SPECTRA
Indices of Psychopathology

Introduction to the SPECTRA: Indices of Psychopathology:

An Assessment Inventory Aligned
With the Hierarchical–Dimensional
Model of Psychopathology

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Executive Summary

The SPECTRA: Indices of Psychopathology (Blais & Sinclair, 2018) is a 96-item, self-administered, multiscale measure of adult psychopathology and functioning. The SPECTRA is unique in that it provides a hierarchical–dimensional assessment of psychopathology.

The purpose of this white paper is to:

   a. Summarize the use, application, and interpretation of the SPECTRA.

   b. Describe the hierarchical–dimensional model of psychopathology and how it is aligned with the SPECTRA.

   c. Demonstrate SPECTRA interpretation via three illustrative case examples.

The Hierarchical–Dimensional Model of Psychopathology

Despite the prominence of categorical classification systems such as the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (*DSM-5*; American Psychiatric Association, 2013) and *International Statistical Classification of Diseases and Related Health Problems* (ICD-10; World Health Organization, 1992), no psychiatric disorder has been shown to be a categorical entity or taxa (e.g., having clear demarcated boundaries and being distinct from a healthy state as well as other disorders [Hyman, 2010]). Rather, research has consistently shown that psychiatric disorders are dimensional or continuously distributed within the population, suffer from high levels of heterogeneity (within-disorder variability), and extensive comorbidity. These official psychiatric classification schemes do not accurately reflect the nature of psychopathology and are conceptually discordant with basic assumptions of psychological measurement and assessment.

In contrast, decades of multivariate research exploring both childhood and adult psychopathology have shown that most psychiatric disorders can be integrated into a few broad dimensions or spectra. These spectra of psychopathology, in turn, can be organized into a meaningful hierarchy. The most widely replicated of these empirical models organizes psychiatric disorders into three broad spectra of Internalizing, Externalizing, and Reality-Impairing psychopathology (Kotov, Ruggero, Krueger, Watson, Yuan, & Zimmerman, 2011; Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Krueger & Markon, 2006; Wright, Krueger, Hobbs, Markon, Eaton, & Slade, 2013). This hierarchical–dimensional organization of psychopathology offers a more parsimonious approach to conceptualizing, measuring, and studying psychiatric disorders. The hierarchical-dimensional model is also better aligned with the realities of clinical assessment in several ways. First, patients often obtain multiple elevated scores on seemingly related scales (e.g., anxiety and depression, drug abuse and antisocial behavior). Second, clinical assessment employs continuous scores (e.g., *T* scores) to represent a patient's standing on a psychological state or trait scale while discouraging the use of cut scores (i.e., *T* score ≥70) to artificially demarcate normal from abnormal functioning (Kotov et al., 2017).

Beyond assessing symptom levels, the SPECTRA's 12 clinical scales produce a broad and balanced assessment of the Internalizing, Externalizing, and Reality-Impairing spectra of psychopathology. In turn, the three higher-order spectra scales combine to create a global supraspectrum of psychopathology (Caspi et al., 2014; Lahey et al., 2012). Factor analytic evidence supporting the SPECTRA's hierarchical–dimensional structure is presented in the SPECTRA Professional Manual.

SPECTRA: Indices of Psychopathology

Inspired by the hierarchical–dimensional model of psychopathology and multivariate research, the SPECTRA (Blais & Sinclair, 2018) is a broadband, self-report inventory that measures psychopathology, cognitive complaints, psychosocial functioning, and suicidal ideation. The SPECTRA's 96 items generate 15 nonoverlapping scales (i.e., 12 clinical scales, 3 supplemental scales) and a validity index. The 12 clinical scales were selected based on clinical importance and their strong empirical association to the higher-order dimensions, or spectra, of psychopathology: Internalizing, Externalizing, and Reality-Impairing. Table 1 provides an overview of the SPECTRA scales and their associated dimensions/spectra.

Table 1
Description of SPECTRA: Indices of Psychopathology Scales

Scale	No. of items	Construct	Dimension/spectrum
Depression (DEP)	6	Depressive affect and ideation	Internalizing
Anxiety (ANX)	8	Worry and fear of losing control	Internalizing
Social Anxiety (SOC)	5	Social worry and avoidance behavior	Internalizing
Post-Traumatic Stress (PTS)	6	Intrusive memories, physical reactivity, and avoidance	Internalizing
Alcohol Problems (ALC)	6	Negative effects of alcohol use	Externalizing
Drug Problems (DRG)	6	Negative effects of drug use	Externalizing
Severe Aggression (AGG)	6	Explosive anger and violence	Externalizing
Antisocial (ANTI)	8	Impulsivity, deceitfulness, rule breaking	Externalizing
Psychosis (PSY)	6	Hallucinations and delusions	Reality Impairing
Paranoid Ideation (PAR)	6	Persecutory thoughts	Reality Impairing
Manic Activation (MAN)	5	Mental and physical acceleration	Reality Impairing
Grandiose Ideation (GRA)	6	Elevated sense of self worth	Reality Impairing
Cognitive Concerns (COG)	5	Perceived cognitive problems	Supplemental
Psychosocial Functioning (PF)	8	Perceived effective coping	Supplemental
Suicidal Ideation (SUI)	6	Suicide-related ideation	Supplemental

Normative data for the SPECTRA were developed from a Census-matched nationally representative sample (N = 1,060). In addition, the manual presents clinical samples for analysis.

The SPECTRA's hierarchical organization (see Figure 1) allows for psychometrically sound assessment at multiple levels or bandwidths along an integrated hierarchy of psychopathology. At the narrowest bandwidth (i.e., Level IV), 12 clinical scales measure the symptomatic expression of Depression (DEP), Anxiety (ANX), Social Anxiety (SOC), Post-Traumatic Stress (PTS), Alcohol Problems (ALC), Drug Problems (DRG), Severe Aggression (AGG), Antisocial (ANTI), Psychosis (PSY), Paranoid Ideation (PAR), Manic Activation (MAN), and Grandiose Ideation (GRA). At midbandwidth (i.e., Levels II and III), the clinical scales organize into three higher-order spectra and four subspectra clusters. At Level II, the three higher-order spectra are the Internalizing Spectrum (INT; composed of DEP, ANX, SOC, and PTS), the Externalizing Spectrum (EXT; composed of DRG, ALC, ANTI, and AGG), and the Reality-Impairing Spectrum (RI; composed of PSY, PAR, MAN, and GRA). The Level II spectra scales are formed by summing the raw scores of the four associated clinical scales and converting the total raw score into a *T* score (provided in Appendix A of the SPECTRA Professional Manual). Thus, the INT raw score is the sum of the scores from the four internalizing clinical scales (i.e., DEP, ANX, SOC, and PTS), which is converted to a *T* score based on the normative sample.

