PRINCIPLES OF ORGANIZATIONAL BEHAVIOR

THIRD EDITION

THE HANDBOOK OF
EVIDENCE-BASED MANAGEMENT

EDITED BY
CRAIG L. PEARCE
EDWIN A. LOCKE

WILEY

Principles of Organizational Behavior

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This edition first published 2023

Registered Offices
John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA
John Wiley & Sons Ltd., The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial Office
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

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Library of Congress Cataloging-in-Publication Data

Names: Locke, Edwin A., editor. | Pearce, Craig L., editor. | John Wiley & Sons, publisher.
Title: Principles of organizational behavior : the handbook of evidence-based management / Edwin A. Locke, Craig L. Pearce.
Description: 3rd edition. | Hoboken, NJ : Wiley, 2023. | Includes index.
Identifiers: LCCN 2022056231 (print) | LCCN 2022056232 (ebook) | ISBN 9781119828549 (paperback) | ISBN 9781119828617 (adobe pdf) | ISBN 9781119828600 (epub)
Subjects: LCSH: Organizational behavior.
Classification: LCC HD58.7 .P7423 2023 (print) | LCC HD58.7 (ebook) | DDC 658—dc23/eng/20230221
LC record available at https://lccn.loc.gov/2022056231
LC ebook record available at https://lccn.loc.gov/2022056232

Cover Design: Wiley
Cover Image: © Peopleimages/Getty Images

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Preface

Our goal with this book was to bring together comprehensive, science-based, actionable advice, from the world's leading experts, for managing organizations. We deliver on this goal.

There are 29 chapters in this book, each dedicated to a specific management challenge. The chapters are written by the foremost thinkers on the topics. The authors hone in on the key principle for their respective topics – the key piece of advice – for turning knowledge into action. All of their advice is solidly based upon science. In other words, you can have confidence in their advice.

Our book is in stark contrast to "normal" textbooks, which provide endless lists of factoids to memorize about topics. Such books are of little value if the reader desires to apply the information to real-world situations. It is difficult to glean from such lists exactly what one should implement – in this book, we prioritize knowledge into overarching principles, which facilitates the implementation of concrete actions in real-world situations.

Books in the "popular press," on the other hand, generally offer pithy advice from self-declared experts, but these books generally have little to no basis in science. These types of books are typically easy to read and do attempt to provide ideas to put into action. Nonetheless, the advice provided is largely overly specific to the author's experience and thus lacks transferability to the circumstances of the reader. As such, while these types of books are generally engaging, they are best regarded as nonfiction stories, with limited practical value.

Our book is different. It combines science and action. The range of subjects is expansive, encompassing 29 areas – ranging from selection, to motivation, to leadership, and all topics in between. In the section on selection, for instance, there are chapters on how to select based on intelligence (In-Sue Oh and Frank Schmidt), how to select based on personality (Murray Barrick and Michael Mount), and the proper use of interviews (Cynthia Stevens). In the section on motivation, there are chapters on how to manage emotions (Edwin Locke), how to implement goal setting (Gary Latham), how to cultivate self-efficacy (Albert Bandura), how to pay for performance (Kathryn Bartol), and how to enhance satisfaction (Timothy Judge, Ryan Klinger, and Meng Li).

In the section on the development of employees, there are chapters on the science of training and development (Eduardo Salas and Kevin Stagl), how to use performance

appraisals (Maria Rotundo and Kelly Murumets), how to use employee participation (John Wagner), how to use recognition (Jean Phillips, Kathryn Dlugos, and Hee Man Park), and how to foster continuous learning (Michael Beer). In the section on leadership, there are chapters on how to empower effectively (Jay Conger and Craig Pearce), the proper use of power and influence (Gary Yukl), how to create unifying vision (David Waldman), and how to foster trust (Jason Colquitt and Michael Baer).

In the section on teams, there are chapters on diagnosing and understanding team processes (Allison Traylor, Scott Tannenbaum, Eric Thomas, and Eduardo Salas), how to manage the boundaries of teams (Deborah Ancona, Henrik Bresman, and David Caldwell), and how to manage intrateam conflict (Laurie Weingart, Karen Jehn, and Kori Krueger). In the section on micro-organizational processes, there are chapters on how to communicate effectively (Jean Phillips, Kameron Carter, and Dorothea Roumpi), how to stimulate creativity (Colin Fisher and Teresa Amabile), how to manage stress (Ralf Schwarzer and Tabea Reuter), and how to negotiate effectively (Kevin Tasa and Ena Chadha).

In the section on macro-organizational processes, there are chapters on how to foster entrepreneurship (Jaume Villanueva, Harry Sapienza, and J. Robert Baum), how to integrate work and family (Malissa Clark, Katelyn Sanders, and Boris Baltes), how to use information technology effectively (Dongyeob Kim, Maryam Alavi, and Youngjin Yoo), how to navigate organizational and international culture (Miriam Erez), and how to align organizational strategy and structure (John Joseph and Metin Sengul).

