Emotional Assessment System (*EAS-5*)
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There are three popular broad-range questionnaires designed to measure psychopathology. The oldest, now on its second edition, is the Minnesota Multiphasic Personality Inventory ([MMPI-2], Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989). Theodore Millon created the Millon Clinical Multiaxial Inventory to measure his own theory of personality. This instrument is currently in its fourth edition ([MCMI-IV], Millon, 2015). And there is the Personality Assessment Inventory ([PAI], Morey, 1991) developed on the basis of Leslie Morey's review of the literature. There was, however, no broad-range questionnaire specifically designed to measure the disorders of our present classification system, the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* ([DSM-5], American Psychiatric Association, 2013), or the *International Classification of Disorders* ([ICD-11], World Health Organization, 2018). The Emotional Assessment System (EAS-5) and its Spanish version, the Sistema Autodiagnóstico de Balance Emocional (SABE) were developed to fill that void.

The development of the EAS started when seven clinical psychologists (Robert Craig, Richard Greenblatt, Linda Laatsch, Gerald O'Keefe, Stephen Strack, Julian Stucko, and the present author) wrote over 1500 items based on the criteria of DSM-IV disorders (American Psychiatric Association, 2000). That pool was edited down to approximately 1000 items. A pilot study that included both psychiatric and community participants was used to reduce the item pool further by taking out items that were highly correlated. Other pilot studies examined the face validity of the items, the differential responding of the genders, and the differential responding of African Americans. These studies led to adjustments or replacements of items.

A second research version of the EAS containing 842 items was administered to 1048 community participants and 800 psychiatric patients. The plan to use adaptive testing methodology and keep all of these items failed due to the strong multidimensional nature of the DSM criteria. The performance of the EAS items was then evaluated using Item Response Theory (IRT). That evaluation made it possible to further reduce the pool to the 321 best items. With the publication of the DSM-5 the EAS items were reviewed and adjustments were made. Thirty-eight more items were created to measure attention deficit and neurocognitive concerns.

For a brief period of time the EAS-5 was administered using a four-point Likert scale (True, Mostly true, Mostly false, and False). A subsequent study showed the correlation of the raw scores between the True-False and the Likert scale versions to be .96, and showed the T-F administration to be quicker. Those findings led to setting back the questionnaire into that T-F format.

The item presentation of the EAS-5 proceeds in an orderly fashion, from one scale to the next. This *nested* presentation is different from the *scrambled* presentation that other psychiatric questionnaires have used. The advantage of the nested presentation is that it makes it easier for the testing to become a collaborative experience between the examiner and the examinee, since information is collected in a manner that is meaningful to the examinee. Another pilot study showed equivalence of the scores obtained through a nested and a scrambled presentation of the items.

EAS-5 was designed to be administered by computer. Each item is read to the examinee as it is presented on the screen. A pilot study showed equivalence of scores when the entire test was presented with either a man's or a woman's voice. The current version uses several different voices to cut down on habituation and boredom. The examinee can enter the response through the keyboard, by the click of a mouse, or by the touch of the screen for equipment that allow that mode of entry. The system is constantly checking on the meaningfulness of the answers being entered, and alerts the examiner the moment that it detects a possible problem. A paper-and-pencil version is available, and can be used as a last resort, but it is not the preferred method of administration.

Target Population and Audience. The EAS can be used by clinicians in the mental health fields to help with the diagnosis of people over the age of 14. It could be used in many settings including hospitals, clinics, jails and courts, or personnel selection centers. It could be useful in any situation that requires the assessment of emotional problems or emotionial stability.

Test Taking Aptitude. The EAS-5 has two tiers. Tier A has the Test Taking Aptitude or validity scales. These are the scales that evaluate the answers being entered to assure that the material being collected is meaningful. Table 1 shows the different measures that are taken. In contrast to other inventories, the examiner using EAS-5 by computer does not have to wait until the test is completed in order to learn that the material collected was not useful. Right from the beginning the EAS-5 is testing whether the individual has the capacity, the concentration, and the motivation to complete the inventory in a meaningful manner.

The methodology for creating most of the scales in Tier A is clear from Table 1. The Unusualness (Au) Scale was developed by grouping the items that were rarely endorsed. The Positive Image and Negative Image scales resulted from a simulated study in which participants were asked to feign, and complete the questionnaire in order to look their best, or to look their worse respectively.

Table 1. Tier A: Test taking aptitude scales.

CODE	MEASURE	DESCRIPTION
Ac	Comprehension	Contains the most difficult words of the inventory in order to make sure that the person is able to understand the language used. Being the first scale, it also serves to ensure that the person can use the equipment adequately. The test administration is interrupted if the level of understanding appears to be too low.
Aa	Alertness	Contains simple items with an obvious answer (e.g., "a penny is a coin") to check on the person's concentration. These items are distributed throughout the inventory, especially towards the end. Answering any of the items in the wrong direction stops the administration and requests that the attendant be called. The examiner can then assess what happened and whether or not the examinee is capable of answering the items in a meaningful manner.
Ad	Defensiveness	This scale is made up of common faults and misbehaviors that most people are willing to admit (e.g., getting angry occasionally) in order to evaluate the level of openness or guardedness with which the person is taking the inventory.

