DOCUMENT RESUME

ED 049 301   TM 000 490

AUTHOR   Owens, William A.
TITLE   A Quasi Actuarial Prospect for Individual Assessment.
PUB DATE   [70]
NOTE   16p.

EDRS PRICE   EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS   Behavioral Science Research, Behavior Patterns,
              *Biographical Inventories, Cluster Grouping,
              Employee Attitudes, Employment Potential,
              Experience, Group Behavior, *Individual
              Characteristics, *Industrial Personnel, *Models,
              Personality Assessment, Personnel Data, *Predictive
              Measurement, Predictor Variables, Psychology,
              Recruitment, Research Methodology

ABSTRACT
              A conceptual model of individual assessment through
the use of biodata responses with minimal input information is
outlined. The process is considered especially applicable to
industrial psychology. A scored autobiographical data form, which
measures the individual's past behavior and experiences, provides for
assignment to a specific subgroup characterized by a cluster of
distinctive behavioral actions as determined by marker variables. It
is expected that the use of such subgroups for additional experiments
and field studies in psychological and behavioral science research
will in turn provide more feedback definition of the subgroups. The
factoral dimensions of the subgroup profiles include: academic
achievement, tough-mindedness, goals, authoritarianism, and
maladjustment. Assumptions emerging from the study are that past
behavior is a good predictor of concurrent and future behavior, and
confidence in post hoc validity of biodata-based subgrouping appears
justified. The model's thesis is that distinctive, differental
behavior can be associated with subgroup membership and by matching
an individual's biodata profile with the subgroup profile modal
behavior for the individual can be predicted. Present performance,
promotability, sociability, motivation, managerial style, individual
responsibility, innovativeness are seen as predictor variables in
employee behavior through implementation of the model. Advantages and
disadvantages of the model are also included. Statistical data on
subgroup validity is presented. (AE)

A QUASI ACTUARIAL PROSPECT FOR INDIVIDUAL ASSESSMENT

William A. Owens

University of Georgia

The term assessment has been used in contexts so varied that Fiske
and Pearson (1970) in their recent chapter for the Annual Review say they
are dropping it because of its imprecision. It has, in fact, been used
on the one hand to refer to the combined effect of several cognitive
predictors of overall performance expressed via multiple R; and on the
other, it has also been applied to the inspection and judgmental summari-
zation of projective test protocols with the ultimate goal of achieving
a "good description" of the S and with only incidental criterion implica-
tions, if any. Thus, so-called assessment has run the full gamut from
"actuarial" to "clinical." Whereas, most of us in Industrial Psychology
probably feel more comfortable with the actuarial variety, we probably
also would admit a gnawing feeling that our characterizations of a S
ought to be fuller, more complete and more meaningful if only such
embellishments could be achieved without an accompanying loss in validity.
In short, we may be haunted by a sophomeric feeling that a psychologist
should be a man capable of responding convincingly to the question,
"what kind of person is John Jones?"

An overlapping implication in the use of the term assessment is that
the resulting appraisal is exhaustive. Undiluted prediction of a present
criterion does not require this, but description, comprehension, and the
potential prediction of future criteria, as yet unknown, all recommend it.
The classic Michigan study of Kelley and Fiske (1950) required that each

S invest a week. This may well be one limiting case; but, if it is, the
other end of the scale is anchored by that of the job applicant who
responds to a 15' mental ability test and winds up with a complete char-
acterization consisting of one score.

The point of these comments is that during the next few minutes I
hope to suggest the broad outlines of an assessment scheme capable of
providing both actuarial and descriptive data; one capable of providing
great amounts of information about the individual without requiring great
amounts of time from him, and one which I believe offers much for the
future of industrial psychology.

At the University of Georgia my colleagues, Lyle Schoenfeldt,
*Patrick Pinto, and I have been involved with the evaluation of a con-
ceptual model for biodata research (Owens, 1968). As a spin-off, this
investigation seems to us to offer a new look at the problem of individual
assessment. A hasty review of the basic model will provide insight into
its application.

