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Assessing the Temporal Relationship Between Changes in Neuroticism and Symptom Improvement in the Unified Protocol

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ASSESSING THE TEMPORAL RELATIONSHIP BETWEEN CHANGES IN NEUROTICISM AND SYMPTOM IMPROVEMENT IN THE UNIFIED PROTOCOL

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
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By

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ABSTRACT OF THESIS

ASSESSING THE TEMPORAL RELATIONSHIP BETWEEN CHANGES IN NEUROTICISM AND SYMPTOM IMPROVEMENT IN THE UNIFIED PROTOCOL

Neuroticism is defined as the tendency to experience frequent and intense negative emotions accompanied by the belief that one could not cope adequately in response to stress. Neuroticism is associated with the development and maintenance of a range of emotional disorders (e.g., anxiety disorders, depression) and targeting this trait in treatment (rather than symptoms) may represent a more efficient approach to care. However, researchers have rarely measured neuroticism and symptoms frequently enough to establish temporal precedence between these dimensions. The present study is a secondary analysis that examined the temporal relationship between neuroticism and anxiety and depressive symptoms during a clinical trial of the Unified Protocol (UP), a treatment developed to address neuroticism. Participants (N = 38) meeting *DSM-5* criteria for a primary emotional disorder completed six weekly sessions of the UP. We hypothesized that treatment with the UP will result in significant reductions in neuroticism and that changes in neuroticism would precede and predict changes in anxiety and depressive symptoms. Results suggest that within-person session-to-session changes in neuroticism precede and predict next session anxiety, but not depression. These findings add to the limited research assessing the temporal relationship between personality change and symptom change.

KEYWORDS: neuroticism, Unified Protocol

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CHAPTER 1. INTRODUCTION

1.1 Background

Neuroticism is defined as the tendency to experience frequent and intense negative emotions accompanied by the belief that one could not cope adequately in response to stress (Barlow, Ellard, et al., 2014). According to Barlow's triple vulnerability theory of emotional disorders, the neurotic temperament develops as a result of a bidirectional interaction between a general biological vulnerability (i.e., heritable genetic contributions) and a general psychological vulnerability (i.e., early life experiences that promote a heightened sense of unpredictability and uncontrollability; Barlow, Ellard, et al., 2014). The third vulnerability in Barlow's model, the specific psychological vulnerability (i.e., learning experiences that predispose distress in response to particular stimuli [e.g., physical sensations in panic disorder, intrusive cognitions in obsessive-compulsive disorder]), may explain why one disorder emerges over another. Research suggests that maladaptive responses (i.e., avoidance, perceiving emotions as intolerable) to emotional experiences often observed in individuals with high neuroticism paradoxically serve to increase and maintain negative affect and emotional disorder symptoms (Barlow et al., 2014).

Neuroticism has consistently emerged as a transdiagnostic risk factor for various forms of psychopathology (Andrews, 1996; Barlow, Sauer-Zavala, et al., 2014; Clark et al., 1994; Khan et al., 2005; Krueger & Markon, 2006; Sher & Trull, 1994; Weinstock & Whisman, 2006). For example, a meta-analysis of 33 population-based samples found large associations between neuroticism and anxiety, mood, somatoform, schizophrenia, and eating disorders (Malouff et al., 2005). There is also evidence that neuroticism

prospectively predicts the development of mental health difficulties; for example, longitudinal twin studies have demonstrated that neuroticism predicts the onset of major depressive episodes (Fanous et al., 2007; Kendler et al., 1993). This trait is also prospectively associated with the onset of generalized anxiety disorder, social phobia, and specific phobia (e.g., Goldstein et al., 2018). Additionally, there is evidence to suggest that neuroticism is associated with comorbidity, accounting for 20-40% of the covariance among internalizing disorders (Khan et al., 2005; Brown, 2007).

Neuroticism is also linked with a host of other negative outcomes such as higher divorce rates, increased treatment seeking, and negative physical outcomes, beyond what can be accounted for by specific symptoms or formal diagnoses (Goodwin et al., 2006; Lahey, 2009; Suls & Bunde, 2005; Smith & MacKenzie, 2006). For example, in a sample of primary care patients with depression, neuroticism accounted for significant variation in health outcomes (i.e., disability, pain, somatization) independent of demographics, chronic disease, and psychiatric diagnoses. Moreover, when controlling for neuroticism, depression did not predict poor physical health outcomes (Russo et al., 1997). Because neuroticism is associated with the development and maintenance of a range of emotional disorders (e.g., anxiety disorders, depression) and negative health outcomes, targeting this trait in treatment (rather than symptoms) may represent a more efficient approach to care (Goodwin et al., 2006; Lahey, 2009; Suls & Bunde, 2005).

1.1.1 Malleability of Neuroticism

Although personality traits have long been considered stable and inflexible (American Psychiatric Association, 2013), there is increasing evidence that neuroticism changes over time and is responsive to treatment. For example, age-related decreases in

neuroticism have been observed in the general population (Eaton et al., 2011; Roberts & Mroczek, 2008), although the degree of change varies by individual (Helson et al., 2002; Mroczek & Spiro, 2003; Small et al., 2003). Additionally, a recent meta-analysis suggests that personality traits change over the course of relatively brief treatment, and the degree of change is influenced by principal diagnosis (Roberts et al., 2017). Specifically, individuals with principal anxiety disorders showed greater decreases in neuroticism and greater increases in extraversion than those with principal depressive, substance use and eating disorders, irrespective of the type of treatment administered.

It is worth noting, however, that the studies included in the Roberts et al. (2017) meta-analysis used symptom-focused treatments (rather than treatments targeting neuroticism, specifically) and measures of personality traits were a secondary outcome. It is also important to consider the ability of our personality measures to capture trait change independent from symptom change. The state-artifact position posits that changes observed in neuroticism (and other personality traits) following treatment may reflect state-level fluctuations that are accounted for by symptom improvement, and that what looks like trait change is actually a temporary state change reflecting imperfect measures (Sauer-Zavala & Barlow, 2021). Recently, statistical techniques have been employed to directly control for the role of symptoms when measuring change in neuroticism over time (e.g., Curran and Bauer, 2011; Fournier et al., 2019).

Despite overall decreases in neuroticism during treatment, intervention effects on this trait have been mixed across individual studies (e.g., Davenport et al., 2010; Tang et al., 2009). For example, Tang and colleagues (2009) compared the effects of cognitive therapy (CT), selective serotonin reuptake inhibitors (SSRIs), and a placebo on neuroticism

in a sample of adult patients with depression. They found that CT and SSRIs significantly reduced neuroticism compared to the placebo group; however, when controlling for depression, decreases in neuroticism were only maintained for those in the SSRI group. In contrast, when controlling for neuroticism, decreases in depressive symptoms were not significantly larger in the SSRI group, relative to the placebo group. Taken together, these results suggest that acute reductions in neuroticism, over the course of treatment, may require an intervention that exerts a specific effect on this trait; indeed, Tang et al (2009) demonstrated that SSRIs have a unique effect on neuroticism, whereas CT does not. Other medication studies have also found a specific effect of SSRIs on negative emotionality that did not extend to changes in positive affect (Knutson et al., 1998).

