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The BEHAVIORAL MEASUREMENTS Letter

Behavioral Measurement Database Services

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Enriching the health and behavioral sciences by broadening instrument access

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Vol. 2, No. 2
Spring 1995

Instrument Update

In our last issue (Fall 1994, Vol. 2, No. 1), a 7-item measure of disaster preparedness was described in David Gillespie's column, "Faith in Measurement." Now, however, HaPI also includes a newer 28-item measure by Gillespie, the Inventory of Organizational Disaster Preparedness, that builds upon the earlier measure. This revised instrument contains the following sets of items: (a) six items assessing "physical preparedness" (the degree to which organizational plans emphasize safety of physical facilities and objects to reduce the loss of life, injury, and property damage), (b) seven items measuring "planning preparedness" (the degree to which organizations generally emphasize disaster planning to reduce the loss of life, injury, and property damage), (c) seven items tapping "training preparedness" (the degree to which organizations emphasize disaster training to reduce the loss of life, injury, and property damage), (d) two items assessing "financial preparedness" (the degree to which organizations emphasize the securing of funds for disaster services designed to reduce the loss of life, injury, and property damage), and (e) six items measuring "community preparedness" (the degree to which organizations emphasize community disaster education and community involvement to reduce the loss of life, injury, and property damage).

Fortunately, disasters are not daily events, but when they do occur as in recent earthquakes and floods, they can be devastating. David Gillespie's efforts to measure disaster preparedness can contribute significantly to saving lives and

property. And HaPI's assessment and evaluation resources, including Gillespie's contribution, are readily available to ensure effective program development, implementation, and continuation.

In Front of the (Bell) Curve: A Prologue

Unarguably, race has been the most daunting domestic issue in the second half of the 20th century. For nearly 50 years race, racism, and race relations have dominated the American agenda. Although race was a factor earlier, it mushroomed in 1954 with the Supreme Court's historic Brown versus Board of Education decision, continuing over the ensuing troublesome decades, and today remaining a conspicuous challenge for the country.

Far less conspicuously but no less evident in all areas of American life — employee selection, pupil classification, admission to schools and colleges, and consideration for appointments in government as well as in corporate America — is the trait referred to as intelligence. A trait considered to determine whether — vernacularly speaking — one is smart, dumb, or fair to middling. The labeling of one as bright, mentally agile, or dull, has gotten to be a descriptor of human variability that most of us consider to be pretty darned important, deservedly or otherwise.

And so, when the book, *The Bell Curve*, by Richard Herrnstein and Charles Murray (1994), was published a few months ago, it provoked

thunderous reaction. A part of the book included, if not necessarily with accepted authenticity, the inflammatory ingredients of race and intelligence. Worse yet, when the book's implications began to be known that a large portion of intelligence is genetically transmitted, you can imagine what a stir this created for months and months in public forums, the nation's leading media, intellectual debates on college campuses, and practically everywhere else.

Since *The Behavioral Measurements Letter*, is after all, about measurement, as is *The Bell Curve*, we thought that our readers would savor the balanced and informed reaction to *The Bell Curve* which follows, "Sizing Up the Capacities of Humankind," by Brown University professor Lewis P. Lipsitt, a leading developmental psychologist. We hope you enjoy it and that you share with us the belief that it offers much digestible and constructive food for thought.

Linda Perloff, Editor

Sizing Up the Capacities of Humankind

Lewis P. Lipsitt

The measurement of learning or any aspect of human ability, especially when ethnic or racial differences are documented, seems always to arouse acrimonious debate. The most recent iteration of this squabble is occasioned by the publication of Herrnstein and Murray's (1994) *The Bell Curve* (Free Press). However, most of us who have children or who have taught children and have found their test scores wanting, especially when a critical decision will likely depend on the scores (as in college admission), know the "gut reaction"—something's wrong with the test, it's not fair.

