# Measurement of Premorbid Adjustment in Chronic Schizophrenia

*by H. Eleanor Cannon-Spoor, Steven G. Potkin, and Richard Jed Wyatt*


## Abstract

**The Premorbid Adjustment Scale (PAS) is a rating scale which was developed to be applicable in a research setting. It is designed to evaluate the degree of achievement of developmental goals at each of several periods of a subject's life before the onset of schizophrenia. A description of the scale and its use is presented, along with a discussion of psychometric properties. The PAS has been found to be useful in identifying patients likely to become chronically hospitalized or at high risk for readmission. It may also serve as a possible predictor of patients with brain abnormalities on a computerized tomography (CT) scan.**


Schizophrenia markedly disrupts an individual's psychosocial functioning. Assessment of psychosocial functioning has become a useful area of investigation but is confounded by the schizophrenic process itself. Therefore, considerable research has focused on assessment of the individual's psychosocial functioning before the onset of the schizophrenic illness, i.e., the premorbid period. Separating early morbid functioning from premorbid functioning can be difficult at times. To the degree that this separation can be made, one can relate factors preceding the disorder to aspects of the disorder itself, such as course, degree of response to treatment, and current symptoms. Do patients with good premorbid psychosocial functioning have better outcomes or require less medication? Are different etiologies suggested by different patterns of premorbid adjustment? Thoughtful planning of therapeutic goals for psychotic patients requires understanding and assessing what the individual was like before onset of the illness, and to what degree psychosocial functioning and developmental tasks were mastered before the individual became ill.

Successful psychosocial functioning comprises many components and is difficult to conceptualize and to define, especially in the form of a rating instrument. Further, it has not always been clear which aspects of premorbid life are most characteristic and have most predictive value in a rating scale. The most thoroughly studied premorbid scales, such as the Phillips Scale (Phillips 1953), the Elgin Prognostic Scale (Wittman 1941), the Premorbid Asocial Adjustment Scale (Gittelman-Klein and Klein 1969), and the Premorbid Adjustment Survey (Goldstein 1977), have shown poor premorbid adjustment to be related to various parameters including outcome of therapy, duration of hospitalization, and types of symptoms (Goldstein, Held, and Cromwell 1968; Klorman, Strauss, and Kokes 1977; Kokes, Strauss, and Klorman 1977). Most of these scales, however, were developed a number of years ago. Consequently, the items in many, while calling for subjective ratings, contain anchor points that no longer reflect cultural norms. Further, most scales fail to evaluate premorbid functioning

Reprint requests should be sent to H.E. Cannon-Spoor at Adult Psychiatry Branch, Division of Special Mental Health Research, IRP, NIMH, Saint Elizabeths Hospital, WAW Bldg., Washington, DC 20032.

systematically at several periods of life. The Premorbid Asocial Adjustment Scale (Gittelman-Klein and Klein 1969), which does incorporate continuity from one age level to another in some of its items, does not attempt to estimate function in adulthood. The Phillips Scale (Phillips 1953) addresses itself to sexual adjustment in adulthood long after the onset of sexual behaviors. The Kantor Scale (Kantor, Wallner, and Winder 1953), which also provides items for several periods of life from childhood through adulthood, was developed as a tool to dichotomize patients into process versus reactive schizophrenics. The scale does not provide items to measure developmental processes. It was noted by Houlihan (1977) that the process-reactive concept when implemented in a scale such as this tends to reflect the development of schizophrenic illness rather than the normal maturation process.

In the summer of 1977, the Center for Studies of Schizophrenia held a workshop focusing on difficulties in assessing premorbid adjustment (Keith and Buchsbaum 1978). The present scale was developed in response to suggestions and apparent consensus that came out of the workshop. We wished to develop a scale that (1) was useful for research purposes, (2) conceptualized successful premorbid adjustment in terms of the attainment of certain developmental goals that were viewed as necessary milestones for healthy functioning, and (3) considered attainment of these goals as specific age-related tasks. Thus, the individual with a poor premorbid adjustment was viewed as one who might not achieve one or more of these developmental goals before the onset of illness, or who might achieve them at a later period of life than is considered appropriate. Premorbid "competence," in social terms, could thus be measured by the extent to which the individual was able to meet age- and sex-appropriate expectations before becoming ill (Phillips 1953).

## Description of the Scale

The Premorbid Adjustment Scale (PAS) (see Appendix) is a rating scale designed to evaluate the level of functioning in four major areas at each of several periods of the subject's life: social accessibility-isolation, peer relationships, ability to function outside the nuclear family, and capacity to form intimate socio-sexual ties. Items evaluating age-appropriate functioning in these areas are repeated for each period of the subject's life. The four life period sections are as follows: Childhood, up to 11 years; Early Adolescence, 12–15 years, Late Adolescence, 16–18 years; and Adulthood, 19 years and beyond. The final section, labeled General, is more global, containing items meant to estimate the highest level of functioning that the subject achieved before becoming ill, as well as the time span and characteristics of onset of illness, and general information such as amount of education. Scale items are made up of a combination of original, adopted, and modified items from the Phillips Scale, the Premorbid Social Adjustment Scale, and the Elgin Scale. The adopted items were chosen from these scales based on their suitability to each time period of the subject's life, and their suitability for estimating the successes and failures in the subject's development.

The scale is intended to measure only "premorbid" functioning, with "premorbid" being defined as the period ending 6 months before the first psychiatric hospital admission or psychiatric contact, or 6 months before evidence of characteristic florid psychotic symptomatology including delusions, hallucinations, thought disorder, inappropriate or bizarre behavior, or gross psychomotor behavior in which the symptoms are not apparently due to organic causes. Only those life periods that are premorbid by this definition should be rated on the scale, regardless of the present age of the subject; for example, a 39-year-old patient who had his first psychotic break at age 17 would not be rated in the adult section (age 19 and beyond), but would be rated on all the other scales, including the General section.