In substance, it is an integrative model des gned to draw measurement
and experimentation, and indeed all the behavioral sciences, somewhat
closer together. For the student of measurement and its applications it
provides the antecedent information required for "causal-type inferences"
and enhanced understanding. For the experimentalist it offers the possi-
bility of employing relatively more homogeneous subsets of Ss, and thus
of reducing error; it also affords knowledge of the Ss pre-experimental
experience and behavior. For the behavioral scientist, generally, it
provides a conceptual framework to which anyone who systematically observes
human behavior may attach his findings, with the prospect that they will

---

* Now at I. R. C., The University of Minnesota.

both gain a new perspective and enhance the meaningfulness of the system.

A sort of flow chart representation of the basic model appears in
figure 1. Here the large circle on the left represents a pool of Ss, let
us say 850 male college freshmen, all of whom complete a scored auto-
biographical data form designed to tap the significant dimensions of their
prior experiences and behaviors. Biodata, known to be a fine empirical
predictor, directly implements the basic measurement axiom that the best
such predictor of man's future behavior is his past behavior. Our con-
cern, however, is with a corollary; namely that, if the axiom holds, it
should then follow that Ss who have behaved similarly in the past will
continue to behave similarly in the future.

Thus, what we wish to do is to sort our Ss into subsets (here repre-
sented as A through E) such that these subsets will display internally
similar and externally differing patterns of prior experience. To achieve
greater brevity, let us deal with the operations involved at a conceptual
level only. An excellent and detailed discussion on methodology is available
elsewhere (See Schoenfeldt, 1970). What we have done to identify Ss with
comparable patterns of prior experience is to factor their biodata responses;
to profile each S on the resulting dimensions; to obtain a matrix of the
distances between each profile and each other; to hierarchically group the
profiles into "families" according to the method described by Ward and Hook
(1963); and finally, to "clean up" the assignments of Ss to these subgroups
in several ways recommended by the approximate nature of the methods
employed to identify the groups. Ultimately, then, persons within a sub-
group have similar patterns of prior experience, as expressed in similar
biodata profiles, and should thus tend, by hypothesis, to exhibit similar
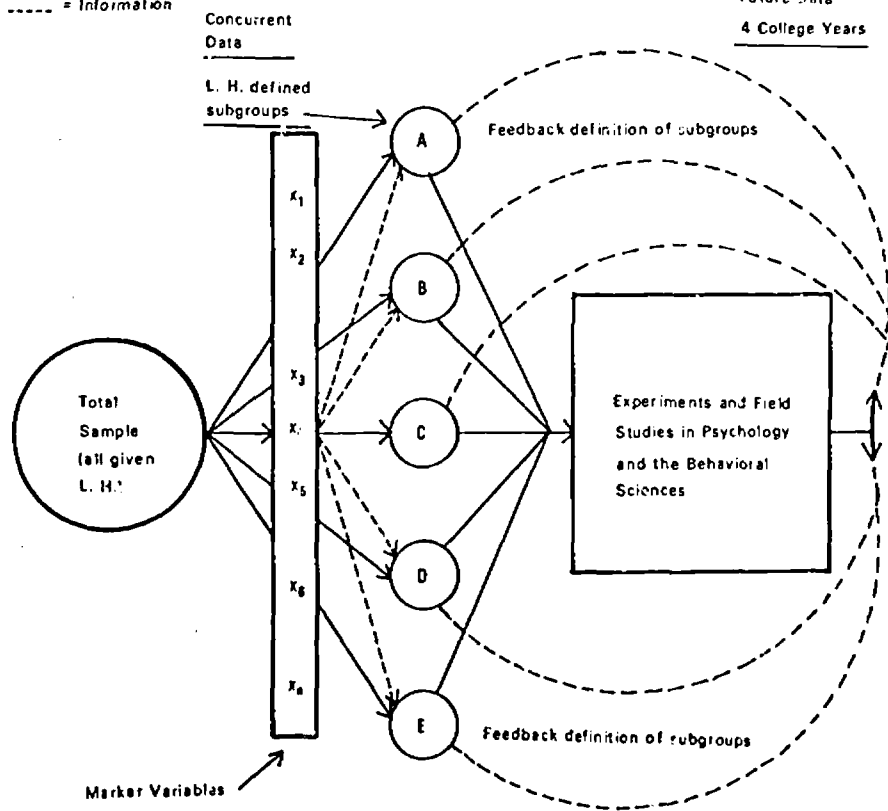patterns of concurrent and future behavior.

