3 = Very Hostile, 0 = Neutral, 3 = Very Friendly.

Vignette #1:

Segment	Transcript/Description (T=Therapist; C=Client)	Therapist Ratings		Client Ratings	
		Control	Affiliation	Control	Affiliation
1	T: Nice to see you, XX. What would you like to talk about today? C: Well, you know, I had a pretty rough week. After seeing you the last time, I had a conversation with my girlfriend, which really did not go well. She was very mad when I told her about how I truly felt, … (Client went on talking about his experiences interacting with his girlfriend, while the therapist listened actively throughout this segment)	0 (Therapist started the session with open question and remained attentive and listening without guiding the session, thus rated as 0 = neutral in Control.)	1 (Therapist was generally being friendly.)	1 (Client started telling his stories and was taking more lead in this segment with therapist following and listening, thus rated as 1 = mildly dominant.)	1 (Client was generally being friendly.)
2	C: I am really not surprised about my girlfriend's	-1	1	2	1

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	reaction, you know, because she is this type of person who is always stubborn and always wants to get her way… T: EmHmm… C: She always complains that I don't listen, and she is only happy when I go along with whatever she says, and if I say something about myself or my thoughts or my feelings, then I would surely be accused of being too ego-centric or narcissistic... T: Hmm… I… C: (Did not even notice therapist's attempt to speak) There is another time, when she… (Client continued talking about her girlfriend and engaged in somewhat a storytelling mode. Therapist attempted to jump in several times but client did not leave space for therapist to say anything.)	(Therapist was relatively passive in this segment, because the client was assuming more lead and therapist was not able to have any input, thus rated as -1 = mildly submissive.)	(Therapist was generally being friendly.)	(Client was taking more lead in this process by directing the session in this segment, without leaving space for the therapist, thus rated as 2 = moderately dominant.)	(Client was generally being friendly.)
3	C: … these are just a couple examples of who she is, Dr. YY. I don't think it's possible for me to truly have a conversation with her… T: XX, if I may pause you here, and I'd like us to go back a bit to the feeling of helplessness you just quickly mentioned, and it seems a constant feeling that you get when you are with her. Can we explore more what this is about? C: Yeah, it just feels like there is no way I can fix this relationship, you know, I feel like I have tried really hard, I reflect about myself daily, I go to therapy, I try to talk with her according to what you say to me… T: It feels like nothing works, while you are trying every possible thing.	1 (Therapist took a mildly dominant stance by interrupting client's storytelling, and asked probing questions and reflected client feelings. Therapist's interventions redirected the	1 (Therapist was generally being friendly.)	0 (When the therapist took a mildly dominant stance and asked probing questions, client went along with therapist's intervention. He still maintained his active involvement and agency in exploring his own	1 (Client was generally being friendly.)

	C: Yeah, you are right, this feels really helpless because I really don't know what I can do other than leaving her, but I can't… (Therapist intervened and interrupted client's storytelling, and invited client to focus on certain feelings and themes by asking probing questions or reflecting client's feelings. Client generally went along with therapist's lead in this segment, and started exploring his thoughts and feelings deeper and stopped the storytelling or complaining his girlfriend.)	conversation in the session in this segment, thus rated as 1 = mildly dominant.)		issues and was not passive or submissive, thus rated as 0 = Neutral.)	
4	…	…	…	…	…

In the above Vignette #1, note that from Segment #2 to Segment #3, therapist responded with relatively high client Control (rating = 2 in Segment #2) by increasing her level of Control from -1 in Segment #2 to 1 in Segment #3. This (and similar such interactions) would be captured by the ODE model as therapist responding to higher client Control by increasing her own Control, thus represented an incidence of therapist being responsive in an anti-complementary way along the Control dimension. On the Affiliation dimension, no variations in ratings were present as therapist and client affiliation levels remained mostly constant.

Vignette #2:

Segment	Transcript/Description (T=Therapist; C=Client)	Therapist Ratings		Client Ratings	
		Control	Affiliation	Control	Affiliation
1	T: How would you like to start our session today, ZZ? C: I am not quite sure… I have been feeling very depressed recently.	1 (Therapist started the session with	1 (Therapist was	-1 (Client was quite passive in this	1 (Client was

	T: That must be a really hard time for you… Can you tell me more about your depression? C: I am not sure where to start… I just feel sad and down all the time, and I cannot motivate myself to do anything that is meaningful for me. … (Client answered therapist's questions mostly with short answers and appeared to have some difficulties talking about her experiences or exploring her thoughts and feelings. The interactions in this segment were mostly characterized by therapist asking questions and client providing restricted short answers.)	open question and followed up with a series of questions, with an attempt to facilitate client's deeper exploration. In this segment it appeared to be that the therapist was taking more lead in asking questions, thus rated as 1 = mildly dominant.)	generally being friendly.)	segment, and did not actively engage with the therapist, nor did he appear to actively explore his issues, thus rated as -1 = mildly submissive.)	generally being friendly.)
2	T: I think one activity that may be helpful for us to do here, is called "thought record". It is a method to identify a specific incidence of your depression, and explore deeper into your thoughts, feelings, and behaviors, and understand how they influence each other and where they may be coming from. How do you feel about us trying out this exercise together in the session now? C: Alright… T: OK. Let me walk you through what this exercise is about. Here is a pencil and a piece of the "thought record worksheet". On the top is the section for you to recall a recent incidence, or a typical incidence when you would feel depressed. C: OK…	2 (Therapist was quite active and taking major lead in this segment, suggesting an in-session exercise and leading client through completing the thought record. Because therapist being mostly directive in this	1 (Therapist was generally being friendly.)	-1 (Client was not very expressive or active in the session, and kept his similarly passive stance. He mostly followed therapist's instructions without taking any lead or control, but was collaborative in	1 (Client was generally being friendly.)

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	T: Can you take a moment to think of one example, either recent or something you typically feel depressed, and write it down here in this box? C: … (Contemplating, and writing on the worksheet). (Therapist guided client through working on the "thought record" worksheet, client went along with therapist's lead in this process in a relatively passive way.)	segment with client mostly following therapist's guidance, therapist was rated as 2 = moderately dominant.)		completing the thought record. Client was thus rated as -1 = mildly submissive.)	
3	…	…	…	…	…

In the above Vignette #2, Segment #1 was characterized by therapist being mildly dominant and client being mildly submissive. Segment #1 to #2 illustrated a dynamic change in which the therapist increased her level of Control (from rating = 1 to 2) in response to client's continuously being submissive (rating = -1). This (and similar such interactions) would be captured by the ODE model as therapist responding to low client Control by increasing her own level of Control, thus represented an incidence of therapist being responsive in a complementary way along the Control dimension. On the Affiliation dimension, no variations in ratings were present as therapist and client affiliation levels remained mostly constant.

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