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# A Computerized Assessment Program for Forensic Science Evaluations: A Preliminary Report

**ABSTRACT:** The development of the innovative use of an on-line, computer-assisted evaluation program is discussed, with a brief review of pertinent literature. The particular applications within a forensic psychiatric center of the Tandem 16 computer system, utilizing both "canned psychological tests" and specialized assessment techniques, are examined and highlighted with a case vignette. A highly relevant problem within forensic psychiatry, malingering or exaggeration of symptoms, is examined in more detail as it relates to computer assessments. The advantages and limitations of a computer-assisted evaluation are described relative to both its clinical and research application.

**KEYWORDS:** psychiatry, computers, malingering

The application of computer-based evaluations in history-taking systems has been definitely established in the fields of psychiatry and psychology. Despite some initial resistance to computerized systems based on lack of familiarity with computerized evaluations [1], as well as fears that computers might supplant clinicians [2], there has been a growing body of knowledge regarding the appropriateness and relevance of computer assessment. The value of computers in clinical assessment has been demonstrated by a series of studies by researchers in Salt Lake City [3] and by studies of Angle and his associates at Duke University [4]. The efficacy of psychiatric evaluations based on on-line evaluation systems has been demonstrated in community mental health centers, diagnostic centers, and psychiatric inpatient units as a useful corollary to psychiatric/psychological evaluations [5,6]. Several studies have demonstrated the importance of computer-acquired patient histories for gathering comprehensive medical information regarding patients and treatments [7,8].

## On-Line Computer Systems: Applications

Angle and his associates [9] demonstrated some of the definite advantages of comprehensive computer interviews in general clinical practice. Their study involved a problem-

oriented approach to diagnostic evaluations and found the computer interview approach superior at identifying critical patient problems. An important finding was that human diagnostic interviews missed approximately 75% of the critical clinical issues in the evaluation of psychiatric patients (such as hallucinations, suicidal and self-destructive behavior, sexual dysfunction, and explosive behavior). Additional studies [10] have demonstrated the overall comprehensiveness of computer assessment models in providing concomitant detailed information and identification of problematic areas, along with strong patient acceptance of the process.

The emphasis on a descriptive diagnostic model with clear inclusion and exclusion criteria in computer-based approaches to assessment is paralleled by advances in the area of general psychiatry [11,12]. This model is seen as an effective method of dealing with the general unreliability of traditional diagnostic categories [13]. Considering the corresponding lack of reliability in forensic psychiatric evaluations [14] and the subsequent lack of comprehensiveness of such evaluations [15], the implementation of comprehensive, automated computerized assessment systems should have several advantages: minimizing reliability problems, systematizing the evaluation approach, and ensuring a systematic application of criterion-based hierarchic decision models.

Several researchers [16,17] have implemented the Minnesota Multiphasic Personality Inventory (MMPI) and other psychological tests onto computers. These computerized psychological tests offer the clinician automated scoring, and, in selected tests such as the MMPI, a computerized interpretation. Such automated systems allow for the storage of detailed clinical information about psychiatric patients, the use of an automated scoring system to minimize errors, and the development of a data-based interpretive profile that may be periodically updated on the basis of current research. Such on-line psychological test assessment systems in forensic psychiatry and psychology provide methodologic advances by gathering extensive research data from specialized forensic patient populations, defining patterns of response to standardized tests, and administering the test in a standardized manner. A developing on-line computer system for clinical assessments in an outpatient clinic is described here.

## Development of the Computer System

The interactive computer system is housed at the Isaac Ray Center of the Department of Psychiatry, Rush Medical College, a forensic psychiatric outpatient clinic that is part of the ambulatory psychiatric services of the department, and the Rush University Data Center. The terminal is a Lear Siegler ADM 42 model connected to the Rush University Data Center by means of two modulators/demodulators (modems): a Racklevadic modem (1200 baud rate) and a Texas Instruments THP 1600 modem (300 baud rate). The hardware at the Data Center consists of a Tandem 16 computer (768 K memory) and an IBM 3031 computer (4000 K memory). A secured phone line connects the terminal at the Isaac Ray Center with this Tandem 16 computer system as well as with the University's central IBM 370 computer (used in all statistical analyses). The Tandem 16 computer utilizes only general global variables and is programmed in MUMPS language [18]. This is a widely used interpretive language designed primarily for medical/clinical record-keeping that operates exclusively in foreground, making it efficient in data collection but less applicable to statistical programs. Several canned programs have been written onto the on-line computer system (Table 1). Subjects undergoing assessment simply sit before the terminal console and keyboard, and specific test questions are sequentially displayed on the terminal screen, allowing the subjects to proceed at their own rate. Confidentiality of patient material is assured; the memory storage system, as well as access to individual patient data, is secured through a specialized code system.