1.1.2 Targeting Neuroticism in Treatment

Emerging research suggests that behavioral interventions specifically designed to target neuroticism may be associated with more robust reductions in this trait (e.g., Sauer-Zavala et al., 2020; Armstrong & Rimes, 2016). For example, the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (UP; Barlow et al., 2018) is a cognitive-behavioral intervention that was developed to engage neuroticism by aiming to reduce aversive reactivity (i.e., perceiving emotions as intolerable, efforts to reduce or escape emotions, anxiety sensitivity) to strong emotional experiences. The UP consists of five core modules aimed at extinguishing distress in response to strong emotional experiences. Specifically, by encouraging an approach-oriented stance toward emotions, the UP may reduce the use of avoidant coping strategies that have been shown to increase the frequency and intensity of negative emotions (Rassin et al., 2000; Wegner et al., 1987). Sustained

changes in the frequency and intensity of negative emotions may constitute trait change (see Magidson et al., 2017) in neuroticism.

Indeed, the UP has shown efficacy in reducing symptoms of anxiety and depressive disorders (Barlow et al., 2017; Boswell et al., 2014; Ellard et al., 2012; Farchione et al., 2012) as well as reducing the frequency of negative reactivity to emotions (Sauer-Zavala et al., 2012). Additionally, treatment with the UP showed significant within-person changes in extraversion and neuroticism, such that individuals treated with the UP evidenced significant increases in extraversion and decreases in neuroticism from pre- to post-treatment (Carl et al., 2014). These trait changes were associated with improvements in symptoms, functioning, and quality of life. More recently, the UP has been shown to reduce neuroticism to a greater degree than symptom-focused cognitive behavioral therapy (CBT) and a waitlist control (Sauer-Zavala et al., 2020). This trial found that the greatest difference in neuroticism decreases between the UP and CBT groups were seen in the last four treatment sessions.

1.2 Current Study

Despite ample evidence underscoring the relationship between neuroticism and psychopathology, along with growing support for the notion that this trait can be engaged in treatment, it is important to understand whether change in neuroticism can serve as a mechanism predicting symptom improvement. Research suggests that personality trait change precedes change in personality disorder symptoms, whereas symptom improvements do not lead to subsequent change in personality traits (Warner et al., 2004). However, these findings have not been replicated in the context of emotional disorders (i.e., anxiety and depressive disorders). Indeed, researchers have rarely measured

neuroticism and symptoms frequently enough to establish temporal precedence regarding order of change. In a recent trial testing personalized skill sequencing with the UP (Sauer-Zavala et al., under review), participants completed measures of neuroticism and anxiety and depressive symptoms prior to weekly therapy sessions. The present study, a secondary analysis from Sauer-Zavala et al. (under review), examined the temporal relationship between decreases in neuroticism and improvement in anxiety and depressive symptoms. We hypothesized that participants would demonstrate significant reductions in neuroticism across treatment, and that changes in this trait will precede and predict changes in anxiety and depressive symptoms.

To strengthen the conclusions that can be drawn from this study, we also tested two alternative models. First, we explored whether reductions in anxiety and depressive symptoms precede and predict improvements in neuroticism to account for trait change in neuroticism covarying with change in anxiety and depression. Additionally, we tested whether changes in aversive reactivity significantly predict change in neuroticism which subsequently predict change in anxiety and depressive symptoms. It is possible that decreased distress in response to emotions occurs first, which in turn decreases the reliance on avoidant coping strategies that maintain both neuroticism and emotional disorder symptoms.

Additionally, we capitalized on the design of the parent study (i.e., Sauer-Zavala et al., under review) to determine whether change in neuroticism differs as a function of treatment length or sequencing of skills presented. In the parent study, participants were randomly assigned to receive modules of the UP in an order that prioritized patient strengths, compensated for weaknesses, or in the standard published order. Following the

fifth therapy session, a secondary randomization assigned participants to either discontinue treatment after their sixth session (brief treatment condition) or complete the full twelve sessions (full treatment condition). We explored whether (a) participants in the brief condition maintain gains garnered across the first six sessions, continue to improve, or worsen during the follow-up period, (b) participants in the full condition continue to improve across the entire 12 sessions. Previous research suggests that most of the change in neuroticism as a function of intervention occurs early and that interventions longer than eight weeks do not invoke greater change (Roberts et al., 2017); thus, we hypothesized that there would be no difference in neuroticism change as a function of treatment length. Additionally, we explored whether there are changes in the extent to which neuroticism improves as a function of skill sequencing condition; given that there were no differences across conditions on the primary symptom outcomes (Sauer-Zavala et al., under review), we hypothesized that there will be no difference in change in neuroticism.

CHAPTER 2. METHOD

2.1 Participants

A subsample of participants (N = 38, M_{age} = 34.9, 70% female, 81% Caucasian, 2.7% Latinx, 81.1% heterosexual) were drawn from a sequential multiple assignment randomized trial (SMART) of the Unified Protocol (UP; Sauer-Zavala et al., under review) for secondary data analyses related to the present aims. Individuals were eligible for the parent trial if they met *Diagnostic and Statistical Manual of Mental Disorders-5* (*DSM-5;* American Psychiatric Association, 2013) criteria for an emotional disorder (i.e., anxiety, depressive [major depression, persistent depression, or premenstrual dysmorphic disorders], obsessive-compulsive and related, or trauma and stressor-related disorder). Individuals were excluded from participation if they endorsed diagnoses or symptoms requiring clinical prioritization or hospitalization (i.e., mania within the past year, acute suicide risk, substance use disorder not in early remission, or the lifetime presence of psychotic features [i.e., hallucinations or delusions]). Patients were also excluded if they received five or more sessions of CBT within the last five years. Anyone receiving other psychotherapy focused on an emotional disorder agreed to discontinue while participating in the study. Individuals taking psychotropic medication (N = 9 in the present subsample) were asked to maintain their current dosages while participating in the study and be stable on their current medications for one month prior to starting the study. Participants who completed at least two weekly self-report measures of neuroticism, anxiety symptoms, and depressive symptoms within the first seven weeks of the parent trial were included in this subsample.

2.2 Procedure

All procedures were approved by our university's Institutional Review Board. After an initial phone screen, likely eligible participants were invited to complete a baseline assessment that consisted of obtaining informed consent[1], administering a clinician-rated diagnostic assessment to confirm eligibility, and completing a self-report battery. Once eligibility was confirmed, participants were randomly assigned to receive modules of the UP in the standard, published order (standard condition), in an order that prioritized patient strengths (strengths condition), or in an order that compensated for skill deficits (weaknesses condition). Skill strengths and deficits were determined by evidence-based questionnaires selected to measure the skills targeted by each UP module. For example, the Southampton Mindfulness Questionnaire (Chadwick et al., 2008) was used to assess competence with the Mindful Emotion Awareness module (see Sauer-Zavala et al., under review for further detail). Total scores for each measure were converted into standard scores which were used to rank order the modules from greatest skill deficit to strongest strength.

