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Automation and Data Processing in Psychiatry

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ASSESSMENT AND TREATMENT TECHNIQUES

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1. Assessment

The use of automated procedures has already drastically changed the field of individual patient assessment. The speed and memory capacity of the computer greatly facilitates the processing of many traditional assessment procedures. In addition, newer techniques make use of the unique advantages of computers to investigate areas of functioning that were difficult or impossible to evaluate without automation. There are now numerous automated assessment procedures available to evaluate such diverse aspects of an individual's functioning as current and past manifest psychopathology, personality traits, ego functioning and cognitive abilities.

For several decades clinicians and researchers have made use of standardized procedures as an aid to individual clinical assessment. These procedures have included questionnaires, rating scales, and check lists, which can be completed by the patient himself, a trained professional (e.g., psychiatrist, nurse, attendant) or some other informant (e.g., family member, friend). In the past, because these forms had to be scored manually, their processing was generally time consuming and prone to error. In addition, data analysis was usually limited to simple scale scores. With automation, scoring can be accomplished rapidly and without error. In addition, the same data can provide more detailed reports, taking advantage, for example, of the ease with which the computer can compare an individual's scores with scores of other known groups.

1.1 Automation of Traditional Techniques

An example of the impact of automation on a traditional as-
sessment technique is the automation of the Minnesota Multiphasic Personality Inventory (MMPI). This self-administered checklist used to require tedious hand scoring. There are now several automated versions of this test currently in use. The psychiatrist can have his patient complete an MMPI on special forms which are sent through the mail to a central computer facility, and within a few days the results are returned to the clinician. The output from these automated procedures contains not only the traditional MMPI scale scores, but also an interpretive description of the patient based upon complex comparisons of the patient’s scores with those of known patient groups. This narrative is similar in appearance to that written by a skilled clinician who has considerable experience and knowledge of test results with different kinds of patients. It differs, however, in that the rules of inference are explicit and easily modified with new data, and the report can be based on many more patients than any individual clinician could ever hope to test. The cost of these automated procedures is already low as compared to the cost of an experienced test interpreter. In addition, many psychiatrists can use this procedure in a locality where there are no facilities for having a patient evaluated by a tester. Although opinion is divided as to whether the automated narrative sections of these reports are better or as good as those written by a human interpreter, many psychiatrists are now making use of these automated MMPI interpretation services and are apparently finding them of value.

1.2 Diagnostic Assessment

Several automated procedures for classifying patients, either in the standard diagnostic categories, or with other typologies, have been developed. Various models have been employed including various mathematical procedures as well as a logical decision tree similar to the logic of differential diagnosis. Both procedures have yielded computerized diagnoses in substantial agreement with diagnoses made by clinicians on the same cases.

1.3 Interaction with Computer

1.3.1 Interview techniques. In some of the new assessment techniques still in the developmental phase, the patient
interacts directly with the computer (on-line). The patient may provide answers to various questions posed by the computer through a typewriter or video screen regarding his psychiatric symptomatology and history. The advantages of this procedure over having the patient answer written questions on a questionnaire is the ease with which a particular response can cue the computer to branch to a line of inquiry relevant to that particular patient. A corollary feature is that areas of inquiry that are irrelevant to the particular patient can be omitted.

1.3.2 Cognitive assessment. Other new assessment techniques involve on-line evaluation of cognitive functioning. For example, the traditional mental status test of recent memory, where the clinician recites a list of digits and asks the patient to reproduce them forward and backwards, can be done more accurately, more reproducibly, and therefore, more meaningfully by computer than by individual clinicians. Reaction times can be routinely measured for each response, without the patient even being aware that this dimension is being evaluated.

2. Treatment

A number of facilities are exploring procedures for using automated assessment techniques for the assignment of patients to treatment. For example, on admission to the hospital, a clinician’s description of the patient’s symptomatology can be used by a computer program to suggest the optimal treatment modality. Subsequent ratings by many different staff members can then be integrated and used to monitor the patient’s progress and to suggest modifications in the treatment program. A computerized monitoring system can detect relationships, trends, and patterns that might otherwise remain undetected.

2.1 Evaluation of Treatment

The research evaluation of various treatment programs is greatly facilitated by automation. It is possible to process large amounts of data using sophisticated statistical procedures.
that would be difficult or impossible without computers. Examples include such techniques as analysis of covariance (which takes into account initial level and relationship between pre-treatment and post-treatment scores), and factor analysis (which reduces a large universe of items into a smaller and, thus, more manageable number of dimensions). In addition, the automation of clinical records is providing researchers with a data base that they never had available to them in the past.

2.2 Computer as Therapy Assistant

In addition to supplying information relevant to treatment assignment or evaluation, computers can be used as active participants in therapy. Computers have been used in the treatment of autistic children. For example, a computer can respond to the child's increasing vocalizations with interesting displays of visual and auditory material. Computers have also been used in the administration of behavior therapy to patients with phobic disorders by a programmed presentation of fear items.

Recent work in computer use of natural language, in which the computer generates its own sentences, has been used in experimental interviews and suggests the possibility of computerized therapy modeled after the more traditional verbal type of psychotherapy.