

Review

A meta-analytic review of personality traits and their associations with mental health treatment outcomes

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HIGHLIGHTS

- We examined the relationship between personality traits (organized via the FFM) and treatment outcomes across 99 studies
- There are meaningful associations between therapeutic outcomes and personality traits congruent with theorized predictions
- Neuroticism had negative associations with almost all outcomes examined
- Extraversion, agreeableness, conscientiousness, and openness had positive associations with nearly all outcomes
- Results suggest assessing client personality can provide implications on potential strengths and barriers in sessions

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ABSTRACT

Personality traits have been hypothesized to be clinically useful for diagnosis, client conceptualization, treatment planning, as well as for predicting treatment outcomes. Although several studies examined the relation between personality traits and specific therapy outcomes, this literature has not yet been systematically reviewed. Thus, the purpose of the current study was to investigate the relations between personality traits and various therapeutic outcomes. Traits were organized via the domains of the five-factor model to provide a common framework for interpreting effects. Across 99 studies ($N = 107, 206$), overall findings indicated that traits were systematically related to outcomes, with many specific relations congruent with theorized predictions. Generally, lower levels of neuroticism and higher levels of extraversion, agreeableness, conscientiousness, and openness were associated with more favorable outcomes. More specifically, agreeableness had positive associations with therapeutic alliance and conscientiousness was positively related to abstinence from substances suggesting these traits are likely a beneficial factor to consider at the outset of services. Personality traits also related to various outcomes differently based on moderators. For example, duration of treatment moderated links between traits and outcomes suggesting these effects are amplified over longer services. Overall results suggest that personality assessment can aid with case conceptualization by suggesting potential strengths as well as barriers to treatment.

In [Vigo, Thornicroft, & Atun, 2016](#), Vigo, Thornicroft, and Atun reported that mental illness was among one of the leading causes of global disease burden. Thus, it has been imperative to develop interventions and identify therapeutic factors that influence treatment effectiveness. Modern psychotherapy typically emphasizes empirically-based practices that are aimed to direct treatment planning and decision-making, and often, these practices are largely guided by client diagnoses. However, [Lambert, Garfield, and Bergin \(2004\)](#) argued that non-diagnostic individual differences, such as personality traits, might also significantly impact client outcomes. This is quite sensible as personality is known to relate with a wide variety of life outcomes ([Ozer &](#)

[Benet-Martinez, 2006](#)) and has great public health significance in its own right ([Hengartner, 2015](#); [Lahey, 2009](#)). However, there has not yet been a systematic evaluation of personality traits' impact on therapeutic outcomes.

Past research examining personality's influence on therapeutic outcomes has primarily focused on personality disorder (PD) diagnoses. Although some have found categorical PD diagnoses are unrelated to pharmacotherapy outcomes (e.g., [Kool et al., 2005](#)), others have found them to be deleterious to psychotherapy treatment outcomes (e.g., [Newton-Howes, Tyrer, & Johnson, 2006](#)). Research has also shown the current categorical model of PD classification has significant problems

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(e.g., Chmielewski, Clark, Michael Bagby, & Watson, 2015; Krueger & Markon, 2011; Widiger & Clark, 2000) and that dimensional models can provide greater nuance and specificity for conceptualization, planning, and decision-making in a clinical context. These dimensional models can also predict PD diagnoses (Bagby, Costa, Widiger, Ryder, & Marshall, 2005). Thus, many have argued for a dimensional model of conceptualizing personality pathology (Clark, 2007; Widiger & Trull, 2007).

One predominant model for conceptualizing personality traits is the five-factor model (FFM), which consists of five broad domains that capture overarching patterns of personality. At the higher-order, the domains are labeled: Extraversion vs. introversion, agreeableness, vs. antagonism, conscientiousness vs. undependability or disinhibition, neuroticism vs. emotional stability, and openness vs. closedness to experience. The FFM has extensive validity support including stability across time and universality across cultures (Costa, Bagby, Herbst, & McCrae, 2005; John, Naumann, & Soto, 2008; McCrae & Costa, 1997; Santor, Bagby, & Joffe, 1997). Perhaps most importantly, the FFM has provided a common language for personality trait description to synthesize research across a variety of fields, including clinical psychology (e.g., Kotov, Gamez, Schmidt, & Watson, 2010; Samuel & Widiger, 2008).

A key aspect to its empirical support is the finding that the FFM domains are robustly and specifically related with a wide variety of important life outcomes, including scholastic and professional success, relationship satisfaction, and even longevity (Ozer & Benet-Martinez, 2006). Because of their pervasive links with functional outcomes, the FFM traits have been suggested as relevant to the treatment context (Bagby, Gralnick, Al-Dajani, & Uliaszek, 2016; Harkness & Lilienfeld, 1997; Lengel, Helle, DeShong, Meyer, & Mullins-Sweatt, 2016). For example, Harkness and Lilienfeld (1997) and Bagby et al. (2016) argued that understanding clients' personalities can aid therapists by identifying treatment options best suited for the client (e.g., providing individual, rather than group therapy for highly introverted clients). Traits might also aid with developing treatment goals that extend beyond reducing symptomatic distress to focusing on pervasive behaviors or thought patterns. For example, for a client with a maladaptively high level of agreeableness, the therapist might focus on core interpersonal deficits that lead to other problems, rather than on a client's depressive symptoms that may stem from them. Thus, incorporating personality assessment into treatment planning might lead to more personalized treatment plans, which could result in increased treatment compliance, improved therapeutic relationships, decreased clinician burnout, fewer early terminations, as well as improved clinical outcomes (Widiger & Presnall, 2013).

Harkness and Lilienfeld (1997) and Bagby et al. (2016) also suggested personality traits might help therapists maintain realistic expectations of clients' capabilities and predict outcomes including therapeutic alliance, treatment adherence, homework completion, and overall treatment motivation. There have been various hypotheses regarding how FFM domains might be associated with treatment outcomes (e.g., Costa Jr, 2008; Sanderson & Clarkin, 2002; Widiger & Presnall, 2013), and a number of studies have attempted to examine these links. Findings from individual studies have suggested high extraversion and conscientiousness tend to associate with more favorable treatment outcomes, while others have suggested high agreeableness, high openness, and low neuroticism also relate to positive outcomes (Bagby & Quilty, 2006; Ogrodniczuk, Piper, Joyce, McCallum, & Rosie, 2003). Importantly, though, findings have been inconsistent across studies, treatments, and outcomes, yielding little systematic evidence for their relations. A comprehensive review of this literature would be particularly helpful in specifying the relations between personality and therapeutic outcomes.

We are aware of one effort to systematically examine the relation between personality and treatment outcome. A meta-analysis by Molloy, O'Carroll, and Ferguson (2014) reviewed 16 studies across the

medical literature and found that the FFM trait of conscientiousness associated positively with medication adherence. As informative as this was, it concerns only a single trait and one possible outcome. No study has synthesized evidence linking personality traits to the variety of psychological treatment outcomes across a range of studies, methodologies, cultures, and diagnoses. This is a crucial step towards understanding the potential relevance of traits and personality assessment information in treatment settings. Specific identification of traits associated with various treatment outcomes holds the promise of aiding practicing psychologists in the areas of client conceptualization, developing treatment goals, incorporating personal strengths, selecting interventions, and identifying potential barriers to successful treatment.

There are a number of specific areas where the FFM domains are expected to relate with clinical outcomes. Extraversion and agreeableness are the domains most associated with interpersonal functioning and so provide important information regarding clients' relationship quality – including potentially with their therapist in a clinical setting. Miller (1991) speculated that those high in agreeableness (i.e., warm, trusting, and honest) would develop a therapeutic alliance more easily than those low in agreeableness, who would be described as argumentative, aggressive, and manipulative. In fact, some research has confirmed such speculations that high levels of agreeableness associates with an increase in working alliance (Hirsh, Quilty, Bagby, & McMain, 2012). Miller speculated that those low in extraversion, who can feel overwhelmed by social interactions, might lack enthusiasm for working with the therapist possibly resulting in lower therapeutic alliance. Research has shown mixed results with this hypothesis, with some confirming a relationship between extraversion and therapeutic alliance (e.g., Kushner, Quilty, Uliaszek, McBride, & Bagby, 2016), others finding the opposite relationship (Johansen, Melle, Iversen, & Hestad, 2013), and others finding no relationship at all (Dennhag, Ybrandt, & Sundström, 2017).

The neuroticism domain provides information on a person's general tendency to experience sadness, frustration, stress, and anxiety. In a clinical context, we expect that those high on neuroticism might be experiencing so much distress that they present with high motivation to engage in treatment (Miller, 1991). Consequently, higher levels of neuroticism at baseline might relate to overall improvement. Yet, on the other hand, it might be the case that, due to difficulty utilizing coping skills effectively (Ball, 2005), neuroticism produces instability and vulnerability that interferes with treatment outcomes, negatively impacting overall improvement. A comprehensive investigation of this domain with various outcomes would clarify the relationship between neuroticism and various treatment outcomes.

Individuals who are high in openness to experience are imaginative, curious, and willing to try new things. Thus, it is reasonable to predict that they might be more willing to be self-reflective, insightful, and consider alternative strategies in ways that promote insight into symptoms and facilitate new behaviors, increasing positive treatment outcomes. Those low on this domain tend to be concrete, closed-minded, or rigid in their thoughts and beliefs (Piedmont, Sherman, Sherman, Dy-Liacco, & Williams, 2009), and so low scores might provide information to clinicians about potential barriers to treatment when working with these clients.

A different type of barrier might be present in individuals who are low on conscientiousness. The domain of conscientiousness reflects a tendency to be organized, dutiful, determined, and deliberate. Not surprisingly, these characteristics are highly related to scholastic and professional success (e.g., Barrick & Mount, 1991) and it stands to reason that they might also increase positive treatment outcomes. This might be particularly true for cognitive behavioral therapy due to its organized, sequential approach (Presnall, 2013). In contrast, those lower in conscientiousness might have a more difficult time attending sessions regularly, completing homework outside sessions, and remaining focused within sessions (Widiger & Presnall, 2013). Additionally, due to its known negative association with substance use

