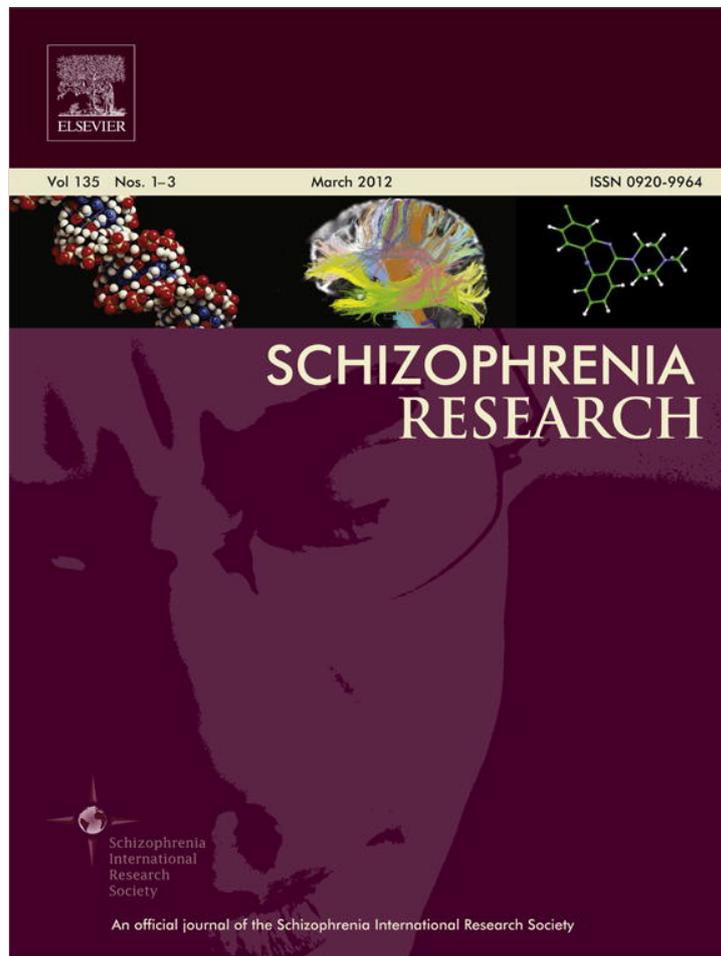


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Screening for negative symptoms: Preliminary results from the self-report version of the Clinical Assessment Interview for Negative Symptoms

Stephanie G. Park^a, Katiah Llerena^a, Julie M. McCarthy^a, Shannon M. Couture^b,
Melanie E. Bennett^c, Jack J. Blanchard^{a,*}

^a Department of Psychology, University of Maryland, College Park, MD 20742-4411, United States

^b Department of Psychology, University of Southern California, United States

^c Department of Psychiatry, University of Maryland School of Medicine, United States

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ABSTRACT

Though negative symptoms in schizophrenia are associated with a host of deleterious outcomes (e.g., White et al., 2009), not all individuals with schizophrenia suffer from negative symptoms (e.g., Blanchard et al., 2005). Thus, methods to quickly screen and identify patients for more intensive clinical interview assessments may have significant clinical and research utility. The present study is a preliminary examination of the reliability and validity of a self-report version of the newly developed Clinical Assessment Interview for Negative Symptoms (CAINS; Blanchard et al., 2011; Forbes et al., 2010; Horan et al., 2011). The CAINS-SR is a 30-item self-report measure that assesses Experiential (avolition, anhedonia, asociality) and Expressive (blunted affect, alogia) domains of negative symptoms. Participants ($N=69$) completed the CAINS-SR questionnaire and were evaluated with symptom interviews using the CAINS and other non-negative symptom interviews that assessed psychotic, affective, and other symptoms. The Experience subscale of the CAINS-SR demonstrated good internal consistency, convergent validity, and discriminant validity, while the poorer psychometric properties of the Expression subscale suggest that self-report of negative symptoms should focus on the experiential domain. Overall, preliminary findings indicate that the CAINS-SR (addressing experiential deficits) may be a useful complement to the clinician-rated interview measure. Future research on the sensitivity and specificity of the CAINS-SR will determine its suitability as a screening measure.

