Submitted: 29th of April 2015
Published: 26th of May 2015
DOI: 10.26775/ODP.2015.05.26
ISSN: 2446-3884

Discounting IQ's Relevance to Organizational Behavior: The "Somebody Else's Problem" in Management Education

Bryan J. Pesta* Michael A. McDaniel† Peter J. Poznanski‡
Timothy DeGroot§

Open Differential Psychology

Abstract

We hypothesize the existence of a "somebody else's problem" in management education for the sub-discipline of organizational behavior (OB). The problem regards human intelligence, specifically, the general factor, g. Although g is arguably the most powerful variable in social science, OB educators largely ignore it. To demonstrate the former, we review a vast literature establishing g's construct validity. To demonstrate the latter, we show that current OB textbooks place far less emphasis on g relative to a popular but less potent predictor of organizational success, emotional intelligence. We also show that when textbooks do reference g, it is often just to offer criticism. Misconceptions about empirical data on intelligence testing, denial that a general factor of intelligence exists, the reality of mean racial differences in mental ability, and the finding that genes play a non-trivial role in causing intelligence, seem to make OB's treatment of this topic "somebody else's problem."

Keywords: Intelligence, Emotional intelligence, Organizational behavior

1 Introduction

Organizational behavior (OB) textbooks contain perhaps the most interdisciplinary content in all of social science. They include lecture material from psychology, sociology, anthropology, political science, and economics. We argue here, however, that OB textbooks tend to ignore what is possibly social science's most powerful variable: IQ (more specifically, the general factor of intelligence, *g*, as derived from IQ test scores). OB textbooks discount the general factor to the point that when discussing intelligence, they often either criticize *g*, relegate its status as secondary to that of specific mental abilities, or focus more attention on other types of "intelligence" (e.g., emotional intelligence) that possess less predictive validity.

As reviewed below, *g* is typically measured as the first, un-rotated factor emerging from factor analysis on any diverse set of mental abilities tests. Statistically, *g* is the variance common to solving a math problem, defining a word, and reading a map. Biologically, *g* reflects the speed and efficiency with which brains process information. Psychologically, *g* is problem solving ability, and usually fares as one of the best predictors of important educational, organizational, and social outcomes. Yet OB educators mostly ignore it.

We suggest that popular misconceptions about intelligence (see, e.g., Gould (1996)) sour motivation to cover this topic in OB textbooks. Nonetheless, research articles addressing *g*'s validity are easy to come by, and they show that these widely-held views about *g* are urban legends. Instead, we hypothesize that fair treatment of *g* in OB education and elsewhere is suppressed by a psychological device: A "somebody else's problem."

> *An SEP is something we can't see, or don't see, or our brain doesn't let us see, because we think that it's somebody else's problem. The brain just edits it out; it's like a blind spot" (Adams, 1982, p. 118).*

That the problem exists today is confirmed by the editor of the journal, *Intelligence*, who recently noted:

* Department of Management, Cleveland State University. Corresponding author, E-mail: b.pesta@csuohio.edu
† Department of Management, Virginia Commonwealth University.
‡ Department of Accounting, Cleveland State University.
§ Department of Management, Cleveland State University.

> *A serious problem for the field of human intelligence is that what people do know about intelligence is often wrong. If not outright wrong, it is often distorted through the lens of the popular press (Detterman, 2014, p. 149).*

To document the problem's existence, we first debunk commonly-held misperceptions about *g*. Our rebuttal attempts to demonstrate that *g* has impressive construct and predictive validity. We then compare *g*'s coverage in current OB textbooks relative to a popular, less-potent predictor of performance, emotional intelligence. The specific beliefs we discredit include the:

(1) Invalidity of factor analysis as used to measure *g*,

(2) "fallacy" of assuming *g* is real merely because factor analysis quantifies it ("reification"),

(3) belief that *g* has no basis in biology or the brain,

(4) denial that race and IQ co-vary,

(5) downplaying of IQ's genetic basis, and

(6) claim that either specific or multiple intelligences predict outcomes better than does *g*.

