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Interpersonal Problems Predict Differential Response to Cognitive Versus Behavioral Treatment in a Randomized Controlled Trial

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Abstract

Objective—We examined dimensional interpersonal problems as moderators of cognitive behavioral therapy (CBT) versus its components (cognitive therapy [CT] and behavioral therapy [BT]). We predicted that people with generalized anxiety disorder (GAD) whose interpersonal problems reflected more dominance and intrusiveness would respond best to a relaxation-based BT compared to CT or CBT, based on studies showing that people with personality features associated with a need for autonomy respond best to treatments that are more experiential, concrete, and self-directed compared to therapies involving abstract analysis of one's problems (e.g., containing CT).

Method—This was a secondary analysis of Borkovec, Newman, Pincus, and Lytle (2002). Forty-seven participants with principal diagnoses of GAD were assigned randomly to combined CBT (n = 16), CT (n = 15), or BT (n = 16).

Results—As predicted, compared to participants with less intrusiveness, those with dimensionally more intrusiveness responded with greater GAD symptom reduction to BT than to CBT at posttreatment and greater change to BT than to CT or CBT across all follow-up points. Similarly, those with more dominance responded better to BT compared to CT and CBT at all follow-up points. Additionally, being overly nurturant at baseline was associated with GAD symptoms at baseline, post, and all follow-up time-points regardless of therapy condition.

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Conflict of Interest Statement
The authors declare that there are no conflicts of interest.

Conclusions—Generally anxious individuals with domineering and intrusive problems associated with higher need for control may respond better to experiential behavioral interventions than to cognitive interventions, which may be perceived as a direct challenge of their perceptions.

Keywords

GAD; interpersonal problems; CBT; cognitive therapy; behavioral therapy

An important focus of psychotherapy research has been which treatments work for whom (Paul, 1967), which is the core theme of "personalized medicine" (Simon & Perlis, 2010). Although studies are beginning to emerge on this topic, there has been limited research with respect to cognitive behavioral therapy (CBT) for generalized anxiety disorder (GAD; Newman, Castonguay, Jacobson, & Moore, 2015; Newman & Fisher, 2013). Such research is important because even though CBT works for many people, it does not work equally for everyone. Elucidation of moderators of therapy outcomes might lead to more individualized treatments.

Interpersonal problems are likely candidates as moderators of therapy given that individuals with the same diagnosis are often heterogeneous in terms of their predominant interpersonal difficulties (e.g., Kachin, Newman, & Pincus, 2001; Przeworski et al., 2011). A relevant, well-developed framework for measuring such problems is the interpersonal circumplex (IPC), which assesses a wide variety of interpersonal characteristics and behaviors (Gurtman, 2009). The interpersonal problems IPC consists of "octant" scales representing underlying dysfunctions of affiliation/warmth (e.g., needing to take care of others) vs. coldness (e.g., seeking distance from others) and dominance (e.g., difficulty considering others' point of view) vs. submission (e.g., excessively deferring to others). Interpersonal problems can be studied at the level of overall problems or more specific types of problems via octant scales (e.g., being "socially avoidant" is defined as being both cold and submissive, whereas "intrusiveness" is a warm and dominant problem; see Figure 1). Such problems are relatively stable over time, suggesting they are trait-like characteristics (Horowitz, Rosenberg, Baer, Ureno, & Vilasenor, 1988; Vittengl, Clark, & Jarrett, 2003).

Knowledge about such problems might facilitate individualized treatment planning, given that interpersonal problems have predicted treatment response to both CBT and other therapies (e.g., psychodynamic therapy). For example, clients' overall pretreatment interpersonal problems predicted less improvement or greater rates of dropout across individual or group CBT for depression or anxiety as well as individual CBT or interpersonal therapy for binge eating disorder, suggesting that interpersonal problems are relevant to treatment response (Hilbert et al., 2007; McEvoy, Burgess, & Nathan, 2014; Renner et al., 2012). Second, overall interpersonal problems predicted differential response to interventions. Higher overall problems predicted less improvement in depression or anxiety from group CBT, but not from individual CBT (McEvoy et al., 2014), and predicted greater attendance in supportive, but not interpretive, group therapy for personality disorders (Ogrodniczuk, Piper, & Joyce, 2006). Lastly, subtypes of interpersonal problems may predict stronger responses to specific therapies. For example, those with avoidant personality disorder who had interpersonal problems related to being cold-avoidant benefitted from

graduated exposure, but not from skills training (Alden & Capreol, 1993). Also, those with more dominant problems (i.e. being too controlling) responded more to a nonmanualized community psychodynamic therapy for personality disorders, but not to manualized supportive-expressive dynamic therapy (Vinnars et al., 2007). Such findings suggest the possibility that the effects of interpersonal problems may depend on specific features of the psychotherapy. However, effects found in non-CBT interventions may not generalize to CBT, and there is no prior research that might be used to predict how interpersonal problems may shape differential response to cognitive versus behavioral therapies.

Despite a lack of direct data on interpersonal moderators of cognitive versus behavioral therapies, hypotheses may be informed by theory and research on internalizing/externalizing coping styles (Beutler & Mitchell, 1981; Welsh, 1952). Those who “internalize” are relatively passive and withdrawn and tend to be more interested in thinking, whereas those with an “externalizing” style are characteristically more active and assertive and more interested in doing. Internalizers had greater symptom reduction from interventions emphasizing intellectual insight, whereas externalizers fared better with more concrete, experiential, and action-oriented therapies (Beutler, 1979; Beutler & Mitchell, 1981; Beutler, Mohr, Grawe, Engle, & MacDonald, 1991; Calvert, Beutler, & Crago, 1988; Cooney, Kadden, Litt, & Getter, 1991). For example, alcoholic patients with higher levels of externalizing coping features did better in response to behaviorally focused skills training compared to a more insight-oriented treatment (Cooney et al., 1991; Kadden, Cooney, Getter, & Litt, 1989). Such findings are relevant to interpersonal problems because passivity maps onto cold-submissive and submissive octants whereas tendencies to be active and assertive map onto the dominant and friendly-dominant octants of the circumplex (i.e. dominant, and intrusive interpersonal problems; Gurtman, 1991; Wiggins & Broughton, 1991). Furthermore, interpersonal traits and problems, although not synonymous, reflect overlapping constructs that occupy the same IPC domains (Alden, Wiggins, & Pincus, 1990). Both cognitive and behavioral interventions have shown efficacy for GAD in general (Borkovec & Ruscio, 2001); however, particular interpersonal problems may lead to differential responses to features of these therapies. For example, one might expect that problems related to being domineering (overly dominant) and intrusive (excessive warm-dominance; Alden et al., 1990) would predict a better response to concrete, action-oriented, and experiential treatments (e.g., “pure” relaxation-based behavioral intervention) over those that feature highly intellectual or cognitively focused interventions (i.e. cognitive restructuring). This notion is consistent with the finding that being higher on intrusive problems predicted greater symptom improvement from a behavioral weight loss program that included a low-calorie diet, skills training, and a fitness regimen (Lahmann et al., 2011).