Something that both teachers and students will appreciate about this book is that the chapters contain cases and exercises to help to illustrate the material. For example, the chapters have cases that demonstrate both the positive and negative applications of the primary principle of the chapter. The cases exhibit the concrete application of the chapter principle to the real world, which enables deeper understanding, as well as a degree of practice for the implementation of the principle in future situations.

The chapters also contain skill sharpening exercises to reinforce the knowledge of the topic at hand. The types of exercises vary by chapter. Some exercises, for instance, involve a degree of role playing, to facilitate the understanding of how the principles play out in action. Other exercises involve, in part, completing questionnaires, helping the readers understand where they fall on a particular dimension. Additional exercises are focused on watching and diagnosing videos pertaining to the principles. Together, all of the exercises complement the core reading of the chapters, buttressing the development of knowledge about the principles.

On a more somber note, since the passing of Sabrina Salam, the rising star who wrote a chapter for the first edition of this book (which is now updated by Jason Colquitt and Michael Baer), two of the contributors to the current edition, Frank Schmidt and Albert Bandura, passed away during the process of writing their chapters. Both were giants in the field of organizational science.

Frank Schmidt was known for many advances in organizational science, but most notably for his cutting-edge work on employee selection and for his definitive

contributions on research methods. His chapter in this book is focused on the importance of intelligence in employee selection. He and his coauthor, In-Sue Oh, distilled the knowledge on this topic, which will leave a lasting mark well into the future.

Albert Bandura was the giant among giants. At the time of his passing, he was, by far, the most widely cited organizational scientist. His contributions were deep and broad. Nonetheless, he was best known for his work on social cognitive theory and on the concept of self-efficacy. His work provides the foundation for most other organizational science. His chapter in this book provides a stake in the ground for transferring his knowledge to the practice of management.

In sum, our book provides comprehensive advice, based on science, written by the foremost experts, for practicing and aspiring managers. Each chapter focuses on a core principle that can be applied, with confidence, in real-world organizations. In many ways, one can think of this book as a roadmap to organizational success. We hope you enjoy reading it. More importantly, we hope you find success in applying the principles in action.

Acknowledgments

The editors are grateful to many people, not the least of whom are the contributors to this book. It could not have happened without their ability to distill the principles of organizational behavior from science-based evidence. The editors would also like to specifically acknowledge the exceptional work of Jeremy Sanville, Craig Pearce's research assistant, in bringing this book to fruition – he worked tirelessly in keeping everything coordinated and on track, from beginning to end.

Introduction[1]

This handbook is about management principles; each chapter is written by an expert in the field – but why do we need principles?

To quote Ayn Rand (1982, p. 5):

> . . . abstract ideas are conceptual integrations which subsume an incalculable number of concretes – and without abstract ideas you would not be able to deal with concrete, particular, real-life problems. You would be in the position of a newborn infant, to whom every object is a unique, unprecedented phenomenon. The difference between his mental state and yours lies in the number of conceptual integrations your mind has performed.
>
> You have no choice about the necessity to integrate your observations, your experiences, your knowledge into abstract principles.

What, then, is a principle? A "principle" is a general truth on which other truths depend. Every science and every field of thought involves the discovery and application of principles. A principle may be described as a fundamental reached by induction (Peikoff, 1982, p. 218).

Everyday examples of principles that we use (or should use) in everyday life are:

"Be honest" (a moral principle)
"Eat plenty of fruits and vegetables" (a nutrition principle)
"Exercise regularly" (a health principle)
"Save for the future" (a personal finance principle)
"Do a conscientious job" (a work or career principle)
"Do not drive under the influence of alcohol or text while driving" (personal safety principles)

It would be literally impossible to survive for long if one did not think in terms of principles, at least implicitly. In terms of concrete details, every situation is dif-

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[1]This introduction is adapted from Locke (2002). I thank Jean Binswanger, Paul Tesluk, Cathy Durham, and James Bailey for their helpful comments on the original article.

ferent from every other. Suppose, for example, that a child were told, "Do not run across that part of this street today." What is the child to do on other days? On other streets? On other parts of the same street? Such a dictum would be useless to the child after the day had passed or if they were in another location. Properly, the child (at the right age) would be taught a principle such as "Never cross any street without first looking twice in each direction." This could guide the child's actions for life and in every location in the world.

How are principles formulated? They are formulated by integrating conceptual knowledge (for more on concept formation, see Locke, 2002 and Peikoff, 1991). Principles, in turn, are integrated into theories, again by induction (Locke, 2007).

Teaching

The use of principles is critical to both the teaching and practice of management. Let us begin with teaching. Most instructors would agree that management is a difficult subject to teach. First, it is very broad in scope. It entails scores if not hundreds of different aspects. The more one studies the field, the more complex and bewildering it seems to become. Second, there are no concrete rules or formulas to teach as in the case of accounting, finance, or management science. Management is as much an art as a science. Third, although there are theories pertaining to different aspects of management (e.g. leadership), many find these theories to be less than satisfactory (to put it tactfully), because they are too narrow, trivial, or esoteric and/or lack firm evidential support. Often, they are based on deduction rather than induction (Locke, 2006). The potentially useful theories are mixed in with those that are not.

