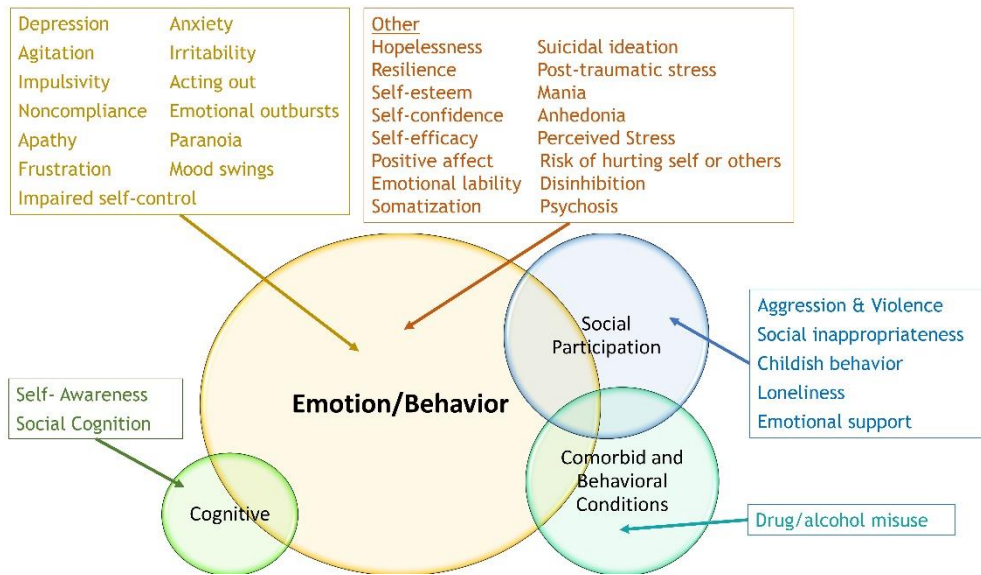


## NINDS/NICHD-NCMRR NeuroRehab CDE Project Emotion Behavior Neuropsychology Subgroup Summary

The Emotion, Behavior, and Neuropsychology subgroup used a combination of the Diagnostic and Statistical Manual of Mental Disorders (DSM) definition of emotional and behavioral symptoms and expert opinion from our subgroup members to define emotional and behavioral symptoms and conditions to be included in our review of measures. Per the DSM, the American Psychiatric Association (APA), defines emotional and behavioral symptoms as including depression, anxiety, agitation, irritability, impulsivity, aggression and violence, acting out, noncompliance, social inappropriateness, emotional outbursts, childish behavior, impaired self-control and self-awareness, drug/alcohol misuse, apathy, paranoia, confusion, frustration, sleep problems, and mood swings. Several concepts outlined by APA (i.e., sleep problems, confusion) were covered by other subgroups. Our subgroup members also added the following domains, to cover additional behavioral symptoms, diagnoses, and positive emotional constructs: emotional lability, disinhibition, hopelessness, resilience, self-esteem, self-confidence, self-efficacy, positive affect, suicide risk, loneliness, somatization, psychosis, post-traumatic stress, mania, risk for hurting self or others, and impaired self-awareness.

The figure to the right represents the domains covered by our subgroup. Of note, some symptoms overlapped with other subgroups (the figure does not represent how those other subgroups may or may not overlap with each other).



