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Research report

The assessment of anhedonia in clinical and non-clinical populations: Further validation of the Snaith–Hamilton Pleasure Scale (SHAPS)

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Abstract

Background: Anhedonia, the inability to experience pleasure, is a major endophenotype of depression. In addition to this, it is an important clinical feature of schizophrenia and substance abuse disorders. Valid instruments to measure anhedonia are sparse.
Methods: In the present study, a short, 14-item instrument, the Snaith–Hamilton Pleasure Scale (SHAPS) to measure anhedonia in normal and clinical samples was further validated. Various aspects of the reliability and validity of the SHAPS that have not been addressed before, were examined in three separate studies. First, we assessed the internal consistency, convergent and discriminative validity of the SHAPS in a non-clinical sample. Second, the test–retest reliability of the SHAPS was investigated in another sample. In the third study, the internal consistency, convergent and discriminative validity of the SHAPS was tested by administering the scale in three clinical samples of psychiatric inpatients.
Results: The SHAPS was found to be highly reliable in terms of internal consistency and test–retest stability. Further, the SHAPS correlated in a theoretically meaningful way with other measures of affect and personality. Patients with a depression, psychosis or substance dependence scored significantly higher on the SHAPS than non-patient controls. Patients with a depression displayed the highest SHAPS-score.
Limitations: The absence of structured assessment data to validate the clinical diagnoses.
Conclusions: The current study shows that the SHAPS is a reliable and valid questionnaire to assess hedonic tone in patient and non-patient populations. Because it is a brief scale it seems to be a very useful instrument for measuring anhedonia in clinical and research settings.

Keywords: Anhedonia; SHAPS; Assessment; Validation; Hedonic tone

1. Introduction

Anhedonia refers to the reduced ability to experience pleasure (Ribot, 1897), and is a prominent feature that is involved in several types of psychiatric disorders and maladaptive behaviors (Andreasen and Olsen, 1982; Loas, 1996; Meehl, 1975). This deficit in the experience of pleasure has primarily been associated with major depression (Klein, 1984) and schizophrenia (Andreasen and Olsen, 1982). Anhedonia is, besides depressed mood, one of the two core symptoms of depression (APA, 1994) and is also one of the most important negative symptoms frequently observed in schizophrenia (Andreasen and Olsen, 1982; Blanchard, 1998). For example, Blanchard and Cohen (2006) found evidence

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to suggest that anhedonia is one of the two key features involved in the negative symptom complex of schizophrenia, although it must be noted that other studies (e.g., Myin-Germeys et al., 2001) indicate that schizophrenics still have dynamics in their affect. Further, it has been suggested that anhedonia can be a trait marker for both depression (Loas, 1996; Schrader, 1997) and schizophrenia (Blanchard et al., 2001; Gooding et al., 2005; Mason et al., 2004). Although anhedonia plays an important role in these disorders, it is not limited to these disorders. Recent research has indicated that anhedonia is also present in individuals with a substance use disorder, as part of the abstinence symptomatology (Gawin and Kleber, 1986). In fact, several authors have suggested that anhedonia is an important factor involved in relapse (Koob and Le Moal, 2001; Volkow et al., 2002), and in the transition from recreational use to excessive drug intake (Ahmed and Koob, 1998). Further, it is becoming increasingly clear that anhedonia is also present in other disorders and dysfunctional behaviors such as Parkinson's disease (Isella et al., 2003), over-eating (Davis and Woodside, 2002), and risky behaviors in general (Franken et al., 2006b).

Anhedonia played an important role in theories of psychopathology in the beginning of the previous century (Bleuler, 1911; Kraepelin, 1919; Myerson, 1923), but the scientific interest has waned considerably since that time (Snaith, 1993). With recent scientific advances in elucidating the genetic basis of psychopathology by means of identifying endophenotypes, anhedonia gradually gains renewed research attention. Endophenotypes are subclinical traits that are associated with the expression of an illness and represent the genetic liability of the disorder in non-affected individuals (Leboyer et al., 1998). The importance of anhedonia in psychopathology is stressed by a recent study of Hasler et al. (2004) who demonstrated that anhedonia, together with increased stress reactivity, is the most important candidate for psychopathological endophenotype of major depression.

One of the merits of anhedonia as endophenotype of depression is that it has a putative neural substrate, the dopaminergic mesolimbic and mesocortical reward circuit (Nestler and Carlezon, in press), which involves the ventral tegmental area, the ventral striatum and part of the prefrontal cortex. Several researchers have proposed that anhedonia is linked to a dysfunction of this dopaminergic reward system (Heinz et al., 1994; Isella et al., 2003; Markou and Koob, 1991; Willner et al., 2005).