Historic
Data

_____ = Ss

----- = Information

DEVELOPMENTAL - INTEGRATIVE MODEL

Future Data
4 College Years

Concurrent
Data

L. H. defined
subgroups

A   Feedback definition of subgroups

X_1

X_2

B

X_3

Total
Sample
(all given
L. H.)

X_4

C

Experiments and Field
Studies in Psychology
and the Behavioral
Sciences

X_5

X_6

D

X_8

E   Feedback definition of subgroups

Marker Variables

What follows is broadly concerned with the significance and meaning-
fulness of this subgrouping; i.e., what are the behavioral correlates of
subgroup membership, and does such membership really argue for distinctive
behavior. Thus, $X_1 X_2$--- X_n are a hopefully representative spectrum of
"reference measures" or "marker variables" to be employed in characterizing
the subsets, but also useful in testing to whether or not they really
differ in terms of concurrent performance. Even more crucially, the box on
the right, were it "opened," could be seen to contain a series of experi-
ments and field studies designed to establish whether or not subgroups
selected with an expectation of differential performance actually do
behave differently. Finally, the dotted lines returning to the subgroups
A through E indicate continuous feedback regarding differential subgroup
behaviors such that these may oe collated and cataloged to provide defini-
tions of ever increasing meaning and precision.

Optimistically, all of this may sound both entertaining and plausible,
yet conceptual models are easy to draw and hard to validate. The crucial
question remains what does it mean to belong to a given subgroup? The
query can probably best be answered by comparing the test behaviors, field
study records and experimental results characteristic of several specific
subgroups. Accordingly, let us turn next to figure 2.