It is interesting that the public freely accepts systematic measures for most things, from the gallon delivered to our car tank to the number of eggs sold for a given amount of money, itself a measure. And we quantify human characteristics, as well, all the time. The second most frequent question people ask on hearing of a baby's birth,

depending on the answer to the first question, is "How much does he/she weigh?" Even the question "Boy or girl?" is asking for a kind of measure.

People do not buy property without knowing its dimensions. Nor do we walk away from the paymaster without counting our earnings and expecting the pay to match our time, effort, and talent. We are constantly "sizing up" the capacities of humankind. Human proficiency in sports events, in car-racing, and in typewriting is always measured in numbers, appropriately checked to be sure the "call" is made on the basis of real data. But when it comes to that sample of human performance called intelligence, people balk and protest.

Why?

First, we're afraid the tests don't really measure what they purport to measure. We don't want to buy what we think is a quart in what turns out to be a half-quart container, and we don't want to draw 87 octane gasoline from a gas pump marked 89.

We are wary, secondly, that the measurement taken, even if accurate, may not be a correct "reflection" of an important aspect of our being. After all, there are different ways of being smart. Psychologists, Howard Gardner and Robert Sternberg, are our cutting-edge scholars in this regard.

Thirdly, people are afraid that the characterization of their "smarts" in terms of an IQ confers a certain static condition on them. We do prefer the prospect of change, particularly for the better, but people tend to believe, at critical moments of measurement, that low and high are forever, despite the prevalence among us of "developmental surprises": friends and relatives who started out well but fell into harm's way, or people who were predicted to come to no good end and worked out just fine. We owe the convincing documentation of the latter sort to Emmy Werner, author of *The Children of Kauai* and, for the former, news accounts virtually every day of respected citizens, like mayors or CEOs, who turn out to have been defrauding the city treasury or their professional association for the past 5 years.

And finally, because the IQ historically was conceived as a ratio of mental age over chronological age and thus in principle remains constant as the child matures, we somehow conceive of IQ scores as hereditarily given when in fact they are measures heavily dependent upon acquired knowledge and skills. Many studies have shown marked IQ shifts over time in some youngsters. J. McV. Hunt collated the evidence in his book, Intelligence and Experience.

Whither group differences?

The Bell Curve has opened an old wound, by restating that in the U.S. (not an insignificant qualifier), African-Americans score group-wise an average of 15 IQ points lower than Whites. This is what the authors report and numerous large-scale studies have shown, and this is where the fighting begins—the same fight that we have with ourselves when our kids come in with a score that is less than optimal for taking up a course of study or entering an occupation of choice. Quarrels ensue over the composition of the tests, and about their predictive validity for different types of life tasks.

Two of the most telling arguments against taking the resurgence of interest in racial disparities seriously are:

(1) Group differences are always about groups, not individuals. Any given individual, White or African-American, may be at the top or bottom of the distribution associated with his or her identity, or anywhere in between.

(2) It is impossible to apply the concept of variance to an individual. Variance is a group statistic. Even if in a particular context of child-rearing and ability-measurement, a finding is made permitting the statement “60% of the variance is due to heredity, and 40% to the environment,” there is no way in which it can be assumed for any given individual that his or her intelligence, for example, is 60% gene-determined and 40% by experience.

(3) There can be questions raised about the very construct of race. Who is African-American and who is White? We live in a culture where having

one great-grandparent who is African-American can designate the person as African-American. Where in our history did this definition of “race by contamination” get its foothold.

(4) Poverty is the most powerful predictor of poor IQ performance in children. In the U.S., where 20% of our children live below the poverty level with all of the attendant handicaps of education, growth, and development that this condition confers, about 50% of African-American children reportedly live below the poverty level. Indeed, study after study has shown that the most salient correlate of IQ scores is *socio-economic level*. Why is this fact so frequently muted during discussions of race differences?

What to do?