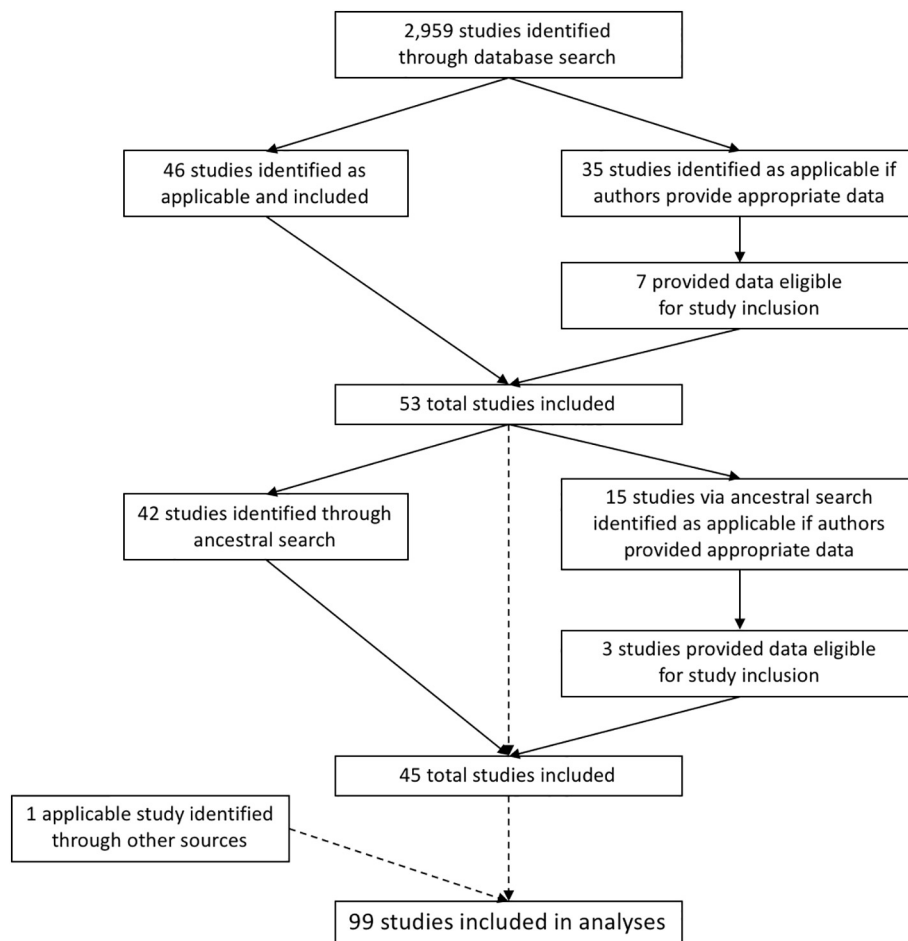


Fig. 1. Flowchart describing identification and selection of studies. 53 total studies were found in the initial literature search, followed by an additional 45 studies in the ancestral search. Finally, one study was identified via another source, resulting in 99 total studies included.

disorders (e.g., Kotov et al., 2010), it is likely that lower levels of conscientiousness would be associated with lower rates of abstinence after substance use treatment.

In sum, there are a wide variety of reasonable hypotheses as to how personality traits might predict the course and outcome of psychotherapy. Further, there have been a number of studies that provide data relevant to these hypotheses, yet they remain largely isolated in disparate literatures. Consequently, there is a strong need to synthesize the existing research to identify the overall pattern of associations between personality traits and therapeutic outcomes.

Specifically, we hypothesized that at the broadest level, high levels extraversion, openness, agreeableness, and conscientiousness, as well as lower levels of neuroticism, would be associated with more favorable outcomes. Extraversion and agreeableness, given their focus on social relatedness, were predicted to associate with interpersonal outcomes, such as working alliance, as well as other therapeutic processes including satisfaction with treatment and overall levels of engagement during sessions. Neuroticism was expected to be associated with a variety of specific outcomes, but in contrasting directions. First, those higher on neuroticism will likely see greater symptom decrease than those lower on neuroticism because they have more room for growth as well as greater motivation for treatment due to general distress (Miller, 1991). However, those higher on neuroticism will still likely display poorer coping abilities at the end of therapy compared to those lower on neuroticism. It was expected that openness would be most strongly associated with outcomes that investigated change, such as overall decrease in symptoms and general improvement. This was predicted as those higher on openness might be more willing to consider alternative

viewpoints and implement new coping strategies that drive improvement. Finally, conscientiousness was expected to relate to specific practical outcomes such as regular session attendance and homework completion. Conscientiousness was also predicted to be the most strongly related with outcomes related to abstinence and relapse as it concerns the regulation of behavior.

We also sought to investigate a number of therapeutic factors that might moderate the effect of traits on outcome. While many of these are exploratory, we specifically predicted that neuroticism would be more strongly related to therapeutic outcome for pharmacotherapy than for psychotherapy because of past predictions that those high on neuroticism would benefit most from pharmacotherapy. Further, we hypothesized that conscientiousness would have a stronger link with treatment outcome for clients receiving cognitive or cognitive behavioral therapy than for other treatment approaches due to its structured, systematic nature.

1. Method

1.1. Literature search

An online search was conducted for research articles that administered personality inventories at the beginning of psycho- and pharmacotherapy investigations and reported the link between these traits and therapeutic outcomes. Initially, the following search terms were used on Web of Science which yielded 3,433 studies: *(TS = (extraver* OR "positive affectivity" OR "positive emotionality" OR sociability OR agreeable* OR "negative affectivity" OR conscientious* OR compulsivity OR*

Table 1
Descriptive statistics of meta-analytic database.

<i>K</i>	772
Total <i>N</i>	107,206
Median publication year	2013
Percentage of females	52%
Mean age of sample	40
Race	Primarily Asian (73) Primarily Black (14) Primarily Caucasian (220) Primarily Hispanic (26) Primarily Mixed (12) Did Not Specify (428)
Diagnoses	Depression disorder (251) Anxiety disorder (17) Substance-related disorder (171) Addictive disorder (49) Feeding and eating disorder (55) Schizophrenia spectrum/Psychosis (60) Sleep-wake disorder (51) Personality disorder (3) Neurodevelopmental disorder (3) Somatic symptom and related disorder (15) Trauma- and stressor-related disorder (5) Medical disorder (18) Various disorders (74)
Patient type	Inpatient (125) Outpatient (622) Both (25)
Treatment	Medication (153) Therapy (424) Both medication and therapy (139) Medication or therapy (27) Medication or placebo (11) Therapy, medication, or placebo (1) Medication, therapy, or both medication and therapy (5) Medication and placebo (2) Light therapy (10)
Treatment type	Cognitive or Cognitive-Behavioral Therapy (247) Supportive/Humanistic Therapy (7) Skills Training (25) Substance Abuse Treatment (68) Weight Restoration (7) Light Treatment (10) Sleep Therapy (10) General Therapy/Does Not Specify (26) Various Modalities (68) General Group Therapy (25) Medication and Therapy (124) General Pharmacology (4) Antidepressant (134) Lithium (12) Combination of Multiple Medications (5)
Modal duration of treatment	Between 1 and 5 months
Modal follow-up time	Between 1 and 5 months after intake
Outcomes	Abstinence (130) Improvement (59) Symptom Severity (198) Completion (106) Decrease in Symptoms (125) Attendance (19) Satisfaction with Therapy (15) Engagement in Services (8) Working Alliance – Therapist report (9) Working Alliance – Client report/Attachment with Therapist (26) Length of Stay in Treatment (5) Coping Skills (33) Self-Efficacy (2) Interpersonal Problems (7) BMI/Weight Gain (2) Risky Behaviors (2) Sleep Outcome (20) Success (6)

Note. The number of effect sizes reported were before combining effect sizes for the overall favorable outcome.

constraint OR impulsive OR neuroticism OR “emotional dysregulation” OR “affective instability” OR “openness to experience” OR intellect OR psychoticism) AND TS = (treatment outcome OR therapy outcome)).* Because many of these articles included treatment for cerebral palsy or stroke, the search terms were refined to the following, which yielded a total of 2959 studies: *(TS = (extraver* OR “positive affectivity” OR “positive emotionality” OR sociability OR agreeable* OR “negative affectivity” OR conscientious* OR compulsivity OR constraint OR impulsiv* OR neuroticism OR “emotional dysregulation” OR “affective instability” OR “openness to experience” OR intellect OR psychoticism) AND TS = (treatment outcome OR therapy outcome)) NOT TS = (stroke OR “cerebral palsy”).*

To be included in the meta-analysis, each study must have: (a) Reported empirical research; (b) reported outcomes for participants in psychotherapy and/or pharmacological treatment; (c) utilized personality trait dimensions; (d) reported associations (preferably zero-order or point-biserial correlations, although spearman's rank and partial correlations were also included to be as inclusive as possible) between personality traits and treatment outcomes and/or reported means and standard deviations of personality traits for specific groups that were based on group outcomes (e.g., response/no response); (e) been written in English. There were no limits on when the research was conducted and, although the FFM was utilized as a framework with which to organize personality trait measures, there were no general exclusions for measures of personality traits used in the studies. All personality measures and subscales examined in this study are listed in Supplemental Table 1.

Fig. 1 has information regarding the identification and selection of studies. Of the 2959 studies yielded in the final search terms, 46 studies met the above inclusion criteria and included the information needed for the meta-analysis (see Supplemental Table 2 for more information on exclusion details). Additionally, 35 studies were found that were relevant but only reported coefficients from multivariate analyses rather than correlation matrices or means and standard deviations of outcome groups. Of the 35 studies, 22 authors were able to be contacted regarding accessing relevant data. Of the 22, data were provided for seven studies (32% response rate) which were then included in the analyses for a total of 53 studies. These 53 studies were then subjected to ancestral searches in which studies cited by the authors *and* studies citing the authors were examined for potential inclusivity. The ancestral searches yielded an additional 57 studies that appeared relevant. As before, 15 of these studies did not report the appropriate analyses to be included. Of the 15, five authors were able to be contacted regarding six research articles to obtain such correlations or means and standard deviations. Of the six, data were provided for three studies (50% response rate), resulting in a total of 45 (42 + 3) studies found via ancestral search. Additionally, one study conducted by the authors of this paper was accepted for publication while conducting this study. Thus, it was also included, resulting in a total of 99 studies ($N = 14,070$) included in the current meta-analysis that provided 772 effect sizes (see Appendix A for references of studies utilized in the analyses). Across all samples, 52% were female, the average age was 40 years old, and the majority were outpatient samples.

1.2. Coding of variables

The following sample characteristics were coded for each study: publication year, diagnoses of sample, personality measures used, domains assessed, sample size (with % female), sample group sizes (when applicable), sample mean age, predominant race, clinical status (clinical vs. nonclinical), patient status (inpatient vs. outpatient), treatment (therapy, medication, or both), treatment type (e.g., CBT, DBT, SSRI, etc.), frequency of treatment, duration of treatment intervention, follow-up time, outcome investigated, outcome descriptor, effect size (r), means and standard deviations of each outcome group (when applicable), page number where data for effect size were found, direction of effect (negatively or positively), p -value, and t -value and F -value

(when applicable). See Table 1 for information on sample characteristics of diagnostic categories, patient type, treatment and treatment type, and therapeutic outcomes.

Personality scales that were not from an FFM measure were sorted into corresponding FFM domains. This was done by investigating the developmental and theoretical constructs of each scale and was also cross-checked with Roberts et al.'s (2017) coding of measures to ensure consistency across studies. Supplemental Table 1 includes the coding of each personality measure/scale used in the study. Additionally, diagnoses were coded based on the category in which they fell in the DSM-5 (American Psychiatric Association, 2013). For example, binge eating disorder and anorexia were both coded as Feeding and Eating disorder. When studies included participants with multiple diagnoses, these samples were coded as 'various disorders.' All studies were also coded for outcome type and grouped into general themes. Although there were no general restrictions in the type of therapeutic outcome, at least three samples per domain were needed to use the outcome independently in the meta-analysis. For outcomes that did not have at least three samples, they were included only when examining an overall favorable outcome.

The first and second author independently coded the above information for all of the articles and any disagreements were addressed to ensure accurate coding of all article information. For sample characteristics, the degree of agreement was 94% before addressing discrepancies and reaching 100% agreement. Intraclass correlations (ICCs) were used to assess agreement among coders for zero-order and point-biserial relations and the level of agreement was 0.99.