Ratings are based on histories derived from the subject's hospital records or family members. When it is felt that the patient is reliable, a personal interview may also be carried out to complete the ratings.

**Rating.** Each section of the scale contains a number of items with a scoring range of 0–6. The "0" end of the continuum denotes the hypothetically healthiest end of the adjustment range, and the "6" the hypothetically least healthy end. Descriptive phrases serve as rough anchor points. The rater selects the number that corresponds most closely to the descriptive phrase nearest it. Not every aspect included in a descriptive phrase is necessary for the rating. For example, "poor adaptation, dislikes school, frequent truancy, and fre-

quent discipline problem" all appear opposite a rating of "4" on the school adaptation item. A child who has a poor adaptation to school, dislikes it, and is a discipline problem may be rated a "4," even though that child does not have a history of truancy. When the rater does not have sufficient information regarding a particular item, that item is not scored.

**Scoring.** The ratings received for each item in a section are summed and expressed as total score divided by the possible score. The possible score indicates the highest score obtainable by adding the maximum score for all items completed. Thus, if a subject receives ratings of 2, 3, 3, and 2 for the four items in the childhood section, the total score for that section is 10. The possible score is 24 (6+6+6+6), and the total score divided by the possible score is .42. When no information is available for a particular item, the item is not scored. The score for the section then is expressed as total score/possible score for the items rated. For example, if only three out of four of the items in the preceding example are scored, possible score becomes 18 (6+6+6) instead of 24. If the patient received the same ratings as in the previous example, except for one unratable last item, the total section score would be 8 (2+3+3). In this case, total score/possible score is 8/18 or .44.

An overall score for the whole scale may be calculated by averaging the subscale scores for all the subscales rated for the patient. An average is preferred to a total score in order to avoid bias that would occur in cases in which the sum of a few highly scored subscales would result in the same score as the sum of several moderately or low-scored subscales, when age of onset of illness or lack of information leads to some subscales being left out.

## Reliability

Interrater reliability was determined in two studies. In the first study, two raters familiar with and experienced in the use of the PAS rated 11 patients. Both raters reviewed the patients' charts for psychosocial histories. In some instances, patient interviews were conducted with both raters present. After chart reviews and patient interviews were completed, the raters independently completed the PAS for each patient. The intraclass correlation coefficient for the two raters was $r = .85$ ($p = .0001$).

In the second study, interrater reliability among raters from another hospital who were unfamiliar with the scale and untrained in its use was investigated. Three raters at a California Veteran's Administration Hospital independently rated patients from chart histories alone. When these ratings were completed, the chart histories were reviewed by the two experienced raters. The intraclass correlation coefficient was $r = .40$ ($p = .01$) for the three Veteran's Administration Hospital raters and $r = .85$ ($p = .0001$) for the NIMH raters. The correlation for all five raters was .74 ($p = .0001$).

Table 1 contains intraclass correlation coefficients for each item and each subscale for all the raters. The correlations are statistically significant for all items except 5 and 6 in the General section.

## Validity

**Comparison With a Normal Population.** A group of 76 normal controls (10 females and 66 males), made up of students, Air Force enlisted personnel, and employees of Saint Elizabeths Hospital, was rated on the PAS. Control subjects were told that the rating scale was being used to compare social development of "normal" persons with that of persons who had become mentally ill. The control subjects were interviewed by one of two raters who were familiar with the scale. The raters then filled out the PAS for the control subjects based on the information gathered in the interview. The mean ± standard error of the mean for each subscale and the Average score for the normals and for a group of 86 schizophrenic patients (12 females and 74 males) are shown in table 2. The patient population was from Saint Elizabeths Hospital and had volunteered to be a part of the study. All patients had met Research Diagnostic Criteria (Spitzer, Endicott, and Robins 1975) and Feighner Criteria (Feighner et al. 1972) for schizophrenia. The normals were significantly different ($p < .01$, two-tailed $t$ test) on every subscale and on Average score from the patient population.

**Outpatients vs. Chronically Hospitalized Patients.** Patients were drawn from wards at Saint Elizabeths Hospital, Washington, D.C., or were outpatients from Saint Elizabeths. PAS ratings for the schizophrenic patients were accomplished by a combination of chart history review and personal interviews by the same raters who rated the normal subjects. All pa-

**Table 1. Intraclass reliability coefficients for each item of the PAS for raters at Saint Elizabeths and the Palo Alto Veterans Administration Hospital**

