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# The Schedule for Nonadaptive and Adaptive Personality (SNAP)

## Temporal Stability and Predictive Validity of the Diagnostic Scales

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*The authors investigated the test-retest reliability and predictive validity of the diagnostic scales from the Schedule for Nonadaptive and Adaptive Personality (SNAP). Participants were identified from a sample of 240 undergraduates who completed the SNAP and the Social Adjustment Scale (SAS-SR) at Time 1. The authors selected 50 people who met criteria for a personality disorder (PD) based on the SNAP and 50 who did not qualify for a diagnosis. Eighty-three of these people completed the SNAP and the SAS-SR for a second time approximately 9 months after initial screening. SNAP PD scales were relatively stable over time. Test-retest correlation coefficients ranged from .58 to .81. Scores on diagnostic scales for paranoid, schizoid, and schizotypal PD were inversely related to self-reported levels of adjustment for social roles concerned with work as a student, leisure activities, and relationships with family. The results provide some evidence for the validity of the SNAP.*

*Keywords:* personality disorders, stability, test-retest reliability, SNAP, social functioning

Clark (1993) developed the Schedule for Nonadaptive and Adaptive Personality (SNAP) to study trait dimensions that are related to personality disorders (PDs). The SNAP is a factor analytically derived self-report questionnaire with 375 true/false items. Scores can be obtained on 34 scales: 12 trait scales, 3 temperament scales, 6 validity scales, and 13 diagnostic (*Diagnostic and Statistical Manual of Mental Disorders* [3rd ed., rev.] PD) scales (American Psychiatric Association, 1987). The SNAP manual includes extensive reliability and validity information for the trait and temperament scales (Clark, 1993). Subsequent studies have expanded this base of knowledge and demonstrated that the trait and temperament scales of the

SNAP have excellent convergent validity in comparison to other questionnaires aimed at traits associated with personality disorders (Clark, Livesley, Schroeder, & Irish, 1996; Clark, McEwen, Collard, & Hickok, 1993; Reynolds & Clark, 2001).

The SNAP's diagnostic scales are also being used in research and clinical settings (e.g., Moes, Lall, & Johnson, 1996), but much less information is available regarding their psychometric properties. Items are similar to the criteria for PDs in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.) (American Psychiatric Association, 1994). Each PD criterion is represented by at least two items. The number of items needed to meet each spe-

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cific criterion varies. Clark (1993) provided two scoring methods for these scales. A criterion-based method can be used to assign dichotomous diagnoses. Using this method, it is necessary to determine whether the person endorsed the required number of SNAP items for each criterion and then compute the number of criteria that are met for each category. A dimensional score can also be computed by counting the total number of items that are endorsed for each scale (regardless of which criteria the items represent). Clark recommends the latter approach because dimensional scores are more reliable. The test manual describes adequate internal consistency and criterion validity for the diagnostic scales. The median correlation coefficient between corresponding diagnostic scores on the Structured Interview for *DSM-IV* Personality and the SNAP was .54, higher than typically found between self-report questionnaires and structured interviews (Clark, 1993). Discriminant correlations were also good but lower than the convergent correlations, probably reflecting the problem of overlap in PD diagnoses. No data are published in the manual or elsewhere regarding test-retest reliability or predictive validity for these scales.

Participants in the present study completed the SNAP and social functioning measures at two points in time. The *DSM-IV* states that PDs are stable and inflexible clusters of personality traits, and research has mostly supported this claim (Perry, 1993; Pilkonis, Heape, Ruddy, & Serrao, 1991; Trull, 1993). We expected that scores on the SNAP diagnostic scales should be stable over a period of several months.