At Level III, within EXT, the clinical scales cluster into Substance-Use Disorders (SUD: ALC + DRG) and Disinhibited Antagonistic Behavior (DIS: ANTI + AGG); the RI clinical scales cluster into Thought Disorder (TD: PSY + PAR) and Mania (MANIA: MAN + GRA). Although these subspectra clusters are not included on the SPECTRA Score Summary/Profile Form, clinicians can generate them simply by averaging the *T* scores of the clinical scales making up the cluster. For example, the SUD cluster can be quantified by taking the average of the ALC and DRG scales and interpreting the score dimensionally.
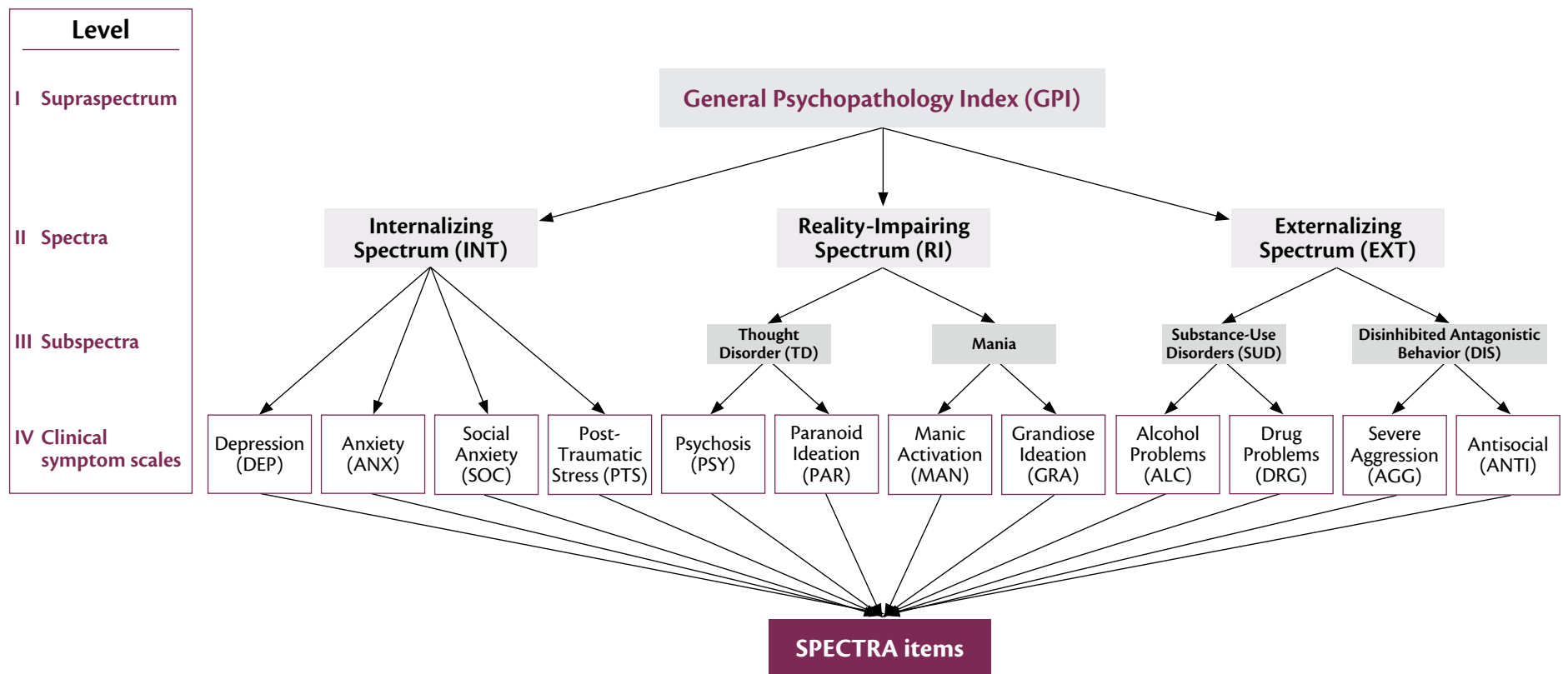
Figure 1. SPECTRA hierarchy of item, scale, and spectra measurement.

At the broadest bandwidth (i.e., Level I), the three spectra scales (INT, EXT, and RI) combine to form the General Psychopathology Index (GPI), which is a global measure of psychopathological burden. The SPECTRA's GPI is generated by summing the raw scores for the three spectra scales and converting it to a *T* score (provided in Appendix A of the SPECTRA Professional Manual). The GPI is related to the general factor of psychopathology, or *p* factor.

SPECTRA Interpretation

SPECTRA findings should be interpreted from high to low level. First, the clinician should consider the GPI, as this will reveal the patient's overall burden of psychiatric illness. The GPI level has important implications for treatment and prognosis. The GPI and spectra scale scores should be interpreted dimensionally, much like an IQ score, without concern for a specific cut score (*T* score > 69). For example, GPI or spectra scale *T* scores falling at or below 45 is considered **Low**, between 46 and 56 are considered **Average**, 57 to 63 is considered **Mild**, 64 to 69 is **Moderate**, 70 to 89 is **Severe**, and scores of 90 or greater are considered **Extreme**. As users gain experience with the SPECTRA, they may want to adjust these suggested ranges to better fit specific clinical populations. Table 2 provides ranges for all spectra clinical scales and the percentage of clinical cases falling within each range (cases are from the Psychological Assessment Center at Massachusetts General Hospital).

General Psychopathology Index (GPI)

The GPI provides a measure of overall global psychopathological burden. This is the aggregate influence of all psychiatric symptoms and their underlying neurobiological processes. Normal range or mildly elevated GPI scores can offer some reassurance that the patient will mostly respond well or in a typical manner to standard treatment. GPI scores within the normal and mild ranges may also suggest the patient's psychiatric issues are more situational, perhaps related to recent life stressors, setbacks, or changes. Higher GPI scores, falling within the

A General Factor of Psychopathology: The *p* Factor

The presence of a superordinate general psychopathology factor (*p* factor) is one of the most important and exciting insights to come out of multivariate psychopathology research. Although its meaning is still under debate, the *p* factor appears to be a way to summarize an individual's propensity to develop any forms of psychopathology (Lahey et al., 2012). The *p* factor is statistically robust, having been replicated across samples and measurement methods, and is stable over time (Snyder, Young, & Hankin, 2017). Conceptually, the *p* factor has similarities to Spearman's *g* factor of global intelligence (Spearman, 1904). As the *g* factor reflects low-to-high overall cognitive ability, the *p* factor seems to represent low-to-high psychopathology burden or vulnerability. Individuals with high *p* factor suffer more severe impairment, have higher rates of concurrent and sequential comorbidity, exhibit greater evidence of neurocognitive impairment, and experience suboptimal or atypical responses to standard treatment modalities (Lahey et al., 2012; Caspi et al., 2014). A recent meta-analysis of genome-wide association studies (GWAS) found evidence for a set of genes that confer a broad liability to psychiatric disorders by acting on early (i.e., prenatal and postnatal) neurodevelopment and brain circuitry. These researchers hypothesize this set of pleiotropic genes may underlie a latent general psychopathology factor (Cross-Disorder Group of the Psychiatric Genomics Consortium, 2019).

Converging research from genetics, neuroscience, and psychiatric epidemiology suggests the *p* factor may be the psychometric representation of overall brain integrity and neurocognitive efficiency (Caspi and Moffitt, 2018). The impact of the *p* factor has been observed in early childhood, before the onset of most psychiatric disorders, and continues throughout the life span (Martel et al., 2017). A large longitudinal study of adolescents found the *p* factor to be the strongest predictive factor of future psychopathology and poor academic performance (Patalay et al., 2015).