Following the fifth therapy session, participants completed a second major assessment (mid-treatment assessment for those in the full condition; a clinician-rated diagnostic assessment corresponding to diagnoses assigned at baseline and self-report battery) and underwent a second-stage randomization to determine if they would terminate treatment after their sixth session (brief treatment condition) or continue for the full twelve sessions (full treatment condition). Participants in the full treatment condition received all

[1] At the beginning of the study, written informed consent was obtained. When study procedures moved online due to the COVID-19 pandemic, verbal consent was obtained.

five core modules of the UP while patients in the brief condition received two or three modules depending on the order in which the modules were presented. Individuals in the brief condition receiving modules in the standard order completed modules 1 (understanding emotions), 2 (mindfulness), and 3 (cognitive flexibility). Of the participants in the subsample, 36.8% received module 1, 63.2% received module 2, 63.2% received module 3, 68.4% received module 4 (countering emotional behaviors) and 34.2% received module 5 (tolerating physical sensations) in the first six sessions. All participants completed weekly self-report questionnaires and a follow-up assessment (DIAMOND modules corresponding to baseline diagnoses and self-report questionnaires) after the 12th week of the study, regardless of condition (brief or full). Participants were compensated $25 for each additional assessment they completed after baseline (i.e., compensated up to $50 total).

2.3 Measures

2.3.1 Diagnostic Assessment

The Diagnostic Interview for Anxiety, Mood, and OCD and Related Neuropsychiatric Disorders (DIAMOND; Tolin et al. 2013) is a semi-structured, clinician-rated interview that assesses *DSM-5* diagnostic criteria for anxiety, depressive, bipolar, obsessive-compulsive, trauma- and stressor-related disorders, and schizophrenia spectrum and other psychotic disorders. Modules of the DIAMOND were administered at baseline to determine the presence of an anxiety, depressive, or related disorder for inclusion and the absence of manic/hypomanic episodes within the past year, schizophrenia spectrum, or other psychotic disorders. Subsequent follow-up assessments included only the DIAMOND modules corresponding to diagnoses endorsed at baseline. The DIAMOND

showed test-retest reliability ranging from good (κ = .59) to excellent (κ = 1) and inter-rater reliability ranging from very good (κ = .62) to excellent (κ = 1) for all diagnoses in the validation sample (Tolin et al., 2016). In the SMART trial from which the present data were drawn, inter-rater reliability among certified graduate student assessors was excellent for the 20% of tapes randomly selected for reliability testing (Krippendorff's αs: .91-1.00; median = 1.00).

2.3.2 Symptom Severity

The Overall Anxiety Severity and Impairment Scale (OASIS; Norman et al., 2006) is a five-item measure assessing the severity of anxiety symptoms and associated impairment of functioning over the last week on a five-point Likert scale ranging from 0 (*I didn't feel anxious*) to 4 (*constantly anxious*). Higher scores indicate greater functional impairment and symptom severity. Participants completed the OASIS at each major assessment (i.e., baseline, mid-treatment, and follow-up) and prior to each therapy session. Scores on the five items of the OASIS showed strong internal consistency (α = .80) and one month test-retest reliability (κ = .82; Norman et al., 2006). Items demonstrated excellent internal consistency in the present subsample at baseline (McDonald's ω = .80).

The Overall Depression Severity and Impairment Scale (ODSIS; Bentley et al., 2014) is a five-item measure assessing the severity of depressive symptoms and associated impairment of functioning over the last week on a five-point Likert scale ranging from 0 (*I didn't feel depressed*) to 4 (*constantly depressed*). Higher scores indicate greater functional impairment and symptom severity. Participants completed the ODSIS at each major assessment and prior to each therapy session. The five items of the ODSIS showed excellent internal consistency (α = .96) and strong two month test-retest reliability in

clinical (κ = .73) and non-clinical samples (κ = .75; Bentley et al., 2014). Items demonstrated excellent internal consistency in the present subsample at baseline (McDonald's ω = .92).

2.3.3 Neuroticism

The NEO Five Factor Inventory (NEO-FFI; Costa & McCrae, 1992) is an abbreviated version of the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). Specifically, the NEO-FFI is a 60-item self-report measure of the five factor domains of personality (i.e., neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience) rated on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Participants completed the neuroticism scale (NEO-FFI-N) prior to each therapy session. The NEO-FFI-N has shown strong internal consistency (α = .84) and two week test-retest reliability (*r* = .89; Robins et al., 2001). Items demonstrated excellent internal consistency in the present subsample at baseline (McDonald's ω = .82).

2.3.4 Aversive Reactivity

The Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gámez et al., 2011) is 62-item self-report measure of experiential avoidance rated on a 6-point Likert scale (ranging from *strongly disagree* to *strongly agree*). Experiential avoidance is the tendency to avoid negative internal experiences (i.e., negative emotionality) that underlies aversive reactivity, a transdiagnostic mechanism thought to maintain emotional disorders. The Distress Aversion subscale examines negative evaluations towards or nonacceptance of distress which may be particularly related to change in neuroticism. Participants

completed the MEAQ-DA prior to each therapy session. The MEAQ-DA has shown strong convergent validity (r = .62) and internal consistency (α = .85).

2.4 Data Analytic Plan

We first examined whether the subsample of patients included in the present study (n = 38) differed from those excluded from analyses but included in the primary study (n = 21). We used an independent samples t-test to determine if the two groups differed according to age, chi-squared goodness of fit tests to determine if the groups differed in gender identity, marital status, and sexual orientation. Fisher's exact test was used to address the small cell sizes in these chi-square comparisons. Finally, Wilcoxon-Mann-Whitney U tests were used to determine if the two groups differed according to education level and family income.

Next, we examined whether treatment with the UP was associated with significant decreases in neuroticism. Given the nested structure of the data (i.e., sessions within patients), we used hierarchical linear modeling (HLM) in SAS Version 9.4 to test this effect. We regressed neuroticism scores on session number, adding ordering condition as a covariate, including random intercepts. We then used piecewise linear mixed-effects models with a linear spline to examine change in neuroticism as a function of treatment length conditions (brief and full). Our linear spline demarcated session six as the timepoint in which we expected the slope of change in neuroticism to vary across treatment length conditions; given that participants in the brief condition discontinued treatment after session six, it would be expected that slopes of their neuroticism scores may be different than those who continued treatment for the remaining six weeks. Specifically, we fit a linear model for each combination of ordering and treatment duration condition (e.g.,

standard order and brief treatment, standard order and full treatment, etc.). We used ordering condition (strengths, weakness, standard) as a moderator in these models. Lastly, we assessed the slopes of change in neuroticism among participants in the two treatment length conditions (i.e., brief and full) before and after session six to determine if participants in the brief condition continued to make treatment gains (i.e., decreases in neuroticism) after discontinuing care and if participants in the full condition saw neuroticism decreases across all twelve sessions.