The *DSM-IV* criteria also hold that PDs lead to significant impairment in social and occupational functioning. In this context, social functioning describes the ability of a person to cope with demands of living as well as the ways in which one interacts with society and his or her own personal environment (Tyrer, 1993). This definition includes interactions and demands at work, within the family, and in other interpersonal relationships. Previous studies have presented evidence of a link between PDs and social impairment in both clinical and nonclinical samples (Casey, 1993; Lara, Ferro, & Klein, 1997; Leader & Klein, 1996; Perry, 1993; Trull, Useda, Conforti, & Doan, 1997). We expected that scores on the SNAP diagnostic scales would be inversely correlated with scores on a standard self-report measure of social adjustment (i.e., higher PD scores would be associated with lower levels of social functioning).

Beyond this cross-sectional association, we also wanted to determine whether evidence of personality pathology would predict a further decline in social functioning over time. Social functioning is certainly malleable, and it is often included in outcome studies of PDs to assess improvement over time (Perry, 1993). We expected our so-

cial functioning measure to be less stable than scores on the SNAP. More specifically, we wanted to know whether the presence of personality pathology at Time 1 would be associated with an increase in social impairment from Time 1 to Time 2 (i.e., controlling for the effects of social functioning at original screening). This pattern would suggest that personality problems can play a central role in creating social impairment.

## METHOD

The current study was part of a larger, ongoing study using peer nomination, self-report, and diagnostic interview data to examine PD traits (Oltmanns, Turkheimer, & Fiedler, 1999). A subset of people was selected to complete the SNAP and a self-report measure of social adjustment 7 to 14 months after they were originally tested for our study.

### Participants

We recruited 240 first-year university students (173 female) for participation at Time 1 through the resident assistants of single-sex dormitories. At Time 2, 50 male and 50 female participants were selected from the Time 1 participant pool. Half of the selected students were chosen because they met the *DSM-III-R* criteria for one or more PDs on the SNAP at Time 1 (based on criterion scoring of the diagnostic scales). The other half did not meet the full *DSM-III-R* criteria for any diagnosis at Time 1, although several of these participants obtained PD scores that were just below the threshold for a diagnostic category. We selected 100 participants because exactly 50 of the original participants met criteria for at least one PD at Time 1. Eighty-three (44 female) of the 100 selected students responded and participated at Time 2, during their 2nd year at the university.

Eleven of the 83 students met criteria (as defined by the SNAP) for a Cluster A diagnosis at Time 1 (paranoid, schizoid, or schizotypal), 20 met criteria for a Cluster B diagnosis (antisocial, borderline, histrionic, narcissistic), and 18 met criteria for a Cluster C diagnosis (obsessive-compulsive, avoidant, dependent). Some students met full criteria for more than one diagnosis on the SNAP, resulting in 34 of the 83 participants' (who completed follow-up) meeting criteria for at least one PD at Time 1. These students were 70% White, 13% African American, 9% Asian, and 8% Native American, Hispanic, or biracial. All participants were paid \$10 at Time 1 and then again at Time 2.

## Materials

*SNAP.* We used scores on the 10 diagnostic scales for the *DSM-III-R* PDs on the SNAP (Clark, 1993). We reported categorical scores in our description of the sample but used dimensional scores in subsequent statistical analyses. We excluded three SNAP diagnostic scales: Passive-Aggressive, Sadistic, and Self-Defeating PD. Passive-aggressive PD was included in *DSM-III-R*, but it has been moved to the appendix of *DSM-IV*. Sadistic PD and Self-Defeating PD were in the appendix of *DSM-III-R* but do not appear in *DSM-IV*.

*Social Adjustment Scale–Self Report (SAS-SR).* The SAS-SR (Weissman, 1999) is a 54-item instrument that assesses role functioning during the previous 2 weeks. It is one of the most widely used and well-validated measures of social adjustment (Tyrer, 1993). A global measure of social functioning can be calculated, along with six role area scores. Our participants completed 23 items that covered three areas: work (school), social, and family roles. Three areas (marital, parental, and family unit) were not included because they were less applicable in a college student population. The SAS-SR was developed and tested with depressed outpatients, but it has been useful in a wide range of populations, including psychiatric and community samples (e.g., Weissman, Olfson, Gameroff, Feder, & Fuentes, 2001). This measure has been shown to have acceptable test-retest reliability (Resnick, Calhoun, Atkeson, & Ellis, 1981), interrater reliability (patients and significant others), concurrent validity (with interview data), and discriminant validity (Weissman et al., 2001).