Ai	Inconsistency	A number of moderate severity items are repeated a second time to evaluate whether the person will be consistent with the answers.
Au	Unusualness	Contains items of high severity that statistically have been endorsed by very few people. This information can be an indication that the individual is attempting to portray himself or herself as dysfunctional.
At	Reaction Time	The system keeps track of the amount of time taken to answer each item, each scale, and the entire inventory.
Ap	Positive Impression	This measure is the proportion of the endorsed socially desirable items. If the endorsement is higher than usual the score suggests an attempt to place himself or herself in the best possible light.
An	Negative Impression	This measure is the proportion of the endorsed socially undesirable items. If elevated the score suggests an attempt to place him or herself in the worst possible light.

Pathological Groups. DSM-5 contains such a multitude of disorders that it would be impossible to include all of the disorders in a questionnaire. To create the EAS-5 the DSM-5 disorders were clustered into six different groups. Each of these groups contains scales to measure specific disorders. Those scales are included in Tier B. At the end of this tier are two scales designed to measure the level of functioning of the individual.

Table 2. Pathology groups of the DSM-5 with the scales of the EAS-5.

GROUP	CODE	SCALE
Personality Disorders	B1	Schizoid
	B2	Avoidant
	B3	Dependent
	B4	Histrionic
	B5	Narcissistic
	B6	Antisocial
	B7	Compulsive
	B8	Schizotypal
	B9	Borderline
Affective Disorders	B10	Anxiety
	B11	Anger
	B12	Depression
	B13	Mania
Pathological Defenses	B14	Somatization
	B15	Eating Disturbance
	B16	Substance Abuse
	B17	Paranoia
Psychic Disorganization	B18	Thought Disturbance

Stress	B19	Current Stress
	B20	Posttraumatic Stress
Cognitive Deficits	B21	Attention Deficit Complaints
	B22	Neurocognitive Complaints
Functional Level	B23	Severity (sum of B1 through 20)
	B24	Impairment

Community Norms. The normative data was collected in the Chicago Metropolitan Area. The Hispanic individuals included in the Community Norms took the English version of the inventory. The community sample consisted of 1820 participants (1171 women, 649 men). Figure 1 shows the ethnic data. Table 3 shows the age and education of the sample.

Figure 1. Ethnic data of the community sample.
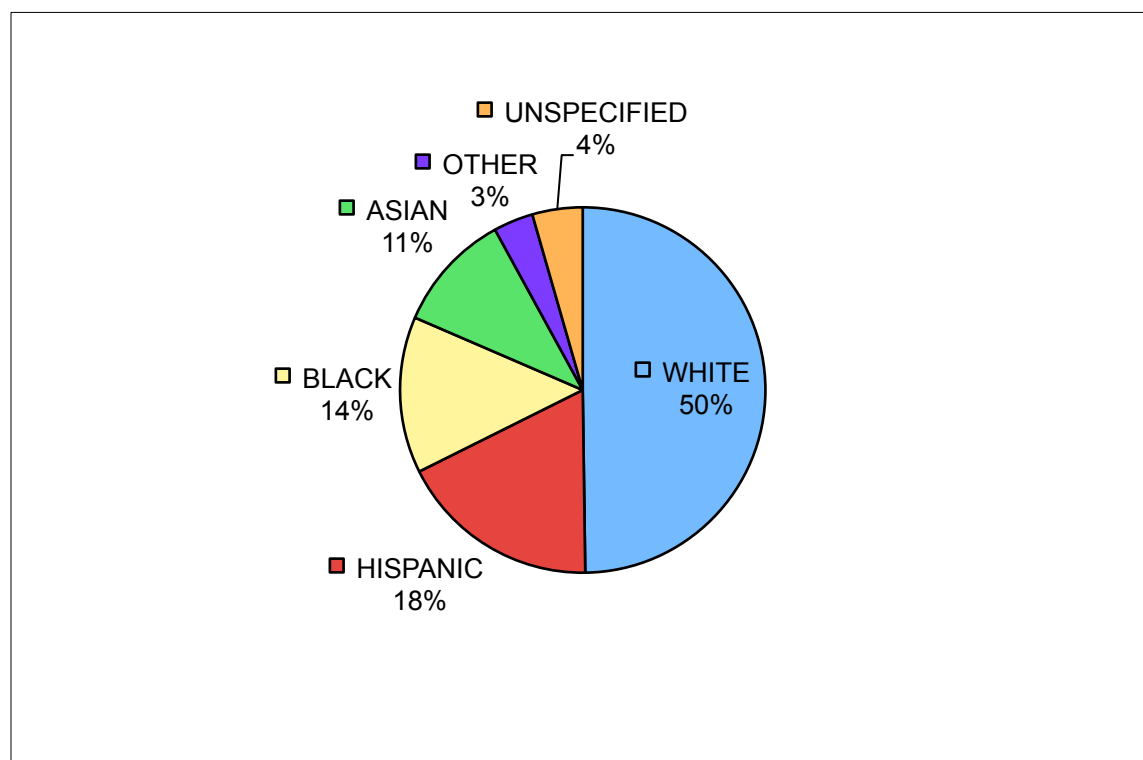
Table 3. Age and years of education of the normative community sample.