The SPECTRA is the only assessment inventory specifically designed to measure the *p* factor. The initial derivation of the SPECTRA GPI was based on a bifactor analysis (Lorenzo-Seva & Ferrando, 2006) similar to that reported by Lahey and colleagues (2012). The bifactor analysis of the SPECTRA clinical scales was conducted on a mixed sample of 620 community and clinical subjects and produced strong evidence of the SPECTRA's structural validity (see below). Subsequent research shows minimal difference between the more complex bifactor GPI and the GPI composed by summing the clinical scale items (Blais & Sinclair, 2016). It appears that the SPECTRA's balanced measurement model, with four scales measuring each higher-order spectrum, along with re-norming of the overall item–total score, resulted in the GPI being a valid representation of the *p* factor. Therefore, the less computationally demanding GPI was included in the published test.

Bifactor Analysis of the SPECTRA Clinical Scales

Scale	Factor			
	INT	EXT	RI	*p* factor
Depression	0.68			0.50
Anxiety	0.71			0.51
Post-Traumatic Stress	0.71			0.43
Social Anxiety	0.67			0.51
Alcohol Problems		0.73		0.36
Drug Problems		0.71		0.45
Severe Aggression		0.40	0.27	0.56
Antisocial		0.44		0.55
Psychosis			0.32	0.57
Paranoid Ideation	0.25		0.52	0.51
Manic Activation			0.59	0.43
Grandiose Ideation			0.65	0.35

Note. *N* = 620. The sample contained both community and clinical patients. INT = Internalizing Spectrum. EXT = Externalizing Spectrum. RI = Reality-Impairing Spectrum. The bifactor analysis was conducted using the Schmid and Leiman method (Schmid & Leiman, 1957).

Table 2
Interpretative Ranges and Suggested Qualitative Labels for SPECTRA *T* Scores for Scale and GPI Scores

Qualitative label	*T*-score range	Percentage of clinical cases within each *T*-score range			
		INT	EXT	RI	GPI
Extreme	≥90	9	5	2	1
Severe	70-89	23	9	5	12
Moderate	64-69	13	9	5	11
Mild	57-63	19	12	8	25
Average	46-56	28	45	59	43
Low	≤45	8	20	21	8

Note. T-score ranges are based on the American Academy of Clinical Neuropsychology (AACN) recommendations for uniform test score labeling. Percentages are derived from the percentage of clinical cases evaluated at an outpatient psychological assessment services center (*N* = 200) falling within each interpretative level. INT = Internalizing Spectrum. EXT = Externalizing Spectrum. RI = Reality-Impairing Spectrum. GPI = General Psychopathology Index.

As hierarchical models have evolved, structures existing between the spectrum and clinical symptom scale levels have been identified (Kotov et al., 2017). When the SPECTRA development data were analyzed using Goldberg's (2006) top-down approach, subspectra clusters were found for the EXT and RI spectra, but not the INT. Within the INT spectrum, the Fear and Distress clusters reported by Krueger (1999) and others (Krueger and Markon, 2006) did not emerge. However, other researchers have also failed to find these or any subspectra clusters within the Internalizing Spectrum (Kotov et al., 2011).

moderate through extreme ranges, are associated with greater psychiatric complexity, illness persistence, cognitive dysfunction, and impaired life functioning. Scores in the higher ranges also suggest increased risk for an atypical or suboptimal response to standard treatments (e.g., psychotherapy and pharmacotherapy). Finally, GPI scores falling within the severe and extreme ranges have been linked to disordered or impaired thinking (Caspi & Moffitt, 2018). This impaired thinking is not necessarily psychotic (e.g., hallucinations, delusions) but rather is marked by odd logic, indecision, rumination, intrusive thoughts or memories, and misattribution of causal relationships.

Next, the high-order spectra of Internalizing, Externalizing, and Reality-Impairing psychopathology should be reviewed. The scores on these dimensions help identify an individual's primary area of psychiatric difficulty. Like the GPI, spectra scores are also interpreted dimensionally.

Internalizing Spectrum (INT)

The INT Spectrum includes symptoms of many of the most common psychiatric disorders including: generalized anxiety, unipolar depression, panic disorder, phobic disorders, obsessional states, dysthymic disorder, posttraumatic stress, and somatoform conditioning. Clinical signs and symptoms common to these conditions are sadness, pessimism, misery, emotional instability, worry, distress, physical tension, fear, avoidance, and vigilance. The INT score is closely related to the normal personality trait of neuroticism or negative affectivity. High INT scores are associated with perceived cognitive difficulties or complaints, but not impaired performance on objective neurocognitive tests. More generally, the INT reflects emotional dysregulation, impaired control, regulation, and management of painful negative emotions. Many conditions that fall within the INT Spectrum respond to common treatments like antidepressant medication, especially selective serotonin reuptake inhibitors (SSRIs), as well as psychotherapy (e.g., cognitive–behavioral or dynamic therapy).

Externalizing Spectrum (EXT)

The EXT Spectrum includes symptoms common in disorders such as antisocial personality disorder, intermittent explosive disorder, impulsive control disorder, substance abuse disorders, and attention-deficit hyperactivity disorder. Clinical signs and symptoms common to these conditions are destructive aggression, boredom proneness, callousness, deceitfulness, risk taking, irresponsibility, limited self-control, distractibility, and delinquency/criminality. EXT scores show a strong positive association with the abnormal personality trait disinhibition and a negative association with the normal personality trait constraint. High EXT scores are associated with significant life impairment, including legal involvement, lower educational attainment, and limited occupational success. More generally, the EXT score reflects behavioral dysregulation and impaired self-control. Not surprisingly, many *DSM-5* personality disorders, including borderline, narcissistic, and histrionic personality disorders also load onto the EXT Spectrum. EXT Spectrum conditions are often treated with mood-stabilizing medications, external structure, and dialectical behavioral therapy (DBT).

Reality-Impairing Spectrum (RI)

The RI Spectrum includes disorders like schizophrenia, schizotypal personality disorder, paranoid disorders, mania, and psychotic depression. The clinical signs and symptoms common to these conditions are impaired reality contact, cognitive distortions, odd or inappropriate logic, racing thoughts, formal thought disorders, perceptual distortions, eccentricity, and unusual beliefs. High RI scores are also associated with limited self-awareness or insight and significant social/functional impairment. The RI score shows a meaningful negative association with neurocognitive measures of working memory and executive function. More generally, the RI captures impaired control and management of the thought process (e.g., perception, interpretation, reasoning, judgment, expression). RI Spectrum conditions are typically treated with antipsychotic medications, reduced life stress, and supportive problem-solving therapy.

When a single spectrum is prominent in a profile, it indicates a broad liability to symptoms, syndromes, and disorders associated with that dimension. For example, a single prominent elevation of the EXT would suggest the presence of a wide range of signs and symptoms associated with behavioral dysregulation, impaired self-control, and aggression. When multiple spectrum scales are elevated, it indicates a more complicated clinical presentation with a diverse range of symptoms, high complexity, and the likely need for a multifocal treatment approach. By focusing clinical interpretation (and assessment) at the spectrum level, the SPECTRA transforms troublesome comorbidity and disorder heterogeneity into valuable clinical information. Comorbidity is most likely to involve disorders within the same spectrum such as comorbid anxiety and depression (Krueger & Markon, 2006), so most comorbid conditions will contribute to the same spectrum-level score. Within disorder heterogeneity, disorders composed of differing combinations of *DSM* symptoms, are handled in the same manner, as all expressions of depression or antisocial behavior are integrated into the appropriate spectrum. Likewise, subclinical conditions, symptom counts falling below the diagnostic threshold but associated with meaningful

impairment (Hyman, 2011), contribute to spectrum-level scores, rather than being overlooked or discarded as unimportant. These features combine to make spectrum-level scores a more accurate reflection of the severity and nature of psychopathology than do traditional scale-level profiles or a list of *DSM* diagnoses.