1.1 On the Invalidity of Factor Analysis

Some (see, e.g., Gould (1996)) believe that g is a statistical artifact, emerging from the arbitrary nature of factor analysis, and the intelligence researcher's misguided attempts to interpret correlations among cognitive ability test scores. It is admittedly counter-intuitive that single IQ scores meaningfully reflect the vast array of human mental ability. However, IQ test scores do this precisely because they measure the general factor. Although other specific types of intelligence exist, g accounts for roughly 50 percent of their variance (Jensen, 1998; McGrew, 2009). g then likely reflects the speed and efficiency with which brains process most any perceptual or cognitive information (Jensen, 2011).

Evidence for these claims comes primarily from a factor analytic literature spanning one century. This literature has produced one of the most replicated findings in social science: The "law" of positive manifold (Jensen, 1998). Scores on surprisingly diverse sets of mental-abilities tests correlate positively. Pesta & Poznanski (2009), for example, reported robust correlations between diverse measures of IQ, such as reaction time, inspection time, over-claiming, the General Management Aptitude Test, and the Wonderlic Personnel Test.

Most experts today accept that human cognitive abilities align in hierarchal order. For example, in the Cattell-Horn-Carroll (CHC) model, cognitive abilities form a three-stratum hierarchy (Carroll, 1982; McGrew, 2009). The apex contains a single general factor, *g*, which correlates strongly with all factors below it. The middle of the hierarchy consists of several broad abilities (e.g., processing speed; short-term memory). Several dozen narrow mental abilities (e.g., perceptual speed; word fluency) comprise the lowest stratum.

1.2 On the Fallacy of Reification

The "fallacy of reification" (see, e.g., Gould (1996)) occurs when researchers interpret factors emerging from factor analysis as reflecting "real things" and / or "real properties" of the brain. In intelligence research, factor analytic derivation of *g* proves only its statistical existence. However, existence as a psychological construct (e.g., personality, motivation, self-esteem, leadership, love) can be established by validation with other psychological constructs. Likewise, existence as a biological construct can be established by validation with brain / body function and morphology.

So many important variables covary with *g* (from semen quality to leadership success) that researchers have postulated the presence of a broad nexus to best describe these interrelationships (Jensen, 1998; Pesta et al., 2010). To illustrate, here we cite just meta-analytic literature showing variables contained within the *g* nexus:

(1) Cognitive: Inspection time (i.e., a measure of the brain's ability to quickly absorb information; Grudnik & Kranzler 2001), reaction time (i.e., a measure of the brain's ability to quickly process information; Sheppard & Vernon 2008), and working memory (i.e., the brain's mental workbench; (Ackerman et al., 2005)).

(2) Health: Lead exposure (Needleman & Gatsonis, 1990), fluoride exposure (Tang et al., 2008), iodine exposure (Qian et al., 2005), and all-cause mortality (Calvin et al., 2011).

(3) Success: Leadership (Judge et al., 2004), socioeconomic success (Strenze, 2007), and job performance / trainability (Schmidt & Hunter, 2004).

(4) Interpersonal: self-efficacy (Judge et al., 2007), interpersonal sensitivity (Murphy & Hall, 2011), delay discounting (Shamosh & Gray, 2008), and religiosity (Zuckerman et al., 2013).

The above list shows that *g* has non-trivial predictive validity in many life domains. If realness can be inferred by construct validation, then *g* is a real psychological construct. This is especially true given

other psychological constructs with less remarkable validation records (e.g., multiple intelligences) whose realness is seemingly conventional wisdom.

1.3 On the Biological Basis of g

The following illustrates *g*'s basis in biology. It is a non-exhaustive list of *g*'s correlations with brain / body function and morphology:

(1) Brain size (McDaniel, 2005)

(2) The arborization of cortical neurons (Ceci, 1990)

(3) Cerebral glucose metabolism (Haier, 1993)

(4) Evoked potentials (Barrett & Eysenck, 1992)

(5) Nerve conduction velocity (Rijsdijk & Boomsma, 1997)

(6) Sex hormones (Christiansen & Knussmann, 1987)

(7) Semen quality (Arden, Gottfredson, Miller, & Pierce, 2009)

(8) Cranial and motor nerve function (Arden, Gottfredson, & Miller, 2009)

(9) Serum cholesterol (Corley et al., 2014)