Appearing here are the biodata profiles of our 23 male subgroups.
The upper one, #9, contains 29 Ss; and the lower one, #21, contains 22 Ss.
These groups were chosen because they differ, although they are not the
most different. The biodata dimensions of their definitions carry consensus
labels as follows: parental warmth, intellectualism, academic achievement,
social introversion, scientific interest, socioeconomic status, independence-
dominance, parental control, academic attitude, sibling friction, religious
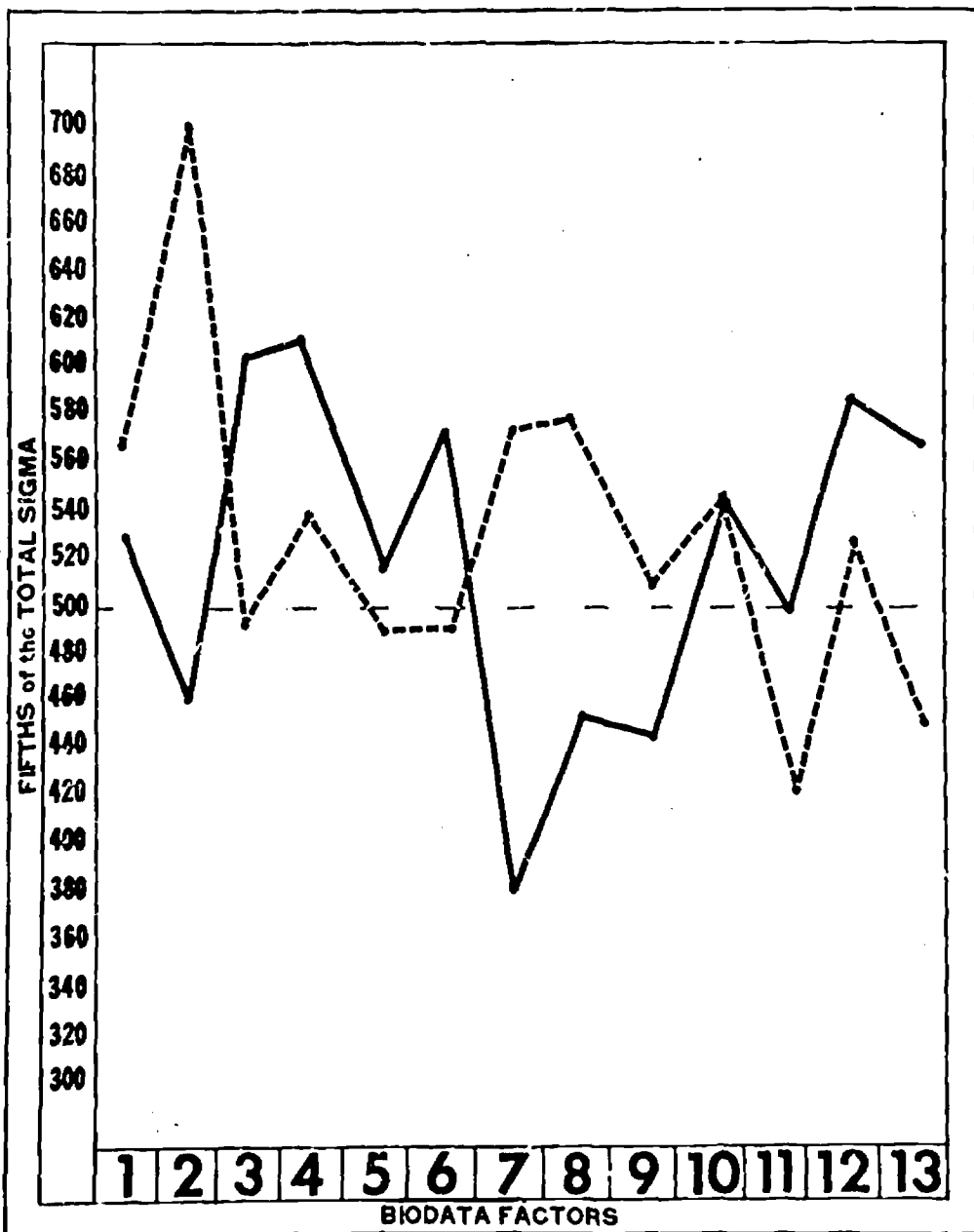
activity, athletic interest and social desirability. Each of the 23 sub-
groups differs significantly from a number of the others on each of these
13 dimensions--a less than remarkable fact since these were the vehicle for
the subgrouping. Specifically, subgroups 9 and 21 differ significantly on
7 factors, and their means sometimes differ by as much as two sigma of the
total sample (units at left = 1/5 σ). This slide was included for two rea-
sons. First, it suggests something of the basis for and effectiveness
of the subgrouping; and second, it shows what a subgroup really _is_; namely,
a distinctive profile--or band of values--across 13 biodata defined
dimensions of prior experience. If we accept the fact of readily apparent
subset differences at this stage, the crucial question remains, "are there
significant and differential behavioral correlates of belonging to a sub-
group?"

One sort of answer may be obtained by examining the distinctiveness
of subgroup performance on the marker or reference variables referred to
in slide #1. Accordingly, in figure 3 you may observe the marker
variable profiles of the biodata defined subgroups 9 and 21.

