

## Self-report Measures of Anhedonia and Approach Motivation Weakly Correspond to Anhedonia and Depression Assessed via Clinical Interviews

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### Abstract:

Self-report scales are popular tools for measuring anhedonic experiences and motivational deficits, but how well do they reflect clinically significant anhedonia? Seventy-eight adults participated in face-to-face structured diagnostic interviews: 22 showed clinically significant anhedonia, and 18 met criteria for depression. Analyses of effect sizes comparing the anhedonia and depression groups to their respective controls found large effects, as expected, for measures of depressive symptoms, but surprisingly weak effect sizes (all less than  $d = 0.50$ ) for measures of general, social, or physical anhedonia, behavioral activation, and anticipatory and consummatory pleasure. Measures of Neuroticism and Extraversion distinguished the anhedonic and depressed groups from the controls at least as well as measures of anhedonia and motivation. Taken together, the findings suggest that caution is necessary when extending self-report findings to populations with clinically significant symptoms.

**Keywords:** Anhedonia | Depression | Motivation | Reward seeking | Individual differences

### Article:

#### 1. Introduction

Major depressive disorder is characterized in part by anhedonia: diminished appetitive motivation and reduced capacity to experience pleasure. Anhedonia is present in other psychological disorders, such as schizophrenia (Shankman et al., 2014), although important differences have been noted (Lambert et al., 2018). To assess anhedonia, clinical research uses clinician-rated items on structured interviews or anhedonia-related items extracted from depressive symptom scales. More commonly, individual-differences research uses self-reported tendencies to seek and experience rewards. Popular examples are measures of approach-oriented motivation, such as the behavioral activation system (Carver & White, 1994) and promotion focus (Lockwood et al., 2002), and measures of diminished pleasure in general (Snaith et al., 1995) or in physical or social domains (Chapman et al., 1976; Gooding & Pflum, 2014).

Because studies of self-reported anhedonia often seek to inform anhedonia's role in psychopathology, it is worth knowing how well these scales capture such clinically significant experiences. No studies to our knowledge have directly compared diagnostic interview-based symptom endorsement with self-report measures. A meta-analytic review of motivation in schizophrenia, however, showed only modest convergence between self-report and clinician-rated measures (Luther et al., 2018). Although that review didn't examine anhedonia, it underscores the importance of examining how self-report and interview-based measures converge.

In this study, adults took part in structured diagnostic interviews that determined (1) whether they endorsed clinically significant anhedonia, and (2) whether they met criteria for depression. We examined both classifications—presence/absence of anhedonia, and presence/absence of depression—to evaluate whether these interview-based assessments have corresponding differences in self-reported reward responsiveness, approach motivation, and pleasure.

## **2. Method**

### *2.1. Participants*

All participants provided informed consent. The sample included 78 adults (M age = 23.26 years, SD = 5.41, range from 18 to 43) recruited from the local area as part of a study of depression and motivation (see Silvia et al., 2020, for recruiting and screening details). They were predominantly female (n = 59, 76%) and ethnically/racially diverse (African-American n = 37, American Indian/Native n = 3, Asian n = 5, Caucasian n = 28, Hispanic/Latinx n = 12, Other/decline n = 8). The sampling process was designed to yield clinical and control groups that were similar in age and gender.

### *2.2. Procedure*

The Structured Clinical Interview for DSM disorders, Research Version (SCID-5-RV; First et al., 2015) is a semi-structured diagnostic interview. The depression module was administered by trained doctoral students in clinical psychology. Endorsing significant diminished interest or pleasure (rated as “present” [1] or “absent” [0]) defined the “anhedonia” group; meeting full diagnostic criteria for a major depressive disorder defined the “depression” group. Twenty-two participants (28%) comprised the anhedonia group and 18 participants (23%) comprised the depression group. Almost everyone in the depression group (17 of 18) was also in the anhedonia group; most of the anhedonia group (17 of 22) was also in the depression group. At a subsequent lab visit, usually within 14 days, people completed a battery of self-report scales.

### *2.3. Self-report Measures*

#### *2.3.1. Depressive Symptoms*

Several scales measured depressive symptoms. The Center for Epidemiologic Studies Depression Scale (CESD; Lewinsohn et al., 1997) is a 20-item scale (0–3 response format) used to measure depression symptoms ( $\alpha = 0.91$ ). The 30-item Mood and Anxiety Symptom Questionnaire (MASQ; Wardenaar et al., 2010) has subscales for anhedonic depression ( $\alpha = 0.92$ ), anxious

arousal ( $\alpha = 0.82$ ), and general distress ( $\alpha = 0.91$ ), each measured with 10 items using a 1–5 scale. The 21-item Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) measures anhedonic depression ( $\alpha = 0.88$ ), anxiety ( $\alpha = 0.81$ ), and distress ( $\alpha = 0.83$ ) with 7 items each using a 0–3 response scale. High scores indicate higher symptoms.