Finally, reviewing the 12 clinical scales, again using a dimensional perspective, identifies the patient's current symptomatic presentation. The clinical scale profile provides important information regarding immediate primary treatment targets and potential *DSM* diagnoses. In addition, the clinical scale profile offers the most direct reflection of a patient's phenomenological experience of his or her psychiatric condition. This experience-near information is often easier to present to patients, treating clinicians, or family members when appropriate.

Supplemental Scales

The SPECTRA's Cognitive Concerns (COG) and Psychosocial Functioning (PF) scales provide valuable information regarding the patient's perceived functional capacity and quality of life. The COG scale represents the patient's perception of his or her cognitive functioning. Though the COG scale is not associated with impaired performance on objective neurocognitive measures, the subjective experience of cognitive dysfunction may negatively impact daily functioning through reduced willingness to undertake or persist at challenging life problems. In fact, it has been argued that self-reported cognitive complaints have greater ecological validity than objective neurocognitive tests (Barkley & Fisher, 2011). In addition, the COG scale can serve as a nonsymptom-based outcome measure as subjective cognitive functioning is expected to improve with successful treatment.

The PF scale assesses four basic components of psychosocial functioning: well-being, self-efficacy, social support, and access to basic life necessities (see Ro & Clark, 2009). Although the PF score provides the strongest measure of a patient's (perceived) life functioning, individual components can also be explored. The PF scale measures well-being (items 13 and 29), self-efficacy (items 77 and 90), social support (items 46 and 63), and environmental security (items 33 and 49). Reviewing these item clusters can help clinicians refine their evaluation of psychosocial functioning.

The third SPECTRA supplemental scale, Suicidal Ideation (SUI), measures important aspects of suicide risk including suicidal ideation, desire to die, and planning to die. Elevated risk for self-harm is a primary indicator for intensive psychiatric treatment including hospitalization. As such, identifying and quantifying suicide risk is an essential component of clinical assessment. Together these three supplemental scales enhance the SPECTRA's clinical utility by assessing important domains beyond psychopathology. The COG and PF scales offer a parsimonious assessment of current life functioning, while SUI quantifies and documents risk for self-harm.

Clinical Examples

Three cases will be presented to illustrate the SPECTRA's hierarchical interpretive approach and clinical utility. For these cases, the identifying information is fictional, but the referral questions and SPECTRA data are based on assessment cases seen at the author's psychological assessment service. SPECTRA scores will be presented using the SPECTRA Hierarchical Interpretation Worksheet (see Figure 2). This worksheet, which may be reproduced for interpretation and training purposes, assists in structuring SPECTRA scores using a hierarchical approach to interpretation. It allows clinicians to record *T* scores associated with each corresponding level of the measurement hierarchy.

Case Example 1: Joe

Joe is a 32-year-old single, college-educated man. Despite having an advanced degree, he could not progress beyond entry-level positions in his field. He has been in psychiatric treatment, "on and off," since college for attention-deficit hyperactivity disorder (ADHD) and generalized anxiety disorder (GAD). He had been seeing a psychiatrist and a psychotherapist to address recent life stressors (i.e., the end of a long-term, long-distance romantic relationship and a demotion at work) and high anxiety. About his anxiety, he said, "When I get anxious, my mind just freezes and I can't do anything." When asked how the evaluation might help, him he stated, "I need direction; I don't know what I want to do with my life."

Figure 3 provides the SPECTRA profile information for the case. Starting at the global or *p*-factor level, we see a GPI score of 65. This score falls within the moderate range, suggesting a significant degree of psychiatric burden and vulnerability, moreso than would be expected from a common anxiety disorder. Joe is likely to have had intermittent life-long psychological problems. His risk for relapse or the emergence of new symptom clusters is elevated. He likely has a moderate degree of functional impairment that has a chronic negative impact on his life accomplishments. Joe is likely to need continuous long-term mental health care to maintain stability and adequate functioning. In other words, the "on and off" approach to mental healthcare is not well suited to his underlying condition. Figure 3 shows a mean clinical elevation (MCE) of 58 for the SPECTRA

SPECTRA

Hierarchical Interpretation Worksheet

Level

I Supraspectrum

II Spectra

III Subspectra

IV Clinical symptom scales

General Psychopathology Index (GPI)

_____

Internalizing Spectrum (INT)

_____

Reality-Impairing Spectrum (RI)

_____

Externalizing Spectrum (EXT)

_____

Thought Disorder (TD)

_____

Mania

_____

Substance-Use Disorders (SUD)

_____

Disinhibited Antagonistic Behavior (DIS)

_____

| Depression (DEP) | Anxiety (ANX) | Social Anxiety (SOC) | Post-Traumatic Stress (PTS) | Psychosis (PSY) | Paranoid Ideation (PAR) | Manic Activation (MAN) | Grandiose Ideation (GRA) | Alcohol Problems (ALC) | Drug Problems (DRG) | Severe Aggression (AGG) | Antisocial (ANTI) |

T score _____   _____   _____   _____   _____   _____   _____   _____   _____   _____   _____   _____

Supplemental Scales

| Infrequency (INF) | Profile Classification Index (PCI) | Cognitive Concerns (COG) | Psychosocial Functioning (PF) | Suicidal Ideation (SUI) |