**Summary of Recommendations**

The instruments in Table 1, organized by symptoms/conditions of interest, are **Supplemental – Highly Recommended**

**Table 1. Emotion, Behavior, and Neuropsychology: Supplemental – Highly Recommended**

Emotion Behavior Neuropsychology Subdomains: Behavioral Function; Emotional and Cognitive Status; Emotional Impairment; Emotional Status; Emotional/Behavioral; Mood/Anxiety; Psychiatric and Psychological Functions; Psychiatric and Psychological Status; Psychological Other; Psychological Status	Symptoms/Conditions/ Constructs of Interest	Instrument(s) include self-report measures and structured clinical interviews (some instruments appear under more than one Symptom/Condition/Construct of Interest)
<b>Mood/Anxiety</b>	Depression Anxiety	Hospital Anxiety and Depression Scale (HADS) Patient Health Questionnaire - 9 (PHQ-9) Depression Scale Generalized Anxiety Disorder (GAD-7)
<b>Emotional Impairment</b>	Apathy Anxiety Depression	Apathy Evaluation Scale Beck Anxiety Inventory (BAI) Beck Depression Inventory II (BDI-II)
<b>Psychological Status</b>	Depression Anxiety	Center for Epidemiologic Studies-Depression Scale (CES-D) Hamilton Anxiety Rating Scale (HAM-A) Hamilton Depression Rating Scale (HDRS)
<b>Emotional/Behavioral</b>	Irritability Loneliness Impulsivity Emotional Outbursts Self-Efficacy Positive Affect Aggression/Violence/Anger Anxiety Depression	NIH Toolbox - Emotional Battery (Full battery) PROMIS Item Bank v1.0 – Emotional Distress - Anxiety PROMIS Item Bank v1.0 – Emotional Distress – Depression (Calibrated items)

<b>Emotion Behavior Neuropsychology Subdomains: Behavioral Function; Emotional and Cognitive Status; Emotional Impairment; Emotional Status; Emotional/Behavioral; Mood/Anxiety; Psychiatric and Psychological Functions; Psychiatric and Psychological Status; Psychological Other; Psychological Status</b>	<b>Symptoms/Conditions/ Constructs of Interest</b>	<b>Instrument(s) include self-report measures and structured clinical interviews (some instruments appear under more than one Symptom/Condition/Construct of Interest)</b>
<b>Emotional and Cognitive Status</b>	Self-efficacy	PROMIS Item Bank v1.0 – Self-Efficacy for Managing Emotions
<b>Behavioral Function</b>	Irritability Impulsivity Apathy Aggression/Violence/Anger Disinhibition/Acting Out Apathy Impaired Self-Control Alcohol Abuse	Frontal Behavioral Inventory (FBI) Frontal Systems Behavioral Scale (FrSBe) Alcohol Use Disorders Identification Test: Self-Report Version (AUDIT)
<b>Psychiatric and Psychological Status</b>	Alcohol Misuse Drug Misuse Post-traumatic stress (PTSD) Psychosis Mania (Bipolar) Anxiety Depression	Structured Clinical Interview for DSM-5 Axis I Disorders Research Version (SCID-5-RV) Alcohol, Smoking, and Substance Use Involvement Screening Test (ASSIST) PTSD Checklist for DSM 5 (PCL-5)
<b>Psychiatric and Psychological Functions</b>	Suicide Risk Apathy PTSD	Columbia - Suicide Severity Rating Scale (C-SSRS) Impact of Event Scale (IES) Apathy Scale (AS)

Measures selected to assess change in emotional and behavioral functioning over time would be different across intervention, natural course/history, and disease progression studies.

This subgroup’s focus was solely on adult emotional and behavioral functioning.