### 2.3.2. 2.3.2. *Anhedonic Experiences*

A second cluster of scales measured hedonic capacity. The Temporal Experiences of Pleasure Scale (TEPS; Gard et al., 2006) is an 18-item measure of anticipatory (10 items;  $\alpha = 0.76$ ) and consummatory (8 items;  $\alpha = 0.65$ ) pleasure completed on a 1–6 scale. The Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS; Gooding & Pflum, 2014) is a 17-item measure of hedonic experiences from social interactions ( $\alpha = 0.89$ ) completed on a 1–6 scale. High TEPS and ACIPS scores reflect greater pleasure. The Snaith-Hamilton Pleasure Scale (SHAPS; Snaith et al., 1995) is a 14-item measure of capacity for pleasure in different activities ( $\alpha = 0.90$ ) completed on a 1–4 scale. The short forms of the Wisconsin Schizotypy Scales (Winterstein et al., 2011) contain scales for social anhedonia ( $\alpha = 0.72$ ) and physical anhedonia ( $\alpha = 0.72$ ), each measured with 15 true-false items; higher scores on these and the SHAPS reflect greater anhedonia.

### 2.3.3. *Motivational Tendencies*

The 18-item Promotion/Prevention Scale (Lockwood et al., 2002) measures promotion ( $\alpha = 0.89$ ; bringing about rewards) and prevention ( $\alpha = 0.74$ ; avoiding losses) on a 1–9 scale. The BIS/BAS Scales (Carver & White, 1994) measure behavioral inhibition (BIS; 7 items,  $\alpha = 0.78$ ) and three facets of behavioral activation (BAS)—fun-seeking (4 items,  $\alpha = 0.63$ ), reward-responsiveness (5 items,  $\alpha = 0.83$ ), and drive (4 items,  $\alpha = 0.76$ )—using a 1–4 scale. High scores reflect greater promotion, prevention, BIS, and BAS.

### 2.3.4. *Personality*

The five NEO domain scores—Neuroticism ( $\alpha = 0.88$ ), Extraversion ( $\alpha = 0.74$ ), Openness to Experience ( $\alpha = 0.53$ ), Agreeableness ( $\alpha = 0.74$ ), and Conscientiousness ( $\alpha = 0.81$ )—were measured with the 240-item NEO-PI-3 (McCrae et al., 2005) with a 1–5 scale. Trait scores were formed by averaging the six facet scores for each domain. These traits were included as benchmarks to aid in interpreting the patterns of effect sizes.

## 3. Results and Discussion

We conducted a descriptive analysis of effect sizes using psych (Revelle, 2021). Table 1 displays the descriptive statistics; the full correlation matrix is in the Online Supplemental material. We evaluated the standardized mean difference—Cohen's  $d$ —in the self-report outcomes as a function of the SCID-5 derived anhedonia and depression groups; the effect sizes were interpreted using small ( $d = 0.20$ ), medium ( $d = 0.50$ ), and large ( $d = 0.80$ ) guidelines.

The largest effect sizes for anhedonia (Fig. 1, shown in blue) were for Neuroticism and many of the depressive symptom scales. The effect size was at least medium ( $d = |0.50|$ ) for the CESD and for all DASS and MASQ subscales. Notably, all the self-report measures of anhedonic

experiences and hedonic capacity—the TEPS, ACIPS, SHAPS, physical anhedonia, and social anhedonia scales—had effect sizes below the medium level ( $d = |0.50|$ ), which is striking for a sample containing groups with and without clinically significant anhedonia. Of the motivational variables, only BIS and promotion focus had at least a medium effect. A similar pattern appeared when groups based on depression (shown in grey) were compared. The measures related to depressive symptoms showed medium and large effect sizes. Measures specific to anhedonic symptoms and hedonic capacity, however, weakly distinguished between the groups. Notably, the effects sizes for Neuroticism and Extraversion were at least as large as most of the specific measures of anhedonia and motivation.