1.3. Quality assessment

A quality assessment was conducted to assess whether the quality of studies impacted the overall findings. The authors rated the studies on the following criteria: a.) whether studies that used correlation analyses had a sample size > 85 or a sample size > 64 if compared group means, as recommended by Cohen (1992) as the minimum *ns* for both analyses to have 80% power to detect a medium effect size with alpha set to 0.05; b.) if authors reported the reliability of the personality measure and scales, and whether the reliability was greater than or equal to 0.70; c.) if the personality measure used consisted of at least 50 items; and d.) if the means to assess each outcome were objective (e.g., validated self-report measures, structured interviews, or blood tests versus informal, unstructured reports of substance use behaviors) and if the study used multiple ways to examine the outcome. Studies were given scores ranging from 6 (met all criteria) to 0 (met no criteria). The overall scoring and full questions can be seen in Supplemental Table 3.

1.4. Statistical analyses

Data coded from each study were entered into a dataset in which each row represented a relationship between a personality trait and a specific outcome. The present study focused on this relationship at the domain-level. Thus, for studies that only reported multiple subscales, or facets, of one domain rather than an overall domain, the data were transformed into Fisher's (1925) z_r , averaged together to result in one single domain association, and transformed back into a correlation coefficient (r). In the handful of cases where studies reported only one facet or subscale of a domain, these data were analyzed as individual cases to be as inclusive as possible. In many cases, because studies tended to examine associations of more than one domain with an outcome, each study had multiple effects with no more than five effects per outcome examined. When there was more than one scale per measure in a study that fell under the same domain, these associations were averaged together in the same fashion as described above to prevent studies from carrying extra weight in the overall analyses. For example, the TCI domains novelty-seeking and persistence were both considered to fall under the conscientiousness domain. Thus, these two scores were

averaged together to produce an overall conscientiousness score. An exception to this case was when investigating moderators of interest. That is, some studies utilized multiple personality measures, treatments, and follow-up points. Because these were moderators of interest, these were not averaged together when investigating moderators. However, the effect sizes were averaged when analyzing the overall effect.

The weighted average effect size for each personality trait and outcome was reported. Although treatment outcomes of interest included both continuous (e.g., symptom severity) and dichotomous (e.g., treatment completion) variables, final effect sizes were reported using correlation coefficients (r). Specifically, for continuous dependent variables, the correlation coefficients were coded in studies when provided. In some cases, however, studies reported the means and standard deviations of two groups (such as abstinent and relapsed) and these data were first coded into an effect size for standardized mean differences using the formula:

$$ES_{sm} = \frac{\bar{X}_1 - \bar{X}_2}{S_{pooled}}$$

where S_{pooled} is:

$$\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

Then, to reduce possible attenuation on dichotomous variables, the standardized mean difference effect size was converted to a point-biserial correlation coefficient, while also weighting the proportion of individuals in each group to reduce sampling error (Lipsey & Wilson, 2001).

Upon coding all effect sizes into correlation coefficients, coefficient signs were reversed as necessary so that the direction conveyed the same meaning across all outcomes. Thus, a negative relationship among each domain and outcome indicates that lower levels of that specific trait at the outset of treatment were associated with an overall favorable outcome, and a positive relationship indicates that higher levels of a specific trait at the beginning of treatment were associated with an overall favorable outcome. Additionally, some traits were reverse scored if the measure was keyed towards the opposite end of the spectrum than the actual FFM trait. For example, the trait callous-unemotional would be considered the low-end of agreeableness. Thus, coefficients that reported the relationship among this trait with outcomes were coded so that a positive correlation indicates that low levels of callous-unemotional traits (in other words, high levels of agreeableness) are associated with more favorable treatment outcomes.

The analyses were conducted using Metafor for R (Viechtbauer, 2010) for random-effect models (Lipsey & Wilson, 2001). This more conservative model acknowledges that the effect sizes are not drawn from the same population. Due to variation in samples used in this meta-analysis, this is likely an accurate assumption. All effect sizes were transformed using Fisher's (1925) z_r transformation before analysis (Hedges & Olkin, 1985) and were re-transformed into correlation (r) for interpretation. Additionally, the DerSimonian and Laird (1986) method for weighting effect sizes was utilized. To statistically compare the absolute magnitude of the effect sizes with one another, we used Fisher's (1925) z via Cocor for R (Diedenhofen & Musch, 2015) in which the correlation coefficients were first transformed into Fisher's (1925) z_r to make comparisons.

Within the 99 studies, there were a total of 772 weighted effects (total $N = 107,206$ with all effects combined from each study) in which the following therapeutic outcomes were extracted: abstinence, improvement, (lack of) symptom severity, completion, decrease in symptoms, attendance, satisfaction with therapy, engagement in services, working alliance as rated by therapist, working alliance as rated by client, length of stay in treatment, coping skills, self-efficacy, interpersonal problems, weight gain (positive outcome for eating disorders),

Table 2
Meta-analytic results for relations between personality traits and therapeutic outcomes.

Outcome	Neuroticism				Extraversion				Openness				Agreeableness				Conscientiousness			
	k	N	r	95% CI	k	N	r	95% CI	k	N	r	95% CI	k	N	r	95% CI	k	N	r	95% CI
Abstinence	19	2381	-0.16	-0.21 to -0.10	6	770	-0.002	-0.09 to 0.08	9	1635	-0.04	-0.09 to 0.01	12	2014	0.08	0.03 to 0.12	14	1997	0.15	0.03 to 0.27
Attendance	22	4661	-0.05	-0.09 to -0.00	10	2158	0.02	-0.02 to 0.06	13	2736	0.06	-0.04 to 0.17	19	3371	0.07	0.01 to 0.14	24	3677	0.08	0.02 to 0.15
Working Alliance	4	469	-0.11	-0.23 to 0.002	5	572	0.04	-0.07 to 0.16	5	572	0.15	-0.07 to 0.35	5	572	0.20	0.02 to 0.37	4	434	0.14	-0.02 to 0.29
Process	6	609	-0.13	-0.23 to -0.02	6	615	0.06	-0.05 to 0.17	7	712	0.06	-0.12 to 0.25	7	712	0.18	0.04 to 0.32	7	625	0.01	-0.17 to 0.19
Coping	4	362	-0.03	-0.26 to 0.19	3	226	0.11	-0.16 to 0.38	2	103			2	103			4	383	0.10	-0.12 to 0.32
Betterment	5	616	-0.02	-0.20 to 0.16	4	480	0.04	-0.17 to 0.24	3	357	0.12	-0.05 to 0.29	3	357	0.01	-0.21 to 0.23	5	637	0.08	-0.09 to 0.25
(Lack of) Sx severity	28	4305	-0.24	-0.30 to -0.17	17	3060	0.13	0.07 to 0.19	15	2739	0.03	-0.02 to 0.09	21	3428	0.10	0.03 to 0.17	22	3708	0.03	-0.02 to 0.07
Sx decrease	19	2327	-0.09	-0.17 to -0.02	6	420	0.15	0.06 to 0.25	6	389	0.001	-0.10 to 0.10	14	2005	0.01	-0.08 to 0.09	14	2005	0.01	-0.05 to 0.06
Improvement	13	1515	-0.05	-0.18 to 0.07	6	1000	0.15	0.05 to 0.24	8	1139	0.11	0.06 to 0.17	8	1319	0.07	-0.03 to 0.16	8	1319	0.002	-0.05 to 0.06
Aggregated Improvement	55	7820	-0.17	-0.22 to -0.11	27	4317	0.13	0.09 to 0.18	26	4102	0.06	0.02 to 0.10	39	6369	0.07	0.02 to 0.12	39	6456	0.02	-0.01 to 0.05
Overall	92	13,961	-0.15	-0.18 to -0.11	44	6814	0.08	0.04 to 0.12	48	7807	0.03	-0.02 to 0.07	66	10,803	0.08	0.05 to 0.12	71	11,139	0.07	0.04 to 0.10

Note. r = weighted effect size; CI = confidence interval. All outcomes are keyed in the positive direction. Bolded effect sizes indicate significant heterogeneity as determined by the Q-statistic. For all domains, a positive effect size indicates that higher levels of these traits are associated with a more favorable outcome and a negative effect size indicates that lower levels of these traits are associated with more favorable outcomes. Bolded outcomes indicate those that were combined with multiple individual outcomes. Specifically, Attendance consisted of the outcomes attendance and completion. The outcome Process consisted of satisfaction with therapy, engagement in services, and client-reported working alliance. The outcome Betterment consisted of coping, self-efficacy and confidence, and interpersonal improvement. Aggregated Improvement consisted of the outcomes: improvement, symptom decrease, (lack of) symptom severity, risky behaviors, BMI/weight gain, and success/failure. The Overall outcome incorporated all therapeutic outcomes found in all studies included in the analyses.

risky behaviors, sleep improvement, and overall success. It should be noted that some of these outcomes have only subtle differences among each other (e.g., lack of symptom severity, symptom decrease, and improvement), but all were deemed important to include separately. (Lack of) symptom severity included studies that only examined severity or count of symptoms at follow-up, whereas decrease in symptoms examined the actual *decrease* in symptoms from the beginning of treatment to the follow-up period. Studies coded with the improvement outcome each specified various criteria that needed to be met in order to be considered “improved” in that study. For example, one study required having a specific score on a symptom checklist, a certain amount of improvement in symptoms, *and* no longer meeting criteria for a psychiatric diagnosis. All but one study in these analyses coded improvement as a dichotomous variable, while the other study correlated personality traits with percentage improved. Because of these subtle differences, the current study does run variations in the analyses by combining some of the above-mentioned groups together to examine similarity and trends among overall similar outcomes. Additionally, it is important to note that some of the outcomes listed above did not have enough independent samples (i.e., three or more) to be investigated independently. However, these outcomes, as well as those analyzed individually, were included and combined when analyzing the “overall outcome,” which examined whether traits were associated with a general favorable outcome, regardless of what the outcome was.

Some studies reported multiple outcomes that fell into the same general category (e.g., the associations of personality traits with two different depression-rating scales). These associations were averaged together barring that there was nothing different in those outcomes (e.g., traits were not assessed with differing personality measures and outcomes were not assessed at different follow-up times). Some studies included in the analyses tended to report different outcomes in the same study (e.g., openness and its relation to attendance as well as to symptom decrease). These were considered separate effects until analyzing the overall outcome in which these effect sizes were averaged together to produce one effect size per domain per measure.

In addition to examining the effect sizes of each domain with specific outcomes, the study examined the following moderators using a meta-regression approach: Diagnosis, personality measure, gender, age, patient type (inpatient vs. outpatient), treatment (medication, therapy, both, etc.), treatment type (specific modality or medicine), duration of intervention, and length of assessment before follow-up. Additionally, to test whether the overall quality of studies impacted findings, quality ratings were treated as a moderator and examined via a meta-regression approach. Specific moderation analyses were conducted on the domains' association with overall outcome, as well as specific outcomes that, based on analysis, were heterogeneous. This was primarily investigated by examining the Q statistics, although I^2 was examined as well. Because the majority of samples in each outcome were fewer than 100, a Knapp & Hartung adjustment was made when conducting these analyses (Knapp & Hartung, 2003).