Traditionally, teaching has been done with either textbooks and/or the case method. Both methods contain the same epistemological limitation. Textbooks, because they try to be comprehensive, pile up detail after detail and theory after theory, but the details, even of subtopics, are very difficult to integrate. As noted, any theories that are presented often have severe limitations because they come and go like snowflakes. The result is that students routinely suffer from massive cognitive overload and a sense of mental chaos; thus, little of the material is retained once the final exam is over. This makes it unlikely that what was memorized will be applied to the students' jobs and career.

With regard to case studies, these allow for the possibility of induction, but shockingly, it has been reported that some business schools openly *prohibit* connecting the cases to each other. This is very unfortunate. Each case is a unique, concrete instance. Suppose, for example, a business student concluded from the analysis of a particular case study that a certain high technology firm in New Hampshire should replace the CEO, develop a top management team, and change to a matrix structure. What could students take away from such an analysis that would help them be better managers? Nothing at all if the analysis were left in this form. The case would only be useful if the student could formulate some general principles from studying a variety of cases. The best way to do this is by induction from a series of cases (see Locke, 2002 for a detailed example) though even this could be limited depending

on the choice of cases. Faculty whom I knew who used cases have admitted to me that they have to use theoretical materials (e.g. principles) for the students to be able to even analyze the cases in the first place.

The value of this book for teaching, therefore, is twofold. *First, it is an alternative to a traditional textbook.* The material in this book is *essentialized.* Only what the expert chapter writers consider important is included; thus, there is far less to remember than in a text. This means the material can be more easily retained and more readily applied to the real world of work. *Second, the principles are evidence-based and thus tied firmly to reality.* This teaching procedure would be mainly deductive, because the inductively based principles would be provided in advance (by this book) and students would have practice applying them to the exercises at the end of each chapter, and/or to their current (and later their future) jobs. Of course, students could be asked to search out other examples of principles and how they were used or not used.

Second, this book can be used as an adjunct to a course which uses cases. Here, both deduction and induction can be used. The book's principles can help students to analyze the cases, yet new principles (or qualifications to principles) could be developed through induction from the cases used.

(There are other problems with the case method that we can only note briefly here, e.g. the emphasis on verbal glibness; the fact that all the information needed is already in the case; the fact that the case is taken out of a wider organizational context; the fact that real action is not possible; and the lack of face-to-face contact with actual employees. Primarily, these problems are inherent in the attempt to teach a practical skill in a classroom and so have no perfect solution, though student mini projects within real businesses help).

Management

This book can also help managers and executives be more effective. However, reading a book of evidence-based principles does not magically turn one into a good manager. Principles cannot be mastered overnight and cannot be applied mechanically. Regardless of the level of abstraction at which they are formulated, they are still abstractions, not concrete rules such as "turn off the lights when you leave the room." Principles, however, are used to guide specific actions in specific contexts.

Consider the principle: "Motivate performance through goal setting" (Chapter 5 of this book). This principle does not tell one what to set goals for (a very critical issue); who is to set them; what the time span will be; what strategy to use to reach them; how performance will be measured; how flexible the goals will be; or how performance will be rewarded. (The latter involves another principle; see Chapter 7).

To some extent, formulating subprinciples can be a help because these would give some idea of how to implement the principles. For example, subprinciples for goals (given in Chapter 5) would include (i) make the goals clear and challenging; (ii) give feedback showing progress in relation to the goals; (iii) get commitment through building confidence and showing why the goals are important; (iv) develop action plans or strategies; (v) use priming; and (vi) find and remove organizational

blocks to goal attainment. But these subprinciples do not tell one everything. There will always be judgment calls to be made, because one cannot teach every possible context factor that a future manager might face.

Furthermore, principles cannot be applied in a vacuum, or one at a time in some arbitrary order. Many – maybe dozens or possibly hundreds – of principles must be used to run a successful business. (The problem of cognitive overload is mitigated over time by gradually automatizing the principles in the subconscious.) Furthermore, the principles must be orchestrated so that they function in concert rather than working at cross-purposes. It is not known how effectively one can teach such orchestration, although one can make the student aware of the issue and give some examples. For example, the goal system must be integrated with the performance appraisal system and the reward system.

It is worth observing here how principles are used in the real world of management. We will use Jack Welch as an example in that he is considered among the greatest CEOs in history, the creator of $300–400 billion in stockholder wealth at General Electric (e.g. see Slater, 1999; Tichy and Sherman, 1993). Some principles that Welch used as his personal guides to action are as follows:

- Reality. Face reality as it really is, not as you want it to be. (We believe that the failure to practice this principle is a major cause of business failures, e.g. Enron. Such failures may involve flagrant dishonesty, but they also may involve simple evasion – the refusal to look at pertinent facts – or putting emotions ahead of facts.)
- Change before you have to (view change as an opportunity, not as a threat).
- Possess energy and energize others.

Welch also helped develop a code of values or guiding principles for GE as a whole. These included integrity (backed up by control systems).