Protocol Classification _____ _____

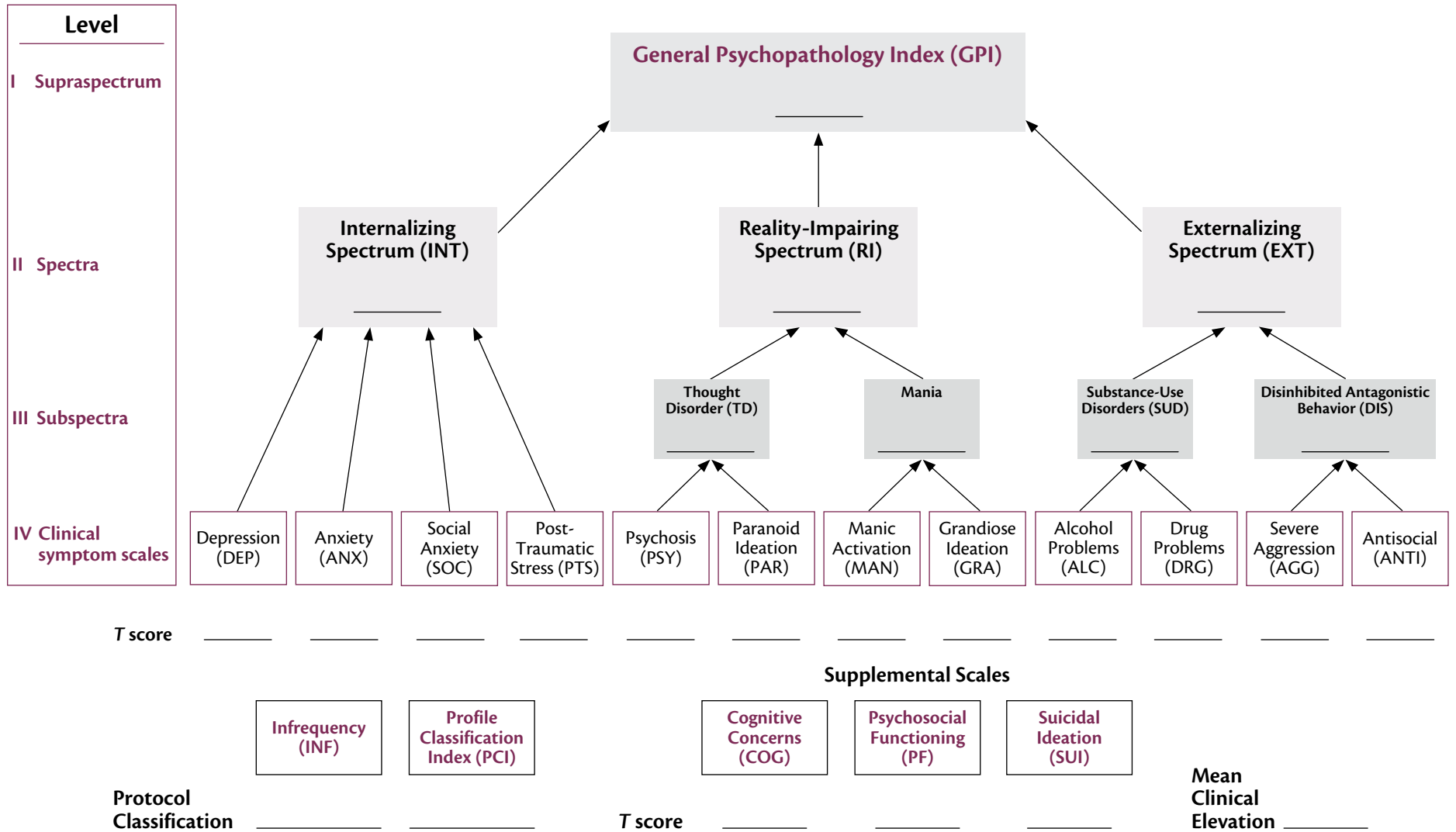*T* score _____   _____   _____

Mean Clinical Elevation _____

Figure 2. The SPECTRA Hierarchical Interpretation Worksheet. This worksheet may be reproduced for interpretation and training purposes.

SPECTRA

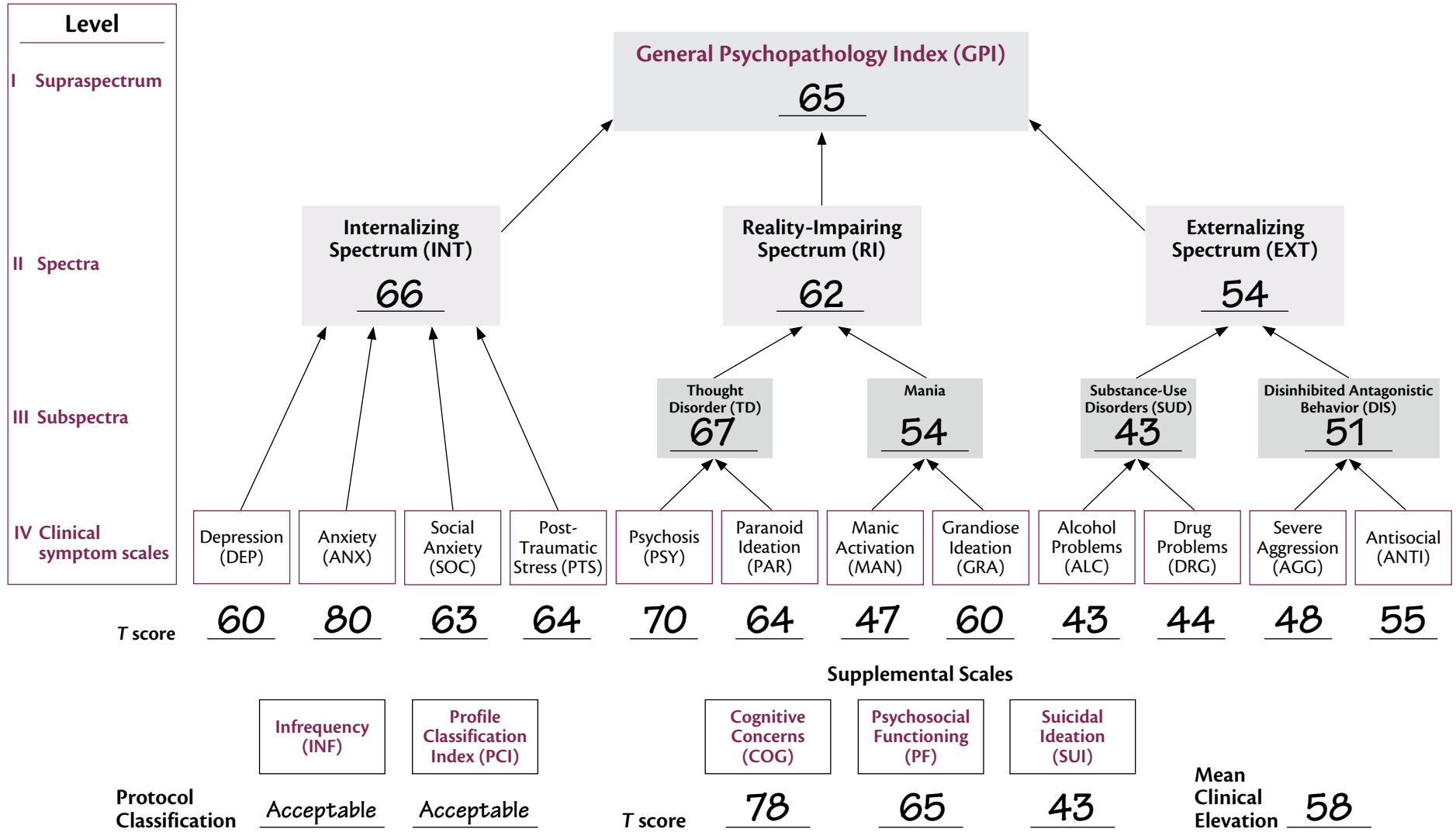## Hierarchical Interpretation Worksheet

Figure 3. A completed SPECTRA Hierarchical Interpretation Worksheet for Case Example 1: Joe.

clinical scales. The MCE score, calculated as the mean score for the 12 clinical scales, is 7 points lower than the GPI and falls within the mild range. Research suggests that MCE consistently underestimates the p factor relative to the GPI (Blais & Sinclair, 2016).

There are two elevations at the spectrum level—an INT score of 66 (moderate) and a RI score of 62 (mild). Multiple spectra-level elevations suggest increased symptom diversity and complexity, along with the likelihood of cross-spectrum comorbidity. Clinicians should be looking for disorders from separate dimensions, and that co-occur less commonly. At the subspectra and clinical scale levels, Joe's profile suggests a moderate thought disorder (PSY + PAR). The presence of a moderate degree of disordered thinking is the most surprising SPECTRA finding, but is consistent with the moderately elevated GPI and the suggestion of long-standing functional impairment.