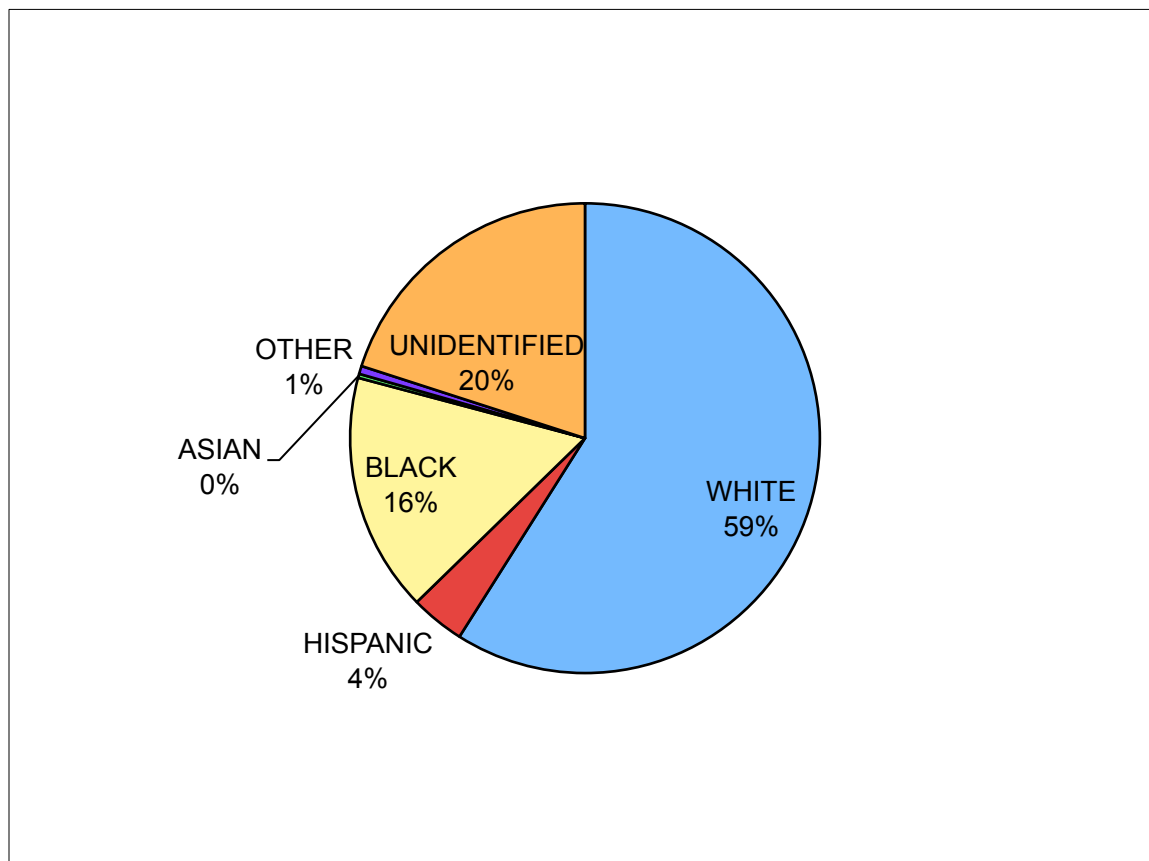| AGE		EDUCATION	
MEAN	S.D.	MEAN	S.D.
29.55	13.44	14.74	3.11

Psychiatric Norms. The psychiatric sample consisted of 724 individuals (356 women and 368 men). The sample included both inpatients and outpatients who were referred for a psychological evaluation.

As part of a study dealing with another instrument, portions of the psychological reports that had been written for our data bank were de-identified and reviewed by an advanced graduate clinical psychology student. The goal was to obtain independent psychiatric diagnoses for a randomly selected sub-sample of 200 examinees. The random sub-sample was assembled through a blind selection of names. The portions of the reports reviewed consisted of the presenting complaints, psychosocial stressors, psychiatric history, medical history, social history, educational history, occupational history, and the mental status examination. These data were used, without access to test data or the evaluation of the original clinician, to determine the range of psychiatric disorders in the data bank. Table 4 shows the psychiatric diagnoses that resulted from this procedure. There are more diagnoses than patients in the sample because some patients were given more than one diagnosis. As can be seen, there was a good range of diagnoses, but 40% of our psychiatric sample suffered from mood disorders (mostly depressions), and 17% had anxiety disorders. That distribution of disorders is probably typical of private practice settings. Clinicians using the EAS-5 in other settings should be aware that our psychiatric norms may not be a good fit for their population. Figure 2 shows the ethnic data for the psychiatric norms. Table 5 shows the age and education of the sample.