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1. Introduction

Presently, a range of clinician-administered measures of negative symptoms are available, including the Scale for the Assessment of Negative Symptoms (SANS; Andreasen and Olsen, 1982; Andreasen, 1983), the Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987), and the Schedule for the Deficit Syndrome (Kirkpatrick et al., 1989). Although each of these measures has contributed greatly to our understanding of negative symptoms, a number of concerns have been voiced about potential limitations with existing negative symptom assessment measures (Axelrod et al., 1994; Erhart et al., 2006; Horan et al., 2006; Kirkpatrick et al., 2006; Blanchard et al., 2011). Based on such concerns, the NIMH-MATRICES consensus statement on negative symptoms (Kirkpatrick et al., 2006) recommended the development of a new approach for the assessment of negative symptoms. This has led to the formation of the multi-site Collaboration to Advance Negative Symptom Assessment in Schizophrenia

(CANSAS; Blanchard et al., 2011), which has subsequently developed and piloted the Clinical Assessment Interview for Negative Symptoms (CAINS; Blanchard et al., 2011; Forbes et al., 2010; Horan et al., 2011). The CAINS seeks to address the limitations of previous measures by going beyond indicators of behavioral success (e.g., functional outcome) and incorporating assessment of patients' internal experiences of motivation, drive, and interest; utilizing clearer and more descriptive anchor points; distinguishing between anticipated and experienced emotion; and providing a detailed user's manual (Blanchard et al., 2011; Horan et al., 2011). Recent findings in a large ($N=281$) multi-site study (Horan et al., 2011) indicate that the CAINS has excellent internal consistency, good inter-rater agreement (at the item and scale level), as well as good convergent validity and discriminant validity (i.e., the CAINS is largely independent of either psychotic or affective symptoms).

Clearly, not all individuals with schizophrenia experience negative symptoms, and clinical presentations of the disorder exhibit significant heterogeneity. For example, research has shown that 28–36% of individuals with a schizophrenia spectrum disorder may occupy a latent class of individuals with severe negative symptoms (e.g., Blanchard et al., 2005). Because not all patients with schizophrenia demonstrate marked negative symptoms, a streamlined screening

* Corresponding author at: Department of Psychology, Biology–Psychology Building, University of Maryland, College Park, MD 20742-4411, United States. Tel.: +1 301 405 8438; fax: +1 301 314 9566.

E-mail address: jblancha@umd.edu (J.J. Blanchard).

process may be useful in order to identify individuals who would most benefit from a more thorough clinician-administered negative symptom interview and thus expedite screening and recruitment for research studies on negative symptoms. A self-report measure assessing negative symptoms would provide a cost and time efficient method of screening individuals across clinical, research, and community settings (Iancu et al., 2005). Thus, in parallel with the CAINS, we undertook the development of a self-report version (CAINS-SR) to explore whether a self-report questionnaire of negative symptoms could provide valid information as a complementary assessment to clinician-rated measures, with future work on the sensitivity and specificity of the CAINS-SR needed to determine its suitability as a screening instrument.

Developing concise screening methods has been a growing interest in recent years, as self-report measures have already been found to be appropriate for evaluating both positive symptoms (Niv et al., 2007; Kim et al., 2010; Lincoln et al., 2010) and prodromal psychotic symptoms (Kobayashi et al., 2008; Kelleher et al., 2011). Due to deficits in self-awareness in schizophrenia (Amador et al., 1994), there is concern that lack of insight in patients may undermine valid appraisal of symptoms on self-report measures (Liraud et al., 2004). However, accumulating evidence suggests that self-report questionnaires of negative symptoms may provide valid information regarding the clinical severity of these symptoms in schizophrenia. Studies have found that patients with schizophrenia demonstrate partial awareness of negative symptoms as reflected by convergence between patient self-report and clinician ratings (e.g., Selten et al., 2000b, 2000c). Selten et al. (2000b, 2000c) found that, compared to clinician ratings, patients self-reported similar ratings on decreased sexual activity while reporting less congruently on other domains, such as poor grooming and hygiene and increased latency of response. Bottlender et al. (2003) found that while clinicians and patients differed on ratings of *alogia* and *attention*, assessment of all other domains converged between the SANS and a self-report version of the SANS. Furthermore, Mueser et al. (1997) found a moderate level of agreement between interviewers and patients on negative symptom severity using the SANS. While the average correlation was 0.45, items measuring experiential domains (e.g., social anhedonia, $r=0.79$) showed more agreement between interviewers and patients than did items assessing expressivity (e.g., blunting, $r=0.31$; *alogia*, $r=0.39$) (Mueser et al., 1997). In another study, Liraud et al. (2004) found comparable ratings between clinicians and acutely psychotic patients (regardless of insight) for depressive, positive, and negative symptoms, except *alogia* and persecutory delusions. Although few studies have examined the source of discrepancies in negative symptom ratings between clinicians and patients, one study found that recognition of positive symptoms did not affect ratings of negative symptoms; instead, it appeared that presence of depression and anxiety symptomatology predicted fewer and greater discrepancies, respectively (Selten et al., 2000a). Though results are mixed, the validity and potential clinical usefulness of self-report measurement of negative symptoms in schizophrenia remains promising.