Obviously, Welch was able not only to formulate but also to apply and orchestrate principles in a way that no one else had. It helped that he had ambition and energy, a brilliant business mind, an insatiable curiosity, the capacity to judge talent, and an uncanny ability to figure out what businesses GE should and should not be in.

It is interesting that Jacques Nasser was a great admirer of Welch and tried to emulate his principles at Ford but was unable to do so and ultimately lost his job. It is clear that there is a long road between knowing good principles and being able to implement them successfully in the context of a given organization.

Management principles need to be organized and integrated hierarchically so that the leader will know what to do first, second, and so forth. Except for facing reality as it is (not evading), which should be the primary axiom of every manager, the hierarchy may not be the same from business to business or in the same business at different times. Nor will they all be organizational behavior principles. For example, in one context, the most critical factor may be to decide, as Welch did, what business or businesses a corporation should be in. This is an aspect of vision and strategic management. There is no point in trying to manage the wrong business or working hard to do the wrong thing. But in another context, the critical issue may be cash

flow, for example, how to avoid bankruptcy in the next six months (a finance issue). In a different context, the core problem might be getting the right people in the right jobs or revamping the incentive system (HR issues).

What factors would determine the hierarchy? Three are critical: (i) *Context.* What are the most important facts regarding the present situation of this company? Context means seeing the whole and the relationship of the parts to the whole. (ii) *Urgency.* What has to be fixed right away if the company is to survive? (iii) *Fundamentality.* What is the cause of most of the different problems the organization is faced with or what must be fixed before any other fixes will work (e.g. get good people in key jobs)?

The hierarchy can change over time. For example, when Welch took over at GE, he focused first on changing the business mix (selling and buying businesses) and cutting costs (increasing productivity) and layers of management. Later, he focused on better utilizing people (empowerment) and still later on improving quality (quality goals). Reversing the sequence would not have worked, because empowerment and quality would not help businesses that were not viable and would not "take" in a ponderous bureaucracy.

The foregoing is to make an important point for the second time: *Business is an art as much as a science.* Having correct principles will not work unless the leader knows how and when to use them. Great leaders are rare because not many of them can effectively perform all the tasks that leadership requires (Locke, 2003).

The way to manage complexity is not to complexify it, as academics love to do. After reading some six books about and one book by Jack Welch, we were struck by how frequently he stressed the importance of simplicity. He said:

> Simplicity is a quality sneered at today in cultures that like their business concepts the way they like their wine, full of nuance, subtlety, complexity, hints of this and that . . . cultures like that will produce sophisticated decisions loaded with nuance and complexity that arrive at the station long after the train has gone . . . you can't believe how hard it is for people to be simple, how much they fear being simple. They worry that if they're simple, people will think they are simpleminded. In reality, of course, it's just the reverse. Clear, tough-minded people are the most simple (quoted in Lowe, 1998, p. 155).

Consider a recent conversation with a consultant who works as a coach to top executives. He told one of us that one question he always asks in the first meeting is "By the way, how do you make money?" The ones who answered by wallowing in complexity usually did not make any. The ones who gave succinct, clear answers usually did.

For a business leader, achieving simplicity, as opposed to simplemindedness, is much harder than achieving complexity. To achieve simplicity, one must look through the morass of complexity one is seemingly faced with, integrate the key observations, and come up with the *essential* ideas that will make one's business succeed. That is, one must bring order out of chaos. This includes knowing what to ignore. The way to do this is to think inductively and integrate one's observations into principles.

Notes Regarding the Third Edition

The third edition of this book includes the following changes: (i) there are new chapters with new authors and some new authors for some of the original chapters; (ii) all the chapters have been updated with respect to the latest research, and nearly all present new cases examples; typically, however, the original principles have remained the same (or been slightly reformulated); (iii) all the chapters now have exercises at the end to help students better understand the principles. Although authors were asked to title their chapters in terms of a single principle, a few have two or three related principles, and all have subprinciples.

This last relates to the issue of what the appropriate level of abstraction should be for management principles. If they are formulated too broadly (e.g. "be rational"), it can be hard to connect them to specific actions without very extensive elaboration. On the other hand, if they are too narrow ("turn out the light when leaving every room"), they are not broadly applicable, and one would need thousands of them – too many to retain – to cover the waterfront. Thus, I encouraged mid-range principles and the authors thankfully complied.

In closing, we should note that the principles in this book do not include all possible management principles (e.g. none of the chapters discussed strategic management principles – that would be another book). Also, we do not include the race issue because that is much too complex an issue to be dealt with in one chapter. That topic would require a whole book. We chose topics from I/O psychology, human resource management, and organizational behavior (fields that all overlap) that I thought would be of most interest and use to present and future managers. I hope these hopefully timeless principles will contribute to your success at work.

References

Locke, E. A. (2002). The epistemological side of teaching management: Teaching through principles. *Academy of Management Learning and Education,* 1, 195–205.

Locke, E. A. (2003). Foundations for a theory of leadership. In S. Murphy and R. Riggio (eds), *The Future of Leadership Development.* Mahwah, NJ: L. Erlbaum.

Locke, E. A. (2006). Business ethics: A way out of the morass. *Academy of Management Learning & Education,* 5(3), 324–332.