2. Results

2.1. Descriptive statistics

Table 1 includes the descriptive information of the samples included in this study. The samples were fairly even in terms of gender and were primarily Caucasian; however, 55% of the studies in this meta-analysis did not report race. The samples were primarily outpatients and the most common psychiatric diagnoses were depressive disorders followed by substance-related disorders. The most common treatment modalities were cognitive or cognitive-behavioral therapy. The majority of the samples received treatment for one to five months, and the most common follow-up time point was at discharge which typically occurred one to five months after intake. The most common outcome was (lack of) symptom severity, followed by abstinence, and then decrease

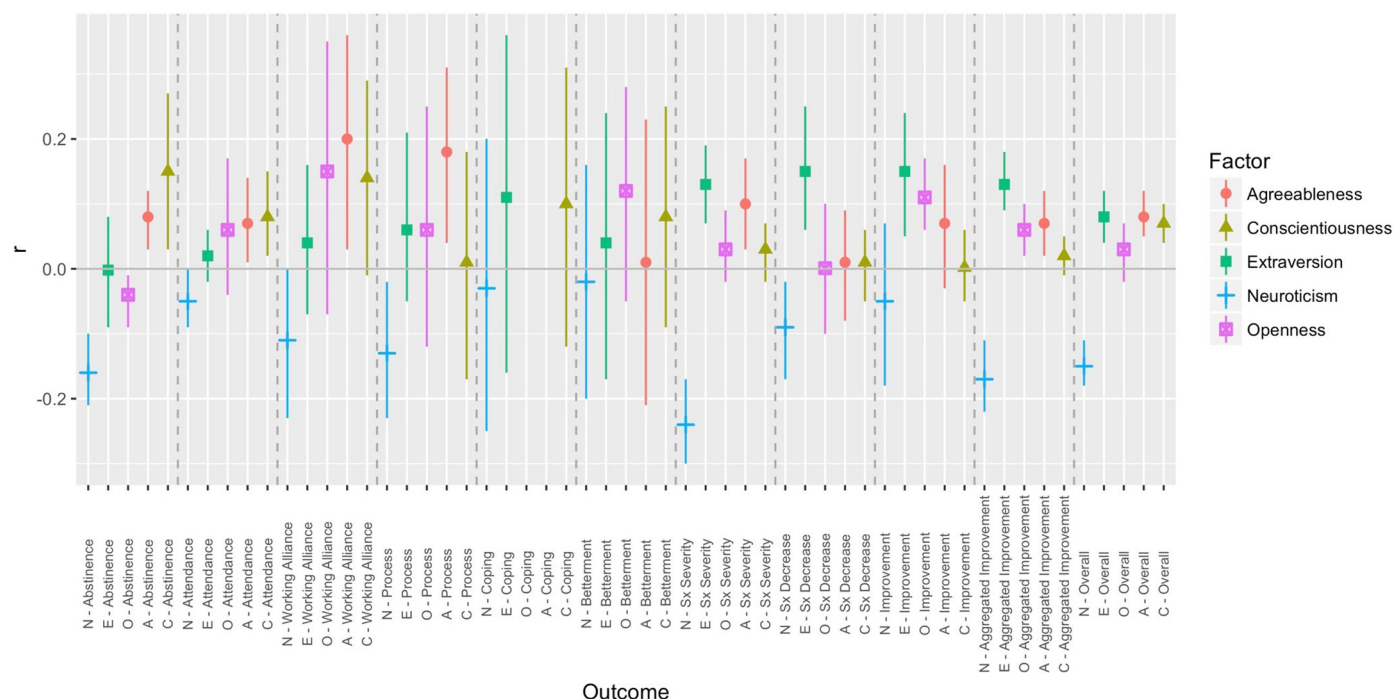


Fig. 2. Deviation plot for weighted effect sizes for each domain and outcome (organized by outcomes).

in symptoms. It is important to note that, based on the meta-regression analyses, there were no significant differences across study findings and levels of quality on the overall results for all five domains (r ranged from 0.12 for openness to experience to 0.97 for extraversion).

Results also showed significant heterogeneity for many of the outcomes investigated, including the overall outcome across all five domains. This was also seen for various specific outcomes, as can be seen in Table 2. For more information on specific values of the Q -statistic and I^2 , please see Supplemental Table 4. As indicated previously, potential moderators impacting heterogeneity were investigated within effects that had significant heterogeneity.

2.2. Overall effects of personality traits' associations with outcomes

Various outcomes were individually analyzed to investigate their associations with personality traits (see Table 2 and Fig. 2), and absolute effect sizes were compared with each other. Differences between domain correlations were tested for significance using Fisher's (1925) z and are noted when $p < .01$ (to correct for multiple comparisons). One way to interpret the table is by examining across the rows to examine the differences between the domains for a given outcome. That is, when examining the outcome abstinence, neuroticism had a significantly stronger association ($r = -.16$) compared to extraversion, openness, and agreeableness, such that lower levels of neuroticism at the beginning of therapy were associated with higher rates of abstinence at follow-up. This was followed by conscientiousness ($r = .15$), in which higher levels of conscientiousness were associated with higher rates of abstinence. This effect was significantly stronger than the domains extraversion and openness. The outcome attendance had its strongest association with conscientiousness ($r = .08$), indicating that higher levels of conscientiousness were more strongly associated with higher rates of treatment completion and attendance. However, this association was not significantly stronger than the other domains. In fact, all of the associations with the domains and overall attendance were quite small.

The study also examined the weighted effect sizes for each domain with client reported working alliance. The highest association for this outcome was agreeableness ($r = .20$), indicating that higher levels of

agreeableness at the outset of therapy were associated with higher client-reported working alliance. The next highest were openness to experience ($r = .15$) and conscientiousness ($r = .14$). Working alliance was then combined with the outcomes 1.) satisfaction with therapy and 2.) engagement in services to create an overall "therapeutic process/satisfaction" outcome. Agreeableness continued to strongly associate with this outcome ($r = .18$), which was significantly stronger than conscientiousness. The next strongest association was with neuroticism ($r = -.13$).

Coping skills (e.g., various mindfulness skills, positive reframing, using humor) had its highest association with extraversion ($r = .11$) followed by conscientiousness ($r = .10$). The domains openness to experience and agreeableness did not have enough sample sizes to be analyzed. When comparing the absolute correlations of the three domains that were analyzed, none were significantly stronger than the other domains. Coping was then combined with the individual outcomes of 1.) self-efficacy and confidence and 2.) interpersonal improvement to create an overall "betterment" outcome. When looking at these combined outcomes, openness to experience had the strongest association ($r = .12$), although this effect was not significantly stronger than any of the other domains.

It is also important to examine outcomes related to clients' overall symptomology, as this is often the sole focus of intervention in therapeutic services. There are two primary ways in which studies have investigated symptomatology: (lack of) symptom severity and symptom decrease. When examining (lack of) symptom severity at the end of treatment, neuroticism had its highest association ($r = -.24$), which was significantly stronger than symptom severity's association with the four other domains associations. That is, lower levels of neuroticism upon the outset of treatment were associated with fewer symptoms upon follow-up. In addition, extraversion ($r = .13$) and agreeableness ($r = .10$) had positive associations with symptom severity that was significantly stronger than openness to experience and conscientiousness.

While examining symptom severity in this way provides us with information on how personality at baseline is related to symptomatology upon follow-up, a more nuanced way to examine the relationship is by examining baseline traits' associations with symptom decrease over

therapy. Extraversion had the strongest association with symptom decrease ($r = .15$), such that higher levels of extraversion at the beginning of treatment were associated with greater decreases in symptoms. This association was significantly stronger than the associations seen with symptom decrease and agreeableness and conscientiousness. This was followed by neuroticism's association with symptom decrease in which lower levels of neuroticism was associated with more symptom decrease ($r = -.09$). In other words, those who had lower levels of neuroticism at baseline actually showed greater symptom improvement during therapy than those who started with higher levels of neuroticism. Neuroticism's association with symptom decrease was also significantly stronger than agreeableness and conscientiousness.

Improvement, a more specific outcome examining client change extending beyond symptom severity and/or decrease, was most strongly associated with extraversion ($r = .15$) which was a significantly stronger positive relationship than improvement's association with conscientiousness. That is, higher levels of extraversion at the outset of therapy were associated with greater general improvement upon follow-up. The outcome "aggregated improvement," a more comprehensive outcome of improvement, consisted of the combined outcomes: improvement, decrease in symptoms, lack of symptom severity, risky behaviors, BMI/weight gain, and success/failure. When combining these outcomes together into one outcome, neuroticism had the highest association ($r = -.17$), which was significantly different than openness, agreeableness, and conscientiousness. Similarly, the next strongest association, extraversion ($r = .13$), was significantly stronger than this outcome's association with openness, agreeableness, and conscientiousness. Openness and agreeableness also had significantly stronger associations compared to conscientiousness.

The last row in Table 2, the overall outcome, examines whether a given outcome was positive, regardless of what the specific outcome is. That is, all outcomes coded were combined to investigate the question: *Regardless of the outcome examined, how likely is it that someone high or low on a given personality trait will benefit from treatment overall?* Somewhat unsurprisingly, neuroticism had the strongest association with this overall outcome ($r = -.15$), which was significantly stronger than the other four domains. That is, compared to all other domains, lower levels of neuroticism at the beginning of treatment were more strongly associated with a favorable outcome. Extraversion and agreeableness had the next highest association at $r = .08$, followed by conscientiousness ($r = .07$). Openness to experience had the smallest weighted effect size with the overall outcome ($r = .03$) and was significantly weaker than all other associations.

2.3. Moderation analyses

To investigate heterogeneity within the reported weighted effect sizes, the current study examined possible moderators using Knapp and Hartung adjustments due to small sample sizes. The moderators diagnosis, personality measure, treatment type, gender, and age were examined for the overall favorable outcome as well as the specific treatment outcomes. Then, additional moderators were examined for the overall outcome, including treatment setting (inpatient vs. outpatient), frequency of treatment, duration of treatment, and follow-up time. Due to small sizes and limited heterogeneity among the specific outcomes for these possible moderators, they were only examined for overall outcome. Once again, a p -value of $< .01$ was used to correct for multiple moderation analyses.

Because various personality measures were used to assess the relationship between traits and outcomes, and because it is acknowledged that not all traits examined fit cleanly into one specific domain (e.g., TCI and TPQ traits), personality measure was investigated as a potential moderator. Of note, there were significant differences between the NEO measures (i.e., NEO-PI-R, NEO-FFI, IPIP-120) and TCI and TPQ measures across different domains and the outcomes abstinence (conscientiousness), symptom severity (openness), attendance

(neuroticism), and aggregated improvement (openness). For the outcome abstinence, conscientiousness as measured by the NEO measures ($r = .33$) had significantly stronger positive associations compared to conscientiousness measured by the TCI and TPQ measures ($r = .05$). When examining symptom severity and aggregated improvement, there was a positive association with openness to experience as measured by the NEO measures ($r = .06$ for symptom severity and $.07$ for aggregated improvement), and a negative association with openness traits measured by the TCI/TPQ measures ($r = -.08$ for symptom severity and $-.02$ for aggregated improvement). Neuroticism as measured by the NEO measures ($r = -.11$) had a significantly stronger negative association with attendance compared to the TCI and TPQ ($r = -.001$).