| Subscale items | Saint Elizabeths | | Subscales | | VA hospital | | Subscales | | All raters | | Subscales | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *r* | *p* | *r* | *p* | *r* | *p* | *r* | *p* | *r* | *p* | *r* | *p* |
| C1 | .92 | .0000 | | | .47 | .796 | | | .71 | .0005 | | |
| C2 | .75 | .001 | | | .50 | 1.0 | | | .51 | .009 | | |
| C3 | .92 | .0001 | | | .13 | .16 | | | .67 | .002 | | |
| C4 | .70 | — | .86 | .000 | −.48 | .83 | .53 | .002 | .36 | .06 | .62 | .0000 |
| EA1 | .99 | .0000 | | | −.29 | .47 | | | .86 | .0000 | | |
| EA2 | .94 | .0000 | | | −.01 | .24 | | | .77 | .0002 | | |
| EA3 | .85 | .0003 | | | −.20 | .38 | | | .86 | .0000 | | |
| EA4 | .76 | .002 | | | .25 | .12 | | | .72 | .0007 | | |
| EA5 | .79 | .003 | .91 | .0000 | — | — | .16 | .15 | .80 | .001 | .83 | .0000 |
| LA1 | .90 | .001 | | | .29 | .10 | | | .87 | .0001 | | |
| LA2 | .88 | .0004 | | | .41 | .07 | | | .78 | .0004 | | |
| LA3 | .91 | .0004 | | | −.33 | .52 | | | .87 | .0001 | | |
| LA4 | .37 | .09 | | | .17 | .15 | | | .39 | .06 | | |
| LA5 | .93 | .0003 | .87 | .0000 | −.20 | .38 | .53 | .002 | .93 | .0000 | .83 | .0000 |
| A1 | .96 | .001 | | | −.33 | .52 | | | .92 | .0001 | | |
| A2 | .88 | .003 | | | .63 | .03 | | | .78 | .001 | | |
| A3 | .97 | .0004 | .96 | .0000 | .50 | .05 | .57 | .006 | .95 | .0000 | .91 | .0000 |
| G1 | .88 | .0001 | | | −.31 | .50 | | | .69 | .001 | | |
| G2 | .56 | .02 | | | −.20 | .38 | | | .59 | .005 | | |
| G3 | .69 | .003 | | | −.11 | .31 | | | .52 | .01 | | |
| G4 | .86 | .001 | | | — | — | | | .94 | .0000 | | |
| G5 | .28 | .13 | | | — | — | | | .06 | .28 | | |
| G6 | .48 | .03 | | | −.46 | .76 | | | .15 | .20 | | |
| G7 | .73 | .001 | | | −.50 | 1.0 | | | .73 | .0004 | | |
| G8 | .78 | .001 | | | — | — | | | .76 | .0006 | | |
| G9 | .86 | .0006 | .74 | .0000 | — | — | .34 | .01 | .79 | .0008 | .62 | .0000 |
| **Full Scale** | | | .85 | .0000 | | | .40 | .0000 | | | .74 | .0000 |

C=Childhood; EA=Early Adolescence; LA = Late Adolescence; A = Adulthood; G = General.

tients' charts were reviewed, and interviews were conducted with patients who were well enough to cooperate. The majority of the patients were drawn from research wards, where care had been taken by the ward physicians and the psychiatric staff to acquire as full and detailed a history as possible for research purposes. Of the total group of 86 schizophrenic patients rated on the PAS, 19 were outpatients at the time the ratings were done. Approximately half of the remaining patients had been continuously hospitalized for 7 years or more. When we compared premorbid adjustment of the patients who were currently outpatients to that of the patients who had been continuously hospitalized for at least 7 years, the PAS successfully discriminated between the two groups. As expected, the patients who had been continuously hospitalized had significantly worse premorbid adjust-

**Table 2. Means (± SEM) for normal controls and chronic schizophrenic patients on each subscale of the PAS and Average scale score**

| | Childhood | | Early Adolescence | | Late Adolescence | | Adult | | General | | Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Subjects** | **Mean** | ***p*** | **Mean** | ***p*** | **Mean** | ***p*** | **Mean** | ***p*** | **Mean** | ***p*** | **Mean** | ***p*** |
| Normal controls | .23 | .01 | .21 | .01 | .17 | .01 | .12 | .01 | .09 | .01 | .16 | .01 |
| (*n*) | (76) | | (76) | | (76) | | (76) | | (76) | | (76) | |
| Schizophrenic patients | .35 | .02 | .44 | .02 | .52 | .02 | .31 | .02 | .51 | .02 | .45 | .02 |
| (*n*) | (77) | | (76) | | (61) | | (32) | | (86) | | (86) | |

ment scores. Significant discrimination was obtained for all subscales except Childhood (Early Adolescence, $p = .02$; Late Adolescence, $p = .009$; Adulthood, $p = .02$; and Average score, $p = .002$; one-way analysis of variance; table 3).

**Length of Hospitalization.** Reliable information regarding length of hospitalization was available for 39 patients. Average premorbid adjustment scores for these patients were correlated with the number of months of hospitalization (Pearson $r = .41$, $p = .006$). Chronic hospitalization was related to poor premorbid adjustment. When the individual subscale scores of the PAS were correlated with length of hospitalization, the Childhood ($r = .47$, $p = .003$), Early Adolescence ($r = .38$, $p = .03$), and General ($r = .36$, $p = .03$) subscales and Average scale ($r = .46$, $p = .005$) were significantly correlated (table 4).

Age of onset could be determined for 40 patients. These patients were divided by age of onset into four groups: age of onset of 15 years old and below (8 patients, mean ± SEM months hospitalization = 174 ± 54.3 months), 16 to 18 years old (18 patients, 109.7 ± 83.6 months), 19 to 24 years old (13 patients, 133.3 ± 46.3 months) and over 25 years old (1 patient, 216 months). The analysis of variance (ANOVA) between the groups for

**Table 3. One-way ANOVA, mean ± SEM, and (*n*) for outpatients and inpatients on the subscales of the PAS**

| Subscales | Outpatients | Inpatients | *F* | *p* |
|---|---|---|---|---|
| Childhood | .37 ± .03 (17) | .45 ± .05 (19) | 1.57 | .22 |
| Early Adolescence | .40 ± .04 (19) | .55 ± .05 (16) | 5.98 | .02 |
| Late Adolescence | .46 ± .05 (18) | .67 ± .05 (11) | 8.0 | .009 |
| Adulthood | .34 ± .05 (9) | .71 ± .08 (4) | 18.1 | .001 |
| General | .44 ± .05 (20) | .59 ± .04 (20) | 6.05 | .02 |

**Table 4. Length of hospitalization and premorbid adjustment**

| Subscale | Pearson *r* | *p* |
|---|---|---|
| Childhood | .47 | .003 |
| Early Adolescence | .38 | .14 |
| Late Adolescence | .28 | .13 |
| Adulthood | .56 | .12 |
| General | .36 | .03 |
| Average | .46 | .005 |

length of hospitalization and age of onset was insignificant ($F = .60$, $p = .62$; see table 5). Table 6 provides item-by-item correlations for length of hospitalization.