Table 4. Psychiatric Diagnoses of a random sub-sample of 200 cases. The fact that there are more diagnoses than cases was due to individuals meeting criteria for more than one diagnosis.

| DIAGNOSTIC GROUP	FREQUENCY	PERCENTAGE
Adjustment Disorders	2	.6
Anxiety Disorders	62	17.2
Attention-Deficit Disorders	9	2.5
Delirium, Dementia, Cognitive Disorders	8	2.2
Eating Disorders	8	2.2
Impulse Control Disorders	8	2.2
Mood Disorders	144	39.9
Psychotic Disorders	37	10.2
Somatoform Disorders	3	.8
Substance Related Disorders	79	21.6
Diagnosis unclear	1	.3

Figure 2. Ethnic data for the psychiatric sample.

Table 5. Age and years of education of the psychiatric sample. (The years of education was not available for 144 of the participants).

AGE		EDUCATION	
MEAN	S.D.	MEAN	S.D.
35.41	18.13	12.37	2.80

Gender Differences. EAS psychiatric protocols of 406 men and 436 women were examined in order to ensure that the inventory was not unduly elevating one of the scales because of the person's gender. Gender differences were expected for some of the scales since it is well known that some disorders are more prevalent with one gender than with the other. Figure 3 shows the results of this work. As expected, men tended to elevate the Narcissistic, Antisocial, and Substance Abuse scales more than women. The finding that men suffering from emotional problems tended to see themselves as more dysfunctional could be attributed to the expectation in our culture that men would be the bread winners in the family. Consistent with the prevalence of eating disorders, women elevated the Eating Disorder Scale more than the men. The factor analytical structure of the test was the same for both genders.

Figure 3. Gender differences across the scales of the EAS.
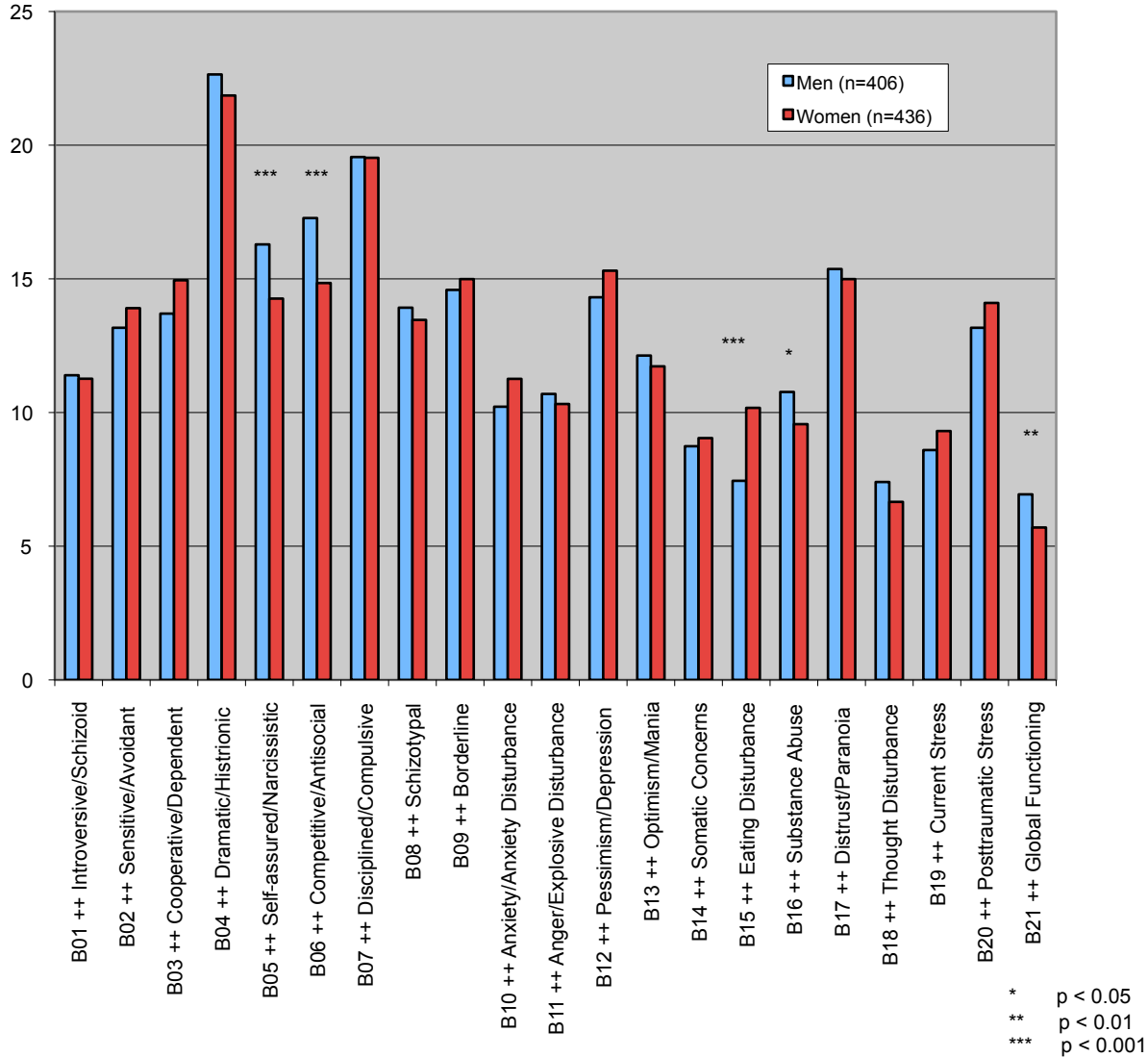
Validation. Figure 4 shows the Tier A (Testing Taking Aptitude) raw scores of the Community sample, the Psychiatric sample and the sample for the Spanish language Sistema Autodiagnóstico de Balance Emocional (SABE). Differences were found in the Positive Image Scale, the Negative Image Scale and the number of unusual items endorsed. These differences were in the expected directions.