Although anhedonia is regarded as an important symptom in psychopathology (Berenbaum et al., 2003; Snaith, 1993), it has received relatively little research attention. This limited attention may be the result of the low availability of short, well-validated instruments that are easy to use. Anhedonia can be measured using behavioral (Gooding et al., 2002; Pizzagalli et al., 2005), electrophysiological (Dubal et al., 2000; Franken et al., 2006a; Simons et al., 1982), hemodynamic (Crespo-Facorro et al., 2001; Keedwell et al., 2005; Mitterschiffthaler et al., 2003), interview-based (Andreasen, 1982), and self-report (Chapman et al., 1976; Fawcett et al., 1983; Snaith et al., 1995) measures. The current study focused on the self-report assessment of anhedonia.

The Physical Anhedonia Scale (PAS; Chapman et al., 1976) is by far the most widely employed self-report measure of anhedonia (Horan et al., 2006). Although this scale has good psychometric properties (Peterson and Knudson, 1983), there are some limitations that hamper optimal application of this scale. First, the content is outdated (Horan et al., 2006). For example, items such as "I have always found organ music dull and unexciting" as index of anhedonia may be less suitable for use in current populations. Second, the PAS consists of 61 items, and as such this scale is rather time consuming, thereby limiting its usefulness in clinical and research settings. Third, because the PAS measures anhedonia as a trait-like personality feature (i.e., "a lifelong characterological defect"; Chapman et al., 1976), the scale is less suitable for evaluating treatment effects in psychiatric samples. A related instrument, the Social Anhedonia Scale (SAS; Chapman and Chapman, 1982) has problems with respect to divergent and convergent validity (D'Haenen, 1996; Leak, 1991): This scale seems to be more related to social anxiety and rigidity rather than anhedonia. The Fawcett–Clark Pleasure Scale (FCPS; Fawcett et al., 1983) is another questionnaire that has been frequently employed to assess anhedonia. However, very few studies have evaluated the psychometric properties of this instrument and little is known about the reliability and validity (see for an overview D'Haenen, 1996). The focus of the present study will be on the Snaith–Hamilton Pleasure Scale (SHAPS; Snaith et al., 1995), a brief 14-item self-report measure of anhedonia. The SHAPS intends to measure hedonic tone and its absence, anhedonia. The scale was constructed in such a way that cultural, gender and age biases were kept to a minimum. The items of the scale relate to experiences likely to be encountered by most people (Snaith et al., 1995) and given its succinctness, the SHAPS seems to have great potential for use in clinical as well as research settings. However, no study addressed the psychometric properties of the

Table 1
The content of the SHAPS-items (Snaith et al., 1995)

Item	Content
1.	I would enjoy my favourite television or radio programme
2.	I would enjoy being with family or close friends
3.	I would find pleasure in my hobbies and pastimes
4.	I would be able to enjoy my favourite meal
5.	I would enjoy a warm bath or refreshing shower
6.	I would find pleasure in the scent of flowers or the smell of a fresh sea breeze or freshly baked bread
7.	I would enjoy seeing other people's smiling faces
8.	I would enjoy looking smart when I have made an effort with my appearance
9.	I would enjoy reading a book, magazine or newspaper
10.	I would enjoy a cup of tea or coffee or my favourite drink
11.	I would find pleasure in small things, e.g. bright sunny day, a telephone call from a friend
12.	I would be able to enjoy a beautiful landscape or view
13.	I would get pleasure from helping others
14.	I would feel pleasure when I receive praise from other people

SHAPS, except for the original investigation in which the SHAPS was introduced (Snaith et al., 1995). That study mainly addressed the construction of the SHAPS and did not examine important features of reliability and validity such as test–retest reliability, concurrent validity, and discriminant validity.

The present investigation was set up to further examine the psychometric properties of the SHAPS. Three studies were conducted in order to achieve this goal. First, we assessed the internal consistency, convergent and divergent validity of the SHAPS in a normal, non-patient sample, by studying its associations with other (related) scales (measuring for example positive affect, negative affect, reward sensitivity). In this study, relations with gender and age were also investigated. In the second study, the test–retest reliability of the SHAPS was examined in another sample of nonclinical individuals. In the third study, the internal consistency, convergent and discriminant validity of the SHAPS was explored by administrating the scale to three clinical samples of inpatients and to a sample of non-clinical controls. The clinical samples included patients with 1) depression 2) psychosis, and 3) substance dependence.

