

THE *g* FACTOR IN EMPLOYMENT

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**Edited by
LINDA S. GOTTFREDSON**

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FOREWORD

The *g* Factor in Employment

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This issue of the *Journal of Vocational Behavior*, The *g* Factor in Employment, is the first of occasional special issues to be published by the *Journal* on topics of particular relevance for the study of vocational behavior. This issue originated in the conference, "The *g* Factor in Employment Testing," which was held October 10-11, 1985, by the Personnel Testing Council (PTC) of Southern California. That conference brought together leading researchers for the purpose of summarizing recent research on the nature of *g* (general intelligence) and the relevance of mental tests in personnel selection. Although the PTC conference was organized specifically for professionals in employment testing settings, it covered issues of vital importance, in my opinion, for all persons concerned with career development processes, worker productivity, and social inequality.

All five speakers at the conference have contributed to this volume, and they include Arthur R. Jensen, Robert L. Thorndike, John E. Hunter, James Crouse, and myself. Lillian Avery organized the PTC conference, and has provided an introduction to this special issue. John Hawk, who served as moderator at the PTC conference, has also contributed to this volume. Partly because the study of ability differences has been dogged by controversy throughout its history, especially in recent decades, it seemed particularly important to solicit commentary from recognized experts in mental testing. Richard D. Arvey, Lloyd G. Humphreys, Robert L. Linn, and Leona E. Tyler all kindly agreed to provide additional perspective on the papers published here. All four have long been concerned about the valid measurement of mental abilities and the appropriate use of mental tests in educational or employment settings.

Avery describes how the conference topic—The *g* Factor in Employment

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Testing—grew out of lively discussions among employment testing personnel about the importance of *g* and *g*-loaded tests. She also summarizes the results of her survey of the reactions of conference attendees.

Jensen explains how the general mental ability factor, *g*, is derived from factor analyses of large and diverse sets of mental tests, and why *g* provides a useful operational definition of intelligence. He also reviews evidence that counters prevalent misconceptions about *g* and mental tests. Finally, Jensen reviews nonpsychometric correlates of *g*, including test heritabilities, inbreeding depression, choice reaction time, and evoked electrical potentials, to argue that *g* is not a methodological artifact, but must be viewed as a natural phenomenon in its own right.

As Thorndike describes in his contribution, ability testing began early in this century with a focus on measures of general cognitive functioning similar to Spearman's *g*, but the focus soon shifted to multiple specific abilities. These specific abilities were, for many years, assumed to provide better prediction of job performance than does a general ability factor. Thorndike presents the results of four double cross-validation studies in which he tests that assumption. He shows that, for the small sample sizes typical in validation research, a uniform general factor predicts performance in training and on the job better than do tailored batteries of specialized abilities, and that in large samples a general factor accounts for 85–90% of the predictive value of such batteries.

Hunter reviews meta-analyses of hundreds of studies showing that general cognitive ability predicts job performance in all jobs, whether performance is measured objectively or subjectively. He also reviews path analytic research consistent with the theory that *g* affects job performance primarily by improving job knowledge, but that general ability also affects job performance above and beyond its impact on job knowledge. Finally, Hunter discusses evidence that, except in a few special cases, tailoring aptitude composites to match the job does not improve the prediction of job performance above and beyond that provided by general cognitive ability.

Crouse (in Gottfredson & Crouse) distinguishes between the predictive validity of a mental test and its practical value for specific uses. Specifically, he argues on the basis of his analyses that although aptitude and achievement tests are both valid for predicting later educational and economic success, the latter may be more useful in college admissions. Crouse summarizes evidence that the Scholastic Aptitude Test (SAT) is largely redundant with other information already used in college admissions, namely, the high school record. He then argues for substituting achievement tests for aptitude tests in the admissions process, because the latter might stimulate improved performance in high school. While not dealing with testing for employment, his more general question is equally applicable to such settings. Namely, once we know that a test is a valid predictor

of some later performance, how should we actually *use* that test, if at all, when making selection decisions?

Gottfredson focuses on the societal consequences of large individual and group differences in *g* among workers. She first addresses seven common arguments that differences in general mental ability are not of practical significance in the workplace. Next, she summarizes a theory explaining how large individual differences in intelligence in a society, by virtue of their impact on job performance, influence the organization of work itself by leading to the emergence of an occupational hierarchy in which some jobs are more intellectually demanding than others. Gottfredson concludes by estimating some of the societal ramifications of the large mean black–white difference in intelligence.