Locke, E. A. (2007). The case for inductive theory building. *Journal of Management,* 33, 867–890.

Lowe, J. (1998). *Jack Welch Speaks.* New York: Wiley.

Peikoff, L. (1982). *The Philosophy of Objectivism: A Brief Summary.* Santa Ana, CA: Ayn Rand Institute.

Peikoff, L. (1991). *Objectivism: The Philosophy of Ayn Rand.* New York: Dutton.

Rand, A. (1982). *Philosophy: Who Needs It.* New York: Bobbs-Merrill.

Slater, R. (1999). *Jack Welch and the GE Way.* New York: McGraw Hill.

Tichy, N. and Sherman, S. (1993). *Control Your Own Destiny or Someone Else Will.* New York: Currency Doubleday.

1

Select on Intelligence

Frank L. Schmidt[1] and In-Sue Oh[2]

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Co-author's Note

Frank Schmidt died on 21 August, 2021 in Iowa City, IA. I am greatly indebted to him for his legacy in intelligence testing and meta-analysis, intellectual honesty and courage, and endless support and mentoring over the years. He will be forever remembered and forever missed.

The principle that we wish to convey in this chapter is quite simple: Ceteris paribus, higher intelligence leads to better job performance. Intelligence is the best determinant of job performance, and hiring people based on intelligence leads to marked improvements in job performance. These performance improvements have great economic value for organizations, giving organizations that hire people based on intelligence a leg-up over other organizations. This principle is incredibly broad and generalizable as it has been empirically validated across numerous jobs, occupations, and industries.

But before elaborating further on this principle, we would like to emphasize that, surprisingly, most human resource (HR) managers do not hire based on intelligence. In fact, most HR managers do not make decisions based on research-informed best practices at all (Rynes, Colbert, and Brown, 2002). This gap between practice and research findings is especially large in the area of staffing, where many HR managers are unaware of this most fundamental staffing principle based on extensive research findings and, as a result, fail to use scientifically established valid employment selection procedures. You may think that this is true only for a small portion of HR managers, but this is not the case.

In a survey of 5000 Society for Human Resource Management members whose title was at the manager level and above, Rynes and her research team (2002) asked two questions relevant to this chapter:

(a) Is conscientiousness, a personality trait, a better predictor of employee performance than intelligence?
(b) Do companies that screen job applicants for values have higher performance than those that screen for intelligence?

The answer to both the questions is (definitely) no![1] But shockingly, 72% of respondents answered yes to the first question and 57% answered yes to the second question. That is, on average, two-thirds of the respondents did not know the most basic principle established by extensive research findings; namely, that intelligence is the single best predictor of employee job performance. And worse, these were largely HR managers and directors with an average 14 years of work experiences in HR. Of the 959 respondents, 53% were HR managers, directors, and vice presidents, occupying an important role in designing and implementing HR practices. Given the respondents' high-level HR positions and considerable experience, we speculate that the percentage of wrong answers would be even higher among less experienced HR staff. This problem is not limited to the United States but is also widely observed in other countries (e.g. Tenhiälä, Giluk, Kepes, Simon, Oh, and Kim, 2016). Thus, we believe that many would benefit by reading this chapter.

What Is Intelligence?

The concept of intelligence is often misunderstood. Intelligence is not the ability to adapt to one's environment: Insects, mosses, and bacteria are well adapted to their environments, but they are not intelligent. There are many ways in which organisms can adapt well to their environments, of which intelligence is only one. Instead, intelligence encompasses the ability to understand and process abstract concepts to solve problems. Gottfredson (1997, p. 13), in an editorial originally published in the *Wall Street Journal* and later reprinted in *Intelligence*, defined *intelligence* as "a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, and learn quickly and learn from experience." This traditional definition captures well *what* intelligent people can do, but this definition is still insufficient in capturing *why* smart people can do it. For the purposes of this chapter, we define intelligence as *the capacity to learn and retain complex information.* Higher levels of intelligence lead to more rapid learning, and the more complex the material to be learned, the more this is true. Intelligence is often referred to as general mental ability (GMA), and we use the terms "intelligence" and "GMA" interchangeably throughout the remainder of this chapter.[2]

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[1]With regard to the first question, the validity of conscientiousness measured via self-reports is 0.22, whereas that of General Mental Ability is 0.65 in predicting supervisory ratings of job performance (Schmidt, Shaffer, and Oh, 2008). With regard to the second question, the answer exists only at the individual level, not at the company level. Arthur, Bell, Villado, and Doverspike's (2006) meta-analysis has shown that the validity of person-organization fit (or value congruence) is 0.13, even less than that of conscientiousness measured via self-reports.

[2]In the applied psychology and HR/OB literatures, another term, "cognitive ability" is widely used.