## Procedure

The data for Time 1 were collected from groups during the spring semester of 1997 (February through April). All participants completed the SNAP and the SAS-SR on a computer, and they were informed that they might be contacted again later.

Participants for Time 2 were contacted beginning in November of 1997 and asked to complete the same measures again. Research assistants made individual appointments with participants for Time 2, and data collection continued until April of 1998. The resulting time lapse ranged from 7 to 14 months.

## RESULTS

Preliminary analyses were conducted separately for men and women, but no differences were found. The results reported here are for all participants. To ensure a nor-

mal distribution for all variables, scores were standardized for all questionnaires.

## SNAP Diagnosis and Participation Rate

Only 83 out of 100 participants who were invited to participate in the follow-up study actually agreed to participate at Time 2. Therefore, we compared those who completed the reassessment with those who did not. We predicted, using multiple regression, Time 2 status (completion or not) from Time 1 SNAP scores and from SAS-SR scores. There were only two significant effects, and those were small. People with higher obsessive-compulsive PD scores (continuous) were less likely to complete the follow-up assessment ( $R^2 = .04$ ). Those with higher dependent PD traits were more likely to complete the follow-up ( $R^2 = .02$ ).<sup>1</sup>

## Stability

At Time 1, 41% of participants ( $n = 34$ ) met criteria for at least one SNAP PD categorical diagnosis. At Time 2, 35% ( $n = 29$ ) of participants met criteria for at least one diagnosis. There were 21 participants who met criteria at both times, 13 who met criteria for at least one diagnosis at Time 1 but not at Time 2, and 8 who did not meet criteria for a diagnosis at Time 1 but did at Time 2. Pearson's  $r$  correlation coefficients between Time 1 and Time 2 dimensional scores on the SNAP diagnostic scales were significant at the .0001 level for each PD (see Table 1). The lowest correlation coefficient occurred for the schizotypal PD traits ( $r = .59$ ), and the highest occurred for the antisocial PD traits ( $r = .84$ ), providing support for the test-retest reliability of the SNAP diagnostic scales.

Table 1 also includes Time 1–Time 2 correlation coefficients between each SNAP diagnostic scale and all other SNAP diagnostic scales. Similar to the criterion validity data provided by Clark (1993), coefficients are highest on the diagonal, but there are several other significant relationships. In addition, SNAP scales are related to each other in logical ways over time. For example, Time 1 avoidant scores are positively correlated with Time 2 schizoid scores ( $r = .56, p < .0001$ ) but negatively correlated with Time 2 histrionic scores ( $r = -.36, p < .01$ ).

Correlation coefficients between Time 1 and Time 2 SAS-SR subscale scores were also significant ( $r = .46$  for School,  $r = .58$  for Social, and  $r = .45$  for Family Role scores,  $p < .0001$ ).

## Predictive Validity

To examine the ability of the SNAP PD scales to predict future social functioning, several regression equations

**TABLE 1**  
**Correlation Coefficients for Time 1 and Time 2 SNAP Personality Disorder Scores (N = 83)**

Time 1	Time 2									
	PAR	SZD	STP	ASP	BDL	HIS	NAR	AVD	DEP	OC
PAR	.74****	.35*	.46****	.11	.34*	-.14	.18	.55****	.30*	.13
SZD	—	.78****	.52****	.38**	.25	-.44****	.00	.56****	-.13	-.04
STP	—	—	.59****	.27***	.48****	-.07	.28*	.46****	.17	.09
ASP	—	—	—	.84****	.49****	.13	.20	.01	-.21	-.28**
BDL	—	—	—	—	.73****	.16	.35**	.17	.20	-.02
HIS	—	—	—	—	—	.79****	.47****	-.36**	.20	.24***
NAR	—	—	—	—	—	—	.72****	.00	.03	.32*
AVD	—	—	—	—	—	—	—	.75****	.27***	.13
DEP	—	—	—	—	—	—	—	—	.80****	.00
OC	—	—	—	—	—	—	—	—	—	.69****