The factored dimensions of these profiles and the scales loading on
them are:

Academic Achievement
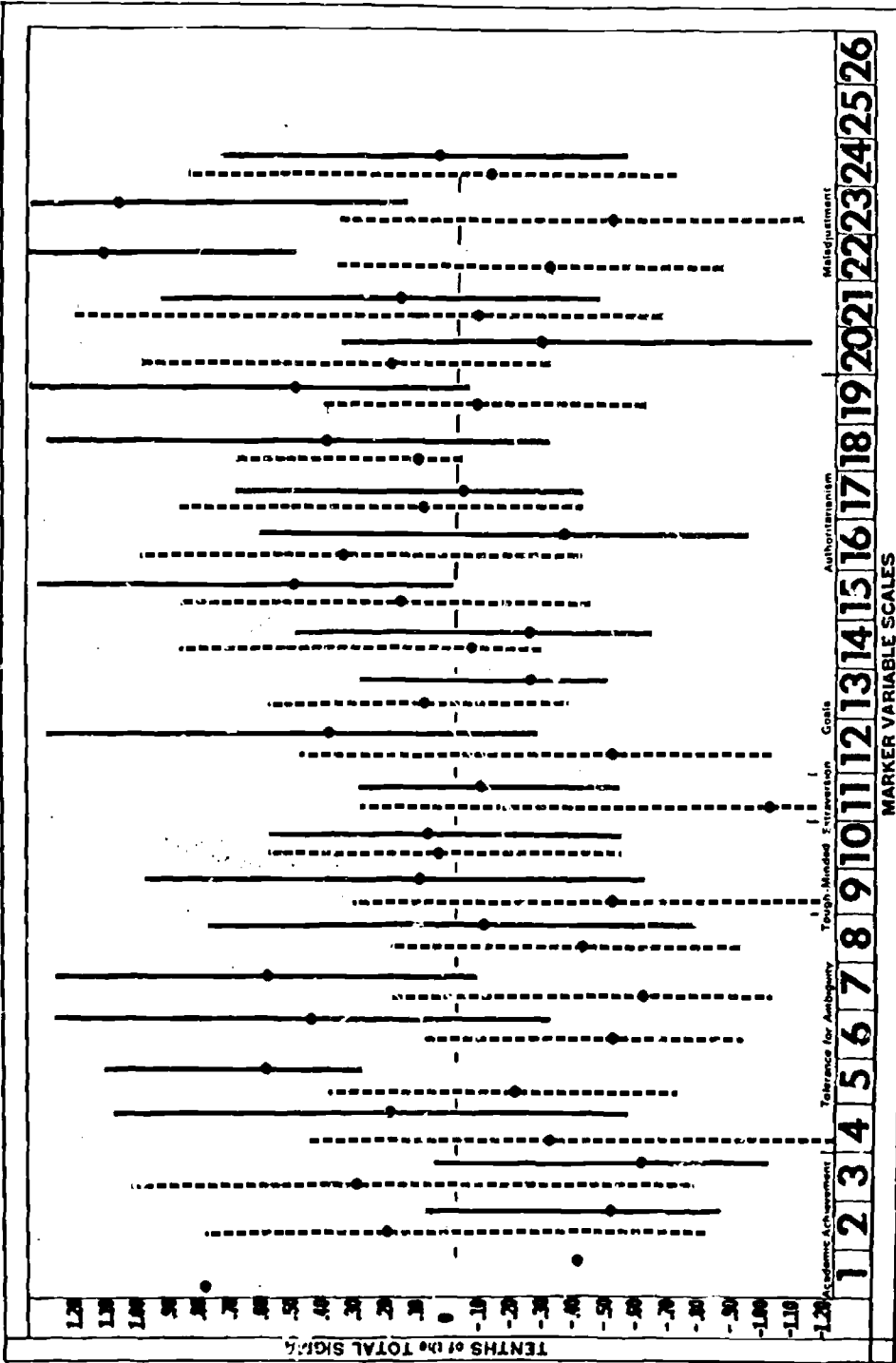
H.S./G.P.A.