(10) Atherosclerosis (Roberts et al., 2013)

(11) Blood pressure (Starr et al., 2004)

(12) The incidence of obesity, diabetes, high blood pressure, stroke and metabolic syndrome across the 50 U.S. states (Pesta et al., 2012)

Relationships between *g* and health are ubiquitous and striking. Arden, Gottfredson, & Miller (2009) postulated the existence of a general fitness factor to explain links between these constructs. We suspect that Jensen (1998)'s *g* nexus, Pesta et al. (2010)'s well-being nexus, Kirkegaard (2014)'s socioeconomic factor, and Arden, Gottfredson, & Miller (2009)'s general fitness factor are converging on the same constructs.

1.4 On Race and IQ

No issue in science is more controversial than that of group mean differences in human mental ability. Its mere mention has caused riots (Modgil & Modgil, 1987), threatened careers (Gottfredson, 2010), and (we suspect) strongly reinforced the "somebody else's problem" in OB education and elsewhere.

Data on race and IQ go back to at least World War I (Jensen, 1998). This century, Roth et al. (2001) conducted a large-scale meta-analytic summary of these effects (N = 6,246,729 people). Black / White differences in mean IQ scores are quite large, although the distributions overlap considerably across groups. Overlapping distributions indicate that millions of minorities score higher on IQ tests relative to tens of millions of Whites, just in the USA. Nonetheless, many of the effect sizes exceed 1.0 (Roth et al., 2001). Finally, debate exists about whether these gaps have recently narrowed, but no one has yet determined the cause of race differences in intelligence, nor how to meaningfully reduce them.

A substantial literature reveals that IQ tests simply are not statistically biased against minorities (Jensen, 1980; Neisser et al., 1996). Rather than review various potential explanations for these effects, we cite a task force commissioned by the American Psychological Association (APA). Although somewhat dated, the task force still represents the APA's current stance on race and intelligence:

> *The [difference] does not result from any obvious biases in test construction and administration, nor does it simply reflect differences in socioeconomic status... In short, no adequate explanation of the differential between the IQ means of Blacks and Whites is presently available (Neisser et al., 1996, pp. 96–97).*

1.5 On Genes and IQ

The "somebody else's problem" in OB education and elsewhere is also reinforced by the consistent finding that genes play an important role in determining individual differences in human mental ability. It is clear that genes substantially influence individual differences in many psychological traits, including intelligence (Bouchard, 2004). The evidence is so strong that the field no longer focuses on "whether" genes affect intelligence. Instead researchers study how heritability differs by "chronological age, epoch and social circumstance" (Gottfredson, 2009, p. 16).

Bouchard (2004) offered a sound summary of the literature in this area. For young children, environmental factors (e.g., parenting philosophy, socioeconomic status) strongly influence individual differences in intelligence. Surprisingly, the effects of "shared environment" gradually drop to approximately zero as children mature into adulthood. Multiple lines of evidence confirm this conclusion, including studies using twins and siblings (raised in either the same or different environments) or adoptees. By the time people reach working age and organizational behaviors become salient, approximately 85 % of the variance in IQ test scores is caused by genes.

1.6 On the Specificity Doctrine

Consider the following three quotations, each from a different OB textbook:

(1) Thus, managers must decide which mental abilities are required to successfully perform each job. For example, a language interpreter...would especially need language fluency (Gibson et al., 2012, p. 90).

(2) ... different jobs require various blends of these [mental] abilities. As some obvious examples, writers have to be adept at word fluency, statisticians have to be good at numerical ability and numerical reasoning, and architects have to be skilled at spatial visualization (Greenberg, 2013, p. 131).

(3) Research suggests that cognitive ability predicts performance on the job, as long as the ability in question is relied on in performing the job (George & Jones, 2012, p. 53).

These claims are factually incorrect, as they illustrate the now-falsified, situational specificity hypothesis (see, e.g., Schmidt & Hunter 1977).

Almost 100 years ago researchers noticed that the validity of any given IQ test often varied considerably from study to study. Even for the same jobs in different organizations, validity coefficients were seldom identical (Schmidt & Hunter, 1977). The situational specificity hypothesis offered a non- parsimonious explanation for these findings. The idea was that unknown features of a "work situation" exist in every job-validation study. These features cause the same IQ test to predict performance in some situations, but not in others. Validity estimates are therefore confounded by unknown, situation-specific factors that should be accounted for when attempting to predict job success.

