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The SCL-90 and the MMPI: A Step in the Validation of a New Self-Report Scale*

By LEONARD R. DEROGATIS, KARL RICKELS† and ANTHONY F. ROCK

Summary. The present investigation was intended principally as a concurrent validation study for a new self-report symptom inventory: the SCL-90. A sample of 209 'symptomatic volunteers' served as subjects and were administered both the SCL-90 and the MMPI prior to participation in clinical therapeutic drug trials. The MMPI was scored for the Wiggins content scales and the Tryon cluster scales in addition to the standard clinical scales. Comparisons of the nine primary symptom dimensions of the SCL-90 with the set of MMPI scales reflected very high convergent validity for the SCL-90. Peak correlations were observed with like constructs on eight of the nine scales, with secondary patterns of correlations showing high interpretative consistency.

A major step in the validation of a new psychological measuring instrument is a demonstration of concurrent validity. More specifically, Campbell and Fiske (4) have stressed that convergent and discriminant validity are two important sub-classes in the overall composite of concurrent validation. The principal rationale behind this class of validation is to demonstrate that the new scale is in essential agreement with an established criterion measure in the measurement domain of interest. This represents the convergent aspect of validation. The discriminant aspect of validation tests the specificity of the operational definition; it examines the limits of the definition as to how narrowly or broadly drawn it is.

The SCL-90 is a new 90-item self-report symptom inventory, multidimensional in nature, and oriented toward the measurement of psychopathology in psychiatric and medical out-patients. As part of an extensive validation program, the present study intended to compare dimension scores on the SCL-90 with corresponding dimensions on the MMPI. Since the MMPI is the prototypic self-report symptom scale, it was considered important to demonstrate a degree of convergence between dimensions of the SCL-90 and those of the MMPI.

While in many ways serving as the standard, the clinical scales of the MMPI have been the subject of considerable criticism over the years. Much of this commentary has been of little consequence and has been ignored, while other commentary has been judged legitimate (5). The recognition of certain shortcomings in the clinical scales has given rise to a number of imaginative alternative means of conceptualizing the MMPI. Wiggins (24, 25) has developed a set of *content* scales for the instrument, which he perceives as providing supplementary information not found in the clinical scales. Tryon (22), using a cluster-oriented factor analytic procedure (23), has identified seven non-overlapping cluster scales on the MMPI which he suggests as an alternative conceptual structure. Both of these systems combine rational appeal with sound analytic procedures

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and contribute added dimensionality to the MMPI.

Recently Wiggins and his colleagues (26) have conducted a validation study which compared the clinical scales, content scales, and Tryon cluster scales with each other and with other multidimensional personality scales. Results of the study provided evidence of strong convergent validity, particularly between the content scales and corresponding Tryon cluster scales.

Since the content scales contribute additional dimensionality to the clinical scales of the MMPI, we chose to include them in the present study. We also included the Tryon cluster scales, since they have been rigorously derived, and approach the measurement of psychopathology in a unique manner. These scales were viewed as a means of extending the measurement domain of the criterion instrument.

Method

Subjects

The subjects for the present study were 209 'symptomatic volunteers' who volunteered to participate in clinical psychotherapeutic drug trials. Ultimately, most of the Ss actually entered a drug trial. The trials were conducted by one of the authors (K.R.) at the Hospital of the University of Pennsylvania and the Philadelphia General Hospital, and consisted of clinical evaluations of anti-anxiety and antidepressant agents. The demographic characteristics of the sample are given in Table I.

The concept of the 'symptomatic volunteer' was developed by Goldstein (2) in response to certain methodological issues in clinical drug trials. Rickels had previously reviewed many of the non-specific factors in drug research (18) and described the probable inadequacies of clinic populations in anti-anxiety and antidepressant drug studies (19). In response to these problems, he innovated the use of the general practitioner and his patient population in research on pharmacotherapy (13). The difficulty remained, however, that most practitioners are limited to a degree in terms of time for evaluation and of ability to rigorously control follow-up visits, both essential to accurate clinical assessment.

In response to these limitations, Goldstein (2) developed the idea of utilizing research subjects who share the background and cultural characteristics of private-practice patients, but are not limited in terms of their ability to be assessed by the methods of controlled clinical research. They represent a sample of individuals who are usually seen by private doctors and who at the time of presentation are experiencing the primary affective symptoms of depression and anxiety. They are 'volunteers' in the sense that they volunteer for a clinical drug trial with medication which may provide relief for their symptoms.