Thus, the current study is an initial assessment of the self-report version of the CAINS (CAINS-SR), which includes items assessing both experiential deficits (*anhedonia* – diminished emotional experience; *asociality* – reduced social interest and engagement; *avolition* – diminished motivation and goal directed behavior) and expressive deficits (*blunted affect* – decreased emotional expression, and *alogia* – reduced verbal expression). The CAINS-SR was evaluated for its internal consistency, convergent validity, and discriminant validity. We hypothesized that the CAINS-SR would demonstrate 1) good internal consistency within its subscales, 2) significant positive correlations with corresponding subscales on the clinician-rated CAINS, and 3) no significant correlations with clinician-rated depressive or psychotic symptoms.

2. Methods

2.1. Participants

Participants were 69 individuals with schizophrenia ($n=40$) or schizoaffective disorder ($n=29$) between the ages of 21 and 60. Participants were recruited from outpatient clinics affiliated with the University of Maryland–Baltimore or the Baltimore Veteran's Affairs Medical Center as part of a larger study investigating the psychometric properties of the CAINS (Horan et al., 2011). Individuals with schizoaffective disorder were included in the sample to ensure a full range of symptoms and to increase external validity by representing the patient populations for whom this instrument would be appropriate. Individuals were excluded from the study if they had 1) other DSM-IV diagnoses (except substance use disorders) as assessed via the SCID-I, 2) substance dependence within the past 6 months, 3) substance abuse within the past month, 4) history of significant head injury or mental retardation, 5) significant neurological disease, or 6) severe psychotic symptoms or intoxication at time of assessment. Participants were also required to be proficient in the English language.

2.2. Procedures

Local Institutional Review Boards approved study procedures. All participants provided informed consent. Participants attended a single session, approximately 3–4 h in length, in which they completed a diagnostic interview, interview-based assessments of general psychiatric symptoms and negative symptoms, and self-report ratings of negative symptoms and social functioning. All participants received study measures in the same order.

2.3. Measures

The *Structured Clinical Interview for DSM-IV* (SCID-I; First et al., 2001; Williams et al., 1992) was administered to establish schizophrenia and schizoaffective diagnoses. Various sources of information were used to confirm diagnoses (patient record, medical records, and treatment providers).

The *Clinical Assessment Interview for Negative Symptoms* (CAINS; Blanchard et al., 2011; Horan et al., 2011) is a new 23-item clinician-based interview designed to assess the current level of severity of negative symptoms. All items were scored on a 5-point Likert scale with scores ranging from 0 (no impairment) to 4 (severe deficit). Based on factor analytic findings (Horan et al., 2011), items were summed to create two subscales: an *Experience* subscale composed of items tapping *Asociality* (items 1–3), *Avolition* (items 4–7), and *Anhedonia* (items 8–16); and an *Expression* subscale composed of items tapping *Blunted Affect* (items 17–21) and *Alogia* (items 22, 23).

The *Clinical Assessment Interview for Negative Symptoms – Self-Report* (CAINS-SR) is a 30-item self-report version of the CAINS interviewer-based measure. Items were selected to assess across the 5 domains that are assessed within the clinician-rated CAINS. *Anhedonia* is assessed with 9 items tapping experienced (intensity and frequency) pleasure across social, physical, and recreational/vocational events as well as expected pleasure in these domains. An example *anhedonia* item: “Looking ahead to being with other people in the next few weeks, how much pleasure do you expect you will experience from being with others?” (rated from 0, “No pleasure” to 4, “Extreme pleasure”). *Asociality* is measured with 6 items assessing the importance of relationships (family, friends, and romantic) and the preference for being with others versus being alone. An example *asociality* item: “When it comes to close relationships with your family members, how important have these relationships been to you over the past week?” (rated from 0, “Not at all important to me” to 4, “Extremely important to me”). *Avolition* is assessed with 7 items that ask about how much the

Table 1
Demographic information and descriptive statistics for measures of symptoms and cognitive functioning (N = 69).