At the clinical scale level, there is a severe elevation on ANX ($T = 80$), along with a moderate elevation on PTS ($T = 64$) and a mild elevation on SOC ($T = 63$). As such, we would expect symptoms of worry, physical tension, panic, and avoidant actions or behaviors to be prominent in his clinical presentation. However, there is also a severe elevation on PSY ($T = 70$), a moderate elevation on PAR ($T = 64$), and a mild elevation on GRA ($T = 60$). This suggests that reality-impairing symptoms like cognitive and perceptual dysregulation, unusual beliefs, and impaired or unusual logic are also present. Reviewing the supplemental scales shows severe subjective cognitive dysfunction (COG $T = 78$), but preserved psychosocial functioning (PF $T = 65$, higher scores indicate better psychosocial functioning). The discrepancy between the COG and PF scores may indicate limited self-awareness, which may mean Joe overestimates his personal ability, which is consistent with impaired thought quality. At present, suicidal ideation does not appear problematic (SUI $T = 43$, low).

Looking at the SPECTRA findings as a whole, the scores can be interpreted to show that Joe suffers from a long-standing complex psychiatric condition, marked by extreme emotional distress and a moderate degree of disordered thinking. The elevated p factor likely explains his lack of life direction and limited occupational achievement. His prior clinicians seem to overemphasize his emotional distress (i.e., anxiety) and underappreciate his level of reality impairment. In fact, his inattention is more likely a reflection of disordered thinking than ADHD. Diagnostically, his age makes this less likely to be emerging schizophrenia, but the findings would fit a diagnosis of schizotypal personality disorder or an attenuated psychotic syndrome (APS). However, the strength of the SPECTRA's dimensional assessment model is in identifying domains of

psychopathology to target for treatment rather than *DSM* diagnoses. Regardless of etiology, Joe needs intensive treatment targeting thought quality and emotional regulation, as well as problem-solving focused psychotherapy.

Case Example 2: Beth

Beth is a 19-year-old female who has been on a medical leave from college. She had recently started psychotherapy for depression and anxiety. The treating psychologist referred her for testing because he was unsure her diagnosis was correct. Beth graduated from boarding school a year early and enrolled in a top-ranked university. She began experiencing psychiatric problems during her second semester of college. She withdrew from school on a medical leave, but her condition continued to worsen. She spent two weeks in a partial hospitalization program during the summer after it was discovered she was engaging in nonsuicidal self-injurious behaviors. She planned to return to college in the fall.

Figure 4 presents Beth's SPECTRA Hierarchical Interpretation Worksheet. She has an elevated GPI score, with a T score (66) falling within the moderate range. Such a score suggests a significant degree of psychiatric burden and vulnerability, putting her at a higher risk for relapse or the emergence of new symptom clusters across her life span. Despite strong cognitive abilities, she is likely to suffer from psychological limitations that hamper her daily functioning. She is likely to benefit from ongoing intensive mental health treatment to stabilize and maximize her life functioning.

At the spectra level, there are elevations of the INT ($T = 77$, severe) and EXT ($T = 66$, moderate). These multiple spectra elevations suggest a high level of symptom diversity and clinical complexity, along with the likelihood of cross-spectra comorbidity. Clinicians will need to be alert for disorders arising from separate dimensions of psychopathology that are not commonly co-occurring. However, Beth's RI score (45) fell within the normal or average range, suggesting a conventional logical thought process.

Beth's subspectra profile provides interesting insights. Despite being elevated into the moderate range, the Externalizing subspectra clusters, SUD and DIS, fell within the mild to moderate range (T scores of 60 and 65, respectively). This suggests that Beth's high level of externalizing psychopathology does not organize neatly into specific disorders. As such, clinicians may have trouble identifying a primary focal target around which to organize her care. At the clinical scale level, there are severe or extreme elevations on scales across all spectra. She has an extreme elevation on DEP ($T = 96$), a severe elevation on ANX ($T = 72$), and moderate elevations on SOC ($T = 65$) and PTS

SPECTRA

Hierarchical Interpretation Worksheet

Figure 4. A completed SPECTRA Hierarchical Interpretation Worksheet for Case Example 2: Beth.

Level	
I Supraspectrum	General Psychopathology Index (GPI) — **66**
II Spectra	Internalizing Spectrum (INT) — **77**; Reality-Impairing Spectrum (RI) — **45**; Externalizing Spectrum (EXT) — **66**
III Subspectra	Thought Disorder (TD) — **42**; Mania — **56**; Substance-Use Disorders (SUD) — **60**; Disinhibited Antagonistic Behavior (DIS) — **62**
IV Clinical symptom scales	Depression (DEP); Anxiety (ANX); Social Anxiety (SOC); Post-Traumatic Stress (PTS); Psychosis (PSY); Paranoid Ideation (PAR); Manic Activation (MAN); Grandiose Ideation (GRA); Alcohol Problems (ALC); Drug Problems (DRG); Severe Aggression (AGG); Antisocial (ANTI)

T score: 96 | 72 | 65 | 66 | 42 | 42 | 77 | 35 | 58 | 62 | 49 | 80

Supplemental Scales

	Infrequency (INF)	Profile Classification Index (PCI)		Cognitive Concerns (COG)	Psychosocial Functioning (PF)	Suicidal Ideation (SUI)	
Protocol Classification	Acceptable	Acceptable	*T* score	80	45	65	Mean Clinical Elevation 62

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(*T* = 66). Symptoms of despair, depression, worry, physical tension, panic, and avoidant behavior are expected to be extremely prominent in the clinical presentation. However, there are also severe elevations on ANTI (*T* = 80) and MAN (*T* = 77). Despite representing different spectra, both clinical scales tap behavioral activation and dysregulation, along with impulsivity, disinhibition, and mental activation (i.e., racing thoughts). So, despite a logical thought process (PSY *T* = 42; PAR *T* = 42), Beth is likely to show impaired judgment and hasty reasoning. Finally, Beth's GRA *T* score of 35 signals a poor self-image and low self-esteem.

Beth's supplemental scales show severe subjective cognitive difficulty (COG *T* = 80) and mildly reduced psychosocial functioning (PF *T* = 45). Though perhaps not matching her actual real-world struggles, her PF score does shows some recognition of her functional difficulties. Her level of suicidal ideation falls within the moderate range (SUI *T* = 65); when combined with other features of her profile, this raises concerns about her safety and point to the need for ongoing monitoring.

Combining insights from spectra levels suggests the patient suffers from significant psychiatric illness. She is likely to experience a broad and complex range of psychiatric symptoms. Her presentation is marked by severe emotional dysregulation and distress accompanied by behavioral disorganization and dyscontrol. She is vulnerable to episodes of poor judgment and disorganized, poorly planned actions. Treatment should be intense, prioritizing mood elevation, stabilization, and behavioral control. Safety monitoring and risk assessment should be a central feature of her care. To translate these findings into a *DSM-5* diagnostic category, the best fit would likely be a mixed state bipolar illness—an agitated bipolar depression. Finally, it appears that family education and therapy may be important in helping Beth's parents understand the extent of her illness and its implications for her future functioning. The benefit of reducing her life stress, lowering expectations, and slowing her return to school should be discussed.