The SCL-90

The SCL-90 is a multidimensional symptom self-report inventory comprised of 90 items, each rated on a five-point scale of distress (0 to 4) from 'not-at-all' to 'extremely'. The instrument is scored on nine primary symptom dimensions plus three global indices of pathology. The primary symptom constructs are Somatization (SOM), Obsessive-Compulsive (O-C), Interpersonal Sensitivity (INT), Depression (DEP), Anxiety (ANX), Hostility (HOS), Phobic Anxiety (PHOB), Paranoid Ideation (PAR), and Psychoticism (PSY). The global indices of pathology are the Global Severity Index (GSI), the Positive Symptom Distress Index (PSDI), and the Positive Symptom Total (PST). The GSI combines information on numbers of symptoms and intensity of distress; the PSDI is a pure intensity measure; the PST communicates data on number of symptoms only.

A preliminary report has been made available on the SCL-90 (7), and a number of studies have already been reported demonstrating its sensitivity (1, 3).

Table I

Demographic characteristics of 209 symptomatic volunteers

Age		Sex		Race		Social class*		
X		Male	%	Black	%		N	%
39·52		100	48	20	10	I	11	5
σ		Female		White		II	26	12
12·34		109	52	189	90	III	80	38
						IV	76	37
						V	16	8

* Social class estimated by the Hollingshead Two-factor Index of Social Position.

Although a 'new' scale, the SCL-90 may be accurately described as having evolved from the Hopkins Symptom Checklist (HSCL). The HSCL is a self-report instrument which has been used in various forms for over a decade, with data available on thousands of patients (10, 11). The SCL-90 incorporates the five symptom dimensions of the HSCL (i.e. SOM, O-C, INT, DEP and ANX) and adds four new dimensions (HOS, PHOB, PAR and PSY). It also involves shifting to a five-point scale from the four distress categories of the HSCL, plus changes in item-content and administrative procedure.

Preliminary norms for the SCL-90 are available based on a sample of over 1,000 heterogeneous psychiatric out-patients, and norms are also being compiled on a broad spectrum of clinical groups. SCL-90 prototypic symptom profiles are now available for a broad range of sexual disorders, alcoholics, psychiatric in-patients, drug abusers, and disturbed adolescents. Norms are also being developed for several prominent categories of medical patients, particularly those with cancer and cardiac disorders. Internal consistency reliability estimates are available on the SCL-90 and appear in Table II along with brief descriptive definitions of each of the nine primary symptom dimensions.

The MMPI Content Scales

As described by Wiggins (24, 25), the content scales provide an opportunity for clarification and extension of the communication about symptoms between the patient and the clinician. Developed by a combination of rational and analytic-empirical methods, the 13 content scales represent a systematic reduction of the original 26 overlapping content categories to the major substantive dimensions underlying the MMPI. Criteria of internal consistency, as well as those of independence and substantive representation, were all utilized in arriving at the final scales. Recently (26), interpretative norms and impressive convergent validity have been demonstrated for the content dimensions. The 13 scales are designated Social Maladjustment (SOC), Depression (DEP), Feminine Interests (FEM), Poor Morale (MOR), Religious Fundamentalism (REL), Authority Conflict (AUT), Psychoticism (PSY), Organic Symptoms (ORG), Family Problems (FAM), Manifest Hostility (HOS), Phobias (PHO), Hypomania (HYP), and Poor Health (HEA). Because developmental procedures for the content scales differ so markedly from the highly empirical criterion-keying approach used with the clinical scales, the content scales communicate unique information. For the same reason they also serve as a highly relevant model for comparison whenever the need arises to contrast scale construction strategies (16).

The Tryon Cluster scales

Using the BC TRY computer system (23), Tryon identified seven oblique clusters of items on the MMPI which had high internal consistency reliabilities, and were seen to represent major underlying categories of pathology (22). These seven clusters were developed without regard to the substantive content of the items, with three 'pivotal' clusters generating four additional 'dependent' clusters.