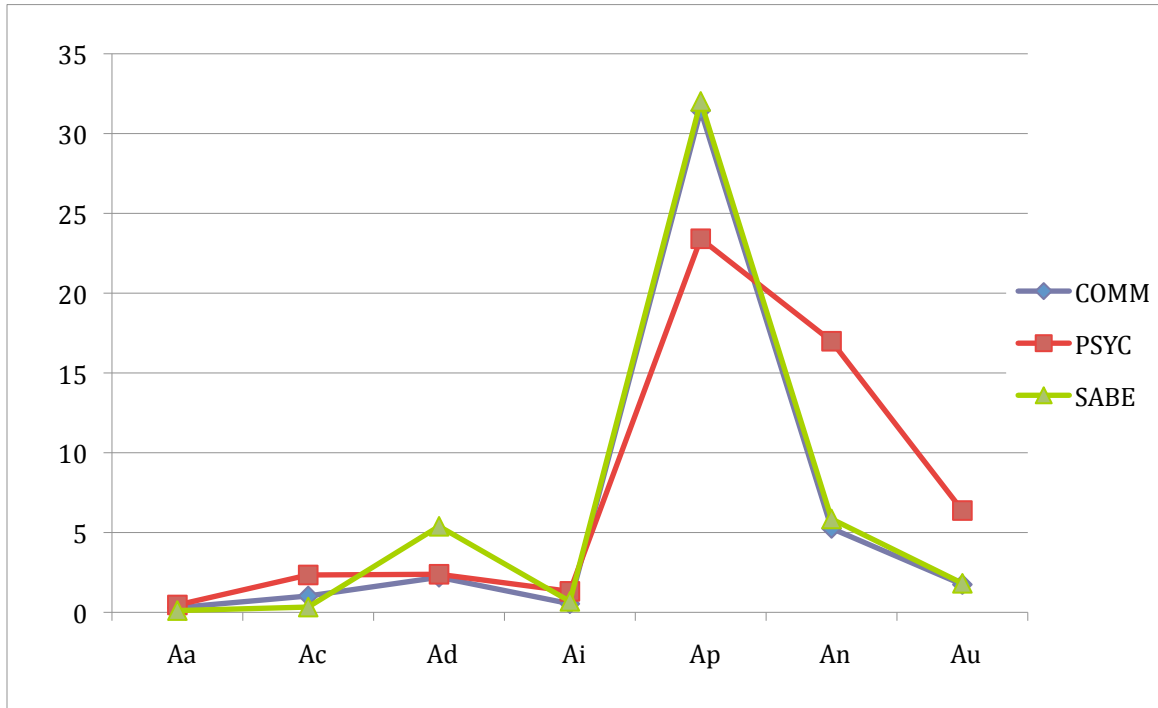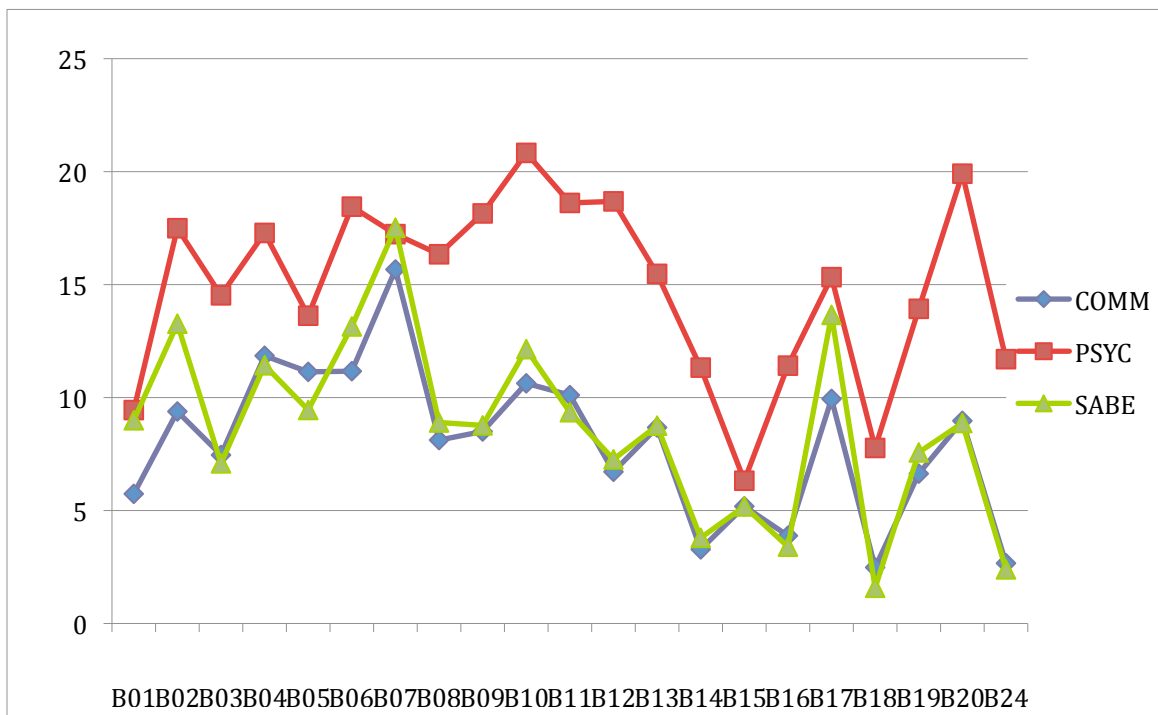**Figure 4. Tier A raw scores for the three normative samples.**