The presumed solution was job analysis. Detailed studies were required to identify the unique knowledge, skills, and abilities needed to do this specific work in that specific organization. However, no matter how detailed and thorough, job analysis was unsuccessful at finding these factors. Instead, empirical estimates of IQ's validity were derived and classified separately by jobs and organizations.

Schmidt & Hunter (1977, 2004) demonstrated the true unknown responsible for these discrepancies: Random sampling error and its artifactual associates (i.e., across-study differences in measurement error and range restriction). Once adjusted for these artifacts, IQ test scores robustly predict job performance.

1.7 To g or Not to g

Conventional wisdom wrongly suggests that IQ tests reflect only narrow academic skills of no real- world import. Instead, the presumed existence of multiple intelligences captures the public's fascination. Consider the popularity of (Gardner, 1983)'s theory of "multiple intelligences." Via Google Scholar, *Frames of Mind* (Gardner, 1983), has been cited 20,694 times in various literatures.

Gardner hypothesized that unique, relatively uncorrelated, intelligences exist, and that they rival g in terms of importance. However, no one has produced data contradicting the "law" of positive manifold (for a review, see Wilson 2012). Instead, scores on diverse sets of mental tests correlate positively.

Another "intelligence" celebrated as predictor of organizational outcomes is emotional intelligence (EQ). EQ is the ability to identify, monitor and accurately use information about emotional states (Goleman, 1996). EQ indeed matters in organizational settings, but its power to predict success is exaggerated relative to IQ (see, e.g., Joseph et al. (2015); Landy (2005). Also problematic is EQ's construct validity, as some claim it may merely be a repackaged version of the *Big Five* personality traits (Conte, 2005; Robbins & Judge, 2015).

Despite these criticisms, EQ remains widely popular in both research and educational settings. Goleman (1996)'s book, *Emotional Intelligence*, has been cited 18,037 times in various literature. Enthusiasm for EQ has also infected authors of organizational behavior textbooks. Notwithstanding decades of meta-analytic literature on IQ and job performance, Hellriegel & Slocum (2011) asserted:

> *Studies have consistently shown, for example, that the attributes associated with emotional intelligence...are twice as important for career success as intelligence (IQ) or technical competencies. (p. 84)*

We next test whether OB textbook authors devote more attention to EQ or to IQ (and whether coverage of each is accurate or critical). The textbook survey could help prove that g is somebody else's problem in OB education. For example, in one surveyed textbook (556 pages), just the following sub- headings appeared in the subject index under "Intelligence:" Cultural, Emotional, Moral and Social. For reasons reviewed above, we predict that OB textbooks will focus more on EQ relative to IQ, and that coverage of especially the latter will sometimes be either inaccurate or critical.

2 Method

2.1 Sample and Design

We used the website, `Coursesmart.com`, to select nine OB textbooks, each written by different authors. Textbook selection was random, except that we sampled

only texts that were currently-used, recent editions from one of the "big three" publishers: Cengage, McGraw Hill, and Pearson (we selected three texts from each of these publishers). We then conducted searches in these books looking for coverage of either "IQ" (i.e., specific mention of *g*), or "EQ" as a comparison group.

We coded variables that would most strongly suggest the existence of a "somebody else's problem" in OB education. Our survey therefore constituted a 2 (IQ, EQ) x 2 (accurate, inaccurate) x 2 (critical, noncritical) factorial design, with paragraph frequency as the dependent variable. Examples of accurate / inaccurate coverage of IQ included mention that it is a strong predictor of job performance, versus mention that specific mental abilities predict better (see the appendix file for several examples). Examples of accurate / inaccurate coverage of EQ included mention of its criterion validity, versus mention that it predicts job performance better than does *g*. Examples of critical coverage of IQ were comments about the ethics of IQ testing; whereas, examples of critical coverage of EQ were claims that it is perhaps a repackaged measure of the *Big Five*.