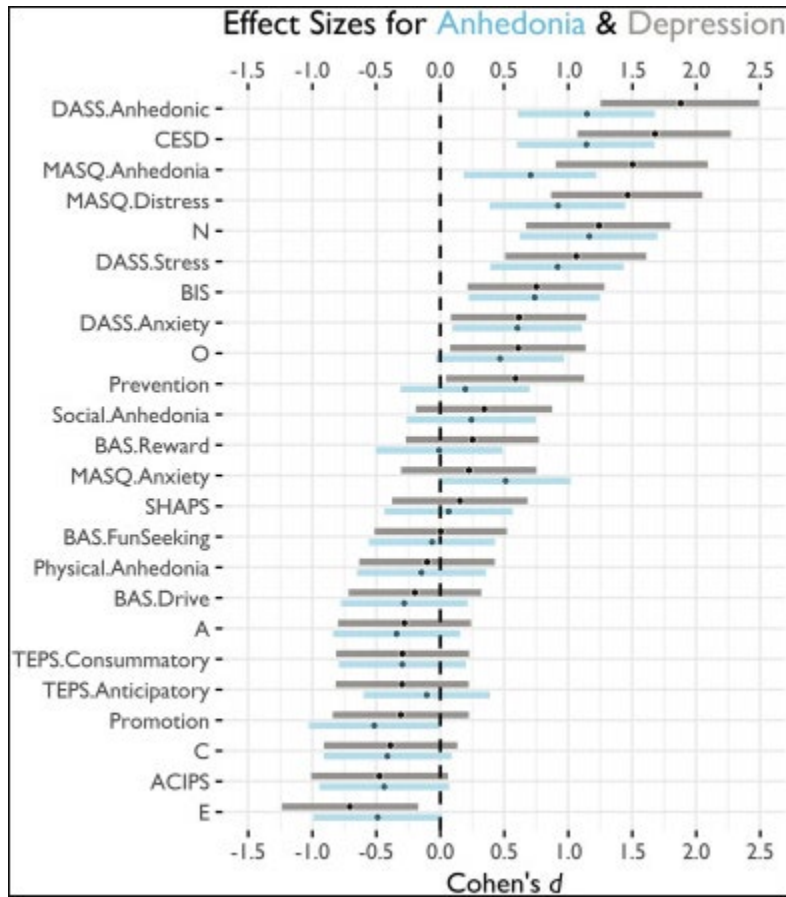
In summary, this study evaluated whether people with elevated anhedonia according to clinical diagnostic interviews show reduced self-reported hedonic capacity and motivation. The groups had at least medium or large difference on measures of depressive symptoms, but the group differences on self-report measures of anhedonia and motivation were surprisingly modest. This is less surprising for the measures of schizotypic anhedonia, which are not necessarily associated with depression (Chapman et al., 1976), but the SHAPS was specifically developed for use in depressed populations (Snaith et al., 1995), and the TEPS and ACIPS grew out of interest in anhedonia's role in psychopathology (Gard et al., 2006; Gooding & Pflum, 2014). None of these measures had at least a medium difference between the anhedonic and control groups, although the ACIPS, which focuses on interpersonal interactions, generally outperformed the other anhedonia scales.

These findings are consistent with related literatures on anhedonia and psychopathology that have often found limited value in self-reported levels of trait-like anhedonia (see Winer et al., 2019). For differentiating clinical and non-clinical groups and for predicting mental health outcomes and treatment response, measures of anhedonia that focus on state-like experiences, trajectories of change in anhedonia, and near-time recent changes in anhedonia appear to be more fruitful (e.g., Ballard et al., 2017; Ritsner & Ratner, 2019; Winer et al., 2014; Yang et al., 2020). Of course, given our modest sample size—a common limitation in research using in-person interviews—we wouldn't draw strong conclusions about the validity of self-report anhedonia scales based solely on this study. Nevertheless, caution is clearly called for when seeking to extend findings from self-report measures of anhedonia and motivation to populations with clinically significant symptom levels.