Figure 5 shows the Tier B clinical raw scores for the three normative samples. As expected, the psychiatric raw scores were higher than the community raw scores in all cases.

Figure 5. Tier B clinical raw scores for the three normative samples.

Internal Consistency. Table 6 shows the internal consistency of the different scales. The great majority of those values are in the excellent range.

Table 6. Internal consistency values.

CODE	SCALE	Standardized alpha
Ac	Comprehension	.92
Ad	Defensiveness	.69
Ai	Inconsistency	.60
Ae	Extremeness	.60
Ap	Positive Image	.84
An	Negative Image	.92
B1	Schizoid	.85
B2	Avoidant	.92
B3	Dependent	.91
B4	Histrionic	.85
B5	Narcissistic	.87
B6	Antisocial	.88
B7	Compulsive	.76
B8	Schizotypal	.91
B9	Borderline	.92
B10	Anxiety	.93
B11	Anger	.90
B12	Depression	.95
B13	Mania	.87
B14	Somatization	.91
B15	Eating Disturbance	.87
B16	Substance Abuse	.94
B17	Paranoia	.91
B18	Thought Disturbance	.89
B19	Current Stress	.87
B20	Posttraumatic Stress	.92
B21	Attention Deficit Complaints	Not available
B22	Neurocognitive Complaints	Not available
B23	Severity	-
B24	Impairment	.91
	Overall Mean	.87
	Mean of Clinical Scales	.89

Temporal Stability. The test-retest reliability values obtained from 47 participants are shown on Table 7. The two administrations were done a week apart. The low score of the Alertness Scale

was due to individuals not repeating the same inattentive mistake on both times the test was administered. All of the values of the Tier B clinical scales were in the excellent range.

Table 7. Temporal stability of the EAS.

CODE	SCALE	Standardized alpha
Ac	Comprehension	.89
Aa	Alertness	.21
Ad	Defensiveness	.76
Ai	Inconsistency	.75
Ae	Extremeness	.74
Ap	Positive Image	.96
An	Negative Image	.95
B1	Schizoid	.96
B2	Avoidant	.96
B3	Dependent	.94
B4	Histrionic	.96
B5	Narcissistic	.95
B6	Antisocial	.95
B7	Compulsive	.90
B8	Schizotypal	.92
B9	Borderline	.94
B10	Anxiety	.92
B11	Anger	.94
B12	Depression	.96
B13	Mania	.83
B14	Somatization	.86
B15	Eating Disturbance	.90
B16	Substance Abuse	.92
B17	Paranoia	.96
B18	Thought Disturbance	.86
B19	Current Stress	.97
B20	Posttraumatic Stress	.96
B21	Attention Deficit Complaints	Not available
B22	Neurocognitive Complaints	Not available
B23	Severity	-
B24	Impairment	.90
	Overall Mean	.88
	Mean of Clinical Scales	.93

Factor Analytic Structure. The circular structure of the personality scales of the EAS is shown on Figure 6. The EAS in its entirety appears to have three major factors in addition to the psychopathology factor that is typically found with similar inventories. These factors were labeled as Emotive versus Restrained, Introverted versus Extroverted, and Dominant versus Submissive.