To assess whether changes in neuroticism precede and predict changes in depressive and anxiety symptoms, we again used HLM, analyzing data collected from weeks 1-7 only. Because neuroticism and anxiety and depressive symptoms were assessed one week following each therapy sessions (to allow for homework practice), data from session seven (reflecting improvement following session 6) were included. Participants who provided data on at least two occasions during weeks 1-7 were included in the analyses. We used restricted maximum likelihood estimation to obtain unbiased estimates of the variance components.

We first disaggregated participants' neuroticism scores into between- and within-person variability in line with Curran and Bauer's (2011) recommendations. Between-person variability in neuroticism was determined by calculating each participant's mean neuroticism score across sessions 1-7, calculating a grand mean of the sample, and subtracting the grand mean from each participant's mean score. Within-person variability in neuroticism was calculated by subtracting each participant's mean score across sessions 1-7 from their raw neuroticism score at each session. This process was repeated for OASIS, ODSIS, and MEAQ-DA scores from sessions 1-7. We then created a lagged variable for

each within- and between-person variable with a lag of one session. We then regressed the target variable (e.g., depression) at session *t* on between- and within-person neuroticism at session *t* and the target symptom at *t*–1 (to control for current-session symptom severity).

To test for bidirectional relations (i.e., that changes in anxiety and depressive symptoms predict session-to-session changes in neuroticism), we regressed neuroticism scores at session *t* on between- and within-person anxiety at session t and neuroticism scores at session *t*–1, using the same model specifications as above. We then replaced anxiety with depression in a separate model.

To test an alternative explanation for the UP's association with neuroticism and symptom severity, we used the MLmed macro (Rockwood, 2017) in SPSS Version 27 to determine whether changes in aversive reactivity significantly predict change in neuroticism which subsequently predict change in anxiety and depressive symptoms. Specifically, we analyzed a within-person mediation model in which aversive reactivity (*x*) predicts next-session neuroticism (*m*) which then predicts anxiety and depression (*y*), in separate models. The MLmed macro performs within-group centering of lower-level predictor variables and stacking the data as recommended by Bauer and colleagues (2006). Additionally, indirect effects include Monte Carlo confidence intervals around within-group effects.

Finally, using G*Power Version 3.1 (Faul et al., 2009) to conduct a sensitivity to power analysis to calculate the effect size our sample was powered to detect, assuming $\alpha = .05$, power = .80, $n = 38$, with 1 predictor, we were powered to detect small-to-medium

sized between-person effects ($f^2 \geq .22$). Using Lafit and colleagues' (2021) Shiny app, we were powered to detect small within-person effects ($R^2 \geq .10$).

CHAPTER 3. RESULTS

3.1 Descriptive Statistics

The sample included in the current study did not differ in age, gender identity, sexual orientation, education level, marital status, or family income, *p*s > .08, compared to those who were included in the parent trial but excluded from this secondary analysis. Participants included in the present sample provided NEO-FFI entries a total of 491 times: 194 entries were completed by participants in the Strengths condition, 118 entries were completed by those in the Standard condition, and 183 entries were completed by those in the Weaknesses condition.

3.2 Changes in Neuroticism Across Treatment

Average neuroticism scores for all participants across time are shown in Figure 1. Treatment with the UP was associated with significant decreases in neuroticism, such that neuroticism decreased as sessions progressed across all twelve sessions, B = -.26 SE = .09, p < .01, 95% CI [--.43, -.08]. Using a linear spline to assess the slope of change in neuroticism before and after the second-stage randomization at session six revealed a significant decrease in neuroticism before session six, B = -.38, SE = .16, p = .02, 95% CI [-.69, -.07], but not after, p > .55. Indeed, the magnitude of change in neuroticism from session one to session six was small, ES_{sg} = .23, whereas the change in neuroticism from session six to week twelve[2] was minimal, ES_{sg} = .09. However, averaged across sequencing conditions, participants in the full treatment length condition showed significant decreases

[2] Not all participants received the full treatment (12 sessions); however, all participants were asked to complete questionnaires for all twelve weeks of the study. We use 'week' rather than 'session' to denote this discrepancy.

in neuroticism both before session six, B = -.50, SE = .22, p = .02, 95% CI [-.93, -.08], and after, B = -.34, SE = .16, p = .04, 95% CI [-.66, -.02]. Those in the brief treatment condition evidenced decreases in neuroticism prior to session six and increases in neuroticism following session six, though these changes were not significant, ps > .24. Changes in neuroticism across treatment length conditions are shown in Figure 2.

Moreover, different patterns in neuroticism change before and after the second-stage randomization were observed as a function of ordering condition. Averaged across length condition, participants in the Strengths condition showed significant decreases in neuroticism before session six, B = -.93, SE = .24, p < .01, 95% CI [-1.40, -.45], but not after, p > .29. By contrast, those receiving modules in the standard order showed significant decreases in neuroticism following session six, B = -.51, SE = .20, p = .01, 95% CI [-.89, -.12], but not before, p > .59. Participants in the ordering condition that compensated for skill deficits showed a decrease in neuroticism before session six followed by an increase in neuroticism after session six, though these changes were not significant, ps > .69. Average changes in neuroticism across module ordering conditions are shown in Figure 3.

3.3 Within-Person Changes in Neuroticism and Symptom Severity

Within-person decreases in neuroticism (i.e., lower than one's personal average) were associated with session-to-session decreases in anxiety symptoms, B = .18, SE = .06, p = .004, 95% CI [.06, .30], but not depression, p = .14. Between-person neuroticism was unrelated to anxiety, p = .41, and depression, p = .14. By contrast, neither within- nor between-person anxiety or depression predicted session-to-session changes in neuroticism, ps > .05. These results suggest that neuroticism uniquely predicts session-to-session

changes in anxiety symptoms. Session-to-session changes in these models can be seen in Table 1.

Testing an alternative model to assess whether neuroticism mediates the relationship between aversive reactivity and change in symptoms, revealed significant within-person effects of aversive reactivity on neuroticism, $B = .29$, $SE = .03$, $p < .01$ 95% CI [.23, .35]. Within-person changes in aversive reactivity also significantly predicted anxiety, $B = .11$, $SE = .02$, $p < .01$, 95% CI [.06, .15], and depression, $B = .09$, $SE = .02$, $p < .01$, 95% CI [.04, .13]. As noted previously, there was also a significant within-person effect of neuroticism on anxiety, $B = .21$, $SE = .03$, $p < .01$, 95% CI [.14, .26], but not between, $p > .14$. Within-persons, there was a significant indirect effect of aversive reactivity on anxiety, through neuroticism, $B = .06$, $SE = .01$, $p < .01$, 95% CI [.04, .08]. Neuroticism exhibited a significant effect on depression within-persons, $B = .18$, $SE = .03$, $p < .01$, 95% CI [.11, .24]. There was a significant indirect effect of aversive reactivity on depression, through neuroticism within-persons, $B = .05$, $SE = .01$, $p < .01$, 95% CI [.03, .07].