2. Study 1

2.1. Reliability and validity in a normal population

2.1.1. Participants and procedure

A sample of 227 undergraduate psychology students (17.2% males) volunteered to participate in the present study. The mean age of the sample was 20.0 years (SD=2.2; range 17–28 years). All participants received course credits or a small financial remuneration for completing a set of questionnaires (see below). A subsample of these individuals (n=110) also completed the Beck Depression Inventory (BDI; Beck et al., 1961). All studies were approved by the Institutional Ethics Committee, and all participants signed informed consent.

2.1.2. Instruments

The 14-item Snaith–Hamilton Pleasure Scale was used to measure the present state of anhedonia. The SHAPS items are displayed in Table 1. Each of the items has a set of four response categories, that is Definitely Agree (=1), Agree (=2), Disagree (=3), and Definitely Disagree (=4). A higher total score indicates higher levels of state anhedonia. The SHAPS was translated into the Dutch language by the first authors of this manuscript. Snaith et al. propose to recode the four response categories into dichotomous categories, that is, agree and disagree (score 0 and 1). However, given the limited set of items, it seems more desirable for research purposes to keep the original four response categories[1]. The original scoring was only used to investigate the proportion of participants that could be diagnosed as anhedonic (original SHAPS score>2). For all other analyses a total score was computed by summing scores across four response categories, yielding more dispersion of the data. Higher scores indicate less hedonic tone, and hence more anhedonic symptoms.

The Revised Physical Anhedonia Scale (R-PAS; Chapman and Chapman, 1982; Chapman et al., 1976) was included as a concurrent measure of anhedonia. Although the psychometric properties of the Dutch R-PAS are unknown, the current study yielded a Cronbach's alpha of .83.

The BIS/BAS scales are presented as a self-report questionnaire that has been constructed to assess individual differences in personality dimensions that reflect the sensitivity of two motivational systems, the aversive and the appetitive system (BIS and BAS; Carver and White, 1994; Gray, 1987), of which as noted in the introduction, the latter reward-related system may be particularly relevant in relation to anhedonia. The BIS/BAS scales consist of 20 items (and four filler

[1] The notion that ordinal scoring was preferable over the dichotomous approach was confirmed by an explorative analysis. The ordinal scoring yielded a higher internal consistency, and stronger convergent correlations with other scales such as the PAS, BIS/BAS Scales and Positive affect.

items) that can be allocated to two primary scales: The Behavioral Inhibition System scale (BIS; 7 items) and the Behavioral Activation System scale (BAS; 13 items). The BAS scale can be divided into 3 subscales: Reward responsiveness (BAS Reward; 5 items), fun seeking (BAS Fun; 4 items), and drive (BAS Drive; 4 items). The Dutch version of the BIS/BAS Scales was described in a previous study (Franken et al., 2005), and has been shown to possess adequate reliability with Cronbach alphas ranging from .61 to .79. The alphas in the current sample were somewhat lower (ranging from .45 to .76).

The Positive and Negative Affect Scales (PANAS; Watson et al., 1988) were administered as a measure of positive and negative affect. The PANAS is a 20-item bidimensional mood inventory. Positive Affect reflects the extent to which a person feels enthusiastic, active, and alert (Watson et al., 1988), and thus bears similarity with hedonic tone. Negative Affect is a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness (Watson et al., 1988). The psychometric properties of the PANAS scales are found to be good (Watson et al., 1988) and this is also true for the Dutch version of this scale (Boon and Peeters, 1999). In this present sample Cronbach's alphas for positive affect and negative affect were .78 and .90, respectively.

The Dutch version of the 5-item Satisfaction With Life Scale (SWLS; Arrindell et al., 1991; SWLS; Diener et al., 1985) was used as an overall assessment of life satisfaction. The Dutch SWLS has good psychometric properties (Arrindell et al., 1999) with an alpha of .82 (in the current sample, alpha was .80).

Depressive symptoms were measured with the widely used Beck Depression Inventory (BDI). The BDI is a 21 item self-report rating inventory measuring characteristic attitudes and symptoms of depression (Beck et al., 1961). Each item in the BDI pertains to the respondent's feelings in the past week, and includes four response categories describing increasing severity of depression. The BDI has adequate psychometric properties (Beck et al., 1961). The alpha in the current sample was .74.