TABLE II

Descriptions of the nine primary symptom dimensions of the SCL-90 with contributing items and internal consistency reliabilities

Symptom dimension	Coefficient (N = 565)	Contributing items	Dimension description
I. Somatization	·86	1, 4, 12, 27, 40, 42, 48, 49, 52, 53, 56, 58	The somatization dimension reflects distress arising from perceptions of bodily dysfunction. Complaints focused on cardiovascular, gastrointestinal, respiratory, and other systems with marked autonomic medication are included. Headaches, pain and discomfort localized in the gross musculature and other somatic equivalents of anxiety are also represented.
II. Obsessive-compulsive	·86	3, 9, 10, 28, 38, 45, 46, 51, 55, 65	The obsessive-compulsive dimension reflects symptoms that are closely identified with the clinical syndrome of this name. This dimension focuses on thoughts, impulses, and actions that are experienced as unremitting and irresistible by the individual, but are of an ego-alien or unwanted nature. Behaviours indicative of a more general cognitive difficulty also load on this measure.

TABLE II—*continued*

Symptom dimension	Coefficient (N = 565)	Contributing items	Dimension description
III. Interpersonal sensitivity	·86	6, 21, 34, 36, 37, 41, 61, 69, 73	The interpersonal sensitivity dimension focuses on feelings of personal inadequacy and inferiority, particularly in comparison to other persons. Self-deprecation, feelings of uneasiness, and marked discomfort during interpersonal interactions are characteristic manifestations, as are acute self-consciousness and negative-expectancies regarding interpersonal communications.
IV. Depression	·90	5, 14, 15, 20, 22, 26, 29, 30, 31, 32, 54, 71, 79	Scales comprising the depression dimension reflect a broad range of the concomitants of a clinical depressive syndrome. Symptoms of a dysphoric mood and affect are represented as are signs of withdrawal of life interest, lack of motivation, and loss of vital energy. Feelings of hopelessness, thoughts of suicide and other cognitive and somatic correlates are also included.
V. Anxiety	·85	2, 17, 23, 33, 39, 57, 72, 78, 80, 86	The anxiety dimension is comprised of a set of symptoms and behaviours associated clinically with high manifest anxiety. General indicators such as restlessness, nervousness, and tension are represented, as are cognitive signs of anxiety. Symptoms reflecting free-floating anxiety and panic attacks are also included.
VI. Hostility	·84	11, 24, 63, 67, 74, 81	The hostility dimension reflects thoughts, feelings, or actions that are characteristics of the negative affect state of anger. The item selection is representative of all three modes of manifestation, and reflects qualities such as aggression, irritability, rage and resentment.
VII. Phobic anxiety	·82	13, 25, 47, 50, 70, 75, 82	Phobic anxiety is defined as a persistent fear response to a specific person, place, object, or situation which is characterized as being irrational and disproportionate to the stimulus, and which leads to avoidance or escape behaviour. The items of the present dimension focus on the more pathognomic and disruptive manifestations of phobic behaviour.
VIII. Paranoid ideation	·80	8, 18, 43, 68, 76, 83	The present dimension represents paranoid behaviour fundamentally as a disordered mode of thinking. The cardinal characteristics of projective thought, hostility, suspiciousness, grandiosity, centrality, fear of loss of autonomy, and delusions are viewed as primary reflections of this disorder, and item selection was oriented toward representing this conceptualization.
IX. Psychoticism	·77	7, 16, 35, 62, 77, 84, 85, 87, 88, 90	The psychoticism scale was developed in a fashion to represent the construct as a continuous dimension of human experience. Items indicative of a withdrawn, isolated, schizoid life style were included, as were first-rank symptoms of schizophrenia, such as hallucinations and thought broadcasting. The psychoticism scale provides a graduated continuum from mild interpersonal alienation to dramatic evidence of psychosis.

Tryon labelled the clusters Introversion (I), Body Symptoms (B), Suspicion and Mistrust (S), Depression (D), Resentment and Aggression (R), Autism (A) and Tension-Fear (T). The cluster scales represent yet another rationale of scale construction which portrays the major reference dimensions in the area of psychopathology in a rather unique manner.

Procedure

'Symptomatic volunteers' were recruited by advertising in a local newspaper in a way similar to the procedure developed by Brauzer and Goldstein (2). Criteria for admission were of two kinds: first, the individual had to show sufficient 'target symptomatology' to qualify for participation in a drug trial (primarily neurotic affective symptoms); second, he had to be free of any signs of exclusion disorders (e.g. schizophrenia, drug or alcohol abuse, sociopathy, etc.). If the applicant qualified in terms of both inclusion and exclusion criteria he became a 'symptomatic volunteer'.