Table 1: Session-to-Session Analyses

	B	*SE*	*p*	95% CI
Dependent Variable: Anxiety				
Within-Person Neuroticism	.18	.06	.00	[.06, .30]
Between-Person Neuroticism	.02	.03	.41	[-.03, .08]
Dependent Variable: Depression				
Within-Person Neuroticism	.11	.07	.14	[-.04, .26]
Between-Person Neuroticism	.05	.03	.14	-[.02, .11]
Dependent Variable: Neuroticism				
Within-Person Anxiety	.39	.20	.05	[-.00, .78]
Between-Person Anxiety	-.12	.16	.44	[-.44, .19]
Within-Person Depression	-.04	.15	.77	[-.34, .25]
Between-Person Depression	.12	.09	.17	[-.05, .30]

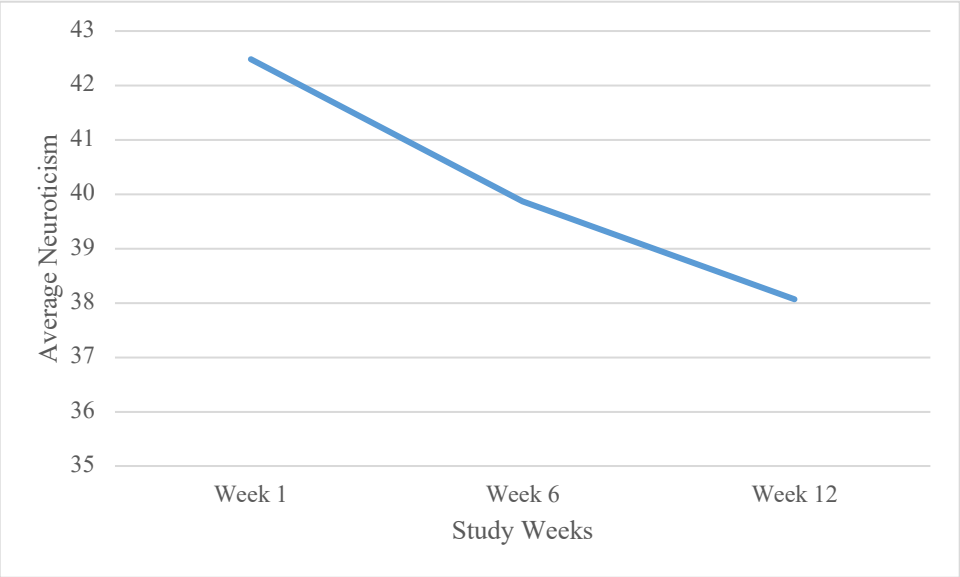

Figure 1: Change in Neuroticism over time

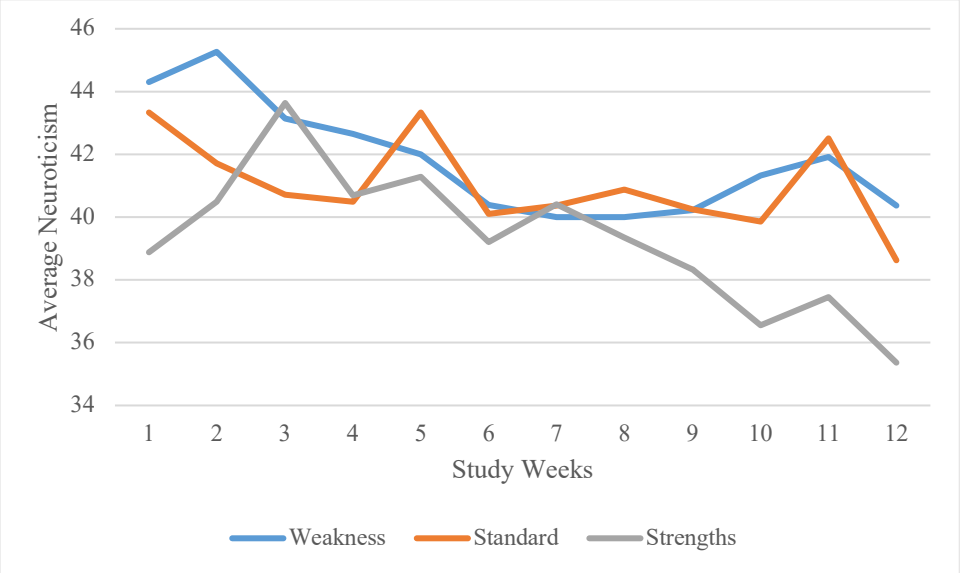

Figure 2: Change in Neuroticism by module ordering condition

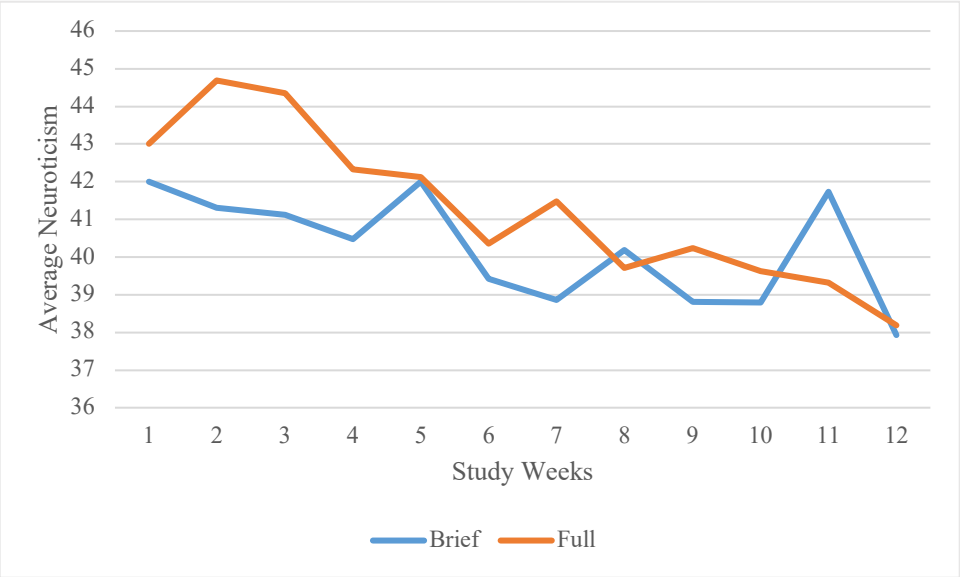

Figure 3: Change in Neuroticism across treatment length conditions

CHAPTER 4. DISCUSSION

In this secondary analysis, we found that significant decreases in neuroticism occurred across treatment with the UP, replicating previous findings (e.g., Carl et al., 2014; Sauer-Zavala et al., 2020). Moreover, the largest amount of change on this trait occurred prior to session six, supporting Roberts and colleague's (2017) conclusions that change in personality traits occurs relatively early during treatment. When examining improvements as a function of skill sequencing, only those who received UP modules in an order that prioritized existing skill strengths showed significant decreases in neuroticism before session six, whereas those who received skills in the standard published order or in a sequence that prioritized relative deficits did not exhibit early change in this trait. However, patients who were assigned to the standard order and full treatment conditions did eventually evidence significant decreases in neuroticism, though these improvements were not observed until the latter half of treatment. Those who received modules in an order that compensated for skill weaknesses did not show significant changes in neuroticism. Although this pattern of results for neuroticism change is in line previous research that favors the compensation model for treatment personalization (e.g., Cheavens et al., 2012), there were no differences in degree of symptom improvement as a function of ordering condition in this study (Sauer-Zavala et al., under review). This contrast of patterns suggests that neuroticism may not be the only driving force behind symptom change.

