

## Real World Implications of *g*

JOHN HAWK

*United States Employment Service*

Spearman's *g* is a very real phenomenon, and it potentially has a great impact on many areas of economic and social life. Key areas include personnel selection, vocational counseling, education, labor market functioning, and equal employment opportunity. © 1986 Academic Press, Inc.

Spearman's *g* is a very real phenomenon. In point of fact, it is very difficult to devise a mental test on which scores are *not* strongly influenced by *g*. Regardless of the purpose of a test (achievement, aptitude, diagnosis, etc.) or the subject matter (math, language, subject matter knowledge, etc.) all mental tests measure *g* to some extent and many are quite good measures of *g*. Further, *g* predicts performance in a very wide range of (perhaps all) human activities, and this relationship is invariant across demographic groups such as sex, racial/ethnic, and age groups (Droege, 1983; Hawk, 1983; Swarthout, Synk, & Goade, 1984; U.S. Department of Labor, 1977). These findings show that *g* potentially has a great impact on the economy and on society in general in a number of areas.

### *Personnel Selection*

The proper use of tests of *g* can greatly improve the accuracy and value of personnel selection. For this reason, over 30 state public employment services are currently field testing a validity generalization (VG) system to predict success in virtually all occupations. This system is based on the work of Hunter (1983a, 1983b, 1983c, 1983d) and uses the well-respected General Aptitude Test Battery (GATB). While the cognitive component of the GATB (*g*) is valid for all known jobs, the addition of general psychomotor ability, which might be considered the physical analog of *g*, adds substantially to the prediction of performance in less complex jobs. Although the VG system has not been fully evaluated yet,

The opinions expressed in this article are those of the author and do not necessarily reflect the policies of the U.S. Employment Service or the Department of Labor. Thanks to Linda Gottfredson for her review of an earlier version of this paper. Requests for reprints should be sent to John Hawk, Division of Planning and Operations, U.S. DOL ETA/USES, 200 Constitution Ave., N.W., Washington, DC 20210.

information to date (McKinney, 1984) shows that employees selected with the assistance of VG are more productive, they learn faster, and they are more quality conscious. Several small-sample studies also show lower turnover and higher satisfaction among the more able. These data therefore suggest that the hypothesis of overqualification is only a myth.

Of particular importance for the national economy is the fact that increases in productivity due to improved personnel selection average several thousand dollars per worker per year employed in the jobs studied to date (Hunter, 1983c; Schmidt, Hunter, Outerbridge, & Trattner, 1986). Cumulatively, this has the potential for increasing national productivity by some \$80 billion per year. Increases of even lesser magnitude have obvious implications for the nation's economic health and competitiveness in the world market. Benefits also accrue to individual workers when they are employed in jobs appropriate to their abilities, because better job performance and fewer failures on the job can be expected to enhance self-esteem.

### *Vocational Counseling*

Specific aptitudes add little or nothing to the prediction of performance in most jobs, even in very different fields, once *g* is taken into account. Two general aptitude factors—*g* and psychomotor ability—predict job performance as well as tailored batteries of specific aptitudes (Hunter, 1983b). The tests lack differential validity, and the unreliability of profile interpretation is notorious. Past efforts to develop counseling instruments to tell individuals which occupations best match their own abilities have focused on profile differences among the specific cognitive abilities required on jobs, and so have been misguided. Measures of *general* cognitive and motor ability can and should be used, however, to assist individuals in estimating their probability of success in different *levels* of work and the amount of effort required to succeed in them.

### *Education*

Performance in occupations is more highly related to general cognitive ability than to more specific skills—even those broad skills such as verbal and numerical abilities. As Hunter notes elsewhere in this issue, this is probably due to high-ability individuals learning the required specific job knowledges more efficiently. This fact, combined with the common observation that most people now entering the work force will change occupations several times in their career, indicates the necessity for broad-based education. In particular, this principle is important to vocational education, technical schools, and other kinds of "skills training." The "quick fix" of short skills training courses will not work except for relatively high-ability trainees. With the limited resources usually available, this means that training will be effective only for those who need it least

or who can profit most quickly from it, and that training will be insufficient for those most in need.