We need more discussion about the processes by which increases in mental age and intellectual or cognitive function occur, and how best to measure these processes. Moreover, we need some reconceptualizations of intelligence, of the type that Sternberg and Gardner provide, honoring the full range of human capacities and areas of expertise. The measurement of IQ is here to stay in one form or another, but the tests must be allowed to evolve to accommodate changing conceptions of intellect and talent. Skilled basketball players probably have better space perception on the basketball court, and are surely more talented in practical aspects of ricochet physics than most physicists, but there is little in the current tests that taps this type of intelligent behavior.

All behavior is collaboratively generated by genes and the environment. The relative power or importance of heredity and experience, measured among groups, can be pushed around by alterations in either. That said, it is important to understand that genetic determination is, in a sense, all over at birth — actually at conception. For any given individual once born, the only sources of variation through which intelligence, however defined, and other developmental outcomes of that person can be altered are environmental or experiential. Thus the statistical findings of race and socio-economic differences in IQ should impel us to look toward optimizing the social conditions of education, child-rearing, and intelligence-making.

Bottom line

Lost in the talk about numerous studies showing persistent race-differences is the fact that many African-Americans have higher IQs than many Whites. One cannot know what the intellectual properties are of any given individual, White or African-American, Jewish or Christian, Japanese or Chinese, without having intelligent interaction with that person. College professors frequently encounter African-Americans with IQs of 115 and higher. The bell curve and the existing data on IQ indicate that such an African-American student has an IQ higher than at least about 83% of the whites in the nation. Many commentators on the Herrnstein and Murray book emphasize group differences rather than honor the vast individual differences, in all peoples, underlying the bell curve.

All individuals have a potential for intellectual development that cannot be ascertained independently of educational input. One defines a river in terms of its flow as much as by the presence of water. Its flow is altered by the rain, and by the slope and borders of the river bed. So does the developmental course of intelligence become sculpted by the context in which it is nurtured. Although species limitations do exist, we do not know in advance how high a given dog can jump until we give it our best shot in training. So also we cannot possibly know, for any given human infant, free of significant birth injury or defect, what that child's cognitive or intellectual limits are.

Dr. Lewis P. Lipsitt is Professor of Psychology and Medical Science at Brown University, where he has been on the faculty since 1957 and directed the Child Study Center for 25 years. He has been a Guggenheim Fellow, and was a Fellow at the Center for Advanced Study in the Behavioral Sciences, at Stanford University. Dr. Lipsitt edits the Brown University "Child and Adolescent Behavior Letter."

May I never use my reason against truth.

—Hasidic prayer

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Development Dimensions International
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**Measuring a Simple Skill,
Not So Simple!**

Marigold A. Edwards

This is my dilemma: I want to measure "relaxation on demand" or voluntary relaxation in normal, healthy people. My students report they cannot relax well in practice when any number of typical conditions (for students) exist such as being too tired, too excited, too "bummed," a bad day, a paper due, an approaching exam, and so on. If you can relax only when conditions are "right," then maybe you don't really have the skill — and if you don't own the skill, then you are denied its potential benefits.

There is general agreement and a strong body of support that relaxation is good for health and well-being. And from personal experience I can attest

that appropriate relaxation, being relaxed in the right places at the right time, is good for performance, too.

So, how do we measure achieved relaxation? For Edmund Jacobson, who developed the principles and techniques of Neuromuscular Relaxation or Progressive Relaxation, it was easy because he defined relaxation physiologically as the absence of tension, and tension is reflected in EMG (electromyograph) records. I recall his insistence that he couldn't teach a person to relax; he could only teach a person to discriminate between the sensation of tension or muscular effort and its absence, relaxation. The person has to cease the effort, i.e., stop the tension. This is a tidy, elegant approach because the definition identifies the yardstick to be used, i.e., the operational definition is inherent in the definition. Thus, my measurement issue stems from the lack of consensus on the definition of relaxation. Definitions abound. They range from popular perception, as when taking a vacation, "goofing off," or otherwise engaging in pleasurable, typically non-work or distracting activities, to clinical definitions that focus on restoring chronically disrupted homeostatic pathways, and definitions employed in experimental research.