Additionally, these ideas dovetail with research on “reactance,” a traitlike style of coping with others’ social influence. Individuals high in “reactance” are characterized by the motivation to maintain self-determination and sensitivity toward perceived threatened autonomy (Beutler, 1979). They tend to be more disposed to resist external influence and show less symptom improvement from interventions that could be perceived as containing direct challenge such as cognitive therapy, but fare better from interventions that allow for more self-guided coping (Beutler et al., 1991; Beutler, Harwood, Michelson, Song, & Holman, 2011; Beutler, Machado, Engle, & Mohr, 1993). For example, patients with

depression who were lower in reactance responded better to cognitive therapy compared to those higher in reactance who responded best to supportive self-directed therapy (Beutler et al., 1993). Dominance has been conceptualized as highly related to reactance (Beutler et al., 1991), and is a key correlate of reactance (Dowd, Wallbrown, Sanders, & Yesenosky, 1994); high dominance (domineering) interpersonal problems (e.g., the item, “It’s hard for me to take instructions from people who have authority over me”) represent a similarly strong need for autonomy (Wiggins & Broughton, 1991). In terms of CBT, it is possible that those with dominant and intrusive interpersonal problems may receive the greatest symptom improvement from treatments that offer concrete, behavioral, and experiential skills that these individuals may perceive as relatively less challenging of their need for control than cognitive therapy and can quickly “own” themselves.

Pretreatment interpersonal problems may be particularly important for understanding the therapy response of those with GAD, and ultimately tailoring treatment to the individual, given evidence of robust links between GAD symptoms and heterogeneous interpersonal difficulties (e.g., Newman & Erickson, 2010). For example, individuals with GAD feel easily slighted compared to those with no diagnosis (Gasperini, Battaglia, Diaferia, & Bellodi, 1990), are disproportionately likely to be separated or divorced (Afifi, Cox, & Enns, 2006; Grant et al., 2005), and endorse higher relational conflict than couples with an agoraphobic member (Friedman, 1990). They report higher interpersonal disturbance in most octants compared to healthy controls and those with other anxiety disorders (Gamez, Watson, & Doebbeling, 2007), but are diverse in their predominant problems (Przeworski et al., 2011; Salzer et al., 2008).

Only two studies have examined whether interpersonal problem subtypes predicted the impact of psychotherapy on GAD symptoms. Crits-Christoph and colleagues (2004) found that higher overly nurturant (excessively warm) problems predicted poorer response to supportive-expressive dynamic therapy for GAD. Another study examined client interpersonal problems in the context of cognitive and behavioral therapies for GAD (Borkovec, Newman, Pincus, & Lytle, 2002). Collapsing data across cognitive therapy (CT), behavioral therapy (BT; applied relaxation plus self-control coping desensitization [SCD]—a variant of systematic desensitization that includes positive coping imagery), and combined treatment (CBT), this study reported zero-order correlations between pretherapy interpersonal problem subscale scores and a categorical endstate functioning outcome measure. Those with more problems related to being domineering, intrusive, or vindictive at pretreatment had lower endstate measures at 6-month follow-up, but there were no associations between pretreatment scores and end-state measures at posttreatment, 1-year, or 2-year follow-up. Several interpersonal problems remaining at posttreatment also predicted endstate measures at posttreatment and 6-month follow-up (vindictive, intrusive, domineering, exploitable, nonassertive, and overly nurturant). However, this study did not formally test whether interpersonal problems moderated the impact of treatment type on outcomes. Also, the analytic strategy used by Borkovec and colleagues (zero-order correlations) failed to take into account the nested nature of the data (repeated measures nested within participants), and the use of a categorical dependent measure likely limited power. Moreover, like other studies testing interpersonal problems as predictors of treatment

response, these GAD studies made no theory-based predictions for what types of clients might respond best to particular treatments.

The goal of the current study was to examine interpersonal problems as moderators of therapy outcome using multilevel models and to predict a dimensional GAD symptom outcome measure. To date, no GAD studies have examined how particular interpersonal problems might moderate the effect of cognitive and behavioral therapies on symptom improvement. Prior findings suggest that individuals higher in dominance and intrusiveness might experience greater symptom reduction in a purely behavioral relaxation-based treatment compared to cognitive therapy or a combination of these treatments. The present study tests this theory-derived prediction in the context of a secondary analysis of data from Borkovec et al. (2002), which compared a behavioral treatment that combined applied relaxation with self-control coping desensitization (BT), cognitive therapy (CT), and a combined treatment (CBT) and found no differences in their efficacy for GAD at any time point. The protocol for CT in this study explicitly emphasized intellectual analysis and Socratic challenge of clients' perspectives. In contrast, the protocol for BT emphasized experiential participation in relaxation exercises (Bernstein & Borkovec, 1973), clients' self-guided development of coping skills related to "letting go" via relaxation, and clients' self-directed desensitization to feared images with imagined positive coping at their own pace (Goldfried, 1971).