Hawk provides an overview of the different work-related arenas for which *g* has important implications, including personnel selection, vocational counseling, education, labor market functioning, and equal employment opportunity. He also describes one way in which the test development activities of the U. S. Employment Service have been influenced by recent evidence on the predictive importance of *g*.

Several common themes run through the four commentaries. All four commentators acknowledge the functional importance of *g* in the workplace, they all agree that *g* has broad and sometimes awkward implications for society, and all want more evidence about the importance of *g* relative to other worker traits, including specific abilities. Both Tyler and Humphreys provide a historical perspective on research in ability testing and note that the pendulum appears to be swinging back toward an interest in Spearman's *g*. Linn and Humphreys suggest that recent decreases in the gap between blacks and whites on achievement tests, although small, might be a good omen for the possibility of further reducing black–white differences in cognitive abilities. They both also respond to Crouse's proposal to substitute achievement for aptitude tests in college admissions, Humphreys expressing strong agreement and Linn expressing some reservations about Crouse's estimates of the utility of aptitude tests.

One issue *not* discussed by any of the commentators should be mentioned to avoid confusion. That is the issue of cultural bias in mental tests. Cultural bias was not discussed in depth by any of the contributors to this volume because the main scientific issue is generally regarded as settled as far as bias in whole tests is concerned. There is no evidence of cultural bias against blacks in the major standardized tests of mental ability, and mental tests predict performance in school and on the job equally well for blacks and whites (Wigdor & Garner, 1982a, 1982b). Interest in the test bias issue now centers mainly on small discrepancies for individual items which favor one group or the other and which often tend to cancel out in total test scores.

In addition to the common themes, each commentator provides additional

perspective on particular issues. To cite just a few examples, Arvey presents data from his own research supporting the conclusion that there is a *g* factor among jobs, that is, that jobs can be described according to the level of their general intellectual demands. Humphreys devotes considerable discussion to the measurement, meaning, stability, and heritability of *g* in which he takes issue with Jensen's belief that biological correlates make *g* more real or more important. He argues that a highly replicable mathematical dimension that is quite stable is itself a natural phenomenon. Linn highlights some implications of the conflict between the competing goals of equality and efficiency, including the limitations that this conflict may place on the gains to be realized from the improved use of *g* in personnel selection. Tyler suggests that perhaps we want to rethink our concepts of productivity and equality, say, by focusing on the productivity of the whole society rather than its parts and by directing more attention to the measurement of qualitatively different contributions to productivity.

The foregoing contributions have brought together a wealth of evidence and theory about the role of *g* at work, and in so doing have moved discussion forward to a whole new set of questions. These are not questions that we are always comfortable dealing with, as Hawk notes, but they are important. And as Avery's account of audience reaction to the PTC conference illustrates, many employment testing specialists, counselors, and other professionals are eager to see more discussion of these difficult issues. I hope that this special issue helps to stimulate that discussion.

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INTRODUCTION

Origins of and Reactions to the PTC Conference on *The g Factor in Employment Testing*

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For over 30 years the Personnel Testing Council of Southern California (PTC) has served as a forum for the growth and development of professionals in the field of personnel research, selection, and testing, through published materials, workshops, and semi-annual conferences. This article describes the interest and concern of the membership in what may be the most critical issue in personnel testing today—the implications of using or not using *g*-loaded tests. It further describes the events that led to the scheduling of a major conference on the *g* factor. Audience reactions to the conference are also described. © 1986 Academic Press, Inc.

Early in 1985, the Personnel Testing Council of Southern California (PTC) selected the subject of *The g Factor in Employment Testing* as its 1985 Fall Conference topic. Since its organization in Los Angeles, California, over 30 years ago, PTC has served as a forum for persons in the field of personnel research, selection, and testing. In addition to workshops and monthly luncheons, semi-annual conferences are offered to provide a continuing flow of information, and to apprise professionals in the field with current practices, new ideas and techniques, legal developments, and solutions to selection problems. Typical PTC conferences held within the last 4 years offered topics such as Validity Generalization, The Job Analysis Challenge, and Measuring Performance: Implications for Employee Productivity.

The topic for the 1985 Fall Conference evolved from ongoing lively and animated discussions among personnel selection and testing staffs of the Los Angeles Unified School District, Classified Employment Branch. The discussions and interest spilled over into the general PTC membership.

The author served as coordinator for the 1985 Fall Conference of the Personnel Testing Council of Southern California, *The g Factor in Employment Testing*, Newport Beach, California, October 10-11, 1985. Request for reprints should be addressed to Lillian Markos Avery, Cooperative Personnel Services, California Test Development Field Center, 9920 La Cienega Blvd., Suite 717, Inglewood, CA 90301.