**Insidious vs. Acute Onset.** Item number 3 in the General subscale assesses rapidity of onset of illness by change in work or school performance. Based on patients' scores on this item, we compared premorbid adjustment in patients who had an acute onset (defined as less than 3 months) to that of patients whose onset was rated as insidious (for whom it was rated difficult or impossible to determine the onset of deterioration). Twelve patients had been rated as having an acute onset of less than 3 months and 10 an insidious onset. The scale successfully discriminated between the two groups of patients on Average PAS and on all subscales except the Adult subscale (Childhood, $p = .004$; Early Adolescence, $p = .005$; Late Adolescence, $p = .005$; General $p = .0001$; Average, $p = .001$; one-way ANOVA; see table 7). Again, insidious onset was related to poor premorbid adjustment, while patients with an acute onset tended to have better premorbid adjustment.

**Prediction of Subdiagnosis.** Premorbid adjustment as measured by the PAS has been shown to be reasonably predictive of type of onset of illness, length of hospitalization, and need for continuous hospitalization for both the subscales and the Average score. The scale was less successful in predicting outcome for schizophrenic subcategories. Following confirmation of a schizophrenic diagnosis, the patients were further categorized as either chronic undifferentiated, paranoid, or chronic undifferentiated with paranoid features as determined by historical review, semistructured interview which included a Paranoid Dimension Checklist based on suggestions by David Rosenthal, and staff consensus on *DSM-II* categories (American Psychiatric Association 1968). A one-way ANOVA based on these subdiagnoses was significant for the diagnosis factor on the Late Adolescent ($p = .05$) and Adult ($p = .01$) subscales. Average score showed a tendency in the same di-

**Table 5. One-way ANOVA by age of onset of subscales, Average score, and length of hospitalization: Means ± SEM and (*n*)**

| Variables | Age of onset | | | | *F* | *p* |
|---|---|---|---|---|---|---|
| | 15 or less | 16–18 | 19–24 | Over 25 | | |
| Childhood | .55 ± .01 (9) | .37 ± .04 (26) | .40 ± .04 (22) | .29 ± .06 (9) | 2.75 | .05 |
| Early Adolescence | .54 ± .06 (4) | .46 ± .04 (27) | .44 ± .04 (24) | .36 ± .06 (10) | .99 | .40 |
| Late Adolescence | — | .54 ± .06 (16) | .54 ± .05 (25) | .42 ± .07 (10) | 1.18 | .32 |
| Adulthood | — | — | .51 ± .07 (14) | .35 ± .05 (11) | 3.53 | .07 |
| General | .70 ± .05 (9) | .46 ± .04 (27) | .49 ± .04 (26) | .36 ± .04 (12) | 5.5 | .002 |
| Average | .63 ± .07 (9) | .45 ± .04 (27) | .46 ± .03 (26) | .35 ± .04 (12) | 4.43 | .007 |
| Length of hospitalization (months) | 174.9 ± 54.3 (8) | 109.7 ± 19.7 (18) | 133.5 ± 46.3 (13) | 216 (1) | 0.60 | .62 |

**Table 6. Correlations of individual PAS items with length of hospitalization**

| | Length of hospitalization | |
|---|---|---|
| Subscales | *r* | *p* |
| C1 | .39 | .02 |
| C2 | .48 | .004 |
| C3 | .51 | .004 |
| C4 | .40 | .02 |
| EA1 | .36 | .05 |
| EA2 | .52 | .004 |
| EA3 | .41 | .02 |
| EA4 | .32 | .07 |
| EA5 | .33 | .08 |
| LA1 | .24 | .21 |
| LA2 | .22 | .23 |
| LA3 | .50 | .008 |
| LA4 | .24 | .21 |
| LA5 | .19 | .33 |
| A1 | .67 | .10 |
| A2 | .60 | .11 |
| A3 | .51 | .16 |
| G1 | .39 | .02 |
| G2 | .15 | .38 |
| G3 | .18 | .31 |
| G4 | .15 | .40 |
| G5 | .05 | −.80 |
| G6 | .29 | .09 |
| G7 | .38 | .03 |
| G8 | .42 | .02 |
| G9 | .44 | .01 |

rection ($p$ = .056). (See table 8.) A Newman-Keuls test indicated that the difference between the paranoid and the paranoid features groups accounted for the significant discrimination in these subscales. The paranoid subgroup had the best premorbid adjustment of the three schizophrenic subgroups.

**Relationship to Other Measures of Abnormality.** Fifty-one of the chronic schizophrenic patients rated on the PAS also had computerized tomography (CT) scans done as part of a study that looked at brain abnormalities in chronic schizophrenia (Weinberger et al. 1980). Twenty-one patients had abnormal scans consisting primari-

**Table 7. One-way ANOVA of type of onset of illness and PAS subscales, Average score, and Phillips score: Means ± SEM and (*n*)**

| Scales | Insidious | Acute | *p* |
|---|---|---|---|
| PAS Childhood | 29 ± .05 (11) | 60 ± .09 (9) | .004 |
| PAS Early Adolescence | .31 ± .06 (12) | .63 ± .08 (8) | .005 |
| PAS Late Adolescence | .35 ± .07 (9) | .70 ± .07 (6) | .005 |
| PAS Adult | .27 ± .04 (5) | .57 ± .17 (3) | .06 |
| PAS General | .29 ± .05 (13) | .74 ± .05 (10) | .000 |
| PAS Average | .30 ± .05 (13) | .69 ± .06 (10) | .000 |
| Phillips | 22.9 ± 1.8 (12) | 16 ± 3.0 (7) | .07 |