SAT-V & Q

Tolerance for.Ambiguity

    cognitive values

    positive emotionality

    emotional exposure

    integrative complexity and hierarchical complexity

TENTHS of the TOTAL SIGMA

1.20 1.10 1.00 .90 .80 .70 .60 .50 .40 .30 .20 .10 0 -.10 -.20 -.30 -.40 -.50 -.60 -.70 -.80 -.90 -1.00 -1.10 -1.20

MARKER VARIABLE SCALES

Academic Achievement | Tolerance for Ambiguity | Tough-Minded | Extraversion | Goals | Authoritarianism | Maladjustment

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

Tough-Mindedness

       tough vs. tender minded

       emotional inhibition

Goals

       short term goals

       long term goals

Authoritarianism

       radicalism vs. conservatism

       direct and reverse F

       social-religious conformity

       physical goals and

       economic goals

Maladjustment

       social desirability

       externalization vs. internalization

       negative emotionality

       conceptual simplicity and

       neuroticism

The circle or dot indicates the subset mean, the length of the bar represents the interquartile range, and the units are tenths of a sigma for the total sample. Overall the entire 23 subgroups differ significantly on all but 2 of these 24 variables and the two subgroups shown differ significantly ($p<.01$) on 5 of them. Differences are also both large and significant across the occupational scales of the Strong Vocational Interest Blank not shown. Indeed, score on most V.I.B. scales can be very well predicted from biodata antecedents. The point of the moment, however, is only that biodata defined subsets of persons do differ substantially

in their performances across a broad spectrum of concurrent measures.
Hopefully, this evidence is convincing, but the skeptic might still say,
"Of course one paper and pencil performance will predict another"; and
the outright cynic would suspect that the same items, or very similar,
appear in biodata and reference measures--a suspicion the substance of
which we categorically deny!

At any event, even the writer will concede that differential sub-
group behavior in field study and experimental settings constitutes more
convincing evidence of the behavioral significance of biodata subset
membership than that already educed. Accordingly, in the academic field
study context, selected subgroups have been shown to differ, in accordance
with hypothesis, along the following lines: (a) in number of items marked
"?" on a Thurstone scale of attitude toward the Negro--a sort of "band
width" phenomenon negatively related to F authoritarianism; and (b) in
test-taking motivation as measured by differential retest improvements in
score on a scholastic aptitude test in response to a monetary incentive.
In addition, Schoenfeldt (1970) has employed all the subgroups and has
demonstrated that they differ significantly in academic performance, as
evidenced by honors, dropouts and probations, and in the numbers of extra-
curricular activities in which they engage. Similarly, in the experimental
domain, subgroups selected to address an hypothesis have been observed to
differ in the meaningfulness of words, as derived from a verbal learning
paradigm; in persuasability, as measured in a pretest-test design involving
five types of persuasive appeals; in consistency of risk-taking behavior as
measured by a modified poker dice game; and in general social desirability,
which serves as a moderator of the tendency for perceived interpersonal
similarity and attraction to be greater within than between subsets.

To date, the writer is aware of only two industrial studies utilizing,
the procedures herein outlined: namely, those of Taylor and Ruda. Taylor

(1968), through the courtesy of Mr. Paul Sparks at Humble Oil & Refining,

obtained the responses of 444 male, managerial employees to the Richardson,

Bellows and Henry biodata form B. Using essentially the present methodology,

he found that 84% of his salesmen in a primary sample of 222 came from 3 of 9

subgroups. He then employed a minimum distance classifier to assign the

remaining 222 to the subgroups of the primary sample. Within this cross

validation sample he found 83% of his salesmen in the 3 parallel subgroups.

Ruda (1970) had 458 executives of a large midwestern oil company complete

a 247-item personal history form. Top level executives also ranked their

subordinates' performances. All Ss were subgrouped employing the methods

previously described and 13 subgroups were identified. Distance from

superiors to subordinates subgroup was found to be negatively related to

rated performance of subordinate. In addition, this distance measure of

rater vs. ratee similarity was found to moderate relationships between

biodata dimensions themselves and rated subordinate performance.

What important facts emerge from this brief review? First, persons

who have behaved similarly in the past do tend to exhibit both similar

concurrent and future behaviors. Second, confidence in the post hoc

validity of biodata based subgrouping does seem justified; indeed, we lack

any completely negative evidence to date. It thus seems reasonable to

assume, following Taylor and Ruda, that subgroup membership will argue

for a wide variety of differential behaviors of industrial moment and

significance.