We predicted an interaction such that individuals with problems related to being excessively dominant (domineering) and affiliative-dominant (intrusive) would respond better to relaxation-based BT than treatments incorporating CT (either CBT or CT alone). This prediction was based on findings that domineering and intrusive octants are characterized by assertiveness and a need for autonomy (Wiggins & Broughton, 1991). Traits related to assertiveness have predicted better response to more concrete, action-oriented treatments than to treatments promoting intellectual understanding (Beutler et al., 1991). Similarly, people with a strong need to feel in control have responded more poorly to cognitive therapy for depression compared to other therapies (Beutler et al., 2011). On one hand, cognitive and behavioral therapists have both been rated as directive, but also as supportive and empathic —contrary to a stereotype of CBT as cold (Keijsers, Schaap, & Hoogduin, 2000). However, although CT and BT may be equivalently "directive," high dominance/intrusive individuals may be more sensitive to misinterpreting cognitive restructuring as a direct challenge given the "devil's advocate" position that therapists often take and such clients may have greater difficulty with the CT focus on cognitive/intellectual processes compared to those lower in dominance/intrusiveness. In contrast, the relatively more experiential, and self-directed, relaxation-based approach of BT focuses more on concrete behaviors (i.e. relaxation and self-control desensitization) that clients can more quickly own and execute independently and does not contain any cognitive challenge. Thus, this approach may be experienced as relatively less autonomy-challenging by high dominant/intrusive individuals. On this theoretical basis, we expected high dominance/intrusiveness individuals to respond better to BT (SCD) vs. treatments incorporating CT.

In summary, we made targeted predictions for the domineering (high dominance) and intrusive (high dominance plus affiliation) octants given that personality characteristic

associated with an externalizing coping style and reactance have mapped onto these regions of the circumplex; analyses for other octants were thus considered exploratory.

Method

PARTICIPANTS

Four hundred and fifty-nine people responded to local newspaper advertisements or referrals from mental health practitioners. Of these, 320 were ruled out by phone screens for not meeting study inclusion criteria, 54 clients were ruled out via an initial structured interview, and 9 clients were ruled out during a second structured interview, leaving 76 participants with primary generalized anxiety disorder who entered treatment. However, 7 clients dropped out at early stages of treatment (4 in BT, 2 in CT, and 1 in CBT), leaving 69 clients who completed treatment. Because the IIP–C was added to the assessment battery near the end of the 2nd year of the project, 47 people provided data at baseline for the current study (CT $n = 15$; BT $n = 16$; CBT $n = 16$). Participants ranged in age from 18 to 65 years ($M = 39.11$, $SD = 12.31$). Of the sample, 63.8% were female. The sample was 89.4% Caucasian, 4.3% Latino, 4.3% Indian, and 2.1% African American. Approximately 10% were taking psychotropic medications.

PROCEDURE

Selection and Assessor Outcome Ratings—Admission criteria included consensus between the two diagnostic interviewers on: a principal diagnosis of GAD, no diagnosable panic disorder (as recommended by the funding agency's review committee), a Clinician's Severity Rating (CSR) for GAD of 4 (moderate) or more, absence of concurrent psychosocial therapy, no history of having received CBT methods in prior therapy, no medical contributions to the anxiety, no antidepressant medication, stable dosage of any psychotropic medications, and absence of severe major depressive disorder, substance abuse, psychosis, and organic brain syndrome. All but two clients (97.1%) met both DSM-III-R and DSM-IV criteria for GAD.

Advanced clinical graduate students trained to reliability in diagnostic interviewing administered 30-minute phone screens and the Anxiety Disorders Interview Schedule–III–R (ADIS-R; Di Nardo & Barlow, 1988). Those not ruled out received the ADIS-R, which included the Hamilton Anxiety Rating Scale (HARS; Hamilton, 1959), CSR for GAD, and additional questions corresponding to two GAD criteria being proposed at the time of study initiation by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM–IV; American Psychiatric Association, 1994) subcommittee for GAD (i.e. uncontrollable worrying, and three of six associated symptoms). A second ADIS-R was administered within 2 weeks by the therapist who would see the client in therapy to reduce likelihood of false positive cases. Pretreatment diagnoses were based on consensus between the independent structured interviewers. A random subsample of 20% of pretreatment audiotapes of ADIS-R interviews conducted by the primary assessor (prior to developing consensus) was reviewed for reliability purposes. For the presence of GAD, kappa agreement was 1. Outcome measures were administered at pre, posttreatment, 6-month, 12-month, and 24-month follow-ups.

MEASURES

The *CSR* (Di Nardo & Barlow, 1988) is a 0 (*none*) to 8 (*very severely disturbing/disabling*) score assigned by interviewers to reflect degree of impairment associated with each disorder. Interrater reliability of CSRs in the current study ranged from an intraclass correlation (ICC) of .77 to 1.

The *State Trait Anxiety Inventory–Trait Version* (*STAI-T*) is 20-item scale measure of trait anxiety with high internal consistency reliability (.86 in the current sample), good retest reliability (high .70's), and strong convergent and discriminant validity (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

The *HARS* (Hamilton, 1959) is a 14-item clinician-administered scale of severity of anxious symptoms. Internal consistency ranged from adequate to good (α =.77 to .81 [Moras, di Nardo, & Barlow, 1992]; .82 in the current sample). Interrater reliability ranged from an ICC of .74 –.96 (Bruss, Gruenberg, Goldstein, & Barber, 1994; ICC = .89 in the present study).

The *Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item self-report measure of pathological worry. It has high internal consistency (Meyer et al., 1990; .83 in the current sample), retest reliability ranging from .74–.93, as well as strong convergent and discriminant validity (Molina & Borkovec, 1994).

The *Inventory of Interpersonal Problems–Circumplex Scale* (IIP-C; Alden et al., 1990) is a 64-item measure of interpersonal problems typically reported by clients seeking psychotherapy. Items reflect both behavioral deficiencies and behavioral excesses. Thirty-nine items are phrased as "It is hard for me to . . . " followed by, for example, "say 'no' to other people." The remaining 25 items are phrased as "These are things I do too much: . . . " followed by, for example, "I open up to people too much." Items are rated on a 5-point Likert scale from 0 (*not distressed at all about this problem*) to 4 (*extremely distressed about this problem*). Eight 8-item subscales corresponding to octants on the circumplex make up the IIP-C, including domineering (e.g., "I try to control other people too much"), and intrusive (e.g., "It is hard for me to stay out of other people's business") problems, which were the primary variables of interest in the current study. Other subscales include vindictive (e.g., "I try to get revenge on other people too much"), cold (e.g., "It is hard for me to feel close to other people"), socially avoidant (e.g., "It is hard for me to socialize with other people"), nonassertive (e.g., "It is hard for me to let other people know what I want"), exploitable (e.g., "It is hard for me to feel angry at other people"), and overly nurturant (e.g., "I try to please other people too much"). Retest reliability (total r = .98; average subscale r = .81) and internal consistency for the octant scales (α = .72–.85) have been demonstrated (Horowitz et al., 1988), and ranged from α = .73–.89 in this study. Client improvement as measured by the IIP correlated with improvement on symptom measures, and with assessments of independent observers (Horowitz et al., 1988). Further, the scale predicted the types of interpersonal issues discussed in therapy (Horowitz et al., 1988; Renner et al., 2012).