**Table 1.** Descriptive Statistics

Outcome	Anhedonia Categories			Depression Categories		
	Control	Anhedonia	<i>d</i>	Control	Depression	<i>d</i>
CESD	11.20 (8.72)	21.73 (10.81)	1.14 [.60, 1.67]	10.73 (7.86)	24.84 (10.37)	1.68 [1.07, 2.27]
MASQ Anhedonia	2.59 (0.84)	3.20 (0.94)	.71 [.18, 1.22]	2.49 (0.76)	3.63 (0.78)	1.50 [.90, 2.09]
MASQ Anxiety	1.56 (0.58)	1.87 (0.66)	.51 [.00, 1.02]	1.61 (0.58)	1.75 (0.71)	.22 [-.31, .75]
MASQ Distress	1.86 (0.84)	2.60 (0.73)	.92 [.39, 1.45]	1.81 (0.74)	2.88 (0.75)	1.46 [.87, 2.05]
DASS Anhedonic	0.34 (0.50)	0.95 (0.63)	1.15 [.60, 1.68]	0.30 (0.45)	1.17 (0.54)	1.88 [1.25, 2.49]
DASS Anxiety	0.36 (0.51)	0.68 (0.61)	.60 [.10, 1.11]	0.37 (0.50)	0.70 (0.64)	.62 [.08, 1.14]
DASS Stress	0.62 (0.63)	1.19 (0.62)	.92 [.39, 1.44]	0.62 (0.62)	1.27 (0.60)	1.06 [.51, 1.61]
TEPS Anticipatory	4.85 (0.69)	4.78 (0.63)	-.11 [-.60, .39]	4.88 (0.69)	4.68 (0.58)	-.30 [-.82, .22]
TEPS Consummatory	4.86 (0.71)	4.66 (0.61)	-.30 [-.79, .20]	4.86 (0.71)	4.66 (0.61)	-.29 [-.81, .23]
ACIPS	5.07 (0.65)	4.79 (0.60)	-.44 [-.94, .07]	5.06 (0.65)	4.76 (0.60)	-.48 [-1.01, .06]
SHAPS	1.53 (0.46)	1.56 (0.37)	.07 [-.44, .57]	1.52 (0.45)	1.59 (0.38)	.15 [-.38, .68]
Social Anhedonia	3.38 (2.72)	4.05 (2.87)	.24 [-.26, .75]	3.34 (2.83)	4.28 (2.47)	.34 [-.19, .88]
Physical Anhedonia	2.38 (2.56)	2.05 (1.40)	-.15 [-.65, .36]	2.34 (2.51)	2.11 (1.41)	-.10 [-.63, .43]
Promotion	7.53 (1.21)	6.88 (1.39)	-.52 [-1.03, .00]	7.44 (1.23)	7.05 (1.45)	-.31 [-.84, .22]
Prevention	5.60 (1.46)	5.86 (1.13)	.20 [-.31, .70]	5.48 (1.42)	6.27 (1.04)	.59 [.05, 1.13]
BIS	2.96 (0.47)	3.31 (0.50)	.74 [.22, 1.25]	2.98 (0.47)	3.33 (0.52)	.75 [.21, 1.28]
BAS Fun-Seeking	2.94 (0.52)	2.91 (0.53)	-.06 [-.56, .43]	2.93 (0.50)	2.93 (0.56)	.00 [-.51, .52]
BAS Reward	3.50 (0.45)	3.50 (0.49)	-.01 [-.50, .49]	3.47 (0.45)	3.59 (0.49)	.25 [-.27, .77]
BAS Drive	2.84 (0.58)	2.68 (0.54)	-.28 [-.78, .22]	2.82 (0.59)	2.71 (0.49)	-.20 [-.72, .32]
Neuroticism	2.82 (0.50)	3.39 (0.48)	1.16 [.62, 1.70]	2.84 (0.50)	3.44 (0.47)	1.24 [.67, 1.80]
Extraversion	3.33 (0.38)	3.15 (0.32)	-.49 [-.99, .02]	3.34 (0.36)	3.09 (0.32)	-.71 [-1.24, -.17]
Openness to Experience	3.45 (0.31)	3.59 (0.29)	.47 [-.03, .97]	3.45 (0.30)	3.63 (0.30)	.61 [.08, 1.14]
Agreeableness	3.56 (0.39)	3.44 (0.30)	-.34 [-.84, .16]	3.55 (0.38)	3.45 (0.31)	-.28 [-.80, .24]
Conscientiousness	3.52 (0.39)	3.36 (0.33)	-.41 [-.91, .09]	3.51 (0.39)	3.36 (0.32)	-.39 [-.91, .13]

**Note.** The columns report M (SD). For the anhedonia grouping, n=56 control, n=22 anhedonia; for the depression grouping, n=60 control, n=18 depression. The means are item averages except for CESD, social anhedonia, and physical anhedonia, which are item sums.



**Fig. 1.** Effect sizes for anhedonia and depression categories. Note. Bars denote 95% confidence intervals around  $d$ .

### CRedit authorship contribution statement

**Paul J. Silvia:** Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Kari M. Eddington:** Conceptualization, Investigation, Methodology, Writing – review & editing. **Kathleen H. Maloney:** Investigation, Writing – original draft, Writing – review & editing. **Jaimie M. Lunsford:** Investigation, Writing – review & editing. **Kelly L. Harper:** Investigation, Writing – review & editing. **Thomas R. Kwapil:** Conceptualization, Investigation, Methodology, Writing – review & editing.

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