When investigating treatment type and the overall favorable outcome, samples who were only given medication had significantly stronger associations with neuroticism ($r = -.24$) compared to those administered both medication and therapy ($r = -.04$). That is, for those who were only administered medication, lower levels of neuroticism at the beginning of therapy were more strongly associated with an overall favorable outcome. When investigating patient type, those receiving inpatient treatment had a negative association between extraversion and overall outcome ($r = -.08$) such that for those who were receiving inpatient treatment, lower levels of extraversion were associated with more favorable outcomes. This was in contrast with the outpatient sample in which higher levels of extraversion was associated with more positive outcomes ($r = .11$).

Additionally, samples receiving daily treatment had significantly weaker associations between conscientiousness and an overall favorable outcome ($r = .04$) compared to samples receiving treatment twice a week ($r = .24$). This suggests that the link between conscientiousness and outcome may be mediated by the time spent practicing outside of session. Samples receiving treatment for longer periods of time also had significantly stronger positive associations with extraversion, openness to experience, and agreeableness with the overall outcome. Specifically, for extraversion, those who were in treatment for four weeks or less had a negative association ($r = -.08$). This was in contrast to those receiving treatment for six to 11 months ($r = .16$) in which higher levels of extraversion was associated with a more positive outcome. Those who were in treatment for one to two years had significantly stronger positive associations with openness to experience and overall outcome ($r = .50$) compared to those who were in treatment for 6 to 11 months ($r = .06$), one to five months ($r = .004$), and four weeks or less ($r = -.12$). Samples receiving treatment for one to two years also had significantly stronger positive associations between agreeableness and an overall favorable outcome ($r = .50$) compared to those receiving treatment for six to 11 months ($r = .07$), one to five months ($r = .08$), and four weeks or less ($r = -.001$).

3. Discussion

The current meta-analysis sought to investigate the association between personality traits and therapeutic outcomes. This was done by focusing on studies that assessed personality traits in participants at the beginning of treatment. Overall findings suggested that personality traits are associated with various psychotherapy outcomes, with specific links between traits and outcomes that were consistent with a priori predictions.

In almost all cases examined, it was more beneficial to have lower levels of neuroticism when beginning treatment, as hypothesized. This is congruent with hypotheses that state those lower on neuroticism might be more willing/able to make necessary changes (Miller, 1991). Furthermore, findings suggested that all FFM domains provided important information about treatment outcomes. At the broadest level, this highlights the relevance of personality traits for predicting the course of therapy and suggests there is utility in considering them in clinical practice. The diversity of relations across domains further suggests that personality's utility is not attributable simply to general

distress. Indeed, if the primary effects were confined to neuroticism, this would suggest limited benefit of FFM traits as negative emotions are already a de facto focus of clinical attention. For this reason, the predictive capacity of the other domains suggests a potentially underutilized resource for informing clinical care.

The findings also suggest that maladaptivity is associated with less favorable outcomes. This is congruent with interpretations that the general factor of personality, which can be defined as low neuroticism, high extraversion, high agreeableness, and high conscientiousness, is likely a factor of general adaptivity (Oltmanns, Smith, Oltmanns, & Widiger, 2018; Widiger & Oltmanns, 2017). Results also coincide with a recent study by Bleidorn et al. (in press) that surveyed expert raters of personality and found psychologically “healthy” individuals had high scores in various facets related to openness to experience, extraversion, agreeableness, and conscientiousness, and low scores on various facets related to neuroticism.

Explicit value of the FFM domains were further revealed when examining specific outcomes. For example, agreeableness displayed a robust association with working alliance, which is noteworthy given how well it comports with prior hypotheses (Miller, 1991; Widiger & Presnall, 2013). Another example of specificity was for neuroticism and conscientiousness with abstinence after substance use treatment. The relation between conscientiousness and abstinence corresponds with past research (Ball, 2002), while neuroticism's negative association with abstinence is congruent with Kotov et al.'s (2010) meta-analysis in which higher levels of neuroticism were associated with substance use disorders ($r = .36$).

Results also suggested extraversion is associated with various outcomes related to symptomatology and improvement. It might be that due to the social nature of extraversion, which has been tied to increased social support seeking behavior (Lysaker, Bryson, Marks, Greig, & Bell, 2004), individuals higher in extraversion are more effective at participating in treatment (Beauchamp, Lecomte, Lecomte, Leclerc, & Corbière, 2011). Thus, due to a willingness to express emotions and participate in therapy, more improvement and symptom decrease might be possible. This might be particularly important across individuals higher in distress or negative affectivity, as an individual with higher positive affect, a component of extraversion, might better benefit from talk therapy.

Although many predicted associations were supported, not all hypotheses for specific relations were fulfilled in the present data. Extraversion, surprisingly, did not have strong associations with interpersonal outcomes, such as working alliance. Although individuals higher on extraversion might be more willing to participate and communicate in treatment, this is not as strongly related to building a therapeutic relationship, as was found for agreeableness. This represents an important distinction concerning how these interpersonal traits play out clinically.

Also of note is that while neuroticism had a stronger negative association with symptom severity, its association with symptom decrease was significantly weaker. Some have even argued that those *higher* in neuroticism might have higher decreases in symptoms over the course of treatment, which was hypothesized in the current study. That is, those with higher levels of neuroticism might show more decrease as they (a) tend to present with the most distress and have the most room for growth compared to clients who present with less distress (perhaps even including regression to the mean) and (b) might be more driven in treatment due to their distress (Miller, 1991). Interestingly, the meta-analysis revealed the opposite trend such that *lower* levels of neuroticism at baseline were associated with greater symptom decrease. This finding is congruent with research that has examined how client symptomatology influences outcome. One such review by Schneider, Arch, and Wolitzky-Taylor (2015) found that, in some cases, severity of anxiety symptoms and high levels of neuroticism predicted worse outcomes, part of which might be due to difficulty effectively utilizing coping skills (Ball, 2005). Additionally, there is a vast literature

discussing distress, which is associated with neuroticism. One common distress syndrome proposed by Dohrenwend, Shrout, Egri, and Mendelsohn (1980), similar to Frank's (1974) concept of demoralization, notes that distress can occur in individuals regardless of psychiatric disorder. Clarke and Kissane (2002) noted that this distress, or demoralization, can affect various factors, such as coping abilities, poor self-esteem, and isolation, all of which can impact treatment. Thus the findings suggest that, similar to Schofield's (1964) “YAVIS” (young, attractive, verbal, intelligent, and successful) client, those clients who are highest in psychological functioning at the outset also benefit the most from treatment, particularly in shorter time periods. This also supports the importance of focusing on effective coping skills when working with clients who present with high levels of neuroticism.

Openness to experience was also expected to relate to the outcomes improvement, aggregated improvement, and decrease in symptoms, but they were not found to have strong links. One possible explanation for openness to experience could be due to its heterogeneity. This domain has been a source of frequent debate and inconsistent findings across the literature. Research has found this domain consists of two distinct, but related aspects (Chmielewski, Bagby, Markon, Ring, & Ryder, 2014; Johnson, 1994). Thus, it might be that specific traits of openness to experience, such as those related to reflection, introspection, depth, and intelligence, would relate to improvement. In contrast, those related to imagination and fantasy proneness, which has been shown to be related with psychoticism (Moorman & Samuel, 2018; Suzuki, Griffin, & Samuel, 2016), might not relate strongly to an outcome like improvement and *negatively* impact therapeutic outcomes, particularly as they become fantasy-proneness or oddity such as those seen in schizotypal-type traits (Piedmont, Sherman, & Sherman, 2012).

Conscientiousness was also hypothesized to show a stronger link with these outcomes, but the results did not bear this out. This suggests that although those high on conscientiousness might be willing to put in the work to *incorporate* skills provided by clinicians, that might not necessarily mean that implementing skills will result in an overall improvement on symptoms, especially those related to depression and anxiety.

3.1. Moderation analyses

In addition to the direct effects of personality traits on treatment outcomes, we also investigated the degree to which aspects of therapy might moderate this relation. In other words, we sought to learn whether certain traits were particularly relevant to specific therapeutic situations. One intriguing finding was that conscientiousness more strongly related to various outcomes when interventions were less frequent. This finding stands to reason in that the presumed mechanism by which conscientiousness impacts outcomes is through regularly engaging in prescribed behaviors (e.g., skill practice; homework) outside of the session. Specifically, for those attending sessions on a daily basis, conscientiousness matters less in terms of general improvement, as the practice with the therapist is built into sessions. However, when a client is working with a therapist less frequently and must practice independently, higher conscientiousness appears more beneficial. Thus, a client's level of conscientiousness might be a factor to consider when deciding frequency of sessions, with individuals lower in conscientiousness needed clinical contact more often.

The duration of treatment also appeared to moderate the link between traits and treatment outcomes. Interestingly, the domains extraversion, openness to experience, and agreeableness, were more strongly related to the overall outcome when treatment was longer (i.e., approximately one year). Thus, a client's characteristic manner of thinking, feeling, and relating to others appears to exert an influence on outcomes across treatment, with additional time providing more opportunity for traits to have an impact. This finding is consistent with research indicating that treatment effects are amplified over longer duration (Leichsenring & Rabung, 2008). Similarly, it appears that the

effects of personality traits on treatment outcomes – which are likely somewhat subtle – amplify with time. Clinically, traits might be even more important to consider at the outset of therapies that are designed to be long-term (e.g., psychodynamic treatment; Dialectical Behavior Therapy) than for short-term interventions.

3.2. Implications for clinical intervention

The findings from the current study have several clinical implications that both researchers and clinicians should consider. Given the established challenges that arise with the treatment of those exhibiting comorbidity across mental health diagnoses (e.g., Newman, Moffitt, Caspi, & Silva, 1998), it is likely that those presenting for therapeutic services that also exhibit maladaptive personality traits will also present with additional challenges in treatment of which clinicians should be aware. First, therapists might expect difficulty establishing therapeutic alliance with clients who are low on agreeableness (as well as possibly openness, and conscientiousness). Because past meta-analyses have found alliance is associated with treatment outcomes (e.g., Martin, Garske, & Katherine Davis, 2000; Sharf, Primavera, & Diener, 2010), it is useful to consider how personality traits provide information about these potential barriers and might suggest prioritizing engagement with such clients early in therapy.

It also appears particularly fruitful to investigate personality traits during substance use treatment (e.g., Ball, 2002), as findings suggested that clients' levels of conscientiousness and neuroticism at the outset of treatment can provide information regarding clients' abilities to remain abstinent after treatment. That is, even among clients seeking treatment for substance use disorders (who will typically be higher than population norms on neuroticism and lower on conscientiousness), these traits still have predictive capacity for outcomes within this group. It might then suggest altered strategies (e.g., additional in-session coping skill and relapse prevention practice), or even more frequent sessions for clients with particularly low standings on conscientiousness. Future work would be helpful in determining specific cut scores for when such approaches are warranted.