We also coded the number of graphs, tables, and other "bonus content" (e.g., surveys measuring EQ) devoted to each intelligence. For IQ bonus content, we counted any table or figure of mental abilities, as long as it also included the general factor. If bonus content made text-based claims about IQ or EQ, we included them in our overall paragraph counts for that book. Finally, two co-authors of the present paper conducted searches independently, so that we could measure inter-rater reliability (average $r = .86$). Disagreement was resolved via discussion and then consensus on all coded paragraphs.

3 Results

Table 1 lists the number of paragraphs each textbook devoted to IQ and EQ by accuracy and criticality, together with the frequency of bonus content. The table also includes a subjective, "five-star" ranking of each text, based on the depth and fairness of its treatment of g, in our opinion. Statistical analyses comprised chi-squares.

From the table, the number of paragraphs devoted to either IQ or EQ was surprisingly small, given that OB textbooks often exceed 500 pages. Nonetheless, when the authors of our nine, sampled textbooks referenced "intelligence," they devoted nearly twice as many paragraphs to EQ (63) relative to IQ (35), χ^2 (1) = 8.00, $p = .005$. Likewise, the number of bonus-content items devoted to EQ (11) was over three times that devoted to IQ (3), χ^2 (1) = 4.57, $p = .0325$. Coverage of EQ was also considerably more accurate (98 %, relative to 71 % for IQ), χ^2 (1) = 16.4, $p = .0001$. We found only one example of an inaccurate claim about EQ (i.e., Hellriegel & Slocum, 2011, although the authors did provide citations supporting their claim). Critical coverage of IQ (46 %) was far more frequent relative to that for EQ (13 %), χ^2 (1) = 13.3, $p = .0003$. That is, to the extent texts did reference IQ, almost half the time it was to offer criticism.

4 Discussion

We attempted to expose the "somebody else's problem" in OB education by first reviewing literature establishing g's reality, validity, utility and importance. That *g* seems to be "somebody else's problem" was then confirmed by our OB textbook survey. Textbooks reflect what material is considered important, or at least worthy of mention, for students in discipline. Given the construct validity of g, as reviewed above, its relative absence in OB texts is unfortunate. OB authors should consider increasing coverage of *g* in their textbooks. Educators should do likewise in their OB classrooms. A level of coverage meeting that of EQ's in current OB textbooks appears reasonable.

We also hypothesized that the "somebody else's problem" is reinforced by the findings of race differences in, and genetic links to, intelligence. What consequence are the former to organizational behavior? Diversity issues are directly relevant to every organization; so too are discrimination lawsuits. Using cognitive abilities tests in employment decisions creates substantial "*disparate impact.*" This is a potentially illegal form of discrimination where a neutral employment practice harms a protected class (see, e.g., *Griggs v. Duke Power* 1971). In our experience, however, most business students have never heard of the Griggs case, nor realize the scope of the disparate impact created by testing for cognitive ability.

Some disclaimers are in order. Although we argue that *g* is the most powerful variable in social science, it is not the only individual difference that matters. Personality, including EQ, predicts organizational outcomes as well. Further, although IQ tests produce predictive validities as high as .50 for some organizational outcomes (e.g., job performance), much of the variance associated with these outcomes remains unexplained by *g*. Finally, the sensitive nature of race differences in human ability (though directly relevant to organizations via issues like diversity, affirmative action, and disparate impact) demands that educators use discretion when (and if) covering this topic.

Author contributions and funding

BP conceived the essay. All authors contributed to writing and revising the various sections. BP and PP

Table 1: Paragraph Counts, Bonus Content, and Five-star Ratings of Various Organizational Behavior Textbooks.