Another important nature of intelligence is that it is the broadest of all human mental abilities. Narrower abilities include verbal ability, quantitative ability, and spatial ability. These narrower abilities are often referred to as special aptitudes. These special aptitudes also predict job performance (although not as well as GMA), but only because special aptitude tests measure general intelligence as well as specific aptitudes (Brown, Le, and Schmidt, 2006). In other words, it is the GMA component in these specific aptitude tests that predicts job performance. For example, when a test of verbal ability predicts job or training performance, it is the GMA part of that test – not specifically the verbal part – that primarily does the predicting, thus "not much more than *g* (GMA)" (Brown et al., 2006; Ree and Earles, 1991, 1992; Ree, Earles, and Teachout, 1994).

Finally, although behavioral geneticists have concluded that GMA is highly influenced by heredity, it does not necessarily mean that nothing can improve GMA (Gottfredson, 1997). A recent meta-analysis by Ritchie and Tucker-Drob (2018) has reported that an additional year of education improves GMA by approximately one to five IQ points across the life span: "Education appears to be the most consistent, robust, and durable method yet to be identified for raising intelligence" (p. 1358).

Higher Intelligence Leads to Better Job Performance

Intelligence plays a central role in virtually all of our daily activities and lifelong pursuits. It predicts many important life outcomes such as performance in school, amount of education obtained, rate of promotion on the job, ultimate job level attained, and salary (Gottfredson, 1997, 2002; Judge, Klinger, and Simon, 2010; Schmidt and Hunter, 2004). More relevant to this chapter is that it predicts job and training performance (Schmidt et al., 2008). No other trait predicts so many important real-world outcomes so well.

However, until several decades ago, most people believed that general principles of this sort were impossible in personnel selection and other social science areas. It was believed that it was not possible to know which selection methods would be most effective for a given organization unless a local validation study was conducted for each job in that organization. This belief, called "situational specificity," was based on the fact that validity studies of the same selection procedures in different jobs in the same organization and across different organizations appeared to give different and often conflicting results. The differences were attributed to the assumption that each job situation includes subtle yet significantly different (i.e. situation-specific) characteristics related to the nature of job performance. Therefore, practitioners at that time (to the delight of consulting firms) were advised to conduct time-consuming and costly local validation tests for virtually all jobs in all organizations to determine if a selection procedure was valid (Ghiselli, 1966).

We now know that these "conflicting results" were caused mostly by statistical and measurement artifacts (e.g. sampling error[3]), and that some selection procedures (e.g. intelligence) have higher validity for predicting performance than others (e.g. age, graphology) across all jobs (Schmidt and Hunter, 1981, 1998). This discovery was made possible by a new method, called meta-analysis or validity generalization, that allows practitioners and researchers to statistically synthesize the results from individual studies.[4] Many meta-analyses synthesizing numerous individual studies based on data collected from various jobs, occupations, organizations, industries, business sectors, and countries all point to the same conclusion that intelligence is the single best predictor of job performance (Schmidt et al., 2008). Thus, there is little to no need to conduct a local validation study to see whether intelligence is predictive of job performance.

Below, we will briefly review some notable studies among the vast body of literature documenting the strong link between intelligence and job performance. Ree and colleagues have shown this for jobs in the Air Force (Olea and Ree, 1994; Ree and Earles, 1991, 1992; Ree et al., 1994), as have McHenry, Hough, Toquam, Hanson, and Ashworth (1990) for the US Army in the famous Project *A* study. (With a budget of 24 million dollars, Project *A* is the largest test validity study ever conducted.) Hunter and Hunter (1984) showed this link for a wide variety of civilian jobs, using the US Employment Service database of studies. Schmidt, Hunter, and Pearlman (1980) have documented the link in both civilian and military jobs. Other large meta-analytic studies are described in Hunter and Schmidt (1996), Schmidt (2002), and Schmidt and Hunter (2004). Salgado and his colleagues (Salgado, Anderson, Moscoso, Bertua, and de Fruyt, 2003a; Salgado, Anderson, Moscoso, Bertua, de Fruyt, and Rolland, 2003b) demonstrated the link between GMA and job performance across a variety of settings in European countries. Further, the strong link between GMA and job performance was found whether performance was measured objectively – via work samples or productivity records – or subjectively – using rankings of performance ratings (Nathan and Alexander, 1988). Finally, the validity of

[3]The sampling error is the error caused by using a (non-representative, small) sample instead of the entire population of interest. Because of this error, sample-based statistics (validity coefficients) can be smaller or greater than their population parameters, thus causing "conflicting results" (i.e. artifactual variance) across local validation studies (Schmidt, 1992).

[4]Meta-analysis has also made possible the development of general principles in many other areas beyond personnel selection (Schmidt and Hunter, 2015). For example, it has been used to calibrate the relationships between job satisfaction and job performance with precision (Judge, Thorensen, Bono, and Patton, 2001), between organizational commitment and work-related outcomes including job performance (Cooper-Hakim and Viswesvaran, 2005), and between transformational leadership and employee, team, and firm performance (Wang, Oh, Courtright, and Colbert, 2011).

GMA for predicting job performance does not differ across major ethnic groups and gender groups (e.g. Roth, Le, Oh, Van Iddekinge, Buster, Robbins, and Campion, 2014; Schmidt, 1988).