Last but not least, the current results provide concrete mechanisms for how personality traits are clinically useful (Mullins-Sweatt & Lengel, 2012) and support their incorporation into clinical treatment. This also amplifies recent efforts to develop interventions geared towards changing maladaptive personality traits (e.g., Allemand & Flückiger, 2017; Roberts, Hill, & Davis, 2017). There have recently been two experimental studies that have investigated volitional personality change and found that traits *do* change over time, even with minimal intervention (Allan, Leeson, De Fruyt, & Martin, 2018; Hudson & Chris Fraley, 2015). Not only that, but individuals with high levels of maladaptive personality traits did view these traits as negative and problematic (Sleep, Lamkin, Lynam, Campbell, & Miller, 2018), suggesting there is a need in developing effective treatment interventions geared towards personality trait change.

3.3. Implications for clinical assessment

The current study demonstrated that traits are meaningfully related to outcomes and thus highly relevant to treatment planning and case conceptualization. This helps to flesh out and provide a mechanism to explain prior research indicating practicing clinicians find the FFM traits clinically useful (Morey, Skodol, & Oldham, 2014; Mullins-Sweatt & Lengel, 2012; Samuel & Widiger, 2006; Sprock, 2002). In short, our results suggest that the FFM traits are deemed useful in practice because they provide information that bears on a wide variety of outcomes that are of interest to clinicians. As such, the present results highly recommend a valid assessment of these traits be incorporated into routine clinical practice. Thankfully, there are number of psychometrically sound measures of these personality traits that can be readily implemented. One predominant measure of the FFM, the NEO PI-R (Costa

& McCrae, 1992), has extensive support for its validity of the domains as well as facet-level scores and would be suggested. Two potential limitations of the NEO PI-R for this purpose are its length (240 items; taking about 20–30 min) and that it is a proprietary measure that must be purchased. Freely available alternatives do exist, such as the 120-item version from the International Personality Item Pool (Maples, Guan, Carter, & Miller, 2014) that reasonably approximates the same scores on the NEO PI-R. It should be specifically noted that the International Personality Item Pool consists of a plethora of personality inventories that can be utilized in a clinical setting. If administration time is a chief concern, there are also several that are quite brief, such as the 60-item IPIP-NEO-60 (Maples-Keller et al., 2017), the 60-item BFI-2 (Soto & John, 2017), and the 30-item FFMRF (Mullins-Sweatt, Jamerson, Samuel, Olson, & Widiger, 2006). Ideally, these measures should be administered within the first few sessions, preferably within the context of a therapeutic assessment (Finn & Tonsager, 1997) so the client is engaged and willing to provide an honest self-appraisal. Personality measures also can be administered periodically throughout treatment to track how trait changes can impact favorable outcomes. It is also informative to gather personality information from knowledgeable informants (Oltmanns & Turkheimer, 2009), particularly in contexts where clients might be motivated to portray oneself in a particular way (e.g., forensic settings or disability evaluations). It is also important to note that one should examine all domains simultaneously to inform of all potential strengths and weaknesses of the client which can aid with identifying the appropriate treatment techniques.

4. Limitations

This was the first study to systematically summarize the relations among personality traits and treatment outcomes. It revealed a pattern of links that were notable and consistent with theoretical predictions (Widiger & Presnall, 2013), emphasizing the relevance of traits for predicting outcomes of mental health treatment. Nonetheless, like any meta-analysis it was limited by the state of the extant literature (Ioannidis & Lau, 1999). Although it was able to organize a disparate literature for main effects as well as substantive moderators for a variety of outcomes, there were other specific outcomes that lacked a sufficient number of studies to permit calculation of individual effects. Still others had a sufficient number of studies, but the sample sizes limited conclusions and generalizability. Additionally, it is important to note that the current study used only one database when conducting the literature search. While this is a limitation, we believe that based on extensive ancestral searches, this is a comprehensive collection of the current studies available that encompass this specific topic.

Although a strength was the integration of traits assessed by a variety of measures, many of these measures assess traits that do not align perfectly with the FFM domains. To account for the heterogeneity among some of these subscales, Roberts, Luo, et al. (2017) coded these traits as blends of two FFM traits. The current study could not, however, due to small numbers. This might have influenced how the NEO measures related to some specific outcomes compared to the TCI and TPQ measures. With a growing body of literature on this topic, it might be possible to examine blended traits in the future with additional studies, which might display more nuanced relationships among domains and outcomes.

5. Future directions

It is worth noting that all effects reported in this meta-analysis are linear relations between traits and outcomes. Nonetheless, as discussed by both Widiger and Presnall (2013) and Miller (1991), traits on both the high *and* low end of almost all dimensions could conceivably result in barriers to treatment. For example, although an individual low in agreeableness might have poorer outcomes due to resistance and difficulty forming a therapeutic alliance, an individual high in

agreeableness might overly focus on pleasing the therapist, in a way that impairs clinical progress. The idea of maladaptive extremes of general traits is not a new concept and is a driving force for using the FFM to conceptualize personality pathology (Widiger & Trull, 2007). The inclusion of bipolar traits, which recognize the full complement of adaptive and maladaptive traits, would be highly valuable for modeling and assessing personality (Samuel, 2011). Consequently, overall effect sizes in the present analysis could be underestimates as the underlying form of the relation might actually be curvilinear, with an inflection point at some middle level. As such, future research would benefit from further examining curvilinear relations between personality traits with various outcomes of interest (Williams & Simms, 2018).

The field of clinical psychology would also benefit from further investigation of the link between traits and specific treatment outcomes. One such example, homework completion, is frequently discussed with its theoretical ties to conscientiousness (Bagby et al., 2016). Yet, we found no published study that actually examined this outcome. It seems likely that data on this outcome would exist, but apparently have not been published. Thus, researchers should continue examining personality traits' relation to treatment outcomes, including probing archival data to determine effects. Lower-order facets, which provide specific and nuanced trait descriptions, should also be further examined as, due to heterogeneity at the domain-level, it is can be unclear which aspects are driving associations (Smith, McCarthy, & Zapolski, 2009). Utilizing facets could provide a more nuanced association with outcomes (Ashton, Paunonen, & Lee, 2014) that could additionally aid with treatment planning. The current study only had the capacity to examine domain-level associations, which is a limitation of the published literature.

It is also worth examining how the relationship between personality traits and outcomes change throughout treatment. One such study that has recently done this found there were indeed differences in the pattern of associations among outcomes from the initial session and after four sessions (Samuel, Bucher, & Suzuki, *in press*). That is, at the beginning of treatment, client-reported neuroticism, extraversion, and openness related to symptom improvement. Yet by the fourth therapy session, openness more strongly related to symptom improvement while neuroticism's and extraversion's associations became weaker. Samuel and colleagues also found differences in the patterns of associations among clinician and client report, such that at the outset, therapist report of client's neuroticism and conscientiousness significantly related to symptom improvement, while client-reported levels were not. Similarly, at the fourth session, client-reported conscientiousness related *negatively* as reported by the client with symptom improvement, while client-levels of conscientiousness reported by the therapist relatedly *positively* and weakly. Future research should examine personality at various time points and across various reporters to examine how traits unfold dynamically across therapy (Wright & Hopwood, 2016) and raters and how those levels may be differentially predictive of outcomes.

The current study showed that personality traits are associated with important treatment outcomes, which has potentially important implications. Nonetheless, the present results concern personality in isolation. A number of past studies have investigated additional client variables that are predictors of therapeutic outcome, including demographic information such as age, race, gender, and socioeconomic status (e.g., Cottraux et al., 2009; Lammers, Vroling, Ouwens, Engels, & van Strien, 2015; Scalise, Berkel, & Van Whitlock, 2010; van de Laar, Pevernagie, van Mierlo, & Overeem, 2015; Vroling, Wiersma, Lammers, & Noorthoorn, 2016). A meta-analysis by Sharf and Primavera (2009) found that educational attainment ($d = .27$), marital status ($d = .24$), age ($d = .24$), and gender ($d = .18$) all related to completion of therapy services although another meta-analysis by Cuijpers et al. (2014) did not find gender predicted favorable outcomes in cognitive-behavioral therapy. Research has also investigated the relation between various other predictors with favorable treatment outcomes. In a systematic

review investigating social anxiety disorder, Mululo, de Menezes, Vigne, and Fontenelle (2012) found that early onset, greater severity, and comorbidity resulted in less favorable treatment outcomes. The finding related to comorbidity is congruent with other reviews investigating predictors of treatment outcomes that have found comorbid depression is related to poorer treatment outcomes (Amati, Banks, Greenfield, & Green, 2017; Eskildsen, Hougaard, & Rosenberg, 2010). An additional review by Vall and Wade (2015) found that lower motivation significantly related to dropout ($r = .23$) and fewer familial problems related to a more favorable overall outcome ($r = .36$).

Past studies have also investigated PDs associations with various treatment outcomes. Messina, Wish, Hoffman, and Nemes (2002) examined antisocial PD and substance use treatments and found it was unrelated to treatment completion; rather treatment completion was the most important predictor. Yet, Dreesen and Arntz (1998) examined the anxiety disorder treatment literature and found that the presence of PDs did negatively affect treatment outcomes for various anxiety disorders. A systematic review by Newton-Howes, Foulds, Guy, Boden, and Mulder (2017) also found some inconsistencies across the relationship between PDs and alcohol treatment outcomes, noting that some found the presence of a PD was associated with short time to relapse, greater alcohol consumption, and dropout, while others found no differences. It is also important to note that when assessing for quality of studies included in the study, they found that they had low to very low quality due to statistical reporting.

Together, these results yield confidence that personality traits can provide comparable information regarding various treatment outcomes compared to demographic information and PD diagnoses. Thus, clinicians are encouraged to continue examining various predictors of treatment, including personality traits, in combination. It will be key to determine how these factors may overlap and complement each other to provide the most robust prediction of therapeutic outcomes.

6. Conclusions

Overall, there *are* meaningful and potentially clinically useful associations between specific outcomes and personality domains, many of which are congruent with the theorized literature on this topic. Assessing personality traits can aid clinicians in treatment planning, case conceptualization, as well as recognizing and addressing potential treatment barriers. Thus, clinicians and researchers should consider incorporating personality measures in basic intake assessments to move beyond simply treating and reducing symptoms, allowing for the integration of personality traits in clinical settings.

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Contributors

Meredith A. Bucher and Douglas B. Samuel designed the study. Takakuni Suzuki assisted with the coding of studies and analyses. Meredith A. Bucher wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cpr.2019.04.002>.