THERAPY CONDITIONS

Participants were randomly assigned to receive either BT (N=16), CT (N= 15), or combined CBT (N= 16). In all conditions, therapy manuals were used. The first four sessions were 2 hours in duration; remaining sessions were 1.5 hours. The first 30 minutes of each BT and CT session involved only supportive listening (SL) to equalize therapist contact time (see Borkovec et al., 2002, for more detailed description of the therapy).

Fourteen weekly sessions were administered. Several aspects were common to the three conditions: presentation of a model of anxiety and rationale for therapy, self-monitoring and early identification of anxiety cues, homework assignments, and review of homework. CT entailed logical analysis, examination of evidence and probabilities, labeling logical errors, decatastrophizing, generation of alternative thoughts and beliefs, plus SL. BT entailed progressive, cue-controlled, and differential relaxation training as described in Bernstein and Borkovec (1973), slowed diaphragmatic breathing, relaxing imagery, meditational relaxation, applied relaxation training, self-control desensitization as described by Goldfried (1971), and SL. For self-control desensitization, clients constructed anxiety cue hierarchies. They practiced relaxation, and when deeply relaxed, they imagined being in the presence of an external or internal anxiety cue until they noted the presence of anxious feelings. They then continued imagining the external situation while imagining deploying coping responses. At the elimination of anxious feelings, clients imagined continued coping deployments for 20 s and then discontinued imagery and focused only on the relaxed state for 20 s. Scenes were repeated until clients could no longer generate anxiety or were able to eliminate it rapidly (i.e. within 5–7 s). Homework emphasized frequent applications of relaxation and focus on living in the present moment. CBT contained all of the treatment techniques in CT and BT, but had no separate SL segment included.

Planned Analyses

There was no missing outcome data and therefore, no data replacement strategies were used. Power analyses were calculated for each of the *a priori* models based on Monte-Carlo simulation studies of the fixed and random effect model estimates. Simulation studies represent a gold standard in power analyses calculations (Ma, Thabane, Beyene, & Raina, 2016; Muthén & Muthén, 2002). After conducting 1,000 simulations per condition, power estimates for the three-way interaction between time, the moderator variable, and therapy condition as well as simple slopes analyses suggested that each test had requisite power.[1]

Similar to other treatment studies (Newman et al., 2011), we created a single continuous variable to represent GAD symptom severity. A composite provides a more valid measure of psychopathology and a means of reducing experiment-wise error rate (Horowitz, Inouye, & Siegelman, 1979). The composite included the CSR, PSWQ, the STAI-T, and the HARS.

[1]Power = 95.55% for the interaction between pre-post time, intrusiveness, and condition; power = 90.29% for the interaction with post-follow-up, time, intrusiveness, and condition; power = 91.72% for the interaction between post-follow-up time, domineering, and condition. Power = 93.40% for differences in slopes between BT and CBT and 79.10% for differences in slopes between CT and BT for the interaction between pre-post time, intrusiveness, and condition; power = 74.26% for differences in slopes between BT and CT and 85.70% for differences in slopes between BT and CBT for the interaction between post-follow-up time, intrusiveness, and condition; power = 86.03% for differences in slopes between BT and CBT for post-follow-up time, domineering, and condition. Power = 77.73% for differences in slopes between BT and CT for post-follow-up time, domineering, and condition.

Each scale was first standardized based on sample means and standard deviations, and then scales were averaged to create a standardized composite. Positive values of the composite (i.e. above the sample mean) represent more anxiety pathology, and negative values (i.e. below sample mean) represent less anxiety pathology. As such, negative regression estimates at post and follow-up reflect a beneficial effect of treatment. The IIP-C was scored using subscales as opposed to the IPC structural summary method (Wright, Pincus, Conroy, & Hilsenroth, 2009) for two reasons. First, subscale scores are easier for practicing therapists to compute than structural summary scores. Secondly, subscale scores permit examination of specific types of problems dimensionally, consistent with our theory-based predictions and are better suited for inferential statistical tests.

Results were analyzed using multilevel models. Time was modeled in a piecewise manner, such that pre-post time and post-follow-up were both included in the same models, but were modeled with different terms. Piecewise models allowed for the symptom change to be different from pre- to posttreatment than from posttreatment to follow-up, given that one would expect different rates of change during the two time periods. Post-follow-up time used one regression coefficient containing three follow-up times (6-month, 1-year, and 2-year) as a single continuous predictor. Each moderator was considered separately to ensure that the models had adequate degrees of freedom and that multicollinearity was not an issue (Leal, Bean, Thomas, & Chaix, 2012). However, given our *a priori* hypotheses, domineering and intrusiveness as moderators were modeled first and were viewed as the primary analyses, whereas examination of additional IIP-C subscales as moderators were considered exploratory. Each multilevel model was analyzed in the R package lme4 (Bates, Maechler, & Bolker, 2012). Random effects included intercepts, and time slopes (pre-post and post-follow-up) as nested within persons. The covariance structure for random effects was unstructured. Fixed effects included (1) the main effects of time (pre-post and post-follow-up), the moderator variable of interest (IIP subscale), and condition; (2) two-way interactions between time (pre-post or post-follow-up), the moderator variable of interest (IIP subscale), and condition; and (3) the three-way interaction between time, the moderator variable of interest, and condition. We first tested full models with all interactions and main effects for domineering and intrusive problems, to examine our primary moderation hypotheses (i.e. three-way interactions), followed by exploratory tests of other IIP subscales. To limit redundancy, we removed nonsignificant random effects and then nonsignificant fixed effects from the model using the R package lmertest (Kuznetsova & Brockhoff, 2014). [2] To ensure high resolution in examining interpersonal problems, subscales were used as continuous predictors in the analyses.