**Table 8. Means (± SEM) for subdiagnostic groups on subscales of the PAS**

| Subscales | Paranoid | Chronic undifferentiated with paranoid features | Chronic undifferentiated |
|---|---|---|---|
| Childhood | .33 ± .03 | .37 ± .07 | .39 ± .04 |
| Early Adolescence | .41 ± .03 | .56 ± .09 | .45 ± .04 |
| Late Adolescence[1] | .44 ± .04 | .64 ± .08 | .57 ± .05 |
| Adulthood[2] | .42 ± .06 | .87 ± .07 | .63 ± .09 |
| General | .44 ± .03 | .55 ± .06 | .49 ± .04 |
| Average[1] | .41 ± .03 | .54 ± .06 | .49 ± .04 |

[1] Significant at $p < .05$ on a one-way ANOVA based on subdiagnosis.
[2] Significant at $p < .01$ on a one-way ANOVA based on subdiagnosis. Newman-Keuls test indicated that the significant discriminations were due to the differences between paranoid and paranoid features groups.

ly of enlarged lateral ventricles. Cortical atrophy was observed in three patients and atrophy of the anterior cerebellar vermis in two. The premorbid adjustment scores were significantly worse in the patients with abnormal CT scans compared with patients having normal scans, as measured on the Childhood ($p<.03$) and Early Adolescence ($p<.02$) subscales. Further, all patients who had severe maladjustment assessed by the Childhood subscale (rating over .50) had abnormal scans compared to 3 of 13 with normal scans (Fisher exact probability test, $p<.0001$). None of the patients were diagnosed as childhood schizophrenics.

**Comparison of the PAS and the Phillips Scale.** One of the most widely used premorbid adjustment scales is the Premorbid History section of the Phillips Prognostic Rating Scale. Twenty patients rated on the PAS were also rated on the Premorbid History part of the Phillips Scale in order to compare the PAS with the most standard scale currently in use. In table 9 correlations of the PAS (subscales and Average scores) and Phillips Scale scores are presented for length of hospitalization and age of onset of illness. Correlations are presented for the total PAS population for whom these data were available and for the subgroup who were rated on the Phillips. For the total PAS population, the Childhood, Early Adolescence, and General subscales of the PAS and the Average PAS score correlate significantly with length of hospitalization compared with $r = 20$ ($p = .46$) for the

**Table 9. Correlation coefficients (*rho*) of length of hospitalization and age of onset of illness for PAS subscales, Average score, and Phillips score**

| | Length of hospitalization | | | | Age of onset | | | |
|---|---|---|---|---|---|---|---|---|
| | Total population | | Patients rated on Phillips | | Total population | | Patients rated on Phillips | |
| Scales | *r* | *p* | *r* | *p* | *r* | *p* | *r* | *p* |
| PAS Childhood | .47 (37) | .003 | .48 (16) | .06 | −.20 (59) | .14 | .10 (17) | .69 |
| PAS Early Adolescence | .38 (34) | .03 | .14 (15) | .61 | −.28 (60) | .03 | −.32 (17) | .20 |
| PAS Late Adolescence | .28 (31) | .13 | .17 (14) | .56 | −.34 (55) | .01 | −.37 (16) | .16 |
| PAS Adulthood | .56 (9) | .12 | .70 (4) | .29 | −.36 (23) | .09 | −.75 (5) | .15 |
| PAS General | .36 (37) | .03 | .29 (16) | .26 | −.31 (66) | .01 | −.27 (18) | .28 |
| PAS Average | .46 (37) | .005 | .30 (16) | .26 | −.35 (66) | .004 | −.14 (18) | .58 |
| Phillips | .20 (16) | .46 | .20 (16) | .46 | −.31 (18) | .21 | −.31 (18) | .21 |

Correlations are presented for the full PAS population and for the subpopulation of patients also rated on the Phillips. Number of subjects denoted by (*n*).

Phillips. Age of onset showed an inverse significant correlation with Early Adolescence, Late Adolescence, General, and Average PAS scores. The correlation between the age of onset and the Phillips score ($r = .31$, $p = .21$) is not significant. Correlations calculated for only those patients who were also rated on the Phillips Scale are, in most instances, lower and do not reach significance, as might be expected with a small sample. However, correlations between length of hospitalization and Childhood, Adulthood, and General subscale scores and Average score on the smaller PAS population remain higher than the correlation between the Phillips score and length of hospitalization, and approach significance on the Childhood subscale. The PAS did about as well as the Phillips in the case of correlations between age of onset and premorbid ratings in the subpopulation.

Information on type of onset of illness (insidious or acute) was available for 19 of the 20 patients rated on the Phillips Scale. The mean Phillips scores for patients with insidious versus acute onset of illness were $22.7 \pm 1.8$ and $16 \pm 3.0$, respectively. The difference was not significant. The PAS differences in type of onset are significant (table 6).

Typically, a rating of "3" on the Phillips Scale has been taken as the dividing point for predicting good and poor outcome (Kokes, Strauss, and Klorman 1977). When this criterion was used, patients for whom CT scan information was available were divided into "poor" and "good" premorbid groups and "normal" or "abnormal" CT scan groups (Weinberger et al. 1980). A Fisher exact probability statistic was computed and was not significant ($p = .77$), indicating that premorbid adjustment as measured by the Phillips and dichotomized in this way does not differentiate between patients with "normal" and "abnormal" CT scans as does the PAS. Weinberger et al. compared patients with "normal" and "abnormal" CT scans using the Childhood subscale of the PAS. Of nine patients with poor childhood adjustment (rating of more than .50) all had abnormal scans, whereas only 3 of the 13 who had good childhood adjustment (rating less than .20) had abnormal scans (Fisher exact probability, $p<.001$).