References

- Allan, J., Leeson, P., De Fruyt, F., & Martin, S. (2018). Application of a 10 week coaching program designed to facilitate volitional personality change: Overall effects on personality and the impact of targeting. *International Journal of Evidence Based Coaching & Mentoring*. <https://doi.org/10.24384/000470>.
- Allemand, M., & Flückiger, C. (2017). Changing personality traits: Some considerations from psychotherapy process-outcome research for intervention efforts on intentional personality change. *Journal of Psychotherapy Integration*, 27(4), 476–494. <https://doi.org/10.1037/int0000094>.
- Amati, F., Banks, C., Greenfield, G., & Green, J. (2017). Predictors of outcomes for patients with common mental health disorders receiving psychological therapies in community settings: A systematic review. *Journal of Public Health*.
- American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (5th ed.). *American Journal of Psychiatry*. <https://doi.org/10.1176/appi.books.9780890425596.744053>.
- Ashton, M. C., Paunonen, S. V., & Lee, K. (2014). On the validity of narrow and broad personality traits: A response to. *Personality and Individual Differences*, 56, 24–28.
- Bagby, R. M., Costa, P. T., Widiger, T. A., Ryder, A. G., & Marshall, M. (2005). DSM-IV personality disorders and the five-factor model of personality: A multi-method examination of domain- and facet-level predictions. *European Journal of Personality*. <https://doi.org/10.1002/per.563>.
- Bagby, R. M., Gralnick, T. M., Al-Dajani, N., & Uliaszek, A. A. (2016). The role of the five-factor model in personality assessment and treatment planning. *Clinical Psychology: Science and Practice*, 23(4), 365–381.
- Bagby, R. M., & Quilty, L. C. (2006). Personality traits can predict best treatment for depression. *Directions in Psychiatry*, 26(4), 199–208.
- Ball, S. A. (2002). *Big five, alternative five, and seven personality dimensions: Validity in substance-dependent patients*.
- Ball, S. A. (2005). Personality traits, problems, and disorders: Clinical applications to substance use disorders. *Journal of Research in Personality*, 39, 84–102.
- Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 44.
- Beauchamp, M., Lecomte, T., Lecomte, C., Leclerc, C., & Corbière, M. (2011). Personality traits in early psychosis: Relationship with symptom and coping treatment outcomes. *Early Intervention in Psychiatry*, 5(1), 33–40.
- Bleidorn, W., Hopwood, C. J., Ackerman, R. A., Witt, E. A., Kandler, C., Reimann, R., ... Donnellan, M. B. (in press). The healthy personality from a basic trait perspective. *Journal of Personality and Social Psychology*.
- Chmielewski, M., Bagby, M., Markon, E. K., Ring, A. J., & Ryder, A. G. (2014). *Openness to experience, intellect, schizotypal personality disorder, and psychoticism: Resolving the controversy*. 28, 483–499.
- Chmielewski, M., Clark, L. A., Michael Bagby, R., & Watson, D. (2015). Method matters: Understanding diagnostic reliability in DSM-IV and DSM-5. *Journal of Abnormal Psychology*. <https://doi.org/10.1037/abn0000069>.
- Clark, L. A. (2007). Assessment and diagnosis of personality disorder: Perennial issues and an emerging reconceptualization. *Annual Review of Psychology*, 58, 483–499.
- Clarke, D. M., & KISSANE, D. W. (2002). Demoralization: Its phenomenology and importance. *Australian and New Zealand Journal of Psychiatry*. <https://doi.org/10.1046/j.1440-1614.2002.01086.x>.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*. <https://doi.org/10.1037/0033-2909.112.1.155>.
- Costa, P. T., Jr. (2008). Just do it: Replace Axis II with a diagnostic system based on the five-factor model of personality. *Dimensional models of personality disorders: Refining the research agenda for DSM-V* (pp. 195–198).
- Costa, P. T., Bagby, R. M., Herbst, J. H., & McCrae, R. R. (2005). Personality self-reports are concurrently reliable and valid during acute depressive episodes. *Journal of Affective Disorders*. <https://doi.org/10.1016/j.jad.2005.06.010>.
- Costa, P. T., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment*, 4(1), 5.
- Cottraux, J., Note, I. D., Boutitie, F., Milliery, M., Genouihlac, V., Yao, S. N., ... Gueyffier, F. (2009). Cognitive therapy versus Rogerian supportive therapy in borderline personality disorder. *Psychotherapy and Psychosomatics*, 78(5), 307–316. <https://doi.org/10.1159/000229769>.
- Cuijpers, P., Weitz, E., Twisk, J., Kuehner, C., Cristea, I., David, D., ... Hollon, S. D. (2014). Gender as predictor and moderator of outcome in cognitive behavior therapy and pharmacotherapy for adult depression: An “individual patient data” meta-analysis. *Depression and Anxiety*, 31(11), 941–951. <https://doi.org/10.1002/da.22328>.
- Dennhag, I., Ybrandt, H., & Sundström, A. (2017). The relationship between clients' personality traits, working alliance and therapy outcome in a training context. *Current Issues in Personality Psychology*, 2, 132–142. <https://doi.org/10.5114/cipp.2017.65244>.
- DerSimonian, R., & Laird, N. (1986). Meta-analysis in clinical trials. *Controlled Clinical Trials*, 7(3), 177–188. [https://doi.org/10.1016/0197-2456\(86\)90046-2](https://doi.org/10.1016/0197-2456(86)90046-2).
- Diedenhofen, B., & Musch, J. (2015). Cocor: A comprehensive solution for the statistical comparison of correlations. *PLoS One*, 10(4), <https://doi.org/10.1371/journal.pone.0121945>.
- Dohrenwend, B. P., Shrout, P. E., Egri, G., & Mendelsohn, F. S. (1980). Nonspecific psychological distress and other dimensions of psychopathology. *Archives of General Psychiatry*. <https://doi.org/10.1001/archpsyc.1980.01780240027003>.
- Dreessen, L., & Arntz, A. (1998). The impact of personality disorders on treatment outcome of anxiety disorders: Best-evidence synthesis. *Behaviour Research and Therapy*. [https://doi.org/10.1016/S0005-7967\(98\)00026-6](https://doi.org/10.1016/S0005-7967(98)00026-6).
- Eskildsen, A., Hougaard, E., & Rosenberg, N. (2010). Pre-treatment patient variables as predictors of drop-out and treatment outcome in cognitive behavioural therapy for social phobia: A systematic review. *Nordic Journal of Psychiatry*, 64, 94–105.
- Finn, S. E., & Tonsager, M. E. (1997). Information-gathering and therapeutic models of assessment: Complementary paradigms. *Psychological Assessment*. <https://doi.org/10.1037/1040-3590.9.4.374>.
- Fisher, R. A. (1925). *Statistical methods for research workers. Statistical methods for research workers*. 281–302.
- Frank, J. D. (1974). Psychotherapy: The restoration of morale. *American Journal of Psychiatry*. <https://doi.org/10.1176/ajp.131.3.271>.
- Harkness, A. R., & Lilienfeld, S. O. (1997). Individual differences science for treatment planning: Personality traits. *Psychological Assessment*, 9(4), 349.
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Orlando, FL: Academic Press.
- Hengartner, M. P. (2015). The detrimental impact of maladaptive personality on public mental health: A challenge for psychiatric practice. *Frontiers in Psychiatry*, 6(May), <https://doi.org/10.3389/fpsy.2015.00087>.
- Hirsh, J. B., Quilty, L. C., Bagby, R. M., & McMain, S. F. (2012). The relationship between agreeableness and the development of the working Alliance in patients with borderline personality disorder. *Journal of Personality Disorders*. <https://doi.org/10.1521/pedi.2012.26.4.616>.
- Hudson, R. M., & Chris Fraley, R. (2015). Volitional personality trait change: Can people choose to change their personality traits? *Journal of Personality and Social Psychology*. <https://doi.org/10.1037/pspp0000021>.
- Ioannidis, J. P., & Lau, J. (1999). Pooling research results: Benefits and limitations of meta-analysis. *The Joint Commission Journal on Quality Improvement*. [https://doi.org/10.1016/S1070-3241\(16\)30460-6](https://doi.org/10.1016/S1070-3241(16)30460-6).
- Johansen, R., Melle, I., Iversen, V. C., & Hestad, K. (2013). Personality traits, interpersonal problems and therapeutic alliance in early schizophrenia spectrum disorders. *Comprehensive Psychiatry*, 54(8), 1169–1176. <https://doi.org/10.1016/j.comppsy.2013.05.016>.
- John, O., Naumann, L. P., & Soto, C. (2008). Paradigm shift to the integrative Big Five trait taxonomy. In O. John, R. W. Robins, & L. Pervin (Eds.). *Handbook of personality* (pp. 114–158). (3rd ed.). New York, NY: Guilford.
- Johnson, J. A. (1994). Clarification of Factor Five with the help of the AB5C model. *European Journal of Personality*, 8(4), 311–334. <https://doi.org/10.1002/per.2410080408>.
- Knapp, G., & Hartung, J. (2003). Improved tests for a random effects meta-regression with a single covariate. *Statistics in Medicine*, 22(17), 2693–2710. <https://doi.org/10.1002/sim.1482>.
- Kool, S., Schoevers, R., De Maat, S., Van, R., Molenaar, P., Vink, A., & Dekker, J. (2005). Efficacy of pharmacotherapy in depressed patients with and without personality disorders: A systematic review and meta-analysis. *Journal of Affective Disorders*. <https://doi.org/10.1016/j.jad.2005.05.017>.
- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking “big” personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*, 136(5), 768–821. <https://doi.org/10.1037/a0020327>.
- Krueger, R. F., & Markon, K. E. (2011). A dimensional-spectrum model of psychopathology: Progress and opportunities. *Archives of General Psychiatry*. <https://doi.org/10.1001/archgenpsychiatry.2010.188>.
- Kushner, S. C., Quilty, L. C., Uliaszek, A. A., McBride, C., & Bagby, R. M. (2016). Therapeutic alliance mediates the association between personality and treatment outcome in patients with major depressive disorder. *Journal of Affective Disorders*, 201, 137–144. <https://doi.org/10.1016/j.jad.2016.05.016>.
- Lahey, B. B. (2009). Public health significance of neuroticism. *American Psychologist*, 64(4), 241–256. <https://doi.org/10.1037/a0015309>.
- Lambert, M. J., Garfield, S. L., & Bergin, A. E. (2004). Overview, trends, and future issues. *Bergin and Garfield's Handbook of Psychotherapy and Behavior Change*. 5. Bergin and Garfield's Handbook of Psychotherapy and Behavior Change (pp. 805–819).
- Lammers, M. W., Vrolijk, M. S., Ouwens, M. A., Engels, R. C. M. E., & van Strien, T. (2015). Predictors of outcome for cognitive behaviour therapy in binge eating disorder. *European Eating Disorders Review*, 23(3), 219–228. <https://doi.org/10.1002/erv.2356>.
- Leichsenring, F., & Rabung, S. (2008). Effectiveness of long-term psychodynamic psychotherapy: A meta-analysis. *Jama*, 300(13), 1551–1565.
- Lengel, G. J., Helle, A. C., DeShong, H. L., Meyer, N. A., & Mullins-Sweatt, S. N. (2016). Translational applications of personality science for the conceptualization and treatment of psychopathology. *Clinical Psychology: Science and Practice*, 23(3), 288–308.
- Lipsey, M. W., & Wilson, D. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.
- Lysaker, P. H., Bryson, G. J., Marks, K., Greig, T. C., & Bell, M. D. (2004). Coping style in schizophrenia: Associations with neurocognitive deficits and personality. *Schizophrenia Bulletin*, 30(1), 113–121.
- Maples, J. L., Guan, L., Carter, N. T., & Miller, J. D. (2014). A test of the International Personality Item Pool representation of the Revised NEO Personality Inventory and development of a 120-item IPIP-based measure of the five-factor model. *Psychological Assessment*, 26(4), 1070–1084. <https://doi.org/10.1037/pas0000004>.
- Maples-Keller, J. L., Williamson, R. L., Sleep, C. E., Carter, N. T., Campbell, W. K., & Miller, J. D. (2017). Using item response theory to develop a 60-item representation of the NEO PI-R using the international personality item Pool: Development of the IPIP-NEO-60. *Journal of Personality Assessment*. <https://doi.org/10.1080/00223891.2017.1381968>.