Once accepted, the applicant was scheduled for an intake appointment and was requested to discontinue all psychotropic medication at least four days prior to his appointment. Details of the patient protocol were outlined to each S, informed consent was obtained, and a battery of outcome measures was completed, which included the SCL-90 and the MMPI. The two instruments were alternated as to which was completed first. No systematic differences were observed resulting from order of presentation.

Although various criterion measures were readministered throughout the drug trials, the comparison of the SCL-90 and the MMPI at initial visit is the focus of the present report. Both instruments were checked subsequent to completion to insure that no omissions were present, and were then processed for scoring. The MMPI clinical scales were scored by the Roche Psychiatric Service Institute scoring program, while the content and cluster scores were calculated by technicians. The SCL-90 was scored by the SCORE-90 computer program, which provides factor and global scores for the instrument as well as developing norms. Once scoring was completed the raw score representations of each symptom construct were correlated. The means and S.D.s for each measure are given in Table III.

Results

The results of the comparisons are presented in summary form in Table IV. Each of the nine SCL-90 symptom dimensions is presented as a heading, with the MMPI symptom constructs that correlate most highly with it listed below. The list is arranged in descending order, the

Table III

Means and standard deviations of 209 symptomatic volunteers on the SCL-90 and MMPI symptom dimensions

Symptom dimension	$\bar{x}$	σ
SCL-90 scales		
Somatization	·90	·65
Obsessive-compulsive	1·58	·86
Interpersonal sensitivity	1·49	·85
Depression	1·87	·84
Anxiety	1·49	·78
Hostility	1·27	·92
Phobic anxiety	·70	·67
Paranoid ideation	1·16	·87
Psychoticism	·82	·64
GSI	1·30	·59
PSDI	2·07	·48
PST	54·15	16·92
MMPI Cluster scales		
Introversion	9·97	4·99
Body symptoms	6·43	3·65
Suspicion and mistrust	9·10	3·82
Depression	11·61	4·23
Resentment and aggression	8·82	4·23
Autism	7·44	3·54
Anxiety	11·16	3·48
MMPI Content scales		
Social maladjustment	15·28	6·66
Depression	17·60	6·15
Feminine interests	14·79	5·70
Poor morale	14·58	4·85
Religious fundamentalism	4·73	3·28
Authority conflict	10·18	4·24
Psychoticism	13·05	7·89
Organic symptoms	12·56	6·33
Family problems	7·87	3·49
Manifest hostility	12·16	4·52
Phobias	10·64	4·85
Hypomania	14·07	3·81
Poor health	10·74	3·99
MMPI Clinical scales		
Lie	47·33	6·79
F	66·75	13·00
K	47·45	7·30
Hs	64·95	13·43
D	80·55	12·99
Hy	67·29	10·93
Pd	70·71	13·62
Mf	56·16	14·77
Pa	65·91	11·27
Pt	75·29	12·90
Sc	74·83	15·73
Ma	59·56	11·45
Si	65·70	13·03

TABLE IV

Correlations between SCL-90 symptom dimensions and MMPI clinical, Wiggins, and Tryon scores

I. *Somatization*			IV. *Depression*			VII. *Phobic anxiety*		
Body symptoms	(T)	·66	Depression	(W)	·75	Phobias	(W)	·50
Organic symptoms	(W)	·62	Depression	(T)	·68	Anxiety	(T)	·44
Poor health	(W)	·58	Poor morale	(W)	·60	Pt		·43
Hs		·57	Sc		·55	Poor morale	(W)	·42
Hy		·48	Resent. and aggr.	(T)	·53	Depression	(W)	·40
			Autism	(T)	·48			
			Anxiety	(T)	·48			
			Pt		·48			
II. *Obsessive-compulsive*						VIII. *Paranoid ideation*		
Sc		·57	V. *Anxiety*			Susp. and mistrust	(T)	·56
Organic symptoms	(W)	·55	Anxiety	(T)	·57	Resent. and aggr.	(T)	·50
Pt		·54	Sc		·51	Manifest hostility	(W)	·50
Depression	(W)	·51	Depression	(W)	·50	Family problems	(W)	·49
Autism	(T)	·50	Pt		·47	Autism	(T)	·48
Resent. and aggr.	(T)	·43	Poor morale	(W)	·46	Pa		·42
Depression	(T)	·41	Autism	(T)	·44			
			Resent. and aggr.	(T)	·43			
			Organic symptoms	(W)	·43			
III. *Interpersonal sensitivity*			Phobia	(W)	·41	IX. *Psychoticism*		
Poor morale	(W)	·64				Sc		·64
Depression	(W)	·63	VI. *Hostility*			Autism	(T)	·55
Depression	(T)	·57	Resent. and aggr.	(T)	·68	Psychoticism	(W)	·52
Sc		·53	Manifest hostil.	(W)	·57	Poor morale	(W)	·51
Introversion	(T)	·52	Depression	(W)	·52	Pd		·51
Si		·49	Anxiety	(T)	·44	Pa		·48
Anxiety	(T)	·49	Susp. and mistrust	(T)	·41	Pt		·48
Social maladj.	(W)	·48						