With regard to why earlier changes in neuroticism were observed in the capitalization ordering condition, relative to the standard ordering condition wherein improvements occurred in the latter half of treatment, it is worth noting that the standard sequence of the UP begins with two sessions of psychoeducation (i.e., Understanding

Emotions Module). Although this module provides patients with important foundational knowledge on the adaptive function of emotions and is associated with robust improvements in symptoms (Boswell, Anderson, & Barlow, 2014; Sauer-Zavala et al., 2017), it does not provide an emotion regulation skill per se. It is possible that applying psychoeducation at the beginning of treatment and delaying skill practice until after session two may have resulted in lagged decreases in neuroticism. Perhaps the UP modules administered in the latter half (i.e., after session six) of the standard treatment sequence target neuroticism more directly than those administered early in treatment. For example, the goal of the Countering Emotional Behaviors Module is to extinguish distress in response to emotional experiences; by decreasing this aversive reactivity, the module aims to reduce the use of avoidant coping strategies that lead to the emotional rebound effects that may maintain neuroticism. Indeed, previous research suggests that the majority of change in neuroticism occurs during the Countering Emotional Behaviors module (Sauer-Zavala et al., 2020). Increasing one's ability to tolerate negative emotional experiences may decrease neuroticism.

It is important to note, however, that individuals in the capitalization condition (who demonstrated early change in neuroticism) completed the Countering Emotional Behaviors module at similar rates to those in the compensation condition (who did not demonstrate early change) across the first six sessions. However, individuals in the capitalization condition received the Confronting Physical Sensations modules twice as frequently as those in the compensation condition. This module focuses on interoceptive exposures with the goal of reducing distress in response to and increasing tolerance of physical symptoms (i.e., increased heart rate, hyperventilation). Interoceptive exposures

have been hypothesized to target anxiety sensitivity, a transdiagnostic construct related to the development of anxiety disorders (Baillie & Rapee, 2005). Indeed, the Confronting Physical Sensations module led to significant decreases in anxiety sensitivity which subsequently led to symptom improvement (Boswell et al., 2013). Researchers have suggested that increases anxiety sensitivity in response to physiological arousal associated with anxiety may interfere with imaginal or in vivo exposures for social anxiety, obsessive-compulsive, and generalized anxiety disorders (Boswell et al., 2013). It is possible that the Confronting Physical Sensations module is necessary for some patients to be able to tolerate the emotional exposers conducted in the Countering Emotional Behaviors module and thus evidence significant change in neuroticism following this module.

The Countering Emotional Behaviors and Confronting Physical Sensations modules aim to reduce distress in response to emotional experiences and physical sensations, respectively. By targeting distress responses, these modules may be addressing the same transdiagnostic construct: aversive reactivity. It is possible that change in aversive reactivity is a mechanism driving change in both neuroticism and symptoms. Indeed, when examining the effects of aversive reactivity on neuroticism and symptom change, aversive reactivity showed indirect effects on symptom change through neuroticism. These findings suggest that aversive reactivity is a core process underscoring neuroticism change, which subsequently affects symptoms. This further supports the idea that the UP works by targeting aversive reactivity to negative emotions (Southward & Sauer-Zavala, 2020) and suggests that this process is a core mechanism underlying both neuroticism and symptoms.

Finally, neuroticism scores below one's personal average were associated with next session deceases in anxiety symptoms, but not depression. Conversely, neither

within- nor between-person changes in anxiety and depression predicted next session changes in neuroticism. This pattern of results suggest that neuroticism exhibits a unique effect on session-to-session changes in anxiety. However, the lack of association between neuroticism and session-to-session changes in depression may be due to the measure used (NEO-FFI). The neuroticism subscale of the NEO-FFI contains more questions assessing the anxiety facet of neuroticism than the depression facet. Continued research is needed to further disentangle symptoms and personality. For example, it is unclear how unique neuroticism is from anxiety and depression, particularly regarding measures of neuroticism. The NEO-FFI, for example, contains more questions related to anxiety than depression. Moreover, it is unclear whether these questions are assessing something totally unique from anxiety symptoms. Because we cannot completely differentiate neuroticism from anxiety and depression, it may be that the unique effects of neuroticism on anxiety found in this study are a result of the measures of neuroticism and anxiety being highly related.

Despite these limitations, this study adds to the limited research assessing the temporal relationship between personality change and symptom change. Researchers have infrequently measured neuroticism and symptoms frequently enough to establish temporal precedence. The present study adds preliminary evidence that neuroticism changes before anxiety symptoms. Additionally, this study's findings suggest that aversive reactivity changes before neuroticism and may be responsible for symptom change, above and beyond personality change. Together, these results offer mechanistic targets for transdiagnostic treatment of emotional disorders.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* (5th ed.). APA.

Armstrong, L., & Rimes, K. A. (2016). Mindfulness-based cognitive therapy for neuroticism (Stress Vulnerability): A pilot randomized study. *Behavior Therapy*, *47*(3), 287–298. https://doi.org/10.1016/j.beth.2015.12.005

Barlow, D. H., Ellard, K. K., Sauer-Zavala, S., Bullis, J. R., & Carl, J. R. (2014). The Origins of Neuroticism. *Perspectives on Psychological Science*, *9*(5), 481–496. https://doi.org/10.1177/1745691614544528

Barlow, D. H., Farchione, T. J., Bullis, J. R., Gallagher, M. W., Murray-Latin, H., Sauer-Zavala, S., Bentley, K. H., Thompson-Hollands, J., Conklin, L. R., Boswell, J. F., Ametaj, A., Carl, J. R., Boettcher, H. T., & Cassiello-Robbins, C. (2017). The Unified Protocol for Transdiagnostic Treatment of Emotional Disorders compared with diagnosis-specific protocols for anxiety disorders. *JAMA Psychiatry*, *74*(9), 875–884. https://doi.org/10.1001/jamapsychiatry.2017.2164

Barlow, D. H., Sauer-Zavala, S., Carl, J. R., Bullis, J. R., & Ellard, K. K. (2014). The nature, diagnosis, and treatment of neuroticism. *Clinical Psychological Science*, *2*(3), 344–365.

Baillie, A. J., & Rapee, R. M. (2005). Panic attacks as risk markers for mental disorders. *Social Psychiatry and Psychiatric Epidemiology*, *40*(3), 240-244.

Bauer, D. J., Preacher, K. J., & Gil, K. M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: new procedures and recommendations. *Psychological methods*, *11*(2), 142.