### *Labor Market Functioning*

Traditionally, the labor market has been competitive. Employers have sought the “best” workers, with “best” sometimes undefined, but most often meaning the most productive, least mistake prone, most stable, etc. Job seekers attempt to market themselves by convincing employers that they are the “best” applicant. Because of the large random element in the selection process, almost everyone has had a reasonable chance of obtaining a job, whatever their ability level. However, with increased precision in the selection process, and as long as there are more applicants than jobs, the least competitive applicant will be less likely to become employed. The very least competitive will probably require some form of subsidization in order to work. The nation does not appear to have reached a consensus regarding the relative social, emotional, and economic costs of alternative approaches regarding the unemployable. Fortunately, recent technical advances have provided some of the tools to estimate at least some of the economic costs and benefits, which will, perhaps, add some degree of rationality to the continuing debate.

### *Equal Employment Opportunity*

The use of ability tests is the most valid way known of identifying the workers or trainees who will be the most productive on the job. The relationship between test and job performance is the same for all groups studied, but there are differences in the average performance of some racial/ethnic groups. Therefore, if selection is fair to individuals, that is, if the most productive persons are hired, there will be adverse impact on some groups (i.e., smaller proportions of them will be hired). If group parity is achieved, some more able members of the higher scoring groups (e.g., Japanese-Americans or nonminorities) will be passed over in favor of some less able members of the lower scoring groups. The simultaneous achievement of both parity for groups and fairness for individuals is impossible given the current state of affairs. No unambiguously virtuous approach exists. Denying anyone opportunity on the basis of race or ethnicity is repugnant, but so too for many people is the continued existence of large group differences in employment and earnings which may be due, to some extent, to past discrimination and lack of opportunity.

### *Summary*

The existence of general cognitive ability, or *g*, and its relevance to effective functioning in many different areas is now a matter of evidence, much of which is covered in the papers in this special issue of the *Journal of Vocational Behavior*. I have noted some of the real world areas in

which these findings are likely to be important. This broad impact of  $g$  is likely to cause some discomfort to some of us, as it is often easier to muddle through rather than to confront directly hard ethical and practical problems. Research findings did not change the true state of affairs, but identified preexisting conundrums. At the same time, new research tools, particularly meta-analysis, have already provided some answers and, perhaps more importantly, have provided the means by which at least some of the right questions can be asked.

## REFERENCES

- Droege, R. C. (1983, August). *Is age a moderator of GATB validity?* Paper presented at the annual meeting of the American Psychological Association, Anaheim, CA.
- Hawk, J. (1983, August). *The fairness of the General Aptitude Test Battery.* Paper presented at the annual meeting of the American Psychological Association, Anaheim, CA.
- Hunter, J. E. (1983a). *Fairness of the General Aptitude Test Battery: Ability differences and their impact on minority hiring rates* (USES Test Research Rep. No. 46). Washington, DC: U.S. Employment Service, U.S. Department of Labor.
- Hunter, J. E. (1983b). *The dimensionality of the General Aptitude Test Battery (GATB) and the dominance of general factors over specific factors in the prediction of job performance for the U.S. Employment Service.* (USES Test Research Rep. No. 44). Washington, DC: U.S. Employment Service, U.S. Department of Labor.
- Hunter, J. E. (1983c). *The economic benefits of personnel selection using ability tests: A state-of-the-art review including detailed analysis of the dollar benefit of U.S. Employment Service placements and critique of the low-cutoff method of test use* (USES Test Research Rep. No. 47). Washington, DC: U.S. Employment Service, U.S. Department of Labor.
- Hunter, J. E. (1983d). *Validity generalization for 12,000 jobs: An application of job classification and validity generalization analysis to the General Aptitude Test Battery (GATB)* (USES Test Research Rep. No. 45). Washington, DC: U.S. Employment Service, U.S. Department of Labor.
- McKinney, M. W. (1984). *Final report: Validity generalization pilot study.* Raleigh, NC: Southern Test Development Field Center.
- Schmidt, F. L., Hunter, J. E., Outerbridge, A. N., & Trattner, M. H. (1986). The economic impact of job selection methods on size, productivity, and payroll costs of the federal work force: An empirically based demonstration. *Personnel Psychology*, **39**, 1-29.
- Swarthout, D., Synk, D., & Goode, W. (1984). *The effect of sex on General Aptitude Test Battery validity and test scores* (USES Test Research Rep. No. 49). Washington, DC: U.S. Employment Service, U.S. Department of Labor.
- U.S. Department of Labor (1977). *Manual for the USES General Aptitude Test Battery. Section III: Development.* Washington, DC: U.S. Govt. Printing Office.

Received: August 8, 1986.