Case 3: Sarah

Sarah is a 21-year-old female, recently discharged from a psychiatric hospital. Post discharge, she went to stay with her parents, who reported that she quickly fell back into her depression, acting lethargic, sleeping 10 to 14 hours per day, not leaving her room, and eating infrequently. Sarah's parents became concerned and contacted the treating psychiatrist who referred the patient for an urgent psychological evaluation.

Figure 5 presents the SPECTRA findings for Sarah. Her GPI score (*T* = 73) is elevated, with a score falling within the severe range. Her GPI score is at approximately the 90th percentile of patients tested in the author's clinic. Such a score suggests a severe degree of psychiatric burden and vulnerability. Sarah is at a higher risk for relapse or the emergence of new disorders across her life span. A GPI within this range will almost certainly be associated with chronic functional impairment and persistent cognitive inefficiency. She is likely to require intensive multifaceted psychiatric treatment to stabilize her life functioning.

At the spectrum level, there is only a single elevation; her INT score (*T* = 98, extreme). Her EXT score (*T* = 54) falls in the average range, although her RI score was within the low range (*T* = 45). Having a single spectrum elevation suggests the patient's symptomatology is primarily contained within the internalizing dimension. Still, her extreme INT and GPI scores suggest she will experience a broad and complex range of internalizing symptoms. She is likely to meet criteria for multiple fear and distress disorders (comorbidity) and is at risk for developing new related disorders in the future. In fact, during the feedback session, her parents revealed that Sarah suffered from an eating disorder during high school and experienced school phobia in elementary school. Both conditions are consistent with a vulnerability to internalizing psychopathology.

Sarah's subspectra profile was unrevealing. The Externalizing subspectra clusters, SUD and DIS, fell within the low and average ranges (*T* scores of 43 and 53, respectively). This suggests that she is unlikely to become behaviorally dysregulated. Likewise, the Reality-Impairing subspectra clusters, TD and MAN, also fell within the average and low ranges (*T* scores of 49 and 45), respectively.

Her clinical scale profile reveals extreme elevations on three scales: DEP (*T* = 102), SOC (*T* = 94), and PTS (*T* = 90). Sarah's ANX score fell within the severe range (*T* = 84). Her scores mean she may experience intense, persistent, and perhaps unrelenting symptoms of despair, depression, worry, physical tension, panic, and avoidant behaviors. No other clinical scales exceeded the average range. It is quite unusual for such extreme levels of psychopathology to be localized to a single spectrum.

Her supplemental scales were concerning, showing an extreme level of subjective cognitive difficulty (COG *T* = 105), along with impaired psychosocial functioning (PF *T* = 40). She also reported an extreme degree of suicidal ideation (SUI *T* = 105). When the supplemental scales (e.g., cognitive confusion, poor life functioning, and extreme

SPECTRA

Hierarchical Interpretation Worksheet

Level		
I Supraspectrum		
II Spectra		
III Subspectra		
IV Clinical symptom scales		

General Psychopathology Index (GPI) — 73

Internalizing Spectrum (INT) — 98

Reality-Impairing Spectrum (RI) — 45

Externalizing Spectrum (EXT) — 54

Thought Disorder (TD) — 49

Mania — 45

Substance-Use Disorders (SUD) — 43

Disinhibited Antagonistic Behavior (DIS) — 53

Clinical symptom scales:
- Depression (DEP)
- Anxiety (ANX)
- Social Anxiety (SOC)
- Post-Traumatic Stress (PTS)
- Psychosis (PSY)
- Paranoid Ideation (PAR)
- Manic Activation (MAN)
- Grandiose Ideation (GRA)
- Alcohol Problems (ALC)
- Drug Problems (DRG)
- Severe Aggression (AGG)
- Antisocial (ANTI)

T score:

DEP	ANX	SOC	PTS	PSY	PAR	MAN	GRA	ALC	DRG	AGG	ANTI
102	84	94	90	55	42	42	48	42	45	48	58

Supplemental Scales

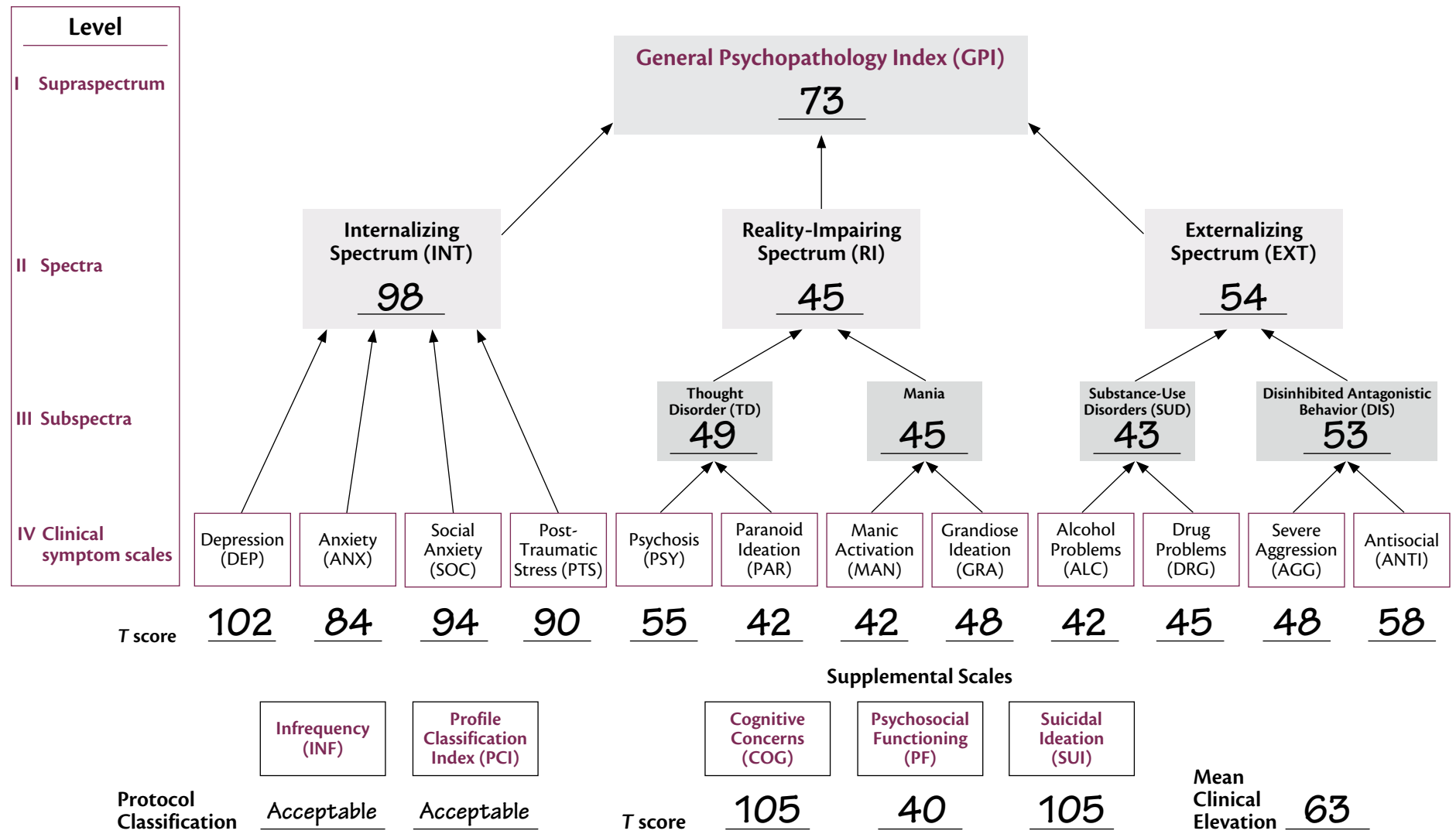|	Infrequency (INF)	Profile Classification Index (PCI)		Cognitive Concerns (COG)	Psychosocial Functioning (PF)	Suicidal Ideation (SUI)	Mean Clinical Elevation
Protocol Classification	Acceptable	Acceptable	*T* score	105	40	105	63

Figure 5. A completed SPECTRA Hierarchical Interpretation Worksheet for Case Example 3: Sarah.