	Mean (SD) or Percent
Age	47.10 (8.36)
Gender	
Male	63.8%
Female	36.2%
Race	
White	11.6%
Black	76.8%
Asian	1.4%
American Indian or Alaska native	1.4%
Multiracial	8.7%
Education	12.07 (2.37)
Marital status	
Married	4.3%
Widowed	2.9%
Divorced/Separated	23.2%
Never married/Single	69.6%
Receives disability	
Yes	89.9%
No	10.1%
Has a paying job	
Yes	18.8%
No	81.2%
Living arrangement	
Unsupervised, house	66.7%
Unsupervised, boarding house	4.3%
Supervised, halfway house	7.2%
Supervised, "Board and Care" or Community resident	21.7%
Diagnosis	
Schizophrenia	58.0%
Schizoaffective–bipolar type	20.3%
Schizoaffective–depressive type	21.7%
BPRS	
Positive symptoms	12.00 (6.20)
Agitation/mania	7.16 (1.76)
Negative symptoms	6.17 (2.80)
Depression/anxiety	7.30 (3.84)
CDSS ^a	2.87 (3.10)
WTAR	89.89 (10.34)

Note: BPRS = Brief Psychiatric Rating Scale, CDSS = Calgary Depression Scale for Schizophrenia, WTAR = Wechsler Test of Adult Reading.

^a Due to missing data, N = 68.

individual wanted or was motivated to do various activities in the past week and how much effort they have made to actually do them. An example avolition item: "In the past week how much effort have you made to do things at work or school? (If you are not working or going to school, how much effort have you made to look for a job or go to school.)" (rated from 0, "No effort" to 4, "Very much effort"). Blunted affect and alogia are assessed with 8 items that ask about an individual's manner of expression, both nonverbal (facial expression, use of gestures) and verbal (how talkative they were). An example blunted affect item: "In the past week, I used my hands or body to help me communicate my feelings to others." (rated from 0, "Not at all true of me" to 4, "Very true of me"). All items are rated on a 5-point Likert scale. After reverse-scoring certain items, higher scores reflected greater pathology. Items were summed to create two subscales that parallel those that were empirically identified with the CAINS: a 22-item Experience subscale comprised of items tapping anhedonia (items 1–9), asociality (items 10–15), and avolition (items 16–22), and an Expression subscale comprised of items tapping blunted affect (items 23–27) and alogia (items 28–30).

The Brief Psychiatric Rating Scale (BPRS; Overall and Gorham, 1962; Ventura et al., 1993) is a 24-item measure that assesses clinical psychiatric symptoms. Items were rated on a 7-point-Likert scale ranging from 1 (not present) to 7 (extremely severe). We selected four subscale scores (Positive Symptoms, Agitation/Mania, Negative Symptoms, Depression/Anxiety) to address discriminant and

convergent validity based on the factor structure supported by Kopelowicz et al. (2008).

The Calgary Depression Scale for Schizophrenia (CDSS; Addington et al., 1990, 1996) is a 9-item, semi-structured interview for depressive symptoms. Items were measured on 4-point scales ranging from 0 (absent) to 3 (severe). Items were summed to provide a total score. The CDSS has been extensively evaluated in both inpatient and outpatient samples, with good inter-rater agreement and good convergent and discriminant validity (Addington et al., 1990; Kim et al., 2006).

The Wechsler Test of Adult Reading (WTAR; Wechsler, 2001) prompts respondents to read a list of 50 words. The WTAR is co-normed with the Wechsler Adult Intelligence Scale (WAIS-III) and provides a reliable estimate of the full-scale IQ score.

2.4. Data analysis

Analyses were conducted to examine the reliability and validity of the CAINS-SR. First, subscale-level statistics were examined to determine internal consistency of the CAINS-SR. Second, the convergent validity of the CAINS-SR was assessed by examining correlations between corresponding subscales of the CAINS-SR and CAINS. Third, discriminant validity was evaluated by examining correlations between the CAINS-SR and measures of psychotic (BPRS) and depressive (CDSS) symptoms.

3. Results

3.1. Sample characteristics

Demographic and clinical information are presented in Table 1. Of the 69 participants, approximately one third were female. The mean age was 47.10 years old. The sample was ethnically diverse, with over 85% of participants identifying as non-Caucasian. Clinically, participants endorsed low to moderate depression and psychiatric symptoms on the CDSS and BPRS, respectively. Mean estimated IQ for this sample was in the low average range.