- Martin, D. J., Garske, J. P., & Katherine Davis, M. (2000). Relation of the therapeutic alliance with outcome and other variables: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 68(3), 438–450. <https://doi.org/10.1037/0022-006X.68.3.438>.
- McCrae, R. R., & Costa, P. T. (1997). Personality trait structure as a human universal. *American Psychologist*, 52(5), 509–516. <https://doi.org/10.1037/0003-066X.52.5.509>.
- Messina, N. P., Wish, E. D., Hoffman, J. A., & Nemes, S. (2002). Antisocial personality disorder and TC treatment outcomes. *American Journal of Drug and Alcohol Abuse*. <https://doi.org/10.1081/ADA-120002970>.
- Miller, T. R. (1991). The psychotherapeutic utility of the five-factor model of personality: A clinician's experience. *Journal of Personality Assessment*, 57(3), 415–433.
- Molloy, G. J., O'Carroll, R. E., & Ferguson, E. (2014). Conscientiousness and medication adherence: A meta-analysis. *Annals of Behavioral Medicine*, 47(1), 92–101.
- Moorman, E. L., & Samuel, D. B. (2018). Representing schizotypal thinking with dimensional traits: A case for the five factor schizotypal inventory. *Psychological Assessment*. <https://doi.org/10.1037/pas0000497>.
- Morey, L. C., Skodol, A. E., & Oldham, J. M. (2014). Clinician judgments of clinical utility: A comparison of DSM-IV-TR personality disorders and the alternative model for DSM-5 personality disorders. *Journal of Abnormal Psychology*, 123(2), 398–405. <https://doi.org/10.1037/a0036481>.
- Mullins-Sweatt, S. N., Jamerson, J. E., Samuel, D. B., Olson, D. R., & Widiger, T. A. (2006). Psychometric properties of an abbreviated instrument of the five-factor model. *Assessment*, 13(2), 119–137. <https://doi.org/10.1177/1073191106286748>.
- Mullins-Sweatt, S. N., & Lengel, G. J. (2012). Clinical utility of the five-factor model of personality disorder. *Journal of Personality*, 80(6), 1615–1639. <https://doi.org/10.1111/j.1467-6494.2012.00774.x>.
- Mululo, S. C., de Menezes, G., Vigne, P., & Fontenelle, L. (2012). A review on predictors of treatment outcome in social anxiety disorder. *Revista Brasileira de Psiquiatria*, 34, 92–100.
- Newman, D. L., Moffitt, T. E., Caspi, A., & Silva, P. A. (1998). Comorbid mental disorders: Implications for treatment and sample selection. *Journal of Abnormal Psychology*. <https://doi.org/10.1037/0021-843X.107.2.305>.
- Newton-Howes, G., Tyrer, P., & Johnson, T. (2006). Personality disorder and the outcome of depression: Meta-analysis of published studies. *British Journal of Psychiatry*, 188, 13–20.
- Newton-Howes, G. M., Foulds, J. A., Guy, N. H., Boden, J. M., & Mulder, R. T. (2017). Personality disorder and alcohol treatment outcome: Systematic review and meta-analysis. *British Journal of Psychiatry*. <https://doi.org/10.1192/bjp.bp.116.194720>.
- Ogrodniczuk, J. S., Piper, W. E., Joyce, A. S., McCallum, M., & Rosie, J. S. (2003). NEO-five factor personality traits as predictors of response to two forms of group psychotherapy. *International Journal of Group Psychotherapy*, 53(4), 417–442.
- Oltmanns, J. R., Smith, G. T., Oltmanns, T. F., & Widiger, T. A. (2018). General factors of psychopathology, personality, and personality disorder: Across domain comparisons. *Clinical Psychological Science*. <https://doi.org/10.1177/2167702617750150>.
- Oltmanns, T. F., & Turkheimer, E. (2009). Person perception and personality pathology. *Current Directions in Psychological Science*, 18(1), 32–36. <https://doi.org/10.1111/j.1467-8721.2009.01601.x>.
- Ozer, D. J., & Benet-Martinez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology*, 57, 401–421.
- Piedmont, R. L., Sherman, M. F., & Sherman, N. C. (2012). Maladaptively high and low openness: The case for experiential permeability. *Journal of Personality*, 80(6), 1641–1668. <https://doi.org/10.1111/j.1467-6494.2012.00777.x>.
- Piedmont, R. L., Sherman, M. F., Sherman, N. C., Dy-Liacco, G. S., & Williams, J. E. G. (2009). Using the five-factor model to identify a new personality disorder domain: The case for experiential permeability. *Journal of Personality and Social Psychology*, 96(6), 1245.
- Presnall, J. R. (2013). Disorders of personality: Clinical treatment from a five-factor model perspective. In T. A. Widiger, & P. T. Costa (Eds.). *Personality disorders and the five-factor model of personality* (pp. 409–432). (3rd ed.). Washington, DC: American Psychological Association.
- Roberts, B. W., Hill, P. L., & Davis, J. P. (2017). How to change conscientiousness: The sociogenomic trait intervention model. *Personality Disorders: Theory, Research, and Treatment*, 8(3), 199–205. <https://doi.org/10.1037/per0000242>.
- 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.
- Samuel, D. B. (2011). Assessing personality in the DSM-5: The utility of bipolar constructs. *Journal of Personality Assessment*, 93(4), 390–397. <https://doi.org/10.1080/00223891.2011.577476>.
- Samuel, D. B., Bucher, M. A., & Suzuki, T. (in press). Personality predicting psychotherapy outcomes: Perspectives from therapists and their clients. *Psychopathology*.
- Samuel, D. B., & Widiger, T. A. (2006). Clinicians' judgments of clinical utility: A comparison of the DSM-IV and five-factor models. *Journal of Abnormal Psychology*, 115(2), 298–308. <https://doi.org/10.1037/0021-843X.115.2.298>.
- Samuel, D. B., & Widiger, T. A. (2008). A meta-analytic review of the relationships between the five-factor model and DSM-IV-TR personality disorders: A facet level analysis. *Clinical Psychology Review*. <https://doi.org/10.1016/j.cpr.2008.07.002>.
- Sanderson, C., & Clarkin, J. F. (2002). Further use of the NEO-PI-R personality dimensions in differential treatment planning. *Personality Disorders and the Five-Factor Model of Personality* (pp. 351–375). (2nd ed.). <https://doi.org/10.1037/10423-021>.
- Santor, D. A., Bagby, R. M., & Joffe, R. T. (1997). Evaluating stability and change in personality and depression. *Journal of Personality and Social Psychology*. <https://doi.org/10.1037/0022-3514.73.6.1354>.
- Scalise, D. A., Berkel, L., & Van Whitlock, R. (2010). Client factors associated with treatment completion in a substance abuse treatment facility. *Addiction Research & Theory*, 18(6), 667–680. <https://doi.org/10.3109/16066351003778726>.
- Schneider, R. L., Arch, J. J., & Wolitzky-Taylor, K. B. (2015). The state of personalized treatment for anxiety disorders: A systematic review of treatment moderators. *Clinical Psychology Review*, 38, 39–54. <https://doi.org/10.1016/j.cpr.2015.02.004>.
- Schofield, W. (1964). *Psychotherapy: The purchase of friendship*. Englewood Cliffs, NJ: Prentice-Hall.
- Sharf, J., & Primavera, L. H. (2009). *Meta-analysis of psychotherapy dropout*. Adelphi University.
- Sharf, J., Primavera, L. H., & Diener, M. J. (2010). Dropout and therapeutic alliance: A meta-analysis of adult individual psychotherapy. *Psychotherapy*, 47(4), 637–645. <https://doi.org/10.1037/a0021175>.
- Sleep, C. E., Lamkin, J., Lynam, D. R., Campbell, W. K., & Miller, J. D. (2018). Personality disorder traits: Testing insight regarding presence of traits, impairment, and desire for change. *Personality Disorders: Theory, Research, and Treatment*. <https://doi.org/10.1037/per0000305>.
- Smith, G. T., McCarthy, D. M., & Zapolsky, T. C. B. (2009). On the value of homogeneous constructs for construct validation, theory testing, and the description of psychopathology. *Psychological Assessment*, 21(3), 272.
- Soto, C., & John, O. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology*, 113, 117–143.
- Sprock, J. (2002). A comparative study of the dimensions and facets of the five-factor model in the diagnosis of cases of personality disorder. *Journal of Personality Disorders*, 16(5), 402–423. <https://doi.org/10.1521/pedi.16.5.402.22122>.
- Suzuki, T., Griffin, S. A., & Samuel, D. B. (2016). Capturing the DSM-5 alternative personality disorder model traits in the Five-Factor Model's nomological net. *Journal of Personality*, 1–12.
- Vall, E., & Wade, T. (2015). Predictors of treatment outcome in individuals with eating disorders: A systematic review and meta-analysis. *International Journal of Eating Disorders*, 48, 946–971.
- van de Laar, M., Pevernagie, D., van Mierlo, P., & Overeem, S. (2015). Psychiatric comorbidity and aspects of cognitive coping negatively predict outcome in cognitive Behavioral treatment of psychophysiological insomnia. *Behavioral Sleep Medicine*, 13(2), 140–156. <https://doi.org/10.1080/15402002.2013.845781>.
- Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, 36(3), 1–48.
- Vigo, D., Thornicroft, G., & Atun, R. (2016). Estimating the true global burden of mental illness. *The Lancet Psychiatry*, 3(2), 171–178.
- Vroling, M. S., Wiersma, F. E., Lammers, M. W., & Noorthoorn, E. O. (2016). Predicting dropout from intensive outpatient cognitive behavioural therapy for binge eating disorder using pre-treatment characteristics: A naturalistic study. *European Eating Disorders Review*, 24(6), 494–502. <https://doi.org/10.1002/erv.2474>.
- Widiger, T. A., & Clark, L. A. (2000). Toward DSM-V and the classification of psychopathology. *Psychological Bulletin*. <https://doi.org/10.1037/0033-2909.126.6.946>.
- Widiger, T. A., & Oltmanns, J. R. (2017). The general factor of psychopathology and personality. *Clinical Psychological Science*. <https://doi.org/10.1177/2167702616657042>.
- Widiger, T. A., & Presnall, J. R. (2013). Clinical application of the Five-Factor Model. *Journal of Personality*, 81(6), 515–527.
- Widiger, T. A., & Trull, T. J. (2007). Plate tectonics in the classification of personality disorder: Shifting to a dimensional model. *American Psychologist*, 62, 71–83.
- Williams, T. F., & Simms, L. J. (2018). Personality traits and maladaptivity: Unipolarity versus bipolarity. *Journal of Personality*, 86(5), 888–901.
- Wright, A. G. C., & Hopwood, C. J. (2016). Advancing the assessment of dynamic psychological processes. *Assessment*, 23(4), 399–403. <https://doi.org/10.1177/1073191116654760>.

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