## Comment

The Premorbid Adjustment Scale (PAS) was devised primarily to measure the degree of success in attainment of certain developmental goals at each phase of a subject's life. Social isolation was felt to be one of the clear-cut signs of a poor premorbid adjustment, particularly if present in Late Adolescence. The capacity to make intimate sexual attachments with others and the ability to function successfully away from home (in school, for instance) were felt to be vital. Items dealing with these aspects of premorbid functioning were thus assessed in each life period by the appropriate subscale. Emphasis was placed largely on asocial characteristics of social functioning; however, some items in the scale (the school adjustment items) tap antisocial behavior as well. It has been suggested that asocial premorbid adjustment may characterize a different type of outcome than does antisocial premorbid adjustment—that is, that individuals who act out against society develop different kinds of mental problems than do people who withdraw from society (Quitkin, Rifkin, and Klein 1976). The PAS in its present form cannot discriminate between these different types of individuals.

More data are needed and are currently being collected regarding the influence, if any, on scale scores of gender, socioeconomic level, and race. We are also studying premorbid adjustment in acute schizophrenic patients.

One of the most widely used premorbid adjustment scales is the Premorbid History section of the Phillips Prognostic Rating Scale. The PAS was significantly correlated with length of hospitalization (Childhood, Early Adolescence, and General subscales, and Average PAS score), while the Phillips was not. An inverse correlation with age of onset also distinguished the scales, where high scores on the PAS in Early Adolescence, Late Adolescence, and General subscales were related to early onset of illness, but age of onset was not significantly correlated with the Phillips scores. If only the PAS scores for the subpopulation of patients who were also rated on the Phillips are used, the PAS performed overall as well as or better than the Phillips Scale in correlating premorbid adjustment with length of hospitalization and age of onset. Further, type of onset of illness was differentiated by the PAS on all but the Adult subscales but not by the Phillips. The Phillips did not distinguish between patients with normal and abnormal CT scans. The majority of the patients rated on the Phillips Scale had high total scores of 20 points or more (14 of 20 pa-

tients, range, 10–29). The PAS data provided a broader spread of scores, from low (healthier) to high (less healthy) (range .03–.99), as well as availability of several subscales, which may partially account for its finer apparent discriminative capability.

In examining the discriminative ability of the subscales to predict length of hospitalization or type of onset, we were concerned that premorbid functioning scores might have been contaminated by age of onset of illness, leading to comparisons, for example, in which 80 of 86 patients were compared on the Childhood subscale with 5 of 86 patients on the Adult subscale because patients were not rated on a subscale after the onset of illness. To address this concern, we grouped patients according to age of onset of illness (15 years or younger, 16–18, 19–24, and over 25) and compared the mean PAS scores for each subscale by a one-way ANOVA (table 5). No significant differences in PAS scores for the Early Adolescence, Late Adolescence, and Adulthood subscales were found. Age of onset was not related to length of hospitalization. The group which became ill at 15 years of age or younger did have significantly worse premorbid adjustment scores in the Childhood subscale ($p = .05$). (A Newman-Keuls test indicated that the significance was accounted for by the difference between the 15 year or younger group and the 25 or older group.) A significant relationship was also found for the General subscale and for the Average score. The significant $F$ ratios for these findings are attributable to the differences between the 15 year or younger onset group and the other three age of onset groups (Newman-Keuls test). No significant differences on the Newman-Keuls test were found between the 16–18, 19–24, and 25 and over age of onset groups for these measures. In the age of onset at 15 years or younger group, three of the nine patients in the group became ill at 15, two at 14, two at 13, and two at age 12. Those patients with onset of illness at 15 years or younger have worse childhood adjustment than those with onset of illness at 16 years of age or older. In spite of the lack of statistical evidence for an association between age of onset and PAS scores in age groups other than the 15 and below age group, it would be unwise to assume that age of onset may be safely disregarded when interpreting the relationship between the PAS and other variables—length of illness, for example. This is particularly problematic in cases of insidious onset of illness when the likelihood that the scale is measuring early morbid rather than premorbid functioning is increased. It is recommended that investigators acquire as full and complete a history as possible, and where age of onset is difficult to pinpoint, a conservative approach with regard to whether or not to rate a patient on a particular subscale should be adopted.

When patients with normal and abnormal CT scans were compared, all nine patients with severe social maladjustment in childhood had abnormal scans. Weinberger et al. (1980) suggest that CT scan abnormalities in schizophrenia relate to a pathological process occurring early in development. The PAS appears to be capable of detecting the social aspects of that process. These data support the usefulness of a developmental approach to measuring premorbid adjustment.

Interrater reliability for untrained raters, using patients' charts, while adequate, was not nearly so good as that for trained raters. This may represent a disadvantage for the researcher or clinician who would like to use the scale as a quick estimate of premorbid adjustment. Best quality data will require training of raters.

The advantages of the scale lie in its simplicity and its adaptability to a variety of information sources. It can be rated on the basis of personal interviews, family informants, or chart histories, and is therefore of value for a variety of research purposes. It is useful in identifying patients likely to become chronically hospitalized or at high risk for readmission. It may also serve as a possible predictor of patients with brain abnormalities on CT scan.

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**The Authors**

H. Eleanor Cannon-Spoor, M.A., is Research Psychologist, Steven G. Potkin, M.D., is Staff Psychiatrist, and Richard Jed Wyatt, M.D., is Chief, Adult Psychiatry Branch, Division of Special Mental Health Research, Intramural Research Program, National Institute of Mental Health, Saint Elizabeths Hospital, Washington, DC.

# Appendix: Premorbid Adjustment Scale

## Childhood (up through age 11)

### 1. Sociability and withdrawal

0 Not withdrawn, actively and frequently seeks out social contacts.

1

2 Mild withdrawal, enjoys socialization when involved, occasionally seeks opportunities to socialize.

3

4 Moderately withdrawn, given to daydreaming and excessive fantasy, may passively allow self to be drawn into contact with others but does not seek it.