While lacking the tidy link provided by the Jacobson definition, there are approaches to assessing achieved relaxation that vary with individuals, settings, assessors, psychometric instruments, and hardware. The usefulness of the results likewise vary with these factors. For example, I found no correspondence between ratings of perceived relaxation (on a Likert-type scale ranging from "very, very relaxed" to "very, very tense") and physiologic measures with naive individuals. However, those who have developed mind-body awareness through movement training, even without formal relaxation training, rate bodily tension/relaxation more accurately. Jacobson preferred to work with athletes for this very reason. Moreover, some individuals rise to the demand characteristics of the situation with more favorable ratings of relaxation. Unfortunately, many relaxation studies have used such self-report instruments as the pre-post measure to demonstrate having learned to

relax. This is not to say that self-report cannot be useful. Jacobson's patients were as highly trained in self-observation as champion athletes, having gone through thorough neuromuscular retraining with 3-4 sessions per week and daily self-practice of 1, 2, or more hours with record-keeping for a period, for some of 1-2 years. You bet they learned to self-report accurately!

A Jacobsonian assessment approach that depends on observer experience has the individual relax while characteristics are noted such as: forehead appears ironed out; eyes quiet, teeth apart; face expressionless; lies/sits still without holding; demeanor is peaceful, effortless, quiet. A manual test of the limbs and head looks for heaviness without resistance to easy joint movements and muscle softness. This manual test is helpful in training individuals not to react to being touched/tested and to sense what holding versus "letting go" means in a practical way. With similar intent, though more formal, the Behavioral Relaxation Scale, developed by Poppen, lists 10 bodily "symptoms" describing the relaxed state that are monitored each minute for a 5-10 minute period by a knowing observer. However, without observer sophistication and the ability to provide feedback and coaching, observer report may be little better than subject self-report.

The stress response is defined essentially by the sympathetic nervous system (and several endocrine axes); the relaxation response likewise, by sympathetic dampening and relative parasympathetic nervous system dominance. Unfortunately, the relevant variables are not equally accessible for monitoring nor do they all move in the desired direction within or among individuals. For bread and butter relaxation training, Elmer and Alyce Green, long associated with the Menninger group, define true relaxation as "quiet thoughts, quiet emotions, and a quiet body." The quiet emotions, as a result of quiet thoughts, are reflected in skin temperature of the hands and feet (peripheral vasodilation moving in the direction opposite to stress vasoconstriction) and skin conductance (as warm, dry hands pass little current) for autonomic relaxation; a quiet body or somatic relaxation is recorded by EMG (electromyograph). This is again straightforward, but at what point is relaxation achieved? Is it simply relative? A change in the desired direction

is necessary but is it sufficient? I think not. But how much is enough?

For example, research shows that breathing with increased use of the diaphragm and decreased use of chest muscles has immediate physiologic benefits. Students in my class have resting respiration rates of 18-20 bpm typical of American adult rapid, shallow breath patterns. We know that minimal training in breathing techniques can reduce rates to < 10 bpm, even < 6 bpm. We know that Yogis can breathe comfortably at 2-3 bpm but is this better for health and well-being than 6 or 9 bpm? What is appropriate? Are there standards? Several authors have suggested criterion levels to indicate that the skill of relaxation has been successfully learned, demonstrating physiologic mastery. Presumably, the skill is then part of one's behavioral repertoire for use on demand. The route to physiologic mastery is basic relaxation training with practice/homework enhanced by biofeedback training which can be thought of as training wheels to speed up the learning of this psychophysiological self-regulation. Criteria in the literature pertaining to relaxation address 3 basic response systems (in case all individuals are not neuromuscular responders, for example) and suggest forehead and forearm EMG (electromyograph) < 2.5 microvolts peak to peak; EDR (electrodermal response) < 2 micromhos; hand temp > 95 °F, foot temp > 92 °F. In addition to measuring performance, instrument readings provide validation of the subjective experience of relaxation as well as evidence of learning over time.