On a more technical note, there has recently been an important development in the method of estimating the validity of a selection procedure by correcting for range restriction more accurately.[5] Applying this procedure to a group of existing meta-analytic data sets shows that previous figures for the validity of GMA (0.51 for job performance and 0.56 for training performance as noted in Schmidt and Hunter, 1998) underestimated its real value by around 30%. Specifically, when performance is measured using ratings of job performance by supervisors, the average of eight meta-analytic correlations with intelligence measures is 0.65–65% as large as the maximum possible value of 1.00, which represents perfect prediction (Schmidt et al., 2008, table 1). Another performance measure that is important is the amount learned in job training programs. For training performance (either based on exam scores or instructor ratings), the average of eight meta-analytic correlations with intelligence measures is 0.67 (Schmidt et al., 2008, table 2). Thus, the more accurate estimate of validity of intelligence is even higher than we previously thought.

Why Does Higher Intelligence Lead to Better Job Performance?

It is one thing to have overwhelming empirical evidence showing a principle is true and quite another to explain *why* the principle is true. Although part of the answer to this question of why higher intelligence leads to better performance in the definition of intelligence was discussed earlier (i.e. learning ability), a more convincing answer can be found by examining the causal mechanism through which intelligence influences job performance. According to Schmidt and Hunter (1998), people who are more intelligent are able to hold greater amounts of job knowledge because they can learn more and more quickly than others. Hence, the more "direct" determinant of job performance is job knowledge, not GMA.[6] Said another way, the biggest influence on job performance is job knowledge, and the biggest influence on job knowledge is GMA. People who do not know how to do a job cannot perform that job well. Research has shown that considerable job knowledge is required to perform even jobs most people would think of as simple, such as data entry.

[5]A new and more accurate method for correcting the biases created by range restriction has been developed and applied (see Hunter, Schmidt, and Le, 2006; Oh, Schmidt, Shaffer, and Le, 2008; Schmidt, Oh, and Le, 2006; Schmidt et al., 2008). (Range restriction is the condition in which the variance of the predictor [here intelligence] in one's sample of people [job incumbents] is lower than that in the population of people [job applicants] for which one wants estimates.)

[6]The traditional psychological theory of human learning (Hunter, 1986; Hunter and Schmidt, 1996; Schmidt and Hunter, 2004) posits that the effect of GMA on job performance would be mostly explained by the learning of job knowledge.

More complex jobs require much more job knowledge. The simplest model of job performance is this: GMA causes job knowledge, which in turn causes job performance.

But even this model is too simple, because GMA also *directly* influences job performance. That is, GMA does not have to be converted to job knowledge before it can influence job performance. In all professions, unforeseen problems arise that are not covered by one's prior education or a body of job knowledge (i.e. manuals), and GMA is used directly to solve these problems. Based on two large samples (in total, over 4500 managers), Dilchert and Ones (2009) found that problem-solving across various assessment center dimensions is most highly correlated with GMA. That is, GMA is not only an ability to learn facts and structured procedures but also an ability to tackle unstructured, real-life problems and solve them. This means that even when workers of varying levels of intelligence have equal job knowledge, the more intelligent workers still have higher job performance given their advantage in problem-solving skills.

Many studies have tested and supported this causal model (Borman, White, Pulakos, and Oppler, 1991; Hunter, 1986; Ree et al., 1994; Schmidt, Hunter, and Outerbridge, 1986). Using an extremely large data set from the US Army Selection and Classification Project (Project *A*), McCloy, Campbell, and Cudeck (1994) differentiated two types of job knowledge – declarative knowledge and procedural knowledge – and showed that GMA was related to each of the two types of job knowledge, which was, in turn, related to job performance. This research is reviewed by Hunter and Schmidt (1996) and Schmidt and Hunter (2004).

What Is Required to Make This Principle Work?

Based on research on selection procedure utility (Le, Oh, Shaffer, and Schmidt, 2007; Schmidt and Hunter, 1998), there are three conditions that are required for companies to improve job performance levels by using GMA tests in hiring and to reap the resulting economic benefits.

First, the company must be able to be selective in who it hires. If the labor market is so tight that all who apply for jobs must be hired, then there can be no selection and hence no gain. The gain in job performance per person hired is greatest with low selection ratios. For example, if one company can afford to hire only the top 10%, while another must hire the bottom 10% of all applicants, then with other things equal the first company will have a much larger gain in job performance. There is another way to look at this: Companies must provide conditions of employment that are good enough to attract more applicants than they need to fill the vacant jobs. It is even better when they can go beyond that and attract not only a lot of applicants, but the higher-ability ones that are in that applicant pool. In addition, to realize maximum value from GMA-based selection, organizations must be able to retain high-performing hires. As discussed later in this chapter, one excellent way to retain high-intelligence employees is to place them in jobs consistent with their levels of intelligence. Otherwise, high-intelligence employees who are ill-placed (and thus not satisfied with their job) may look for alternatives outside the organization; if they leave, then the organization will incur enormous direct and indirect costs (e.g. unpaid-off selection and training costs, performance loss, low morale among existing coworkers).