2.1.3. Results

2.1.3.1. Internal consistency. The internal consistency (Cronbach's alpha) of the SHAPS was .91. The mean item-total correlation was .62 (ranging from .49 to .68). These data indicate that the SHAPS has a good internal consistency in a non-patient sample. A principal component analysis initially yielded a three-factor solution (i.e., eigenvalues of the first three factors were 6.5, 1.2, 1.0). However, closer inspection of the factor scores showed that all items load high (>.56) on the first factor, which explained 46.5% of the total variance. This result suggests that the one-factor structure yields the most adequate solution for the SHAPS.

2.1.3.2. Convergent and divergent validity. Correlations between the SHAPS and the other measures are displayed in Table 2. As can be seen, there was a negative correlation between SHAPS and BAS Reward Responsiveness ($r=-.37$), and BAS Drive ($r=-.26$). The BAS-total score was negatively correlated with the SHAPS ($r=-.34$). Further, the SHAPS was also negatively correlated with PANAS Positive Affect ($r=-25$) and with the SWLS ($r=-.18$), indicating that persons with lower levels of positive effect and satisfaction with life displayed somewhat higher levels of anhedonia. Further, the results indicated that the SHAPS was significantly correlated with the BDI ($r=.23$, $p<.05$). This correlation was not very high, suggesting that anhedonia as measured with the SHAPS taps a related but distinct construct from depression.

Table 2
Pearson correlation coefficients between the SHAPS and various other scales

	SHAPS	PAS	BIS	BAS Reward	BAS Drive	BAS Fun	SWLS	PANASPA
PAS	.41**							
BIS	−.15	−.02						
BAS Reward	−.37**	−.32**	.17					
BAS Drive	−.26**	−.30**	−.06	.44**				
BAS Fun	−.13	−.15	−.18*	.27**	.32**			
SWLS	−.18*	−.17	−.10	.10	.03	.01		
PANAS PA	−.25**	−.25**	−.21*	.31**	.30**	.26**	.30**	
PANAS NA	−.02	.11	.51**	.08	.07	−.08	−.39**	.03

Notes. $N=227$. *$p<.01$. **$p<.001$. SHAPS=Snaith–Hamilton Pleasure Scale, PAS=Physical Anhedonia Scale, BIS=Behavioral Inhibition System, BAS=Behavioral Approach System, SWLS=Satisfaction With Life Scale, PANAS=Positive And Negative Affect Scales, PA=Positive Affect, NA=Negative Affect.

In keeping with its construction intentions, the scores on the SHAPS were not associated with age ($r=-.04$) or gender ($t[224]=.80$)[2].

3. Study 2

3.1. Test–retest reliability

3.1.1. Participants and procedure

A separate sample of fifty participants (undergraduate psychology students) was asked to complete the SHAPS twice with an interval of 3 weeks. Mean age of these participants was 19.7 years (SD=3.7), and again, this sample mainly consisted of females (82%). All participants received course credits or a small financial remuneration for completing a set of questionnaires (see below).

3.1.2. Results

The mean scores on the first (22.4; SD=4.8) and second (22.4; SD=4.8) occasion were not different ($t[49]=-.80$). The intraclass correlation coefficient (ICC) between test and retest on the SHAPS was satisfactory ($r=.70$, $p<.001$), suggesting adequate test-retest reliability.

4. Study 3

4.1. Reliability and validity in clinical samples

4.1.1. Participants and procedure

For the purpose of Study 3, data from three groups of inpatients ($n=90$) residing in different psychiatric hospitals, including the psychiatry department of a general hospital, in The Netherlands and a control group ($n=50$) derived from the general population were collected. These clinical groups consisted of patients who were residentially treated for psychosis ($n=20$), major depression ($n=20$), and patients with a diagnosis of substance dependence ($n=50$). For all patients, diagnoses were made by a multidisciplinary team of mental health professionals following psychological and psychiatric evaluation. Furthermore, all subjects of the involved wards with the appropriate diagnosis were approached to participate in the present study. The control group ($n=50$) was recruited among relatives and coworkers of the recruiters. In all samples, both the SHAPS and the BDI were administered. Demographic data of all groups are displayed in Table 3.

4.1.2. Results

4.1.2.1. Internal consistency. For the total group of psychiatric patients, the Cronbach's alpha of the SHAPS was .94. The mean item-total correlation was .70 (ranging from .56 to .77). Alpha of the SHAPS in the psychosis group was .92, in the major depression group .95, and in the substance dependent group .91. A principal component analysis again yielded a one-factor solution explaining 55.7% of the variance. Altogether, these findings suggest that the SHAPS has an excellent internal consistency in a psychiatric sample.