What is the role here of psychometric instruments that comprise the HaPI database? I have routinely used Spielberger's State Anxiety Inventory (SAI) and subscales of McNair and Lorr's Profile of Mood States (POMS) to measure changes in arousal following an intervention or to get a baseline, and Spielberger's Trait Anxiety Inventory (TAI) to better interpret the scores. If the parameter of interest is low arousal, then it is reasonable to expect the psychological and physiologic measures to fit, i.e., correlate. Research, however, shows a frustrating lack of congruence between the soft (self-report) data on the one hand and the hard (physiologic) data on the other. Is subjective reality of lesser value than

objective reality? Sport coaches have reported that self-report data is more useful than physiologic data and it is certainly easier to get. But consider this: I feel fine but the cuff is registering my blood pressure as 160/95 mmHg. I can't feel it so does that mean it is not a problem? Of course not. On the questionnaire a subject checks "I feel relaxed," and "I feel calm," but her forehead EMG (electromyograph) is at 5 microvolts, EDR (electrodermal response) is 11 micromhos, and finger temperature, 81 °F. 'Tis a puzzlement!

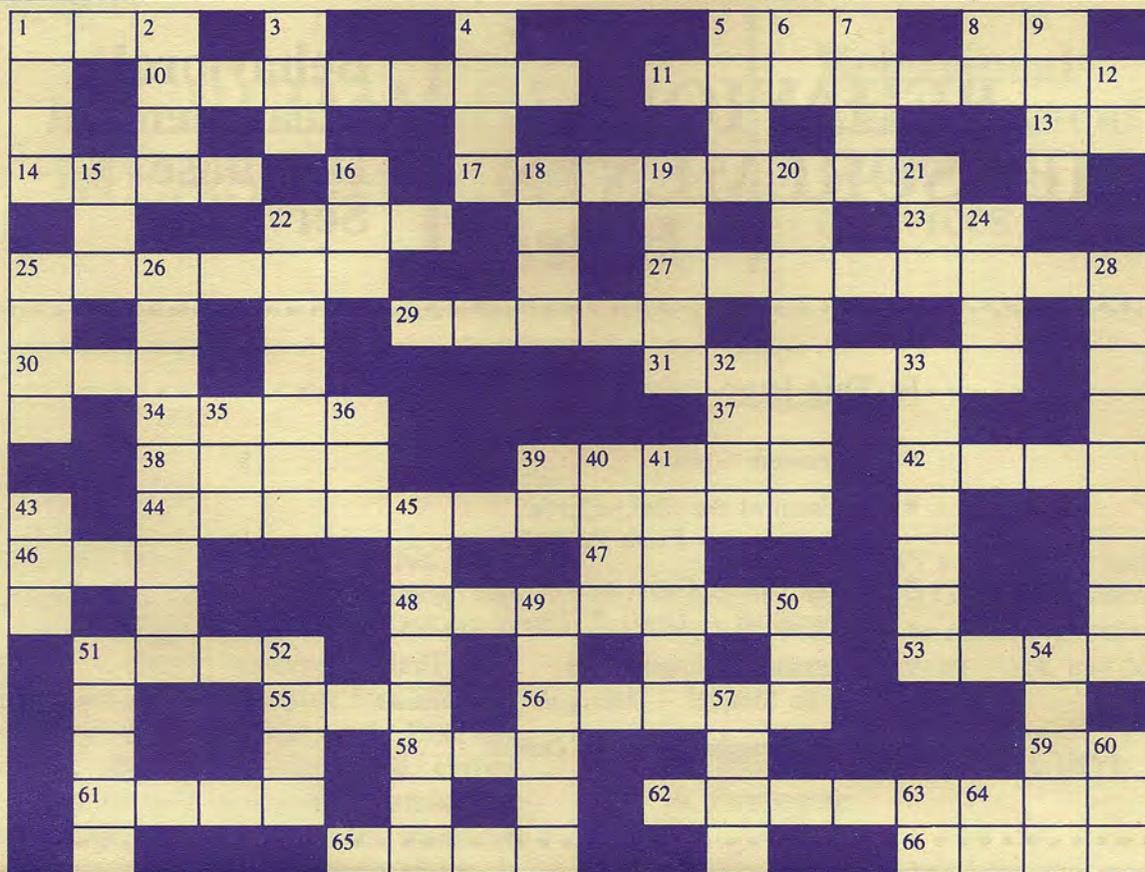
I have the J & J I-330 software and J & J interfaced hardware to measure 8 physiologic variables: 2-site EMG (electromyograph), skin temp, EDR (electrodermal response), respiration rate, SBP (systolic blood pressure), DBP (diastolic blood pressure), & PR (pulse rate). I would like to develop a normative data bank of psychophysiological relaxation profiles of normal healthy individuals, students, staff, faculty, and others. If the capacity to relax can be retained and cultivated rather than retrained at a later point in life when beset with psychosomatic symptoms/complaints, if skills now rather than pills later is feasible, then here is a health-promoting venture in the true spirit of prevention. But what is my best combination of psychometric and psychophysiological instruments? How much relaxation is enough to achieve its benefits? At what point can one say I can do it; I own the skill; I can relax on demand?