5

6 Unrelated to others, withdrawn and isolated. Avoids contacts.

### 2. Peer relationships

0 Many friends, close relationships with several.

1

2 Close relationships with a few friends (one or two), casual friendships with others.

3

4 Deviant friendship patterns: friendly with children younger or older only, or relatives only, or casual relationships only.

5

6 Social isolate, no friends, not even superficial relationships.

### 3. Scholastic performance

0 Excellent student.

1

2 Good student.

3

4 Fair student.
5
6 Failing all classes.

**4. Adaptation to school**

0 Good adaptation, enjoys school, no or rare discipline problems, has friends at school, likes most teachers.
1
2 Fair adaptation, occasional discipline problem, not very interested in school, but no truancy, or rare. Has friends in school, but does not often take part in extracurricular activities.
3
4 Poor adaptation, dislikes school, frequent truancy, frequent discipline problem.
5
6 Refuses to have anything to do with school—delinquency or vandalism directed against school.

## Adolescence (Early, ages 12–15)

**1. Sociability and withdrawal**

0 Not withdrawn.
1
2 Mild withdrawal, enjoys socialization when involved, occasionally seeks opportunities to socialize.
3
4 Moderately withdrawn, given to daydreaming and excessive fantasy, may passively allow self to be drawn into contact with others, but does not seek it.
5
6 Unrelated to others, withdrawn and isolated. Avoids contact.

**2. Peer relationships**

0 Many friends, close relationships with several.
1
2 Close relationships with a few friends (one or two), casual friendships with others.
3
4 Deviant friendship patterns: friendly with children younger or older only, or relatives only, or casual relationships only.
5
6 Social isolate, no friends, not even superficial relationships.

**3. Scholastic performance**

0 Excellent student.
1
2 Good student.
3
4 Fair student.
5
6 Failing all classes.

**4. Adaptation to school**

0 Good adaptation, enjoys school, no or rare discipline problems, has friends at school, likes most teachers.
1
2 Fair adaptation, occasional discipline problem, not very interested in school, but no truancy, or rare. Has friends in school, but does not often take part in extracurricular activities.
3
4 Poor adaptation, dislikes school, frequent truancy, frequent discipline problem.
5
6 Refuses to have anything to do with school—delinquency or vandalism directed against school.

**5. Social-sexual aspects of life during early adolescence**

0 Started dating, showed a "healthy interest" in the opposite sex, may have gone "steady," may include some sexual activity.
1 Attachment and interest in others, may be same-sex attachments, may be a member of a group, interested in the opposite sex, although may not have close, emotional relationship with someone of the opposite sex, "crushes" and flirtations.
2 Consistent deep interest in same-sex attachments with restricted or no interest in the opposite sex.
3 Casual same-sex attachments, with inadequate attempts at relationships with the opposite sex. Casual contacts with both sexes.
4 Casual contacts with the same sex, no interest in the opposite sex.
5 A loner, no or rare contacts with either boys or girls.
6 Antisocial, avoids and avoided by peers. (Differs from above in that an active avoidance of others rather than passive withdrawal is implied.)

## Adolescence (Late, ages 16–18)

**1. Sociability and withdrawal**

0 Not withdrawn.
1
2 Mild withdrawal, enjoys socialization when involved, occasionally seeks opportunities to socialize.
3
4 Moderately withdrawn, given to daydreaming and exces-

sive fantasy, may passively allow self to be drawn into contact with others, but does not seek it.

5

6 Unrelated to others, withdrawn and isolated. Avoids contact.

**2. Peer relationships**

0 Many friends, close relationships with several.

1

2 Close relationships with a few friends (one or two), casual friendships with others.

3

4 Deviant friendship patterns: friendly with children younger or older only, or relatives only, or casual relationships only.

5

6 Social isolate, no friends, not even superficial relationships.

**3. Scholastic performance**

0 Excellent student.

1

2 Good student.

3

4 Fair student.

5

6 Failing all classes.

**4. Adaptation to school**

0 Good adaptation, enjoys school, no or rare discipline problems, has friends at school, likes most teachers.

1

2 Fair adaptation, occasional discipline problem, not very interested in school, but no truancy, or rare. Has friends in school, but does not often take part in extracurricular activities.

3

4 Poor adaptation, dislikes school, frequent truancy, frequent discipline problem.

5

6 Refuses to have anything to do with school—delinquency or vandalism directed against school.

**5. Social aspects of sexual life during adolescence and immediately beyond**

0 Always showed a "healthy interest" in the opposite sex, dating, has gone "steady," engaged in some sexual activity (not necessarily intercourse).

1 Dated regularly. Had only one friend of the opposite sex with whom the patient went "steady" for a long time. (Includes sexual aspects of a relationship, although not necessarily intercourse; implies a twosome, pairing off into couples, as distinguished from below.)

2 Always mixed closely with boys and girls. (Involves membership in a crowd, interest in and attachment to others, no couples.)

3 Consistent deep interest in same-sex attachments with restricted or no interest in the opposite sex.

4 Casual same-sex attachments with inadequate attempts at adjustment to going out with the opposite sex. Casual contacts with boys and girls.

5 Casual contacts with same sex with lack of interest in opposite sex. Occasional contacts with the opposite sex.

6 No desire to be with boys and girls, never went out with opposite sex.

## Adulthood (Age 19 and above)

**1. Sociability and withdrawal**

0 Not withdrawn, actively and frequently seeks out social contact.

1

2 Mild withdrawal, enjoys socialization when involved, occasionally seeks opportunities to socialize.

3

4 Moderately withdrawn, given to daydreaming and excessive fantasy, may passively allow self to be drawn into contact with others but does not seek it.

5

6 Unrelated to others, withdrawn and isolated. Avoids contacts.

**2. Peer relationships**

0 Many friends, close relationships with several.

1

2 Close relationships with a few friends (one or two), casual friendships with others.

3

4 Deviant friendship patterns: friendly with children younger or older only, or relatives only, or casual relationships only.