4.1.2.2. Convergent and discriminative validity. As expected, the correlation between the SHAPS and the BDI was high in the psychiatric sample ($r=.64$, $p<.001$), suggesting that the SHAPS has good convergent validity. A One-way ANOVA revealed a significant between groups effect, $F(2,87)=9.0$, $p<.001$. Bonferroni corrected post-hoc tests revealed that depressive ($p<.001$), psychotic ($p<.001$) and substance abuse patients ($p<.001$) had higher SHAPS scores as compared to the control group. In addition, depressive patients displayed higher SHAPS scores than both psychotic ($p<.05$) and substance abuse patients ($p<.001$). No difference was observed between

Table 3
Characteristics of the three patient and control groups

	Controls	Substance abuse patients	Depressive patients	Psychotic patients
Mean age (years)	41.3 (13.5)	37.1 (9.8)	53.4 (8.4)	23.7 (6.2)
Gender ratio (% males)	52%	82%	40%	80%
Mean BDI Score	2.9 (3.6)	12.8 (9.7)	21.8 (11.3)	13.4 (9.5)
Normal BDI Score (%)	94%	44%	20%	40%
Mean SHAPS score	20.2 (4.4)	25.4 (7.4)	34.4 (9.8)	28.0 (7.6)
Range SHAPS score	14–29	14–43	14–52	14–43
Presence of anhedonia[1]	2%	32%	75%	45%

Note.[1]According to the criteria of Snaith et al., 1995.

[2] In contrast to the SHAPS, the PAS was in this sample significantly influenced by gender and age. The gender effect of the PAS may reflect the fact that this scale has some "typical female" items such as "I like playing with and petting soft little kittens or puppies" or "I have often enjoyed the feel of silk, velvet, or fur". In the same vein, PAS anhedonia scores significantly decrease ($r=-.18$ in the present study) as function of age. Probably because of some items that are age-dependent. For example, "I have always found organ music dull and unexciting" is probably more often answered in a confirmative way by young persons than by older persons.

psychotic and substance abuse patients. These results show that the SHAPS has adequate discriminant validity.

5. Discussion

This study examined the reliability and validity of the SHAPS in both clinical and non-clinical samples. The SHAPS had good to excellent internal consistency as indicated by high Cronbach's alpha values and item-total correlations, and this is true for both types of populations. As expected, the SHAPS was not influenced by age or gender. This finding supports the claim that the SHAPS measures anhedonia "free of distortion by reasons of age or sex" (Snaith et al., 1995). Theoretically meaningful correlations were found between the SHAPS and other questionnaires. That is, SHAPS scores were negatively correlated with scales that represent positive affect and sensitivity for reward, and unrelated to measures of negative affect and sensitivity for punishment. The modest correlations between the SHAPS and constructs such as BAS and positive affect suggest that these constructs are significantly associated but are not the same (see also Franken and Muris, 2006). Further, because anhedonia is defined as the absence of pleasurable feelings, and not the mere presence of aversive emotions (such as anxiety), these findings can be regarded an important contribution to the validity of the SHAPS as pure measure of anhedonia. In addition, the SHAPS also correlated negatively with general life satisfaction. Altogether, the pattern of correlations with other questionnaires demonstrate that the SHAPS has adequate construct validity.

Because the SHAPS does not measure anhedonia as a trait, in contrast to the PAS, scores on the SHAPS are to some extent expected to fluctuate over time. Therefore, the three-week test–retest reliability was found to be satisfactory (ICC = .70).

The SHAPS was able to discriminate between a sample of clinical patients and non-clinical individuals. In addition, the scale distinguished between a sample of depressive patients, and samples of psychotic patients and substance dependent patients. These differences in SHAPS scores were theoretically meaningful, indicating good discriminant validity.

Interestingly, the SHAPS has been successfully employed to study neurophysiological correlates of anhedonia in a healthy population (Franken et al., 2006a), which confirms its validity as an instrument for measuring anhedonia as an endophenotype.

A limitation of the present study is the absence of structured interview to validate the clinical diagnoses. A related limitation is that there were no data on comorbidity in the patient groups. Lastly, only self-report measures of anhedonia were used; it would be interesting to validate the SHAPS against behavioral measures (e.g., Pizzagalli et al., 2005).

To summarize, the SHAPS is a short, reliable and valid self-report questionnaire for assessing anhedonia. This conclusion may encourage further research addressing the role of anhedonia in several psychopathological states such as depression, schizophrenia, and substance use disorders.

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