NOTE: SNAP = Schedule for Nonadaptive and Adaptive Personality (Clark, 1993); PAR = paranoid; SZD = schizoid; STP = schizotypal; ASP = antisocial; BDL = borderline; HIS = histrionic; NAR = narcissistic; AVD = avoidant; DEP = dependent; OC = obsessive-compulsive.  
 \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . \*\*\*\* $p < .0001$  (meets correction for multiple comparisons).

were estimated. Our initial goal was to determine the proportion of variance in Time 2 SAS-SR scores explained by Time 1 SNAP scores, independent of Time 1 SAS-SR. First, we predicted Time 2 SAS-SR from Time 1 SAS-SR for each role score. The effect size ( $R^2$ ) for the Social Role scale was highest, then School Role, and then Family Role (see Table 2). Time 1 SNAP PD dimensional scores were then added to the equation simultaneously. Rather than add 10 separate but correlated PD scores to the equation, we created cluster scores by summing the standardized SNAP scores within each cluster. The additional reduction in error ( $R^2$ ) attributable to the SNAP PD cluster scores, over and above Time 1 social functioning, was then calculated for each role score (Table 2). As expected, the addition of SNAP scores to the regression equation improved the prediction of social functioning.

When the SNAP cluster scores were examined for their independent effect sizes in the regression equations, we found that only Cluster A (paranoid, schizoid, schizotypal) scores contributed significant reduction in error ( $F = 4.89$ ,  $p < .05$  for School;  $F = 6.03$ ,  $p < .05$  for Social;  $F = 6.82$ ,  $p < .05$  for Family). These results provide evidence for the ability of these SNAP scales to predict changes in social functioning.

This method of extracting Time 1 social functioning variance from Time 2 social functioning may be overly conservative. Therefore, we also examined how well Time 1 SNAP cluster scores could predict Time 2 SAS-SR scores without partialling out Time 1 SAS-SR scores. When we estimated these regression equations, results were similar (see Table 2). The effect size ( $R^2$ ) for predicting the Social Role score was highest followed by School Role and then Family Role. An examination of the independent effect sizes for the SNAP cluster scores revealed that Cluster A scores contributed significantly to the pre-

**TABLE 2**  
**Prediction of Time 2 SAS-SR From Time 1 SAS-SR and SNAP Scores (N = 83)**

Regression Equations			
Predicting Time 2			
Social Functioning			
(SAS-SR)	School Role	Social Role	Family Role
Time 1 SAS-SR only	0.21	0.34	0.20
SAS-SR and SNAP	0.27	0.40	0.30
SNAP only	0.17	0.29	0.22

NOTE: SAS-SR = standardized role scores from Social Adjustment Scale-Self Report (Weissman & Bothwell, 1976); SNAP = Schedule for Nonadaptive and Adaptive Personality (Clark, 1993) personality disorder cluster scores.

diction of Time 2 SAS-SR for all role area scores ( $F = 11.80$ ,  $p < .01$  for School;  $F = 20.59$ ,  $p < .01$  for Social;  $F = 15.86$ ,  $p < .01$  for Family). Cluster B scores contributed significantly to the prediction of only the Social Role score ( $F = 5.74$ ,  $p < .05$ ), and Cluster C did not make any contribution.

Contrary to our initial expectations, high Cluster B scores at Time 1 predicted high scores on the Social Role scale of the SAS-SR at Time 2 ( $t = -2.40$ ,  $p < .0190$ ). It is somewhat difficult to draw conclusions regarding this result because four PDs make up Cluster B. Eleven of the 20 participants who qualified for Cluster B diagnoses met the criteria for histrionic PD, 3 met criteria for antisocial PD, 3 for narcissistic PD, and 3 for borderline PD. Due to the disproportionate number of participants qualifying for histrionic PD, we wondered if these scores were driving the relationship between Cluster B scores and the SAS-SR. In addition, although an equal number of participants met criteria for each of the three PDs in Cluster A, we wanted to

clarify the nature of their relationship with the social functioning measure.