Marigold A. Edwards, PhD. CHES, a New Zealander, is Associate Professor at the University of Pittsburgh. Certified in Biofeedback and Stress Management Education, she teaches and lectures in the various areas of lifestyle and health. That she is nationally ranked in the top 10, Women's A squash singles 1967-1992, and national senior singles champion, 1974-1993, makes for perfect integration of the personal and professional life of Marigold Edwards.

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HaPI Thoughts



ACROSS

1. random access memory
5. opposite of good
8. third person singular of "to be"
10. measurement scale where points are ordered
11. pertaining to meaning
13. table of organization
14. ruminant mammal
17. measurement scale where distance between neighboring points is the same
22. word that makes another word negative
23. preposition
25. number when multiplied produces a product
27. not absolute
29. electronic broadcast medium
30. container, usually of metal and cylindrical
31. to restate a fraction in simpler terms
34. trigonometric function y/r
37. Roman numeral eleven
38. device used to catch animals
39. to divide into parts
42. National Opinion Research Center
44. giving the same measurement repeatedly
46. British Thermal Unit
47. acceptable; all right
48. validity determined by instrument's substance
51. basic component of an instrument

53. instrument measuring achievement
55. organ of hearing
56. measurement scale where intervals are directly proportional
58. goal or objective
59. preposition
61. divisible by two with no remainder
62. may assume two or more values
65. basic unit of an organism
66. have been looked at

DOWN

1. brief foray outside one's usual sphere
2. most frequent score in a distribution
3. to sum
4. largest database containing information on measurement instruments
5. beverage of fermented barley and hops
6. first person singular of "to be"
7. unprocessed information
8. one chosen or "tagged" in a game
9. location
12. abbreviation for company
15. correlation ratio
16. negative conjunction
18. a requirement
19. not a true score
20. measuring what it purports to measure
21. batch
22. measurement by naming
24. two plus three

25. validity when an instrument looks appropriate
26. theoretical concept
28. minimizing time by using HaPI
32. way out
33. environment; milieu
35. anger
36. prefix meaning upon, over, outer
39. abbreviation for *Sports Illustrated*
40. to place data points in a grid
41. usually a 5-point scale
43. point or condition of decline
45. free from error
49. bell-shaped distribution
50. also
51. to derive descriptor or key terms
52. arithmetic average
54. subset of items in an instrument
57. individual retirement accounts
60. base of the decimal system
63. preposition
64. infinitive form of "is"

Al K. DeRoy, PhD, MPA is currently on leave from the University of Pittsburgh where he is a Senior Research Associate working in program and proposal development. His educational background encompasses biology, medicine, education, and public administration. Dr. DeRoy has been involved in the ongoing evolution of HaPI since 1983.

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The Behavioral Measurements Letter

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