highest correlation in each case being at the top of the list. A cut-off of ·40 was used in preparing the table, so that correlations below that value were omitted. All coefficients in the table are statistically significant at the ·01 level.

It is worth noting that the peak correlations with the SCL-90 scales are roughly evenly split between cluster and content scales, with clinical scales following third. Peak correlations on Somatization, Anxiety, Hostility, and Paranoid Ideation were observed to be with like-constructs from the cluster scales. Highest correlations on Interpersonal Sensitivity, Depression and Phobic Anxiety were with comparable content scales. The clinical scales correlated highest on Obsessive-Compulsive and Psychoticism, the latter being more distinctive.

In all probability, this pattern of peak convergence reflects the 'mixed' developmental strategy underlying the SCL-90, which stresses a combination of clinical-rational conceptualizations with empirical-analytic models. Our strategy in the development of the SCL-90 has been to select psychiatric constructs based on clinical experience which represent major predictive dimensions of psychopathology; to develop a clear theoretical conceptualization of these constructs; and to proceed to operationalize the conceptualizations in the form of measurement scales. Neither the empirical nor the rational aspects of our approach have been allowed to dominate; rather, they have functioned in a reciprocal, complementary fashion.

The pattern of relationships and degree of convergence between the SCL-90 and MMPI scales may be clearly appreciated from the coefficients in Table IV. Space is not available to provide a detailed interpretative discussion of the observed relationships, but a brief review of the convergence pattern for each dimension is provided.

Somatization

This dimension is conceived as a measure of subjective distress arising from the perception

of bodily dysfunctions. Many of the symptoms included are judged as somatic 'equivalents' of anxiety, and others arise from organ systems with strong autonomic mediation. The Somatization dimension has proved to have very high factorial invariance (8, 9), and shows excellent convergence on comparable MMPI dimensions. Highest correlation is with the cluster scale termed Body Symptoms, followed by the two content scales of Organic Symptoms and Poor Health. The Hs and Hy measures from the standard clinical scales also show substantial correlations, and this contributes interpretive consistency, since both contain strong somatic components.

Obsessive-Compulsive

The Obsessive-Compulsive dimension is a measure consistent with the analogous clinical syndrome. It is the only dimension on the SCL-90 for which there is not a directly comparable MMPI scale. Of the scales that correlate with O-C the clinical Pt scale is the most consistent with its definition. The Pt scale is typically described as reflecting psychiatric symptoms categorized as compulsive, phobic, or obsessive in a broad range of individuals. The Sc scale probably correlates with O-C by virtue of the fact that both focus on disturbed thought processes, and Sc tends to correlate with elevations in a number of psychopathologic dimensions. The Organic Symptoms scale as defined by Wiggins (25) contains items on difficulty with concentration, memory, speaking and coordination. Directly overlapping items are present on the O-C scale which accounts for the high agreement between the two.

Interpersonal Sensitivity

This dimension is oriented towards hypersensitivity to perceived self deficiencies and strong feelings of inferiority compared to others. It focuses on a generalized self-deprecating posture that may affect an individual's physical, social, intellectual or emotional self-perception. Correlations with MMPI constructs in Table IV are quite consistent with this definition. The peak correlation is with the content scale Poor Morale, followed very closely by both content and cluster scales of Depression. Tryon's Introversion and Anxiety scales also show correlations with INT, as do the clinical Si scale and the content Social Maladjustment scale. The definitions of these scales are to varying degrees all consonant with our definition of Interpersonal Sensitivity and provide impressive confirmation of the scale.