Following each analysis, the significance of each interaction was investigated with reference to each group via post-hoc tests using the R package, phia (Rosario-Martinez, 2013). All of the primary fixed effect coefficients' effect sizes were converted to Cohen's *d*, using the following equations for *F*-statistics, *t*-statistics, and chi-squared statistics:

[2]Note that the full models without removing nonsignificant effects led to identical results in their significance and their direction for the primary analyses.

$d = \frac{2 * \sqrt{F}}{\sqrt{(N-1)}}$, $d = \frac{2 * t}{\sqrt{(N-1)}}$, and $d = ((4\ \chi^2)/(N - \chi^2))^{1/2}$ (Dunst, Hamby, & Trivette, 2004; Wolf, 1986).

Results

DESCRIPTIVE STATISTICS AND BASELINE DIFFERENCES

Table 1 provides descriptive statistics and correlations between subscales of the IIP-C at baseline. Consistent with other studies, octants that are closer together on the circumplex were more highly correlated with one another than more distant octants. There were no significant pretreatment differences between the three compared psychotherapy conditions on IIP-C subscales (*p*s ranged from .083–.964; *d*s ranged from .078–.673). Thus, most interpersonal problems were distributed across all conditions, permitting tests of differential treatment response by problems. There were also no differences between therapy conditions at baseline on the composite of GAD symptom outcome measures $F(2, 45) = 0.275$, $p = .640$, $d = .303$. Examination of the distributions of the IIP-C scales within each therapy condition suggested a normal distribution. Additionally, Shapiro-Wilk tests on each of the IIP-C scales for each condition were not significant ($p > .050$), suggesting normal distributions. There were also no differences between those who did or did not complete the IIP-C on GAD symptoms at baseline, post, 6-month, 12-month, or 24-month follow-up (*p*s ranged from .497–.895; *d*s ranged from −0.032–0.166). Completing the IIP-C ($\chi^2 = 0.349$, $p = .840$) was also not significantly related to treatment condition. Additionally, completing the IIP-C did not significantly moderate or predict outcome (*p*s ranged from .162–.926, *d*s ranged from 0–0.452).

PRIMARY ANALYSES

Moderation of Treatment Response by Intrusive Problems—Supporting our hypotheses in the pre-post moderation analyses, there was a significant three-way interaction between pre-post time, condition, and intrusiveness, $F(2, 182) = 3.783$, $p = .024$, $d = .58$. Significant differences emerged in the slopes between BT and CBT ($\Delta B = 0.377$, $\chi^2 = 7.179$, $p = .022$, $d = 1.098$), but not in the slopes between CT and CBT ($\Delta B = 0.075$, $\chi^2 = 0.237$, $p = .626$, $d = 0.178$) or BT and CT ($\Delta B = 0.302$, $\chi^2 = 3.468$, $p = .125$, $d = 0.710$). This interaction showed that as baseline intrusiveness levels increased, GAD symptoms were more likely to show improvement in response to BT compared to CBT. Although nonsignificant, the larger effect size comparing slope for BT to CT suggests greater distance than between CT and CBT (Figure 2).

Similarly, there was a significant three-way interaction between post-follow-up time, condition, and intrusiveness, consistent with our prediction, $F(2, 163) = 4.228$, $p = .016$, $d = .613$. In the slope contrasts, higher intrusive individuals who received BT responded significantly better than higher intrusive individuals who received CBT ($\Delta B = 0.064$, $\chi^2 = 7.804$, $p = .015$, $d = 1.16$), and marginally better than higher intrusive individuals who received CT ($\Delta B = 0.055$, $\chi^2 = 4.323$, $p = .075$, $d = 0.805$). There were no slope differences between CBT and CT ($\Delta B = 0.009$, $\chi^2 = 0.131$, $p = .717$, $d = 0.132$) (Figure 3).

Moderation of Treatment Response by Domineering Problems—In contrast to our hypothesis, domineering problems did not moderate treatment at pre-post ($p > .050$). However, supporting our hypothesis, domineering was a significant treatment moderator at follow-up, $F(2, 161) = 4.063$, $p = .019$, $d = .601$. In the slope contrasts, higher domineering individuals who received BT fared significantly better than higher domineering individuals who received CBT ($\Delta B = 0.083$, $\chi^2 = 7.244$, $p = .021$, $d = 1.104$) and marginally better than higher domineering people who received CT ($\Delta B = 0.071$, $\chi^2 = 4.598$, $p = .064$, $d = 0.835$). There were no significant differences in the slopes between CBT and CT ($\Delta B = 0.012$, $\chi^2 = 0.128$, $p = .721$, $d = 0.131$). Thus, increased levels of domineering at baseline predicted better responsiveness to BT compared to either CBT or CT across all follow-up points (Figure 4).

EXPLORATORY ANALYSES

There were no significant interactions ($p > .05$) between any of the remaining interpersonal problem subscales and either time or treatment condition, suggesting that these variables neither predicted change from therapy nor moderated outcome. There was a main effect only of overly nurturant problems ($B = 0.45$, $SE = 0.216$, $t[47] = 2.071$, $p = .044$, $d = 0.610$) on anxiety at baseline, as well as at post and all follow-up points, regardless of treatment condition, suggesting a consistent link of these problems and GAD symptoms.

Discussion

As predicted, compared to participants lower on intrusiveness, those who were relatively higher on this interpersonal problem responded with greater change in GAD symptoms to BT than to CBT at posttreatment and across all follow-up points and marginally greater change to BT than to CT across all follow-up points. Similarly, those higher on dominance responded better to BT compared to CBT and marginally better to BT compared to CT at all follow-up points. Although our analyses cannot conclusively determine *why* BT was superior to the other interventions, both CT and CBT contained cognitive restructuring, whereas BT did not.

It is possible that some discriminating features of CT may interact with dominant and intrusive clients' sensitivities. Cognitive therapists' in-session behavior has been rated as high in both interpersonal warmth (Jones & Pulos, 1993; Keijsers et al., 2000) and control (Ablon & Jones, 1998), suggesting an affiliative-dominant process. Although CT operates on the principle of "collaborative empiricism," some high dominance (domineering/intrusive) clients may perceive this process to be less autonomy-granting relative to relaxation-based BT. In addition, cognitive therapy requires logical introspection and analysis of clients' thoughts, which may be less comfortable for clients who prefer not to engage in more intellectual interventions. Furthermore, in their daily lives clients are encouraged to track, examine, and regularly dispute their thoughts, and to submit records of their thoughts (and cognitive "errors") to analysis by the therapist. Clients higher in dominance/intrusiveness may be sensitive to challenges to their interpretations, which may be perceived as less autonomy granting than procedures that BT emphasized, such as letting go, relaxation, and positive coping imagery.