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suicidal preoccupation) are combined with the clinical scales (e.g., high degree of despair, fear, and misery), immediate significant concern for her safety is warranted.

Combining the SPECTRA findings we see that Sarah remains extremely burdened and impaired by her psychiatric condition. Although her symptoms are confined to a single spectrum, they are intense, complex, and persistent. She is experiencing extreme emotional dysregulation leading to chronic fear, distress, and misery. Given the concerns raised for her safety and the disabling nature of her symptoms, a more intensive level of care appears necessary. The high GPI suggests her response to treatment may be slow, suboptimal, or atypical. If first-line agents and adjunctive treatment do not produce adequate results, more aggressive interventions like electroconvulsive therapy (ECT) may be an option. In addition, given the elevation of her GPI, a careful evaluation of her thought quality is necessary, as she is at risk for developing the rigid, slowed, concrete thought dysfunction associated with severe affective illness. Her SPECTRA profile indicates the need for continued intensive care and monitoring post-hospitalization to decrease the risk for a rapid relapse.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Barkley, R. A., & Fisher, M. (2011). Predicting impairment in major life activities and occupational functioning in hyperactive children and adults: Self-report of executive function (EF) deficits versus EF tests. *Developmental Neuropsychology*, *36*, 137-161.

Blais, M. A., & Sinclair, S. J. (2018). *SPECTRA: Indices of Psychopathology*. Lutz, FL: PAR.

Blais, M. A., & Sinclair, S. J. (2016). *Exploring the utility of the "p-factor" in psychological assessment*. Paper presented at the Annual Convention of the Society for Personality Assessment, March 2016, Chicago, IL.

Caspi, A., Houts, R. M., Belsky, D. W., Coldman-Mellor, S. J., Harrington, H., Israel, S., …Moffitt, T. E. (2014). The *p* factor: One general psychopathology factor in the structure of psychiatric disorders? *Clinical Psychological Science*, *2*, 118-137.

Caspi, A., & Moffitt, T. E. (2018). All for one and one for all: Mental disorders in one dimension. *American Journal of Psychiatry*, *175*, 831-844.

Cross-Disorder Group of the Psychiatric Genomics Consortium (2019). Genome wide meta-analysis identifies genomic relationships, novel loci, and pleiotropic mechanisms across eight psychiatric disorders. Under review. Retrieved from http://dx.doi.org/10.110/528117

Goldberg, L. R. (2006). Doing it all bass-ackwards: The development of hierarchical factor structures from the top down. *Journal of Research in Personality*, *40*, 347-358.

Hays, R. D., Bjorner, J. B., Revicki, D. A., Spritzer, K. L., & Cella, D. (2009). Development of physical and mental health summary scores from the patient-reported outcomes measurement information system (PROMIS) global items. *Quality of Life Research*, *18*, 873-880.

Hyman, S. E. (2010). The diagnosis of mental disorders: The problem of reification. *Annual Review of Clinical Psychology*, *6*, 155-179.

Hyman, S. E. (2011). Diagnosing the *DSM*: Diagnostic classification needs fundamental reform. *Cerebrum*, *6*, 1-10.

Kessler, R. C., Chiu, W. T., Demler, O., Merikangas, K. R., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM-IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 617-627.

Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., …Zimmerman, M. (2017). The hierarchical taxonomy of psychopathology (HiTOP): A dimensional alternative to traditional nosologies. *Journal of Abnormal Psychology*, *126*, 454-477

Kotov, R., Ruggero, C. J., Krueger, R. F., Watson, D., Yuan, Q., & Zimmerman, M. (2011). New dimensions in the quantitative classification of mental illness. *Archives of General Psychiatry*, *68*, 1003-1011.

Krueger, R. F. (1999). The structure of common mental disorders. *Archives of General Psychiatry*, *56*, 921-926.

Krueger, R. F., & Markon, K. E. (2006). Understanding psychopathology: Modeling behavior genetics, personality, and quantitative psychology to develop an empirically based model. *Current Directions in Psychological Science*, *15*, 113-117.

Lahey, B. B., Applegate, B., Hakes, J. K., Zald, D. H., Hariri, A. R., & Rathouz, P. J. (2012). Is there a general factor of prevalent psychopathology during adulthood? *Journal of Abnormal Psychology*, *121*, 971-977.

Lorenzo-Seva, U., & Ferrando, P. J. (2006). FACTOR: A computer program to fit the exploratory factor analysis model. *Behavior Research Methods, Instruments and Computers*, *38*, 88-91.

Martel, M. M., Pan, P. M., Hoffmann, M. S., Gadelha, A., do Rosario, M. C., Mari, J. J., …Salum, G. A. (2017). A general psychopathology factor (*p* factor) in children: structural model analysis and external validation through familial risk and childhood global executive function. *Journal of Abnormal Psychology*, *126*, 137-148.

McCrae, R. R., & Costa, P. T. (2010). *NEO Five-Factor Inventory–3*. Lutz, FL: PAR.

Morey, L. C. (1991). *Personality Assessment Inventory*. Lutz, FL: PAR.

Patalay, P., Fonagy, P., Deighton, J., Belsky, J., Vostanis, P., & Wolpert, M. (2015). A general psychopathology factor in early adolescence. *British Journal of Psychiatry*, *207*, 15-22.

Ro, E., and Clark, L. A. (2009). Psychosocial functioning in the context of diagnosis: Assessment and theoretical issues. *Psychological Assessment*, *21*, 313-324.

Schmid, J., and Leiman, J. M. (1957). The development of hierarchical factor solutions. *Psychometrika*, *22*, 53-61.

Spearman, C. (1904). "General intelligence," objectively determined and measured. *American Journal of Psychology*, *15*, 201-292.

Snyder, H. R., Young, J. F., & Hankin, B. L. (2017). Strong homotypic continuity in common psychopathology—Internalizing- and externalizing-specific factors overtime in adolescents. *Clinical Psychological Science*, *5*, 98-110.

Sullivan, J. L., Edgley, K., & Dehoux, E. (1990). A survey of multiple sclerosis: Part 1: Perceived cognitive problems and compensatory strategy use. *Canadian Journal of Rehabilitation*, *4*, 99-105.

World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*. Geneva, Switzerland: World Health Organization.

Wright, A. G. C., Krueger, R. F., Hobbs, M. J., Markon, K. E., Eaton, N. R., & Slade, T. (2013). The structure of psychopathology: Toward an expanded quantitative empirical model. *Journal of Abnormal Psychology*, *122*, 281-294.

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