	IQ			EQ			Bonus Content		
First Author	Paragraphs Total	Accurate (n)	Critical (n)	Paragraphs Total	Accurate (n)	Critical (n)	IQ (n)	EQ (n)	Five-star rating
Newstrom	0	0	0	2	2	0	0	1	*
Gibson	3	1	2	13	13	1	0	1	**
Kreitner	4	4	1	6	6	1	0	2	****
Greenberg	13	7	10	9	9	0	1	2	*
Robbins	9	9	2	12	12	6	1	2	*****
George	4	2	1	8	8	0	1	2	***
Griffin	1	1	0	2	2	0	0	0	*
Hellriegel	0	0	0	4	3	0	0	1	*
Nelson	1	1	0	7	7	0	0	0	**
Totals[1]	35	25 (71 %)	16 (46 %)	63	62 (98 %)	8 (13 %)	3	11	–
Mean frequency	3.89	2.78	1.78	7.00	6.89	0.89	0.33	1.22	2.2 (*'s)

[1] Percentiles in this row equal the cell's frequency divided by the total number of paragraphs for the IQ or EQ category.

conducted the textbook survey. The article was not funded, and there are no known conflicts of interest.

Peer review and supplementary materials

The peer review history is publicly available in the submission thread https://openpsych.net/forums/15/thread/183/.

Data files and earlier drafts are available in the forum thread and also at the Open Science Framework repository https://osf.io/r8q7m/.

References

Ackerman, P. L., Beier, M. E., & Boyle, M. O. (2005). Working memory and intelligence: the same or different constructs? *Psychological Bulletin*, *131*(1), 30—60. doi: 10.1037/0033-2909.131.1.30

Adams, D. (1982). *Life, the universe and everything*. New York, NY: Del Rey.

Arden, R., Gottfredson, L. S., & Miller, G. (2009). Does a fitness factor contribute to the association between intelligence and health outcomes? Evidence from medical abnormality counts among 3654 us veterans. *Intelligence*, *37*(6), 581-591. (Intelligence, health and death: The emerging field of cognitive epidemiology) doi: 10.1016/j.intell.2009.03.008

Arden, R., Gottfredson, L. S., Miller, G., & Pierce, A. (2009). Intelligence and semen quality are positively correlated. *Intelligence*, *37*(3), 277–282. doi: 10.1016/j.intell.2008.11.001

Barrett, P., & Eysenck, H. (1992). Brain evoked potentials and intelligence: The hendrickson paradigm. *Intelligence*, *16*(3), 361–381. (Special Issue: Biology and Intelligence) doi: 10.1016/0160-2896(92)90015-J

Bouchard, T. (2004). Genetic influence on human psychological traits. *Current Directions in Psychological Science*, *13*(4), 148–151. doi: 10.1111/j.0963-7214.2004.00295.x

Calvin, C. M., Deary, I. J., Fenton, C., Roberts, D. G., B. A., Leckenby, N., & Batty, G. D. (2011). Intelligence in youth and all-cause-mortality: systematic review with meta-analysis. *International journal of epidemiology*, *40*(3), 626—644. doi: 10.1093/ije/dyq190

Carroll, J. (1982). *Human cognitive abilities: A survey of factor-analytic studies*. Cambridge, England: Cambridge University Press.

Ceci, S. (1990). *On intelligence more or less: A bioecological treatise on intellectual development*. Englewood Cliffs, NJ: Prentice Hall.

Christiansen, K., & Knussmann, R. (1987). Sex hormones and cognitive functioning in men. neuropsychobiology. *Psychological Bulletin*, *18*(1), 27—36. doi: 10.1159/000118389

Conte, J. (2005). A review and critique of emotional intelligence measures. *Journal of Organizational Behavior*, *26*(4), 433—440. doi: 10.1002/job.319

Corley, J., Starr, J., & Deary, I. (2014). Serum cholesterol and cognitive functions: the lothian birth cohort 1936. *International Psychogeriatrics*, *27*(3), 439–453. doi: 10.1017/S1041610214001197

Detterman, D. K. (2014). You should be teaching intelligence! *Intelligence*, *42*, 148-151. doi: 10.1016/j.intell.2013.07.021

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York, NY: Basic Books.

George, J., & Jones, G. (2012). *Understanding and managing organizational behavior* (6th ed.). Upper Saddle River, NJ: Pearson.

Gibson, J., Ivancevich, J., Donnelly, J., & Konopaske, R. (2012). *Organizations: Behavior, structure, processes* (14th ed.). New York, NY: McGraw Hill.

Goleman, D. (1996). *Emotional intelligence: Why it can matter more than IQ*. New York, NY: Bantam Books.