Bentley, K. H., Gallagher, M. W., Carl, J. R., & Barlow, D. H. (2014). Development and Validation of the Overall Depression Severity and Impairment Scale. *Psychological Assessment*, *26*(3), 815–830. https://doi.org/10.1037/a0036216

Boswell, J. F., Anderson, L. M., & Barlow, D. H. (2014). An idiographic analysis of change processes in the unified transdiagnostic treatment of depression. *Journal of Consulting and Clinical Psychology*, *82*(6), 1060–1071. https://doi.org/10.1037/a0037403

Boswell, J.F., Farchione, T.J., Sauer-Zavala, S., Murray, H., Fortune, M., & Barlow, D. H. (2013). Anxiety sensitivity and interoceptive exposure: A transdiagnostic construct and change strategy. *Behavior Therapy, 44*, 417-431.

Brown, T. A. (2007). Temporal course and structural relationships among dimensions of temperament and DSM-IV anxiety and mood disorder constructs. *Journal of Abnormal Psychology*, *116*(2), 313–328. https://doi.org/10.1037/0021-843X.116.2.313

Carl, J. R., Gallagher, M. W., Sauer-Zavala, S. E., Bentley, K. H., & Barlow, D. H. (2014). A preliminary investigation of the effects of the unified protocol on temperament. *Comprehensive Psychiatry*, *55*(6), 1426–1434. https://doi.org/10.1016/j.comppsych.2014.04.015

Chadwick, P., Hember, M., Symes, J., Peters, E., Kuipers, E., & Dagnan, D. (2008). Responding mindfully to unpleasant thoughts and images: Reliability and validity of the Southampton mindfulness questionnaire (SMQ). *The British Journal of Clinical Psychology / the British Psychological Society*, *47*, 451–455. https://doi.org/10.1348/014466508X314891

Cheavens, J. S., Strunk, D. R., Lazarus, S. A., & Goldstein, L. A. (2012). The compensation and capitalization models: A test of two approaches to individualizing the treatment of depression. *Behaviour Research and Therapy*, *50*(11), 699–706. https://doi.org/10.1016/j.brat.2012.08.002

Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology*, *103*(1), 103–116.

Curran, P. J. & Bauer, D. J. (2011). The disaggregation of within-person and between-person effects in longitudinal models of change. *Annual Review of Psychology, 62*, 583-619. 10.1146/annurev.psych.093008.100356

Eaton, N. R., Krueger, R. F., & Oltmanns, T. F. (2011). Aging and the structure and long-term stability of the internalizing spectrum of personality and psychopathology. *Psychology and Aging*, *26*(4), 987–993. https://doi.org/10.1037/a0024406

Ellard, K. K., Deckersbach, T., Sylvia, L. G., Nierenberg, A. A., & Barlow, D. H. (2012). Transdiagnostic treatment of bipolar disorder and comorbid anxiety with the unified protocol: A clinical replication series. *Behavior Modification*, *36*(4), 482–508. https://doi.org/10.1177/0145445512451272

Fanous, A. H., Neale, M. C., Aggen, S. H., & Kendler, K. S. (2007). A longitudinal study of personality and major depression in a population-based sample of male twins. *Psychological Medicine*, *37*(8), 1163–1172. https://doi.org/10.1017/S0033291707000244

Farchione, T. J., Fairholme, C. P., Ellard, K. K., Boisseau, C. L., Thompson-Hollands, J., Carl, J. R., Gallagher, M. W., & Barlow, D. H. (2012). Unified Protocol for Transdiagnostic Treatment of Emotional Disorders: A randomized controlled

trial. *Behavior Therapy*, *43*(3), 666–678. https://doi.org/10.1016/j.beth.2012.01.001

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behavior Research Methods, 41(4), 1149–1160. https://doi.org/10.3758/BRM.41.4.1149

Fournier, J. C., Wright, A., Tackett, J. L., Uliaszek, A., Pilkonis, P. A., Manuck, S. B., & Bagby, R. M. (2019). Decoupling personality and acute psychiatric symptoms in a depressed sample and a community sample. *Clinical Psychological Science: A Journal of the Association for Psychological Science*, *17*(3), 566–581. https://doi.org/10.1177/2167702618813989

Gámez, W., Chmielewski, M., Kotov, R., Ruggero, C., & Watson, D. (2011). Development of a measure of experiential avoidance: The Multidimensional Experiential Avoidance Questionnaire. *Psychological assessment*, *23*(3), 692. https://doi.org/10.1037/a0023242

Goldstein, B. L., Kotov, R., Perlman, G., Watson, D., & Klein, D. N. (2018). Trait and facet-level predictors of first-onset depressive and anxiety disorders in a community sample of adolescent girls. *Psychological Medicine*, *48*(8), 1282–1290. https://doi.org/10.1017/S0033291717002719

Goodwin, R. D., Cox, B. J., & Clara, I. (2006). Neuroticism and physical disorders among adults in the community: Results from the national comorbidity survey. *Journal of Behavioral Medicine*, *29*(3), 229–238. https://doi.org/10.1007/s10865-006-9048-5

Helson, R., Jones, C., & Kwan, V. S. Y. (2002). Personality change over 40 years of adulthood: Hierarchical linear modeling analyses of two longitudinal samples. *Journal of Personality and Social Psychology*, 752–766.

Huang, F. L. (2018). Multilevel modeling myths. *School Psychology Quarterly*, *33*(3), 492–499. https://doi.org/10.1037/spq0000272

Kendler, K. S., Neale, M., Kessler, R., Heath, A. C., & Eaves, L. J. (1993). A longitudinal twin study of personality and major depression in women. *Archives of General Psychiatry*, *50*, 853–862. https://doi.org/10.1001/archpsyc.1993.01820210024003

Khan, A. A., Jacobson, K. C., Gardner, C. O., Prescott, C. A., & Kendler, K. S. (2005). Personality and comorbidity of common psychiatric disorders. *The British Journal of Psychiatry: The Journal of Mental Science*, *186*, 190–196. https://doi.org/10.1192/bjp.186.3.190

Knutson, B., Wolkowitz, O.M., Cole, S.W., Chan, T., Moore, E.A., et al. (1998). Selective alteration of personality and social behavior by serotonergic intervention. *American Journal of Psychiatry, 155*, 373-379.

Krueger, R. F., & Markon, K. E. (2006). Reinterpreting comorbidity: A model-based approach to understanding and classifying psychopathology. *Annual Review of Clinical Psychology*, *2*(1), 111–133. https://doi.org/10.1146/annurev.clinpsy.2.022305.095213

Lafit, G., Adolf, J. K., Dejonckheere, E., Myin-Germeys, I., Viechtbauer, W., & Ceulemans, E. (2021). Selection of the number of participants in intensive longitudinal studies: A user-friendly Shiny app and tutorial for performing power

analysis in multilevel regression models that account for temporal dependencies. Advances in Methods and Practices in Psychological Science, 4(1), 1–24. https://doi.org/10.1177/2515245920978738

Lahey, B. B. (2009). Public health significance of neuroticism. *The American Psychologist*, *64*(4), 241–256. https://doi.org/10.1037/a0015309

Malouff, J. M., Thorsteinsson, E. B., & Schutte, N. S. (2005). The relationship between the five-factor model of personality and symptoms of clinical disorders: A meta-analysis. *Journal of Psychopathology and Behavioral Assessment*, *27*(2), 101–114. https://doi.org/10.1007/s10862-005-5384-y