At the same time, it is possible that BT, when not combined with cognitive therapy, taps into domineering and intrusive clients' strengths. BT focuses on very concrete behavioral strategies such as progressive and applied relaxation, and self-control coping desensitization. Such techniques also emphasize self-directed desensitization and imagery of positive coping at clients' own pace and do not require extensive cognitive analysis or disputation. Thus, BT, with its emphasis on the experiential process of relaxation and coping desensitization exercises, may be an optimal treatment for GAD clients who score higher on dominance or intrusiveness, compared to treatments incorporating cognitive restructuring.

Given that domineering and intrusive octants of the interpersonal problem circumplex (i.e. dominant and affiliative-dominant IPC octants) are typified by a need for autonomy, assertiveness, and action, our findings are consistent with studies on similar interpersonal issues. Such studies showed that individuals high in dominance and high in sensitivity to perceived threatened freedoms (i.e. reactance) fared better in interventions that emphasized experiential participation and self-direction than from treatments such as cognitive therapy that entailed intellectual introspection and could be misperceived as containing direct challenge of client's perceptions (Beutler et al., 1991; Beutler et al., 1993). Similarly, our findings for domineering and intrusive problems parallel the relatively robust finding that "externalizing" coping styles, assertive interpersonal tendencies, and high activity level are associated with a better response to concrete, action-oriented approaches rather than introspective ones (Beutler et al., 1991; Cooney et al., 1991). Thus, our findings replicate this general pattern of dominance-related problem features moderating the impact of various treatments on symptom change, but also add to the literature by being the first study to directly test and detect this effect in a GAD sample and between cognitive and behavioral therapies. Our study provides evidence that such problems are relevant for these interventions. It therefore may be beneficial to assess interpersonal problems of individuals with GAD at pretreatment and to select interventions based on clients' levels of dominance and intrusiveness. Given that this sort of moderation effect has now been found in both CBT and psychodynamic studies, and in multiple diagnostic categories, it is possible that it represents a transtheoretical and transdiagnostic process which is not specific to GAD.

Results of our secondary, exploratory analyses revealed that no other interpersonal problems predicted or moderated change from psychotherapy. However, those GAD individuals higher on overly nurturant interpersonal problems at baseline exhibited higher levels of GAD severity at baseline—a relationship that was maintained across postassessment and all follow-up points. Previously, Borkovec et al. (2002) found that overly nurturant problems (among other problems) remaining after treatment predicted posttreatment and 6-month follow-up outcomes. Similarly, in Crits-Christoph et al. (2004) higher overly nurturant problems predicted less change at postassessment in an open trial of GAD clients who received supportive-expressive psychodynamic therapy.

Thus, although we did not replicate a predictive effect of overly nurturant problems on treatment response, the significant covariation between overly nurturant interpersonal problems and GAD severity points to an emerging problem area in GAD phenomenology, one that likely merits further consideration, as overly nurturant problems may play a role in maintaining GAD symptoms. Although heterogeneous interpersonal problems occur in the

context of GAD (e.g., Przeworski et al., 2011), several studies have linked excessive or maladaptive forms of affiliation to GAD and/or worry. Individuals with GAD reported childhood memories of "role-reversal" or taking care of parents (Cassidy, Lichtenstein-Phelps, Sibrava, Thomas, & Borkovec, 2009) and believe that worrying means that one "cares" (Hebert, Dugas, Tulloch, & Holowka, 2014); people with GAD may have learned to manage potential and actual stressors (e.g., loss of a parent; Torgersen, 1986) by both the internal strategy of worry and interpersonal strategies related to caretaking behavior (Newman & Erickson, 2010). In line with this theory, a recent series of studies showed that after controlling for depression symptoms and social anxiety, worry uniquely predicted perceiving one's own interpersonal tendencies as affiliative on self-reported traits, interpersonal problems, and social behavior during daily experience sampling over 1 week, and interpersonal goals in relationship to a significant other (Erickson et al., 2016). However, worry also uniquely predicted being viewed as *unaffiliative* by significant others, in line with previous research finding a disconnect between interpersonal self-perceptions and perceptions by others in high-worry individuals (Erickson & Newman, 2007). Affiliative behavior that is viewed by others as cold rather than genuinely supportive could plausibly impair relationships, consistent with evidence of relational difficulties in GAD (Newman & Erickson, 2010).

Across prior treatment studies outside of GAD research, problems related to uninvolvement or *low* affiliation typically predicted worse outcomes in CT or CBT (Hardy et al., 2001; McEvoy, Burgess, & Nathan, 2013) or psychodynamic therapy (Lorentzen & Høglend, 2004), whereas affiliation and affiliative problems have generally predicted *better* response to CBT (Lahmann et al., 2011) and psychodynamic therapies (Lorentzen & Høglend, 2004). In contrast, the fact that for GAD studies, affiliative problems predicted worse treatment outcome for psychodynamic therapy (Crits-Christoph et al., 2004) and covaried with GAD symptoms across time despite CBT suggests that extant treatments have not adequately targeted pathologically affiliative problems occurring in GAD. However, the foregoing theory is speculative and warrants further empirical testing to determine if it may contribute to understanding GAD treatment response.

Several limitations for this study should be mentioned. First, the study sample was highly educated and not very ethnically diverse; thus our findings may not generalize to more diverse samples. Second, because the IIP-C was added to the study only at the end of the second year, we had data from only a subsample of the total original sample of this study and cell sizes for the three therapy conditions were relatively small. Although we had sufficient power to test our hypotheses, it would be important to replicate our findings using a larger and more diverse GAD sample. At the same time, our main findings were replicated across multiple time phases (pre-post, versus post–6 months, 1 year, 2 years), which is an unusual strength of this dataset as most studies examining moderation do not find the same results at multiple time points. Furthermore, in order to control for and equalize therapist contact, while keeping the amount of cognitive and behavioral therapies received equivalent across therapy conditions, both the BT and CT conditions contained a distinct supportive listening component, whereas the CBT condition did not. However, given that our results were more similar between CT and CBT than between CT and BT, this likely suggests that supportive listening did not contribute to the moderation effects we found. Lastly, our

measure of interpersonal problems measured dominance vs. submissive problems, but did not directly measure autonomy-seeking, relevant to previous theorizing about reactance as a treatment moderator. The Structural Analysis of Social Behavior (SASB) is a validated behavioral coding system and self-report measure that can examine therapist "control" versus "autonomy-granting," as well as the extent of therapist affiliation; similarly, the SASB can be used to code extent of client submission vs. autonomy-seeking (Benjamin, Rothweiler, & Critchfield, 2006). Future research should also investigate directly whether these interpersonal variables relevant to reactance may moderate cognitive and behavioral interventions for GAD.