In delineating the relationship of this discussion to assessment,

the reader will anticipate the writer. If we know that meaningful,

distinctive, differential behavior is associated with subgroup membership,

we may then identify an individual to be assessed, match his biodata

profile with the subgroup profile it most closely resembles and predict

extent that the subset mean differs from the grand mean, and that the subset
variance is less than the grand variance, the potential range of assess-
ment errors is reduced. The efficiency of the procedure for the assessee
is great, since he need only complete a biodata form.   Its meaningfulness,
on the other hand, is commensurate with our knowledge of the repertoire of
subgroup behaviors.

Clearly, if we would implement this conceptual model in the indus-
trial context we must not only administer an appropriate biodata form to
large numbers of employees, but we must also be ingenious in the identi-
fication and development of large numbers of criteria of performance.
Some of these will have immediate job relevance, some will have relevance
in the future and some will seem to be only descriptors. But comprehensive
description favors understanding and, with understanding, apparently
irrelevant variables may turn out to represent critical moderators. The
topic was treated more eloquently five years ago by then retiring
president, S. Rains Wallace (1965), who noted that the answer to the question,
"Criteria for what?" must always include "for understanding." Suffice it
to say, in the present context, that the real vehicle of implementation
would have to be a comprehensive system for the recording of all sorts of
employee behavior. What does it mean to say that John Jones belongs to a
given subgroup? It means as much as our knowledge of the behavioral
characteristics of that subgroup! It is this knowledge we must have!

Clearly, it is easier to ask for more and different criteria than
it is to identify some. What sorts of variables beyond the usual ratings
of present performance and promotability might we consider. First, ratings
of congeniality with associates would be useful, since persons within a
subset tend to be attracted to each other, especially if the subset is a
socially desirable one, and would presumably benefit from a chance to work

speed of performance to tenure, have strong subset affinity and obvious

potential utility.   Third, however appraised, managerial style in general

and risk-taking behavior in particular, have clear affinity for subset

and warrant further study in this context.   Fourth, we have highly

tentative data to suggest that innovativeness and ingenuity have subset

affinity and should be re-examined accordingly.   Fifth, let us take a

purely hypothetical case and assume that the number of unexcused absences

on ones record may be regarded as an inverse measure of his "responsi-

bility."   I would venture that such a variable would have both subset

affinity and industrial relevance.   In any case, it is illustrative of a

most important point.   No such predictor is needed to justify our

collection of criterion data on responsibility.   If responsibility has

affinity for subset, and we can predict subset, we can indirectly predict

not only responsibility but a host of other previously unpredictable

variables as well.   Incidentally, with testing somewhat under a cloud,

it may be interesting to note that a full spectrum of test scores is

predictable from biodata, and that criteria predictable from tests should

therefore also be predictable with greater or lesser success from such

biodata.

To the extent that the present conceptual model is a departure from

traditional approaches, it has a new set of strengths and limitations.

Some we can anticipate and some we will come upon as we proceed.   One

possible weakness is that we do not know precisely how to evaluate the

match of individual to subset.   In our Georgia study we did not subgroup

some 25% of Ss at all because, within error limits, they fit two subsets

equally well; or they were, conversely, outlyers who did not closely

resemble any subset.   Perhaps these subjects parallel those found in any

testing program who have very average scores and about whom

decisions are made on other bases. In any event, as a second concern, some

of our friends have argued that our model deals in foreordination and sug-

gests that a man is completely a creature of his past. We, of course, have

replied that we neither make nor enforce the rules, but only enunciate

them. In any event, studies with employed persons suggest similar but

slightly more numerous factors and subsets than we identify with college

freshmen. Some continued but congruent differentiation with the years

does thus seem to be implied. Third, in interpretation, both criterion and

subgroup base rates are of obvious importance. If 84% of Taylor's (1968)

entire sample had been salesmen instead of 31%, his findings would have

seemed much less remarkable.