3.2. Internal consistency of CAINS-SR

The Experience scale of the CAINS-SR showed high internal consistency (Cronbach's $\alpha = .90$). However, the Expression scale of the CAINS-SR showed only modest internal consistency (Cronbach's $\alpha = .44$). The two CAINS-SR scales are modestly correlated ($r = .51$, $p < 0.01$).

3.3. Convergent validity of the CAINS-SR

The CAINS-SR showed good convergent validity with the clinician-administered CAINS (Table 2). The Experience subscale of the CAINS-SR was significantly correlated with the corresponding Experience subscale of the CAINS ($p < 0.01$) and was not significantly correlated with the interview-rated Expression scale. Although the CAINS-SR

Table 2
Convergent validity: correlations between CAINS-SR and clinician-rated CAINS.

		CAINS clinician-rated	
		Experience	Expression
CAINS-SR	Experience	.67**	.22
	Expression	.34**	.29*

Note. CAINS-SR = Clinical Assessment Interview for Negative.

Symptoms–Self-Report, CAINS = Clinical Assessment Interview for Negative Symptoms.

** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

Table 3
Discriminant validity: correlations between CAINS-SR and depressive (CDSS) and psychiatric (BPRS) symptoms.

		CDSS	BPRS		
			Positive symptoms	Agitation/Mania	Depression/Anxiety
CAINS-SR	Experience	.27*	.10	.19	.18
	Expression	.31*	.14	.03	.23

Note: CAINS-SR = Clinical Assessment Interview for Negative Symptoms, Self-Report, CDSS = Calgary Depression Scale for Schizophrenia, BPRS = Brief Psychiatric Rating Scale.

* Correlation is significant at the 0.05 level.

Expression scale was correlated with the corresponding clinician-rated CAINS scale, the correlation was only moderate ($r = .29$); additionally, the self-report Expression scale was also correlated with the Experience scale for the clinician-rated CAINS ($r = .34$).

3.4. Discriminant validity of the CAINS-SR

The CAINS-SR demonstrated good discriminant validity with the BPRS (Table 3). The Experience and Expression subscales of the CAINS-SR were not significantly correlated with positive symptoms, agitation/mania, or depression/anxiety as assessed by the BPRS. However, both subscales of the CAINS-SR were moderately correlated with depressive symptomatology as rated by the CDSS (Experience, $r = .27$; Expression, $r = .31$, $ps < 0.05$).

Given the moderate associations between the CAINS-SR and clinician-rated depression on the CDSS, we sought to determine if depression influenced the relationship between self-reported and clinician-rated negative symptoms. Partial correlations were computed to examine the relationship between CAINS and CAINS-SR subscales while controlling for depression as rated by the CDSS. When controlling for CDSS total score, the relationship between self-report and clinician-rated negative symptoms remained largely unchanged for both subscales (Experience ($pr = .66$, $p < .01$) and Expression ($pr = .32$, $p < .01$)). These partial correlations are nearly identical to the zero-order correlations, indicating that although depression may modestly contribute to patients' self-reported negative symptoms on the CAINS-SR, this association does not impact the agreement between the CAIN-SR and the clinician-rated CAINS.

In addition to examining the association with symptoms, we sought to determine if the CAINS-SR was related to gender differences or general cognitive ability. There were no gender differences for Experience ($p = .15$) or Expression ($p = .37$) on the CAINS-SR. Cognitive ability, as measured by the WTAR, was not correlated with either Experience ($r = .12$, $p > .05$) or Expression ($r = .06$, $p > .05$) scales from the CAINS-SR.

4. Discussion

The present study is an initial assessment of the reliability and validity of the CAINS-SR, a self-report measure of negative symptoms in schizophrenia that parallels the clinician-rated CAINS (Blanchard et al., 2011; Horan et al., 2011). We hypothesized that the CAINS-SR would demonstrate good internal consistency within its two subscales, good convergent validity with the CAINS, and good discriminant validity with measures of depressive and psychotic symptoms. Based on preliminary findings, the CAINS-SR appears to be a promising complement to the clinician-rated CAINS.