TABLE 1—*On-line computer system programs.*

Measures of psychopathology
   Minnesota Multiphasic Personality Inventory
   Psychological Screening Inventory
   SCL-90
   Beck Depression Scale
   Zung Depression Scale
   Experiential World Inventory

Measures of personality characteristics
   California Psychological Inventory
   State Trait Anxiety Scale
   Behavioral Type A Scale
   Omnibus Personality Inventory

Measures of interpersonal functioning
   FIRO B
   Marriage Adjustment Inventory
   Family Environment Scale
   MATE

Measures of cognitive functioning
   Shipley-Hartford Scale
   Concept Mastery Test

Psychiatric/medical histories
   Alcohol history
   History of critical events
   Marriage history
   Medical history
   Sexual history

## Use of the On-Line System in Diagnostic Evaluations

A brief case vignette is presented that illustrates the use of the on-line computer system in a forensic psychiatric diagnostic evaluation; it is followed by a discussion of the contribution of the on-line computer system to the evaluation process.

*Case Study*

A 21-year-old, single white man is presently incarcerated in a large Midwestern jail on charges of murder involving a local actor. The defendant allegedly stabbed the victim with a pair of scissors, leaving the victim's office through a tenth-floor window and across a dangerously thin ledge to a fire escape. The defendant was observed by two witnesses who later correctly identified him after his "bizarre" escape. The defendant stated that he was convinced the victim was a Mafia informer and that the victim and many of his associates wanted the defendant dead. The defendant stated that earlier in the year in New York he was followed by "two producers" who wanted him for an important, lucrative acting role. These producers subsequently "reneged" on their agreement, and the defendant thought that they had talked previously with the victim, who suggested aborting the "contract." The defendant thought that on several occasions the victim and others involved in a "conspiracy" were hiring a sniper with an automatic rifle and telescopic sights to kill him.

In our evaluation, he had no past history of psychiatric treatment and no past general medical history. Based on psychiatric interviews, a psychological evaluation, and a review of all pertinent records, it was our opinion that the defendant was presently psychologically fit to stand trial, that the defendant was not able to appreciate the criminality of his behavior or conform his conduct to the requirements of the law at the time of the commission of the

alleged offense (Illinois insanity defense standard) because of the presence of an acute psychosis in the course of his paranoid schizophrenic illness, and that he was presently in need of mental treatment because of active suicidal ideation and paranoid delusional thinking. Finally, of considerable concern, he reported hearing voices that he thought were responsible for planting in his head the idea that he would kill again in the near future.

*Discussion*

Our computer-assisted evaluation consisted of measures of intellectual and psychological functioning. The Shipley-Hartford Scale revealed an overall IQ of 114 (verbal IQ = 124; abstract IQ = 107), eliminating the possibility of mental retardation or pervasive higher cortical brain damage. Figure 1 summarizes the results of the computerized MMPI, demonstrating a typical pattern for the paranoid schizophrenic with marked elevations on the psychopathic deviance (PD), paranoia (PA), and schizophrenia (SC) scales, all of which were at least five standard deviations above the mean. The basic validity scales (L and K), measuring degree of defensiveness (a minimization of psychopathology), were unremarkable. However, the F score (106) was extremely elevated, indicative of conscious attempts to exaggerate psychopathology (malingering). This inference is supported by the significant disparity between the F and K scores (F $-$ K = 27). This has been confirmed as a reliable indicator of malingering [19].