Depression

As reflected in our previous definition, the Depression dimension reflects a broad range of concomitants of a clinical depressive syndrome. Although affective dimensions tend to be less invariant than other dimensions of psychopathology (8, 9), our structure was developed with an eye toward generalizability as well as construct representation. In comparison with the MMPI scales, the Depression dimension showed very high convergent validity. The highest correlation was with the content Depression scale, followed by the cluster Depression scale and Poor Morale. The clinical Sc scale and the three cluster scales of Resentment, Autism and Anxiety also correlated to a lesser degree. Clearly, the various depression scales are measuring analogous constructs.

Anxiety

The SCL-90 Anxiety scale is comprised of items that have been identified as high-frequency concomitants of states of clinical anxiety. Lader and Marks (14) describe pathological anxiety as a pervasive negative affect state which is present to some degree in almost all clinical syndromes and is the predominant clinical feature in some. Our pattern of convergence supports the concept of anxiety as a pervasive pathological affect, since it showed the greatest number of significant correlations of all nine SCL-90 dimensions. The highest correlation was with the Tryon Anxiety scale, which provides substantive confirmation for the measure. Beyond this agreement, ANX also correlated with content Depression and Poor Morale, providing further confirmation for the observation that anxious symptomatology is an integral aspect of depressive syndromes (6). The Anxiety dimension also showed notable correlations with a variety

of other scales, including Sc, Pt, Autism, Resentment and Phobias.

Hostility

Is the third of the negative affects included as primary symptom dimensions of the SCL-90. The definition of this scale stresses thoughts, feelings, or behaviours that may be characterized as manifestations of anger, resentment, hostility, or aggression. Correlations with the MMPI scales reflect the fact that this definition of hostility is consistent with comparable MMPI measures. The primary correlation is with the cluster scale of Resentment and Aggression, followed by the content scale of Manifest Hostility. Substantial correlations with depression and anxiety measures tend to corroborate the long-standing clinical observation of significant hostile affect in both anxious and depressive syndromes.

Phobic Anxiety

The SCL-90 definition of Phobic Anxiety represents it as a persistent fear response to a specific person, place, object, or situation which is characterized as being disproportionate and irrational. The actual structure of the dimension is in close agreement with Marks' (15) definition of 'agoraphobia', also termed 'phobic-anxiety-depersonalization syndrome' by Roth (20). The dimension thus portrays the most pathological and clinically significant of the phobic states, somewhat to the exclusion of common phobias of snakes, spiders, darkness, etc. Correlations indicate highest agreement with the content Phobias scale, followed by the cluster Anxiety scale and the clinical Pt measure. Lower correlations with content scales of Poor Morale and Depression suggest the quality of ultimate futility and hopelessness that often accompanies a prolonged struggle with a phobic anxiety condition. The relatively low magnitude of the correlations with this dimension may result from the fact that phobic symptoms are the least frequently endorsed on the scale, resulting in a clearly J-shaped score distribution.

Paranoid Ideation

The present dimension of Paranoid Ideation is conceived primarily as a disordered mode of thinking. It is typified by hostility, suspiciousness, rigidity, grandiosity, projective thought, centrality, concerns over loss of autonomy, and persecutory themes as major characteristics (21). Comparisons with the MMPI scales indicated that convergent validity was high for this scale. Peak correlations were with the cluster scales Suspicion and Mistrust and Resentment and Aggression. The content scales of Manifest Hostility and Family Problems also correlated, as did the clinical Pa scale.

Psychoticism

The Psychoticism scale is conceived as defining a continuous dimension of human behaviour which varies from mild idiosyncratic thought and interpersonal distancing at one extreme to florid symptoms of psychosis at the other. In this respect the present definition owes much to the work of Eysenck (12). Items reflect indications of alienation, loneliness, and a schizoid life style at one end of the continuum. At the other, Schneiderian 'first rank' symptoms of schizophrenia (e.g. auditory hallucinations, thought broadcasting, thought control, etc.) reflect the more dramatic aspects of Psychoticism. In comparison with scales of the MMPI, very high levels of convergent validity were observed for this dimension. SCL-90 Psychoticism correlated highly with the comparable scale from each of the three sets of MMPI scales. The highest correlation was with the clinical Sc scale, followed by the cluster scale Autism, and the content scale Psychoticism. Notable correlations were also observed on the Poor Morale scale, and the clinical Pd, Pa and Pt scales.