Few studies to date have examined differences between component treatments of CBT and instead there has been a movement to look outside of standard CBT for ways to personalize or augment it. Nonetheless, the moderating impact demonstrated in the current study does suggest that components of CBT may work differently for different people and that these more traditional therapies deserve greater attention. Given findings showing that only about 50% of GAD clients who receive CBT show clinically significant change (Borkovec & Ruscio, 2001), finding out who will benefit from more relaxation-based versus cognitive treatments may be as important as searching for a nontraditional treatment that is better than CBT across GAD clients.

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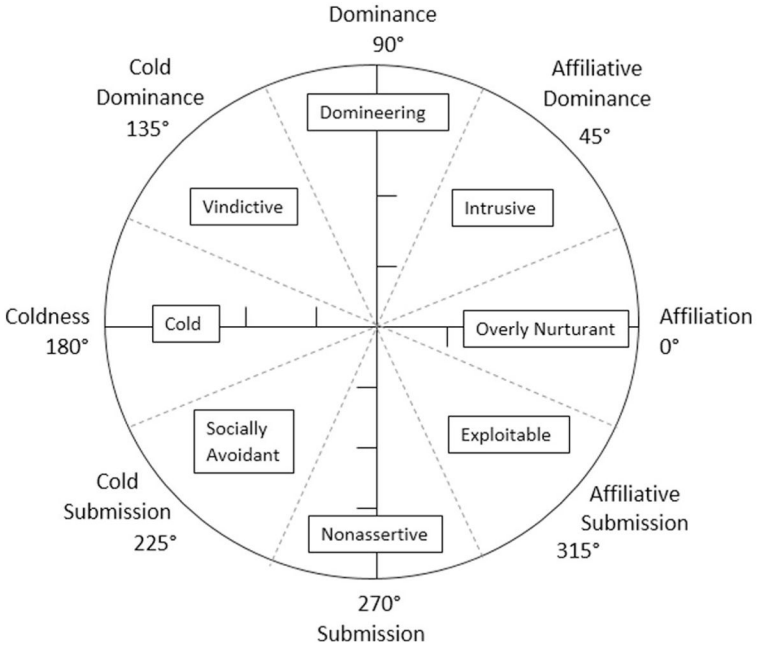

FIGURE 1.

The interpersonal circumplex with eight octants representing combinations of the dimensions of dominance and affiliation. Interpersonal problem types, which reflect rigid or extreme versions of normal social behavior, are superposed on these octants.

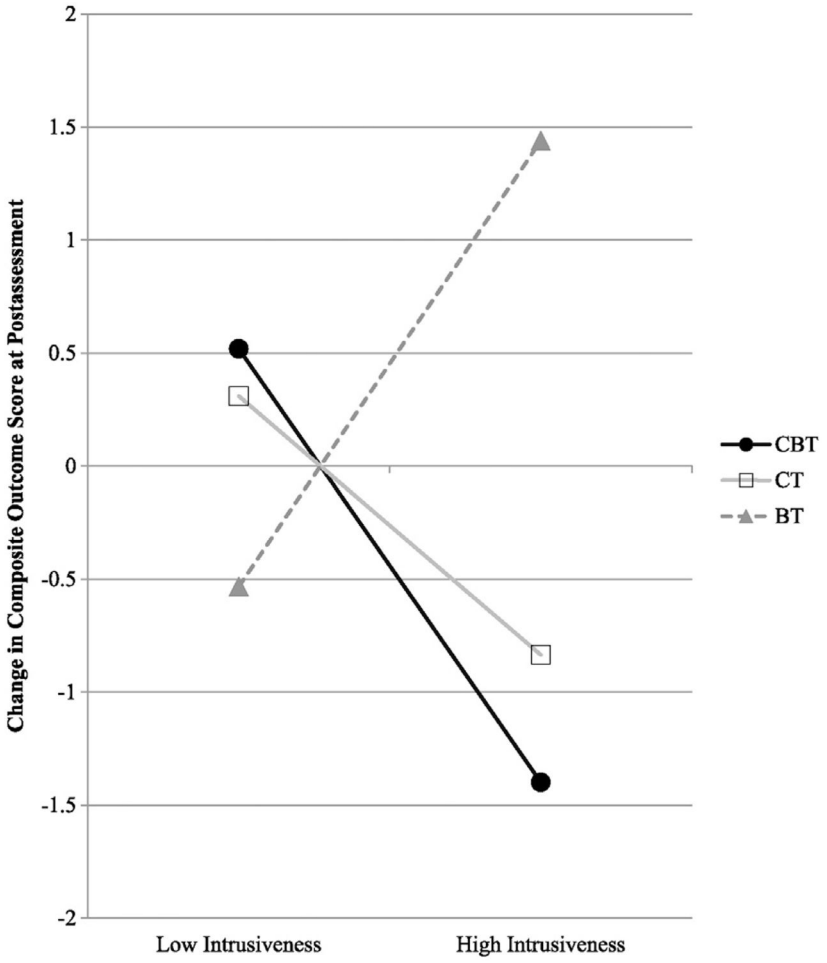

FIGURE 2.

This graph depicts the three-way interaction between the pretreatment and posttreatment time, condition, and intrusiveness when predicting the change in generalized anxiety disorder symptoms. Note that the change scores were calculated from the regression estimates. BT = behavioral therapy, CT = cognitive therapy, CBT = cognitive-behavioral therapy.