We used cluster scores rather than individual PD scores in the above analyses because of power constraints and because the SNAP diagnostic scales are correlated with each other. We then decided to explore the relationship between specific Cluster A diagnostic scales and the SAS-SR scales and between specific Cluster B diagnostic scales and the Social Role scale. We calculated Pearson's  $r$  correlation coefficients between the three individual Cluster A PD scales and each SAS-SR score (see Table 3). All comparisons were significant at the .0001 level, except for between Time 1 schizotypal and schizoid PDs and Time 2 School Role.

We then calculated Pearson's  $r$  correlation coefficients between the four Cluster B diagnostic scales and the Social Role scores. Only the histrionic PD scale was correlated with the Social Role scale, and the relationship was in the negative direction. In other words, participants who endorsed more histrionic PD items at Time 1 also reported higher levels of social role functioning at Time 2.

## DISCUSSION

Our results support the test-retest reliability and the predictive validity of the diagnostic scales on the SNAP (Clark, 1993) in a sample of college students originally selected for high PD scores. Test-retest correlation coefficients over 7 to 14 months ranged from .59 to .84. These numbers are as good as should be expected with instruments for normal or dysfunctional personality traits (McDavid & Pilkonis, 1996). Vaglum, Friis, Karterud, Mehlum, and Vaglum (1993) suggested that 70% to 80% stability is actually the maximum that one can expect to find even if the true stability should be higher. Furthermore, it has been suggested that the overall pattern of behavior related to PD traits is stable but likely to fluctuate in severity over time (Hirschfeld, 1993). The SNAP is clearly a stable measure of traits that are related to PDs.

The first evidence we found regarding the predictive validity of the SNAP scales was in our analysis of the differences between those participants who completed the follow-up assessment and those who did not. These data support the validity of SNAP diagnostic scales for Cluster C. The effects were small, but results suggested that those with higher scores on the scale for obsessive-compulsive PD (OCPD) were less likely to complete our follow-up assessment. People who produced higher scores on the dependent PD scale were more likely to comply with the follow-up testing. We were initially surprised by this result because OCPD is associated with conscientiousness, and we expected that conscientious people would be more

**TABLE 3**  
**Correlation Coefficients Between Select Time 1 SNAP Personality Disorder Scores and Time 2 SAS-SR Social Functioning Scores ( $N = 83$ )**

Time 1	Time 2		
	School Role	Social Role	Family Role
Paranoid PD	.45****	.42****	.42****
Schizoid PD	.21	.47****	.32****
Schizotypal PD	.33**	.42****	.39****
Antisocial PD	—	.03	—
Borderline PD	—	.17	—
Histrionic PD	—	-.36****	—
Narcissistic PD	—	.01	—

NOTE: SNAP = Schedule for Nonadaptive and Adaptive Personality (Clark, 1993); SAS-SR = Social Adjustment Scale–Self Report (Weissman & Bothwell, 1976); PD = personality disorder.  
\*\* $p < .01$ . \*\*\*\* $p < .0001$  (meets correction for multiple comparisons).

likely to complete our assessment. On the other hand, OCPD is also associated with workaholic and perfectionism. People who produced high scores on the OCPD diagnostic scale may have been overextended and having difficulty completing projects for school and in other areas of their lives. These responsibilities may have prevented them from accepting another assignment. The picture for people with high scores on the dependent PD scale was quite different. They may have found it somewhat difficult to refuse to participate in the follow-up, regardless of their workload.