    In a more positive vein, it is enormously efficient measurement if

the completion of a biodata form, and the profiling of a S on it, can argue

for that S's probable pattern of test scores, motivations, managerial

style, promotability, creativity, and, indeed, much of his behavior reper-

toire. Comparably, and as priorly noted, any characteristics which adhere

to subgroup membership may be inferred from it, whether they are directly

measurable or not. Choice behaviors, illustrated by the sort of car one

buys, provide a hypothetical example. Or further, since the observation of

subgroup affinity for a given criterion is a post hoc observation, such

a figure as the percent of Ss in a particular subset who satisfy a criterion

of creativity may be expected to show sampling variation but not systematic

skrinkage. The estimate provided is, in this sense, an unbiased one.

Then, too, the longer records are kept, and the more differential information

is attributed to subgroups, the more valuable the system becomes.

    In conclusion, I have tried to sketch the broad outlines of a quan-

titatively based rationale and procedure for the comprehensive assessment

of individuals. The overlap of subgroups with criteria is in the best

actuarial tradition, and may be regarded as the counterpart of ,nore

classical multiple regression approaches. What I believe to be somewhat

more unique is the potential for attributing to the individual many

behavioral characteristics of his subgroup which are neither directly

measurable nor of immediate criterion relevance. At this point, the

proposed model seems to speak directly to a concern expressed many times

and in many different ways by sensitive students of personality. Some

years ago, Allport (1937) feared that we were losing the individual through

the interstices of nomothetic law. More recently Tyler (1959) has suggested

that choice behavior might constitute the mortar to be used in bonding the

concepts of trait theory into a workable psychology of individuality. In

the end, many readers will recall a statement by Toops (1959) to the effect

that the most meaningful thing one can say about an individual is that he

belongs to a subset, or "ulstrith" the behavioral characteristics of which

are known. Toops (1959) followed with a plea that we get about the be-

havioral description and definition of the ulstriths. Improvements in

computer technology, statistical methodology and the sophistication of

conceptual models have followed, and biodata subgroups are more sharply

and complexly defined than ulstriths. The plea, however, still rings

true, so let us indeed be about it, for now we have both a compelling

rationale and a modus operandi!

Owens

References

Allport, G. W. Personality, New York, Holt, 1937.

Fiske, D. W. & Pearson, Pamela H. Theory and techniques of personality
measurement. In P. H. Mussen & M. R. Rosenweig (Ed's). Annu. Rev. of
Psychol. Palo Alto, Cal.: Annual Reviews, Inc. 1970.

Kelly, E. L. & Fiske, D. W. The prediction of success in the V. A. training
program in clinical psychology. American Psychologist, 1950, 5, 395-406.

Owens, W. A. Toward one discipline of scientific psychology. American
Psychologist, 1968, 23, 782-785.

Ruda, E. S. The effect of interpersonal similarity on management performance.
(Doctoral dissertation, Purdue University, Lafayette, Ind., 1970)

Schoenfeldt, L. F. Life experience as a moderator in the prediction of
educational criteria. Paper read at the meeting of the American Educa-
tional Research Association, Minneapolis, March, 1970.

Schoenfeldt, L. F. Nontest variables in the prediction of educational progress.
In E. E. Dudek (Chm.), use of nontest variables in admission, selection,
and classification operations. Symposium presented at the meeting of
the American Psychological Association, Miami, September 1970.

Taylor, L. R. A Quasi-actuarial approach to assessment (Doctoral dissertation,
Purdue University, Lafayette, Ind., 1968)

Toops, H. A. A research utopia in industrial psychology. Personnel Psychol.,
1959, 12, 189-225.

Tyler, Leona. Toward a workable psychology of individuality. American
Psychologist, 1959, 14, 75-81.

Wallace, S. R. Criteria for what? American Psychologist, 1965, 20, 411-417.

Ward, J. H. & Hook, M. E. Application of an hierarchical grouping procedure
to a problem of grouping profiles. Educ. psychol. Measmt, 1963, 23,
69-81.