Figure 6. Circular structure of the personality scales of the EAS.
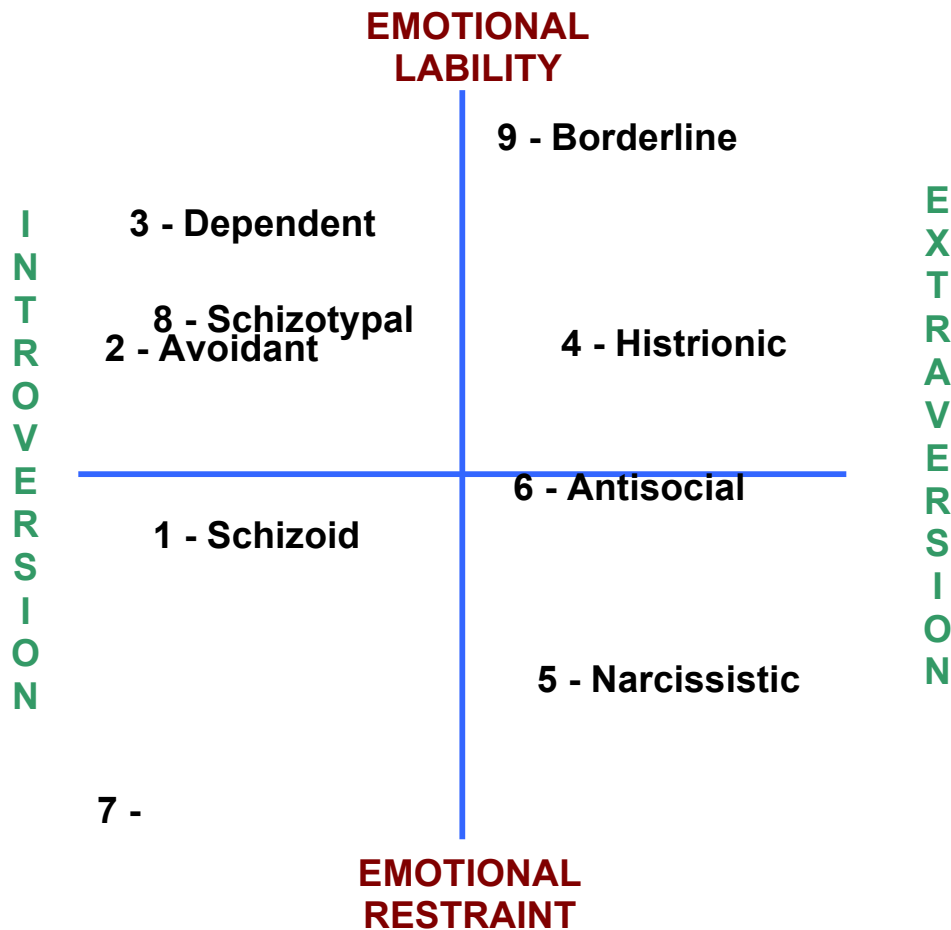
Convergent Validity. The EAS was administered to individuals who also took one of the other broad-range psychiatric inventories using a counterbalanced design. The results of those studies are shown on tables 8 through 11. The goal of convergent validity studies is to show similarity between instruments that are expected to measure related concepts. A very high correlation (.90 or above) is not desirable; such correlation would indicate that the two instruments are the same and, in that case, there would not be a need for one of the two instruments. When two scales do not correlate it is impossible to determine which of the two scales is not measuring the construct in an adequate manner.

Thus, in the few occasions when the EAS-5 scale did not correlate significantly with the relevant scale of the other instrument, it was impossible to tell which of the two scales was "deficient". It could be argued that, since the EAS-5 was taken out of the DSM-5, and shown to have face validity with the DSM criteria, the other scale is not an accurate reflection of the DSM-5 disorder. However, such claim would have to be supported in other ways.

There appeared to be a general tendency for the newer questionnaires to show higher correlations with the EAS-5 scales than the MMPI-2. That apparent tendency suggested that the newer inventories were more in tune with the contemporary description of the constructs.

Table 8. Correlations of the EAS with the relevant scales of the second edition of the Minnesota Multiphasic Personality Inventory (MMPI-2). For this study 73 individuals were administered both instruments. Asterisks denote significance at the .01 level. As can be seen, the only scales that did not correlate significantly were the EAS-5 Antisocial and the MMPI-2 Psychopathic Deviate.

EAS SCALE	MMPI-2 SCALE	CORRELATION
B06. Antisocial	Psychopathic Deviate	.21
B08. Schizotypal	Schizophrenia	.44*
B10. Anxiety	Psychasthenia	.48*
B12. Depression	Depression	.63*
B13. Mania	Mania	.49*
B14. Somatization	Hypochondriasis	.28*
B17. Paranoia	Paranoia	.28*
B18. Thought Disturbance	Schizophrenia	.55*

Table 9. Correlations of the EAS with the relevant scales of the third edition of the Millon Clinical Multiaxial Inventory (MCMI-III). For this study 69 psychiatric patients and 47 community participants were administered both instruments. With the exception of the Histrionic, Narcissistic, and Compulsive scales, the EAS correlated well with the personality scales of the MCMI-III. The only clinical syndrome scales that did not correlate significantly with the MCMI-III were the Substance Abuse and Alcohol Dependence. Asterisks denote significance at the .01 level.