Predictive validity of the three Cluster A diagnostic scales on the SNAP was supported by evidence regarding the prediction of social functioning. Social functioning is expected to fluctuate somewhat over time. Our results do indicate some malleability because SAS-SR scores were only moderately correlated between Time 1 and Time 2 ( $r = .46$  for School Role,  $r = .58$  for Social Role, and  $r = .45$  for Family Role). We considered the influence of personality traits that may contribute to changes in social functioning by adding SNAP diagnostic scale scores to the prediction equation. This analysis was conservative because we partialled out a major portion of the variance with Time 1 social functioning scores. Cluster A traits independently predicted poor social functioning 7 to 14 months later. In other words, beyond their connection to lower levels of social functioning at Time 1, young adults who produce higher scores on the SNAP diagnostic scales for Cluster A are more likely than their peers to experience a further decline in social adjustment over the next few months. Cluster B (antisocial, borderline, narcissistic, and histrionic) and Cluster C (dependent, avoidant, and obsessive-compulsive) scores did not independently contribute to change in self-reported social functioning.

When we predicted Time 2 social functioning from SNAP scales without extracting variance from Time 1 social functioning, we found that high Cluster A scores predicted poor social functioning. Cluster B also predicted higher scores on the Social Role scale of the SAS-SR using this method. The Cluster C scales, taken as a group, were not related to any of the social functioning scores.

When we explored these relationships at the level of individual scales, we found that the paranoid, schizotypal, and schizoid diagnostic scales were all related to poor social functioning. On the other hand, only one of the Cluster B scales, histrionic PD, was significantly correlated with scores on the SAS-SR, and this relationship was in the opposite direction. People who produced higher scores on the SNAP histrionic scale reported better levels of social role functioning.

The significant correlation between scores on the histrionic diagnostic scale and scores on the social role scale of the SAS-SR makes sense when we examine the content of specific questions on the SAS-SR. Questions on the social and leisure role scale include the following: "How many friends have you seen or been in contact with in the last 2 weeks?" "How many times in the last 2 weeks have you gone out socially with other people?" and "How often have you been able to talk about your feelings and problems with one of your friends during the last 2 weeks?" People who meet the criteria for histrionic PD would be expected to produce low scores on these items, that is, they would spend more time with their friends and would have less trouble expressing feelings. This pattern would not necessarily imply that histrionic PD is associated with improved social functioning. Rather, it means that the kind of social impairment associated with this disorder is of a different kind. For example, *DSM-IV* suggests that people with histrionic PD are likely to have superficial relationships with other people (not necessarily fewer social relationships). The SAS-SR was not designed to probe for this kind of problem. Future studies of social functioning in histrionic PD (and other types of PD) should consider this issue carefully.

The present study is also limited by its reliance on a self-report measure of social functioning. People with PDs may not recognize the problems that their own behavior causes in interpersonal relationships. Again, the *DSM-IV* suggests that people with histrionic PD may experience difficulties in friendships with same-sexed peers who might feel threatened by the histrionic person's overtly flirtatious behaviors. The person in question would not necessarily be aware of their friends' hard feelings. This issue raises important questions about procedures used to measure social impairment. It may be useful to obtain relevant information from friends and family members.

Taken as a whole, the results of this study provide support for the utility of the SNAP diagnostic scales. They are relatively stable over a period of several months in time. Scores on the paranoid, schizotypal, and schizoid PD scales are correlated with impaired social functioning as indexed by a self-report measure. Furthermore, young adults who score high on these three diagnostic scales are likely to experience a further decline in social functioning over the next year.

## NOTE

1. The 4 participants with obsessive-compulsive personality disorder diagnoses who did not complete the follow-up assessment all refused participation passively rather than directly (i.e., they did not respond to repeated e-mails and phone calls). Two of these people met criteria for three additional subclinical, Axis II diagnoses (based on the Schedule for Nonadaptive and Adaptive Personality [SNAP] diagnostic scales with criterion scoring from Time 1). The other 2 met full criteria for another personality disorder (PD) diagnosis (1 narcissistic and 1 avoidant). No other differences were found using either the SNAP trait scales or the Social Adjustment Scale-Self Report scales.

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**Eric Turkheimer** is a professor of psychology at the University of Virginia. In addition to his research on the measurement of personality disorders and psychopathology, he is interested in genetic and environmental pathways to development.