Mroczek, D. K., & Spiro, A., III. (2003). Modeling intraindividual change in personality traits: Findings from the normative aging study. *The Journals of Gerontology: Series B*, *58*(3), P153–P165. https://doi.org/10.1093/geronb/58.3.P153

Norman, S. B., Cissell, S. H., Means-Christensen, A. J., & Stein, M. B. (2006). Development and validation of an Overall Anxiety Severity And Impairment Scale (OASIS). *Depression and Anxiety*, *23*(4), 245–249. https://doi.org/10.1002/da.20182

Rassin, E., Muris, P., Schmidt, H., & Merckelbach, H. (2000). Relationships between thought–action fusion, thought suppression and obsessive–compulsive symptoms: A structural equation modeling approach. *Behaviour Research and Therapy*, *38*(9), 889–897. https://doi.org/10.1016/S0005-7967(99)00104-7

Roberts, B. W., Luo, J., Briley, D. A., Chow, P. I., Su, R., & Hill, P. L. (2017). A systematic review of personality trait change through intervention. *Psychological Bulletin*. Advanced online publication. http://dx.doi.org/10.1037/bul0000088

Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, *17*(1), 31–35. https://doi.org/10.1111/j.1467-8721.2008.00543.x

Robins, R., Fraley, R., Roberts, B., & Trzesniewski, K. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality*, *69*, 617–640.

Rockwood, N. J. (2017). Advancing the formulation and testing of multilevel mediation and moderated mediation models (Master's thesis). The Ohio State University, Columbus. Retrieved from https://static1.squarespace.com/static/58d3d231893fc0bdd12db130/t/5935660659cc687cc79948c0/1496671777254/Rockwood-Thesis.pdf

Russo, J., Katon, W., Lin, E., Von Korff, M., Bush, T., Simon, G., & Walker, E. (1997). Neuroticism and extraversion as predictors of health outcomes in depressed primary care patients. *Psychosomatics*, *38*(4), 339–348. https://doi.org/10.1016/S0033-3182(97)71441-5

Sauer-Zavala, S., & Barlow, D. H. (2021). *Neuroticism: A new framework for emotional disorders and their treatment*. Guilford Publications.

Sauer-Zavala, S., Boswell, J. F., Gallagher, M. W., Bentley, K. H., Ametaj, A., & Barlow, D. H. (2012). The role of negative affectivity and negative reactivity to emotions in predicting outcomes in the unified protocol for the transdiagnostic treatment of emotional disorders. *Behaviour Research and Therapy*, *50*(9), 551–557. https://doi.org/10.1016/j.brat.2012.05.005

Sauer-Zavala, S., Cassiello-Robbins, C., Conklin, L., Bullis, J.R., Thompson-Hollands, J., & Kennedy, K. (2017). Isolating the unique effects of the Unified Protocol

treatment modules using single-case experimental design. *Behavior Modification, 40,* 286-307.

Sauer-Zavala, S., Cassiello-Robbins, C., Woods, B.K., Wilner Tirpak, J.W., Curerri, A., & Rassaby, M. (2020). Countering emotional behaviors in the treatment of borderline personality disorder. *Personality Disorders: Theory, Research, and Treatment, 11*(5), 328-338.

Sauer-Zavala, S., Fournier, J. C., Jarvi Steele, S., Woods, B. K., Wang, M., Farchione, T. J., & Barlow, D. H. (2020). Does the unified protocol really change neuroticism? Results from a randomized trial. *Psychological Medicine*, 1–10. https://doi.org/10.1017/S0033291720000975

Sher, K. J., & Trull, T. J. (1994). Personality and disinhibitory psychopathology: Alcoholism and antisocial personality disorder. *Journal of Abnormal Psychology*, *103*(1), 92–102. https://doi.org/10.1037//0021-843x.103.1.92

Small, B. J., Hertzog, C., Hultsch, D. F., & Dixon, R. A. (2003). Stability and change in adult personality over 6 years: Findings from the victoria longitudinal study. *The Journals of Gerontology: Series B*, *58*(3), P166–P176. https://doi.org/10.1093/geronb/58.3.P166

Suls, J., & Bunde, J. (2005). Anger, anxiety, and depression as risk factors for cardiovascular disease: The problems and implications of overlapping affective dispositions. *Psychological Bulletin*, *131*, 260–300. https://doi.org/10.1037/0033-2909.131.2.260

Tang, T. Z., DeRubeis, R. J., Hollon, S. D., Amsterdam, J., Shelton, R., & Schalet, B. (2009). A placebo-controlled test of the effects of paroxetine and cognitive

therapy on personality risk factors in depression. *Archives of General Psychiatry*, *66*(12), 1322–1330. https://doi.org/10.1001/archgenpsychiatry.2009.166

Tolin, D. F., Gilliam, C., Wootton, B. M., Bowe, W., Bragdon, L. B., Davis, E., Hannan, S. E., Steinman, S. A., Worden, B., & Hallion, L. S. (2016). Psychometric properties of a Structured Diagnostic Interview for DSM-5 Anxiety, Mood, and Obsessive-Compulsive and Related Disorders. *Assessment*, *25*(1), 3–13. https://doi.org/10.1177/1073191116638410

Warner M. B., Morey L. C., Finch J. F., Gunderson J. G., Skodol A. E., Sanislow C. A., Shea M. T., McGlashan T. M., Grilo C. M.. The longitudinal relationship of personality traits and disorders. *Journal of Abnormal Psychology.* 2004;113:217–227.

Wegner, D. M., Schneider, D. J., Iii, S. R. C., & White, T. L. (1987). Paradoxical effects of thought suppression. *Attitudes and Social Cognition, 53*(1), 5-13. https://doi.org/ 0022-3514/87/J00.75

Weinstock, L. M., & Whisman, M. A. (2006). Neuroticism as a common feature of the depressive and anxiety disorders: A test of the revised integrative hierarchical model in a national sample. *Journal of Abnormal Psychology*, *115*(1), 68–74. https://doi.org/10.1037/0021-843X.115.1.68

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Stumpp, N. E. & Sauer-Zavala, S. (in press). Evidence-based strategies for treatment personalization: A review. *Cognitive and Behavioral Practice, https://doi.org/10.1016/j.cbpra.2021.10.004*

Sauer-Zavala, S., Southward, M. W., Hood, C. O., Elhusseini, S., Fruhbauerova, M., **Stumpp, N**. E., & Semcho, S. A. (in press). Conceptual development and case data for a modular, personality-based treatment for borderline personality disorder. *Personality Disorders: Theory, Research, & Treatment*.

Stumpp, N. E., Southward, M. W., & Sauer-Zavala, S. (2021). Do you see what I see? Researcher-participant agreement on single-item measures of emotion regulation behaviors in borderline personality disorder. *Assessment*.

Southward, M. W., Semcho, S. A., **Stumpp, N. E.,** MacLean, D. L., & Sauer-Zavala, S. (2020). A day in the life of borderline personality disorder: A preliminary analysis of within-day emotion generation and regulation. *Journal of Psychopathology and Behavioral Assessment*. https://doi.org/10.1007/s10862-020-09836-1