Gottfredson, L. S. (2009). *Logical fallacies used to dismiss the evidence on intelligence testing* (In R. P. Phelps ed.). Washington, DC: American Psychological Association. (Correcting fallacies about educational and psychological testing)

Gottfredson, L. S. (2010). Lessons in academic freedom as lived experience. *Personality and Individual Differences*, *49*(4), 272-280. (Collected works from the Festschrift for Tom Bouchard, June 2009: A tribute to a vibrant scientific career) doi: 10.1016/j.paid.2010.01.001

Gould, S. (1996). *The mismeasure of man* (2nd ed.). New York, NY: Norton and Company.

Greenberg, J. (2013). *Behavior in organizations* (10th ed.). Upper Saddle River, NJ: Pearson.

Griggs v. duke power. (1971). (401 U.S. 424. U.S. Supreme Court)

Grudnik, J. L., & Kranzler, J. H. (2001). Meta-analysis of the relationship between intelligence and inspection time. *Intelligence*, *29*(6), 523–535. doi: 10.1016/S0160-2896(01)00078-2

Haier, R. (1993). *Cerebral glucose metabolism and intelligence* (In P.A. Vernon ed.). Norwood, NJ: Ablex. (Biological approaches to the study of human intelligence: 317–332)

Hellriegel, D., & Slocum, W. (2011). *Organizational behavior* (13th ed.). Mason, OH: Cengage.

Jensen, A. R. (1980). *Bias in mental testing*. New York, NY: Free Press.

Jensen, A. R. (1998). *The g Factor: The Science of Mental Ability*. Santa Barbara, CA: Praeger Publishers.

Jensen, A. R. (2011). The theory of intelligence and its measurement. *Intelligence*, *39*(4), 171–177. doi: 10.1016/j.intell.2011.03.004

Joseph, D. L., Jin, J., Newman, D. A., & O'Boyle, E. H. (2015). Why does self-reported emotional intelligence predict job performance? a meta-analytic investigation of mixed EI. *The Journal of Applied Psychology*, *100*(2), 298–342.

Judge, T. A., Colbert, A. E., & Ilies, R. (2004). Intelligence and leadership: a quantitative review and test of theoretical propositions. *The Journal of Applied Psychology*, *89*(3), 542–552.

Judge, T. A., Jackson, C. L., Shaw, J. C., Scott, B. A., & Rich, B. L. (2007). Self-efficacy and work-related performance: the integral role of individual differences. *The Journal of Applied Psychology*, *92*(1), 107–127.

Kirkegaard, E. O. W. (2014). Crime, income, educational attainment and employment among immigrant groups in norway and finland. *Open Differential Psychology*.

Landy, F. J. (2005). Some historical and scientific issues related to research on emotional intelligence. *J. Organ. Behav.*, *26*(4), 411–424.

McDaniel, M. A. (2005). Big-brained people are smarter: A meta-analysis of the relationship between in vivo brain volume and intelligence. *Intelligence*, *33*(4), 337–346.

McGrew, K. S. (2009). CHC theory and the human cognitive abilities project: Standing on the shoulders of the giants of psychometric intelligence research. *Intelligence*, *37*(1), 1–10. doi: 10.1016/j.intell.2008.08.004

Modgil, S., & Modgil, C. (1987). *Arthur jensen: Consensus and controversy*. Philadelphia, PA: The Falmer Press.

Murphy, N. A., & Hall, J. A. (2011). Intelligence and interpersonal sensitivity: A meta-analysis. *Intelligence*, *39*(1), 54-63. doi: 10.1016/j.intell.2010.10.001

Needleman, H. L., & Gatsonis, C. A. (1990). Low-level lead exposure and the IQ of children. a meta-analysis of modern studies. *JAMA, Journal of the American Medical Association; (USA)*, *263*(5). doi: 10.1001/jama.263.5.673

Neisser, U., Boykin, A., Brody, N., Ceci, S., Loehlin, J., Perloff, R., ... Urbina, S. (1996). Intelligence: Knowns and unknowns. *American Psychologist*, *51*, 77–101.