EAS SCALE	MCMI-III SCALE	CORRELATION
B01. Schizoid	1. Schizoid	.65*
B02. Avoidant	2A. Avoidant	.68*
B03. Dependent	3. Dependent	.73*
B04. Histrionic	4. Histrionic	-.20
B05. Narcissistic	5. Narcissistic	.28
B06. Antisocial	6A. Antisocial	.65*
B07. Compulsive	7. Compulsive	.11
B08. Schizotypal	S. Schizotypal	.62*
B09. Borderline	C. Borderline	.75*
B10. Anxiety	A. Anxiety	.66*
B11. Anger	6B. Aggressive	.68*
B11. Anger	6B. Negativistic	.68*
B12. Depression	2B. Depressive	.64*
B12. Depression	8B. Self-defeating	.60*
B12. Depression	D. Dysthymia	.77*
B12. Depression	CC. Major Depression	.82*
B13. Mania	N. Bipolar/Manic	.59*
B14. Somatization	H. Somatoform	.58*
B16. Substance Abuse	T. Drug Dependence	.61*
B16. Substance Abuse	D. Alcohol Dependence	.30
B17. Paranoia	P. Paranoid	.80*
B17. Paranoia	PP. Delusional Disorder	.71*
B18. Thought Disturbance	SS. Thought Disorder	.44*
B20. Posttraumatic Stress	R. PTSD	.77*

Table 10. Correlations of relevant EAS scales and scales of the Personality Assessment Inventory (PAI). The data came from 50 participants who took both questionnaires in a counterbalanced manner. Asterisks denote significance at the .01 level. The scales that did not correlate were the Extremeness-Infrequency and the Somatization-Somatic Complaint scales.

EAS SCALE	PAI SCALE	CORRELATION
Ae. Extremeness	Infrequency	.04
Ap. Positive Image	Positive Impression Management	.64*
An. Negative Image	Negative Impression Management	.70*
B06. Antisocial	Antisocial	.67*
B09. Borderline	Borderline	.66*
B09. Borderline	Suicidal Ideation	.43*
B10. Anxiety	Anxiety	.58*
B10. Anxiety	Anxiety Related Disorders	.43*
B11. Anger	Aggression	.81*
B12. Depression	Depression	.71*
B12. Depression	Suicidal Ideation	.42*
B13. Mania	Mania	.56*
B14. Somatization	Somatic Complaints	.38
B16. Substance Abuse	Alcohol Problems	.70*
B16. Substance Abuse	Drug Problems	.72*
B17. Paranoia	Paranoia	.82*
B18. Thought Disturbance	Schizophrenia	.57*

Table 11. Correlations of relevant EAS scales and scales of the Millon Adolescent Clinical Inventory (MACI). The data come from the evaluation of 99 adolescents (78 males and 21 females) at a juvenile detention center. As was true with the MCMI-III, the Histrionic and Narcissistic personality scales did not correlate significantly. In the case of the MACI, however, the Dependent-Submissive scales also did not correlate. In the case of the MACI, the clinical syndrome scale that did not correlate significantly with the EAS was Anxiety.

EAS SCALES	MACI SCALES	Pearson r
B01. Schizoid	1. Introversive	.62*
B02. Avoidant	2A. Inhibited	.55*
B03. Dependent	3. Submissive	.04
B03. Dependent	8B. Self-Demeaning	.32*
B04. Histrionic	4. Dramatizing	.00
B05. Narcissistic	5. Egotistic	.12
B06. Antisocial	6A. Unruly	.68*
B06. Antisocial	CC. Delinquent Predisposition	.53*
B07. Compulsive	7. Conforming	.46*
B09. Borderline	9. Borderline Tendency	.70*
B09. Borderline	GG. Suicidal Tendency	.74*
B10. Anxiety	EE. Anxious Feelings	-.04
B11. Anger	6B. Forceful	.51*
B11. Anger	8A. Oppositional	.28*
B12. Depression	2B. Doleful	.54*
B12. Depression	FF. Depressive Affect	.59*
B12. Depression	GG. Suicidal Tendency	.76*
B15. Eating Disorder	AA. Eating Dysfunctions	.59*
B16. Substance Abuse	BB. Substance Abuse Proneness	.73*

The EAS-5, just like our classification systems, are works in progress. The samples used for EAS-5 norms were "convenience" samples, all collected from the US Midwest Region, and not necessarily following the US census. Even with the commercial instruments that were able to follow the census, the clinician has to decide whether the normative sample is a good enough fit for the individual being examined. The EAS-5 is no exception. Clinicians have to decide whether the normative samples we have available are good enough, and whether the results of the instrument can add value to their diagnostic work. The convergent validity data shown suggested that the EAS-5 performs as well as the other broad-spectrum inventories. The advantage of the EAS-5 is that it is designed to measure our current nosology. Clinicians interested in helping with this project should contact the author.

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