To investigate the malingering issue further through use of the on-line computer system, a set of subscales (special scales) developed by Wiener and Harmon [20] has been included within the analysis of the computerized MMPI program. In testing for five of the MMPI basic scales, some items clearly appear pathological ("obvious") in comparison to those in which it is difficult to infer psychopathology ("subtle"). Appreciably more "obvious" than
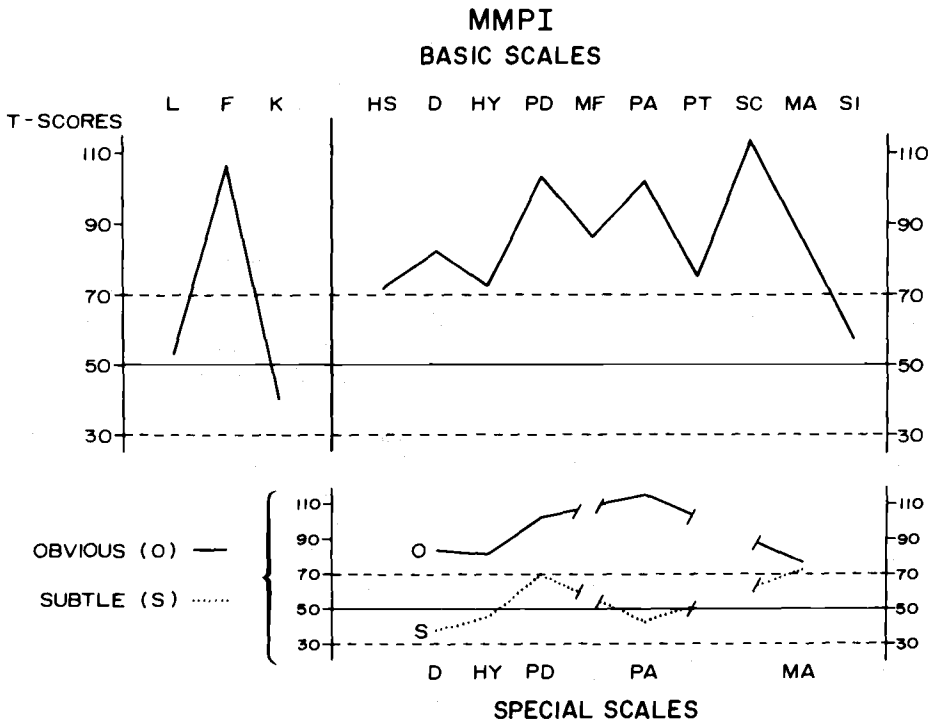


FIG. 1—*Format for results of administration of the computerized MMPI.*

"subtle" responses were given in four of the five basic scales included in this part of the computer system (bottom, Fig. 1). Three of the "subtle" responses (depression [D], hysteria [HY], and PA) are within the normal range; the other two (PD and hypomania [MA]) border on the pathological ($>70$). The "obvious" (easy to fake) scores, in comparison, are all in the clearly pathological range. Thus, three computer system indicators (F score elevation, F — K score, and "obvious" versus "subtle") were consistent in suggesting malingering. In integrating the findings of malingering in the computer assessment with the psychiatric inter-views, it was the clinical team's opinion that the malingering represented a defensive maneuver in an acutely disturbed, psychotic individual. Even though he demonstrated some conscious exaggeration, the overwhelming clinical data supported the finding of a paranoid schizophrenic disorder of sufficient severity to meet the Illinois' insanity defense standard.

In this case the profile interpretation from the on-line computerized MMPI raises a critical concern regarding malingering, a central issue in many forensic psychiatric evaluations. An MMPI administered with paper and pencil was also given; the response pattern was analogous to that of the computer-assisted MMPI in both basic and special scales, substantiating the potential reliability of interactive computer programs. The actual time saving in the use of the computer assessment programs occurs in the scoring process, and the time of administration (paper and pencil versus computer) is essentially identical. Additional comprehensive clinical assessments were clearly necessary in the case reported here, with special emphasis on the problem of symptom exaggeration in a paranoid schizophrenic defendant of normal intelligence. The on-line computer programs utilized in this case (Ship-ley-Hartford and MMPI) certainly contributed important clinical data to the evaluation process, but it is the research application of the on-line computer system, with its potential for extensive data storage and retrieval, that needs further development.

## Conclusion

The case illustrates the clinical application of an on-line computer system in a forensic psychiatric evaluation. Computerized assessment techniques must be approached conservatively; they will never replace the clinician. Because of the substantial cost of the equipment and support programs necessary for the development of the computer system, research applications still remain the primary area for potential contributions. Unless a significant volume of assessments is done clinically, the cost involved in implementing this system cannot be justified. To set up an interactive computer system, a programming specialist is necessary to implement the use of canned programs and to design new ones, which represents a time commitment of several hundred hours. In clinical use, time saving is predominantly in the area of scoring (for example, 15 to 20 min per MMPI evaluation). The practical value of computer assessment approaches to work in the forensic sciences lies in the possibility of obtaining more objective diagnostic standards on which to base opinions and as a method of recording systematically and reliably data acquired in the evaluation process. We do not yet know how the courts will accept the application of computer science to forensic psychiatric evaluations, but our initial impression is that it will be favorable. Finally, work is presently under way at our center on the development of a dissimulation index based on computer technology toward designing a special diagnostic technique that would employ a computer model involving multiple psychological correlates in the detection of malingering.

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