Though the Experience subscale of the CAINS-SR demonstrated good internal consistency, the internal consistency of the Expression subscale of the CAINS-SR was unacceptably low. Specifically, the internal consistency of the Experience subscale (Cronbach's $\alpha = .90$) was much higher than that of the Expression subscale (Cronbach's $\alpha = .44$). The lower alpha may be attributable in part to the briefer

Expression scale (8 items) compared to the Experience scale (22 items). Internal consistency of the Expression scale may be compromised by the heterogeneous items within this scale (assessing facial expression, gestures, and vocal expressivity) as well as the potential challenge of requiring respondents to be aware of their behavioral expressivity and how this may be perceived by others.

When comparing the CAINS-SR and CAINS subscales, the self-report measure demonstrated good to moderate convergent validity with the clinician-rated instrument. The Experience subscale of the self-report measure was significantly correlated with clinician-rated Experience, sharing approximately 45% common variance. The self-reported Experience scale was not significantly correlated with the clinician-rated Expression scale. Results for the CAINS-SR Expression subscale were less compelling. The self-report Expression scale was only modestly related to the corresponding subscale on the clinician-rated CAINS, sharing approximately 8% common variance. This finding is consistent with previous studies (Mueser et al., 1997; Bottlender et al., 2003; Liraud et al., 2004) that reported poorer agreement between clinicians and patients on ratings of expressivity. Moreover, the self-report Expression subscale was similarly correlated with the Experience subscale on the clinician-rated CAINS, suggesting a lack of specificity. This may be due to the item content of the self-report Expression subscale, which indirectly taps social domains relating to asociality and avolition (e.g., not talking to others, others not knowing how they feel, etc.). These findings raise questions as to whether assessment of the expressivity domain can be successfully achieved within a self-report questionnaire.

With regard to discriminant validity, the CAINS-SR subscales were not significantly correlated with the Positive Symptom, Agitation/Mania, or Depression/Anxiety subscales of the BPRS. However, the Experience and Expression subscales of the CAINS-SR were moderately correlated with depressive symptomatology as measured by the CDSS, indicating that self-report ratings of negative symptoms may be influenced by depression. Importantly, less than 9% of the variance in the CAINS-SR scales was accounted for by clinician-rated depression. Further, controlling for depression had no impact on the strength of association between self-reported and clinician-rated negative symptoms. We also found that CAINS-SR ratings were not differentially related to gender nor were the CAINS-SR ratings related to general cognitive ability. These results support the discriminant validity of the self-report of negative symptoms with the CAINS-SR with the caveat that depression may modestly impact the self-report of negative symptoms (though depression does not appear to compromise the agreement between self- and clinician-ratings).

Overall, the CAINS-SR demonstrates encouraging psychometric properties that indicate its utility as a screening measure for negative symptoms. Results for the CAINS-SR Experience scale were particularly promising with very high convergent correlations with clinician ratings in this domain. However, lower internal consistency and poor agreement between patients and clinicians in the Expression subscale suggest that self-report of expressivity may not be useful. Thus, as the development of the CAINS-SR continues, the Expression subscale will likely be excluded from future versions of the self-report measure. One limitation of the present study is that a broader assessment of clinical functioning was not included, so it is unclear whether self-reported negative symptoms are related to functioning. Future research may examine whether patient ratings on the CAINS-SR are related to functional impairment ratings. Another limitation is that the present study did not examine possible factors that may have contributed to ratings discrepancies between the clinician administered CAINS and the self-report CAINS-SR. For example, poor insight or severe positive symptoms may predict lower agreement between clinicians and patients on ratings of negative symptoms. Further, the present study does not provide data on the temporal stability of self-reported negative symptoms. Longitudinal assessments conducted with the CAINS-SR may clarify whether self-reported negative

symptoms are enduring over time and/or unaffected by other symptomatology. Lastly, data regarding the sensitivity and specificity of the CAINS-SR is needed to determine its suitability as a screening measure. Future work ought to examine the self-report measure's level of accuracy in predicting those with elevated negative symptoms as well as its ability to minimize false-positives. As the CAINS-SR continues to evolve based on initial psychometric data from the CAINS (Horan et al., 2011), the self-report measure appears to be a promising complement to the comprehensive clinician-rated measure of negative symptoms.

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Contributors

Drs. Blanchard and Bennett contributed to the study design, data collection, data analysis, interpretation of data analysis, and writing of this report. Dr. Couture, Stephanie Park, Katiah Llerena, and Julie McCarthy contributed to the data analysis, interpretation of data analysis, and writing of this report.

Conflict of interest

The authors declare no conflicts of interest.

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