Pesta, B. J., Bertsch, S., McDaniel, M. A., Mahoney, C. B., & Poznanski, P. J. (2012). Differential epidemiology: IQ, neuroticism, and chronic disease by the 50 U.S. states. *Intelligence*, *40*(2), 107-114. doi: 10.1016/j.intell.2012.01.011

Pesta, B. J., McDaniel, M. A., & Bertsch, S. (2010). Toward an index of well-being for the fifty U.S. states. *Intelligence*, *38*(1), 160–168. doi: 10.1016/j.intell.2009.09.006

Pesta, B. J., & Poznanski, P. J. (2009). The inspection time and over-claiming tasks as predictors of MBA student performance. *Personality and Individual Differences*, *46*(2), 236–240. doi: 10.1016/j.paid.2008.10.005

Qian, M., Wang, D., Watkins, W., Gebski, V., Yan, Q., Li, M., & Chen, Z. (2005). The effects of iodine on intelligence in children: a meta-analysis of studies conducted in china. *Asia Pacific Journal of Clinical Nutrition*, *14*(1), 32–42.

Rijsdijk, F. V., & Boomsma, D. I. (1997). Genetic mediation of the correlation between peripheral nerve conduction velocity and IQ. *Behavior Genetics*, *27*(2), 87–98. doi: 10.1023/a:1025600423013

Robbins, S., & Judge, T. (2015). *Organizational behavior* (16th ed.). Upper Saddle River, NJ: Pearson.

Roberts, B. A., Batty, G. D., Gale, C. R., Deary, I. J., Parker, L., & Pearce, M. S. (2013). IQ in childhood and atherosclerosis in middle-age: 40 year follow-up of the Newcastle Thousand Families Cohort Study. *Atherosclerosis*, *231*(2), 234-237. doi: https://doi.org/10.1016/j.atherosclerosis.2013.09.018

Roth, P. L., Bevier, C. A., Bobko, P., Switzer, F. S., & Tyler, P. (2001). Ethnic group differences in cognitive ability in employment and educational settings: A meta-analysis. *Personnel Psychology*, *54*(2), 297–330. doi: 10.1111/j.1744-6570.2001.tb00094.x

Schmidt, F. L., & Hunter, J. E. (1977). Development of a general solution to the problem of validity generalization. *Journal of Applied Psychology*, *62*(5), 529–540. doi: 10.1037/0021-9010.62.5.529

Schmidt, F. L., & Hunter, J. E. (2004). General mental ability in the world of work: occupational attainment and job performance. *Journal of personality and social psychology*, *86*(1), 162–73. doi: 10.1037/0022-3514.86.1.162

Shamosh, N. A., & Gray, J. R. (2008). Delay discounting and intelligence: A meta-analysis. *Intelligence*, *36*(4), 289–305. doi: 10.1016/j.intell.2007.09.004

Sheppard, L. D., & Vernon, P. A. (2008). Intelligence and speed of information-processing: A review of 50 years of research. *Personality and Individual Differences*, *44*(3), 535–551. doi: https://doi.org/10.1016/j.paid.2007.09.015

Starr, J. M., Taylor, M. D., Hart, C. L., Davey Smith, G., Whalley, L. J., Hole, D. J., ... Deary, I. J. (2004). Childhood mental ability and blood pressure at midlife: linking the scottish mental survey 1932 and the midspan studies. *Journal of hypertension*, *22*(5), 893–897. doi: 10.1097/00004872-200405000-00009

Strenze, T. (2007). Intelligence and socioeconomic success: A meta-analytic review of longitudinal research. *Intelligence*, *35*(5), 401–426. doi: https://doi.org/10.1016/j.intell.2006.09.004

Tang, Q.-Q., Du, J., Ma, H.-H., Jiang, S.-J., & Zhou, X.-J. (2008). Fluoride and children's intelligence: a meta-analysis. *Biological trace element research*, *126*(1–3), 115–120. doi: 10.1007/s12011-008-8204-x

Wilson, R. (2012). The emperor's new clothes: Learning styles and multiple intelligences. *Colleagues*, *8*(2), 1–4.

Zuckerman, M., Silberman, J., & Hall, J. A. (2013). The relation between intelligence and religiosity: A meta-analysis and some proposed explanations. *Personality and Social Psychology Review*, *17*(4), 325-354. doi: 10.1177/1088868313497266