Discussion

The present study was primarily concerned with demonstrating the concurrent validity of a new self-report symptom inventory. The strategy for accomplishing this goal involved comparing the component dimensions of the new scale with various scales of the MMPI. Results of the study reflected a high degree of convergence for the nine primary symptom dimensions of the SCL-90. Each dimension correlated highest with one of the MMPI scales considered to measure a corresponding symptom construct.

Secondary correlations also formed a pattern highly consistent with current conceptualizations of out-patient psychopathology.

The study was performed with a unique sample of 'symptomatic volunteers' who possess demographic and social characteristics consistent with a patient population usually treated by private physicians. Their presenting symptom patterns closely approximate that of reactive depressions or chronic anxiety states, and a recent study (17) has observed that 86 per cent of a similar sample were matched via maximum likelihood procedures with an *anxious-depressive* prototypic profile. The most accurate overall description of the level of psychological disorder manifested by this group is 'moderate'.

Concurrent validation, of the convergent type, has been demonstrated for the SCL-90 by the present study. Each of the nine SCL-90 symptom dimensions showed peak correlation with an MMPI scale representing a highly corresponding symptom construct. The one exception was perhaps the Obsessive-Compulsive dimension, where no directly comparable MMPI scale was available. Even in this instance, correlation with the MMPI Pt scale, which conceptually would represent the most analogous symptom measure, was still quite good.

The Somatization dimension was very consistent in its pattern of correlations. SOM showed greatest correlation with the cluster scale Body Symptoms. Further correlations with content and clinical scales were strictly limited to measures that reflected distress arising from a somatic focus. The Interpersonal Sensitivity dimension showed maximal correlations with the content scales Poor Morale and Depression. The secondary correlations with INT were with scales such as Introversion, Si, Anxiety and Social Maladjustment, which are consonant with a dimension reflecting a generally self-deprecating posture and life style.

The principal negative affect dimensions of anxiety and depression received strong confirmation from the pattern of correlations observed here. Each showed greatest correlation with a like-named scale on the MMPI: DEP showed a peak correlation with content Depression, closely followed by the cluster Depression scale; ANX showed maximum correlation with cluster Anxiety, and also correlated moderately with a number of other scales, reflecting its pervasive clinical nature. Both of these dimensions have received extensive validation in the context of a precursor instrument (10, 11), however, convergence with dimensions of the MMPI adds significantly to overall validation of the scales.

Perhaps the most gratifying result was the degree of convergence observed for the four 'new' scales of the SCL-90 (i.e. HOS, PHOB, PAR, PSY). Although they were constructed with attention to clinical relevance, and to conceptual as well as item consistency, validation by external criterion measure remains an important and substantial confirmatory procedure. All four of these scales showed peak correlations with directly comparable MMPI measures: HOS with the cluster scale Resentment and Aggression; PHOB with the content scale Phobias; PAR with the cluster scale Suspicion and Mistrust; and PSY with the clinical scale Sc. The secondary patterns of correlations for each of these scales were also quite consonant with clinical experience.

Unlike most psychological scales developed in this area, the SCL-90 is not a totally independent, free-standing instrument: It is a single instrument in a coordinated *series* of rating scales. In addition to the '90' there is a companion clinical observer's scale termed the Hopkins Psychiatric Rating Scale (HPRS). This scale is composed of the nine dimensions of the SCL-90, and contains seven additional dimensions (e.g. Hysterical Behaviour, Disorientation) felt to be important to comprehensive clinical assessment. The series also contains the Brief Symptom Inventory (BSI), a substantially shortened version of the self-report scale. The BSI is being developed primarily to meet the demands of assessing incapacitated medical patients. Work is continuing on the development and validation of all the instruments in the series, and additional reports will be available on these scales in the near future.

The process of validating a new psychological instrument is inherently programmatic. As the title of this report indicates, the present study is viewed as only a step in the validation program for the SCL-90. It is part of a more

extensive series of studies focused on demonstrating predictive and construct validity for the instrument. We believe that the present investigation provides impressive concurrent validation for this new self-report scale, and confirms our belief that it will make a significant contribution to our library of clinical assessment techniques.

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