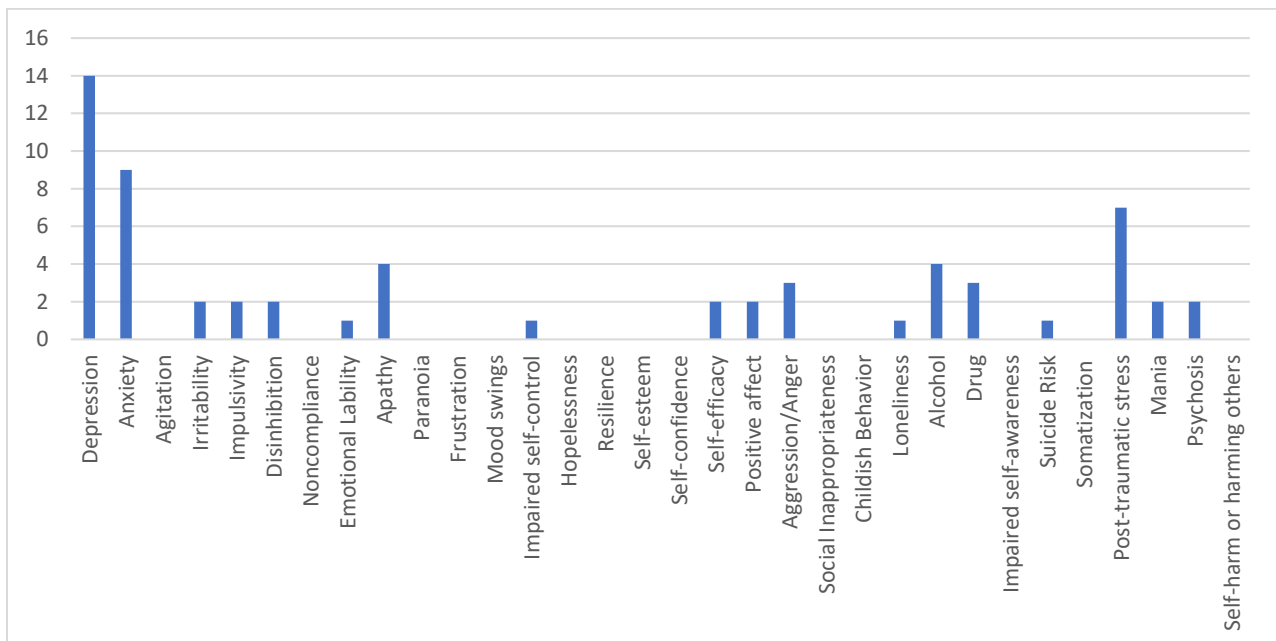
There are no formal neurorehabilitation standards established to which the CDEs can be compared.

Patient orientation and cognition should be considered prior to measure administration. In cases where patients’ orientation or cognition would be expected to interfere with administration, proxy administration should be considered, when appropriate (based on the properties of the measure).

**Gap Areas**

The gap areas recognized in this initial NeuroRehab CDE project (i.e., need for potential new instruments) will provide a framework for identifying a continuum of CDE development activities needing to be addressed in upcoming annual reviews. Of all the domains identified by our subgroup, Depression, Anxiety, Apathy, Alcohol/Drug misuse, and Post-traumatic stress (PTSD) had the largest number of well-validated measures from which to choose. However, highly recommended supplemental measures were available to also measure irritability, impulsivity, disinhibition, emotional lability, impaired self-control, self-efficacy, positive affect, anger/aggression, loneliness, mania, psychosis, and suicide risk. See the figure below for a summary of domains covered by the Supplemental – Highly Recommended measures noted above.

Notable gap areas (i.e., domains not covered by any recommended measures) were: agitation, noncompliance, paranoia, frustration, mood swings, hopelessness, resilience, self-esteem, self-confidence, social inappropriateness, childish behavior, impaired self-awareness, somatization, and self-harm or risk of harming others. Our subgroup further recommends that some of the Supplemental – Highly Recommended instruments be updated to reflect further validation.



The following measures were recommended by the Emotion, Behavior, and Neuropsychology subgroup as potential measures for future inclusion as CDEs:

- Behavioral Rating Inventory of Executive Function (Brief-SR) – self reported for adults: self-control (emotional control)
- Behavioral Assessment Screening Tool (BAST): substance abuse, negative affect, social executive function, impulsivity
- Beck Hopelessness Scale (BHS): hopelessness
- Personality Assessment Inventory (PAI): personality, emotional regulation, behavioral regulation, and underlying mood and anxiety disorders
- The Brief Symptom Inventory (BSI): somatization
- Symptom Catastrophizing Scale (Moore 2018): catastrophizing