5

6 Social isolate, no friends, not even superficial relationships.

**3. Aspects of adult social-sexual life.**

a. Married, presently or formerly:

0 Married, only one marriage (or remarried as a result of death

of spouse), living as a unit, adequate sexual relations.

1 Currently married with history of low sexual drive, periods of difficult sexual relations, or extramarital affair.

1 Married, more than one time, currently remarried. Adequate sexual relations during at least one marriage.

2 Married, or divorced and remarried, with chronically inadequate sex life.

2 Married, and apparently permanently separated or divorced without remarriage, but maintained a home in one marriage for at least 3 years.

3 Same as above, but: divorce occurred over 3 years ago, and, while married, maintained a home for less than 3 years.

b. Never married, over 30:

2 Has been engaged one or more times or has had a long-term relationship (at least 2 years) involving heterosexual or homosexual relations, or apparent evidence of a love affair with one person, but unable to achieve a long-term commitment such as marriage.

3 Long-term heterosexual or homosexual relationship lasting over 6 months but less than 2 years. (If stable, long-lasting homosexual relationship, over 2 years, score as "3.")

4 Brief, or short-term dating experiences (heterosexual or homosexual) with one or more partners, but no long-lasting sexual experience with a single partner.

5 Sexual and/or social relationships rare or infrequent.

6 Minimal sexual or social interest in either men or women, isolated.

c. Never married, age 20–29:

0 Has had at least one long-term love affair (minimum of 6 months) or engagement, even though religious or other prohibitions or inhibitions may have prevented actual sexual union. May have lived together.

1 Has dated actively, had several "boyfriends" or "girlfriends," some relationships have lasted a few months, but no long-term relationships. Relationships may have been "serious," but a long-term commitment such as marriage was not understood to be an eventuality.

3 Brief, short-term dating experiences or "affairs" with one or more partners, but no long-lasting sexual experiences with a single partner.

4 Casual sexual or social relationships with persons of either sex with no deep emotional bonds.

5 Sexual and/or social relationships rare or infrequent.

6 Minimal sexual or social interest in either men or women, isolated.

## General

**1. Education**

0 Completed college and/or graduate school, or professional school (Law, for example).

1 Completed high school and some college or vocational training school or business school (such as secretarial or computer programming schools).

2 Completed high school.

3

4 Completed eighth grade.

5

6 Did not get beyond fifth grade.

**2. During a period of 3 years up to 6 months before first hospitalization or onset of first episode, patient was employed for pay or functioning in school**

0 All the time.

1

2 Half the time.

3

4 Briefly, about 25 percent of the time.

5

6 Never.

**3. Within a period of a year up to 6 months before first hospitalization or first episode change in work or school performance occurred**

0 Abruptly.

1

2 Within 3 months.

3

4 Within 6 months.

5

6 Imperceptibly, difficult or not possible to determine onset of deterioration.

**4. During a period of 3 years up to 6 months before first hospitalization or first episode, frequency of job change, if working, or interruption of school attendance was**

0 Same job held, or remained in school.

1

2 Job change or school interruption occurred two to three times.

3

4 Kept the same job more than 8 months but less than a year, or remained continuously in school for the same period.

5

6 Less than 2 weeks at a job or in school.

**5. Establishment of independence**

0 Successfully established residence away from family home, financially independent of parents.

2 Made unsuccessful attempts to establish independent residence, lives in parents' home, but pays parents room and board, otherwise financially independent.

4 Lives in parents' home, receiving an allowance from parents which patient budgets to pay for entertainment, clothes, etc.

6 Made no attempt to leave home or be financially independent.

**6. Global assessment of highest level of functioning achieved in patient's life**

0 Fully able to function successfully in and take pleasure from (1) school or job; (2) friends; (3) intimate sexual relationships; (4) church, hobbies, etc. Enjoys life and copes with it well.

2 Able to function well in and enjoys some spheres of life, but has a definite lack of success in at least one area.

4 Minimum success and pleasure in three areas of life.

6 Unable to function in or enjoy any aspect of life.

**7. Social-personal adjustment**

0 A leader or officer in formally designated groups, clubs, organizations, or athletic teams in senior high school, vocational school, college, or young adulthood. Involved in intimate, close relationship with others.

1 An active and interested participant, but did not play a leading role in groups of friends, clubs, organizations, or athletic teams, but was involved in close relationships with others also.

2 A nominal member, but had no involvement in or commitment to, groups of friends, clubs, organizations, etc. Had close relationships with a few friends.

3 From adolescence through early adulthood had a few casual friends.

4 From adolescence through early adulthood had no real friends, only superficial relationships.

5 From adolescence through early adulthood (i.e., after childhood), quiet, seclusive, preferred to be by self, minimal efforts to maintain any contact at all with others.

6 No desire to be with peers or others. Either asocial or antisocial.

**8. Degree of interest in life**

0 Keen, ambitious interest in some of the following: home, family, friends, work, sports, art, pets, gardening, social activities, music, and drama.

2 Moderate degree of interest in several activities including social gatherings, sports, music, and opposite sex.

4 Mild interest in a few things such as job, family, quiet social gatherings. The interest is barely sustaining.

6 Withdrawn and indifferent toward life interests of average individual. No deep interests of any sort.

**9. Energy level**

0 Strong drive, keen, active, alert interest in life. Liked life and had energy enough to enjoy it. Outgoing and adequate in meeting life.

2 Moderately adequate drive, energy, interest, as described above.

4 Moderately inadequate energy level. Tended toward submissive, passive reactions. Showed some potential to face life's problems, but would rather avoid them than expend the necessary energy.

6 Submissive, inadequate, passive reactions. Weak grasp on life, does not go out to meet life's problems, does not participate actively, but passively accepts his lot without having the energy to help self.