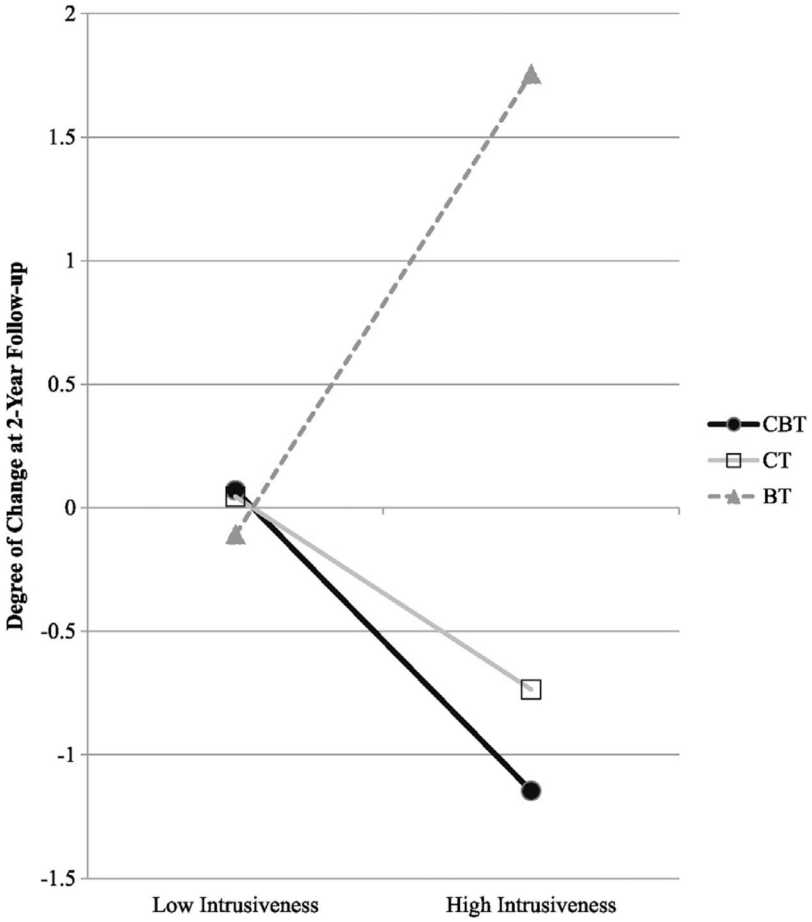

FIGURE 3.

This graph depicts the three-way interaction between the posttreatment and 2-year follow-up time, condition, and intrusiveness when predicting the change in generalized anxiety disorder symptoms. Note that the change scores were calculated from the regression estimates. BT = behavioral therapy, CT = cognitive therapy, CBT = cognitive-behavioral therapy.

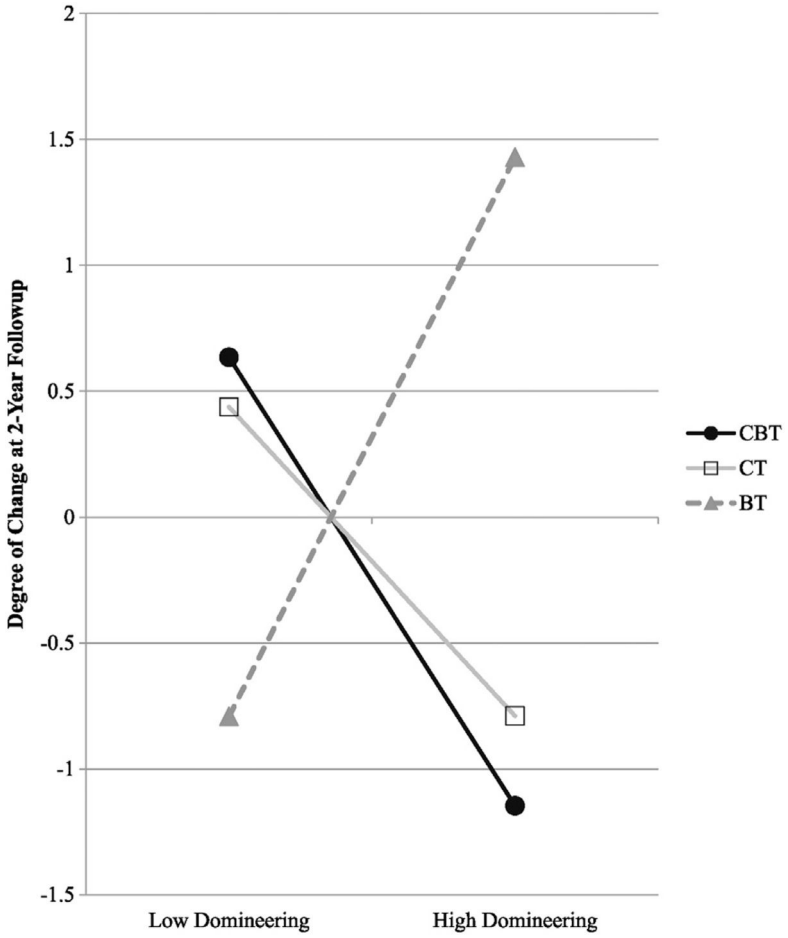

FIGURE 4.

This graph depicts the three-way interaction between the posttreatment and 2-year follow-up time, condition, and domineering when predicting the degree of change in outcome. Note that the change scores were calculated from the regression estimates. BT = behavioral therapy, CT = cognitive therapy, CBT = cognitive-behavioral therapy.

Table 1

Correlations and Descriptive Statistics of the Inventory of Interpersonal Problems Subscales at Pretreatment

IIP Subscale	1	2	3	4	5	6	7	8
1. Vindictive	1							
2. Cold	.622 **	1						
3. Socially avoidant	.235	.544 **	1					
4. Unassertive	.273	.364 **	.579 **	1				
5. Exploitable	.213	.269	.514 **	.829 **	1			
6. Overly nurturant	.386 **	.092	−.007	.388 **	.538 **	1		
7. Intrusive	.449 **	.142	−.051	.226	.356 *	.617 **	1	
8. Domineering	.522 **	.174	−.113	.022	.144	.595 **	.685 **	1
Mean	8.94	9.62	13.90	18.56	16.98	15.29	11.80	8.40
SD	4.68	4.91	6.40	6.78	5.59	5.57	6.39	5.10
Range	0–20	3–25	2–29	4–32	6–29	1–28	1–28	0–20

Note. IIP = Inventory of Interpersonal Problems.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).