Second, the company must have some effective way of measuring GMA. The most common and most effective method is a standardized employment test of general intelligence, such as the Wonderlic Personnel Test, the Wesman Personnel Classification Test, or the Watson-Glaser Critical Thinking Appraisal Form. Such tests are readily available at modest cost. This method of measuring GMA is highly cost-effective given its excellent validity and reliability, low cost, and ease of administration and scoring. However, there are alternative methods of measuring intelligence as listed as follows. We advise the reader that part of the reason that these alternative methods can be somewhat successful is often due to their high correlation with GMA. For example, meta-analytic evidence has shown that grade point average (Roth, Bevier, Switzer, and Schippmann, 1996), work sample tests (Roth, Bobko, and McFarland, 2005), assessment center scores (Collins, Schmidt, Sanchez-Ku, Thomas, McDaniel, and Le, 2003), employment interviews (Huffcutt, Roth, and McDaniel, 1996), and situational judgment tests (particularly, knowledge-based ones; McDaniel, Hartman, Whetzel, and Grubb, 2007) are moderately to strongly correlated with GMA. That is, as Schmidt (2002) pointed out, performance on these selection procedures is moderately to strongly a consequence of GMA and, hence, reflects GMA. These findings further attest to the fact that what is more important is the constructs (i.e. the traits themselves) measured during the selection process, not the formats/methods (how the traits are measured). These alternative selection procedures are generally less valid and more costly (especially assessment centers and employment interviews) than standardized tests of GMA. Therefore, we recommend that hiring managers simply use GMA tests whenever possible to maximize cost-effectiveness. However, many organizations that rarely use written GMA tests build oral GMA tests into the interview process. For example, high-tech companies such as Microsoft and Google use multiple job interviews to measure GMA (and other important characteristics) among their highly intelligent applicants perhaps because standardized GMA tests are too easy for many of their highly intelligent applicants and, thus, cannot differentiate their applicants in terms of GMA. Moreover, these highly profitable organizations may not care about selection costs.

Third, the variability in job performance among employees must be greater than zero. That is, if all applicants after being hired have the same level of job performance anyway, then nothing is gained by hiring "the best." However, this is never the case. Across all jobs studied, there have been large differences between different workers in both quality and quantity of output. Hunter, Schmidt, and Judiesch (1990) meta-analyzed all the available studies on this topic and found large difference between employees. In unskilled and semi-skilled jobs, they found that workers in the top 1% of performance produced over three times as much output as those in the bottom 1%. In skilled jobs, top workers produced 15 times as much as bottom workers. In professional and managerial jobs, the differences were even larger. At the CEO level, we can easily find many examples supporting huge performance variability (e.g. Steve Jobs, Bill Gates). These are precisely the reasons why it pays so handsomely to hire the best workers, managers, and CEOs.

But there is another advantage to hiring the best workers: the pool of talent available for future promotion is greatly increased. This is of great value to organizations, because it helps ensure high performance all the way up through the ranks of managers. When the right people are promoted, their value to the organization in

their new jobs is even greater than it was in their original jobs. Thus, the selection of high ability people has implications not only for the job they are hired onto, but also for other jobs in the organization.

Are There Moderators or Exceptions to This Principle?

Is Intelligence More Valid for More Complex Jobs?

For many predictors of job performance (motivational techniques, personality, etc.), their relationship with job performance depends on some moderators or boundary conditions (e.g. situational constraints). In addition, some predictors can replace other predictors. Many relationships in personnel psychology are bounded by situational constraints, which can be frustrating to managers who are looking for broad, overarching principles that are applicable across their organization. There is no relationship in the field of personnel psychology for which there are as few situational constraints as there are for the relationship between GMA and job performance.

The only major moderator to the relationship between GMA and job performance is job complexity level. That is, the validity of GMA for predicting job performance increases as the difficulty or complexity of the job in question increases. Schmidt et al. (2008) also reported validities for GMA ranging from 0.55 for low-complexity jobs to 0.61 for medium-complexity jobs to 0.78 for high-complexity jobs based on two meta-analyses that tested job complexity level as a moderator for the validity of GMA (Hunter, 1986; Salgado et al., 2003b). Similarly, Schmidt et al. (2008) also reported that the validity of GMA for training performance varies by job complexity level: 0.56, 0.69, and 0.81 for low-, medium-, and high-complexity jobs, respectively (Hunter, 1986; Salgado et al., 2003b). That is, while intelligence is predictive of performance on jobs of all the complexity levels, it is more predictive for jobs of high complexity.

Contrary to many lay people's intuition that applicants for high-complexity jobs do not differ much from each other in intelligence and thus intelligence may not work as a selection tool for them, the research findings mentioned here have clearly shown that there is still considerable variability in intelligence among applicants for high-complexity jobs and intelligence is still an excellent selection tool in these situations (Sackett and Ostgaard, 1994). We believe that the straightforward nature of the link between GMA and job performance comes as good news for many practitioners who are under time and competitive pressures to allocate resources as efficiently as possible, because it means that they do not have to consider many situational peculiarities when designing and implementing an intelligence-based staffing system. Given the massive amount of evidence available, there can be no doubt that intelligence is the best, most useful predictor of job performance across most situations (Schmidt, 2002).