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**Article**

## The value of soft skills in the labor market

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*“The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Design Response,”* presented in the NBER IO Summer 2014 meeting, and Quarterly Journal of Economics, 130(4), 2015, pp. 1547–621; A. Hortacsu, J. Kastl, and A. Zhang, “Bid Shading and Bidder Surplus in the U.S. Treasury Auction System,” NBER Working Paper No. 24024, November 2017, and American Economic Review, forthcoming.

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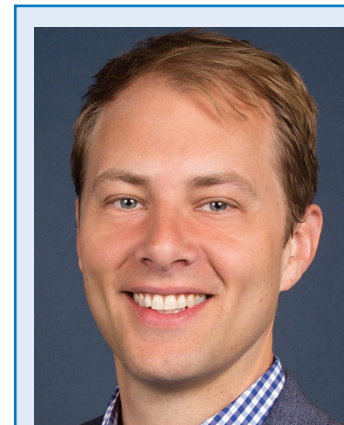
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## Research Summaries



David J. Deming is a research associate in the NBER’s Program on Education and Program on Children. He is a professor at the Harvard Kennedy School and the Harvard Graduate School of Education, the director of the Inequality and Social Policy Program at Harvard, and a co-editor of the *Journal of Human Resources*. Deming earned his B.S. from The Ohio State University in 2002, his Master of Public Policy from the University of California, Berkeley in 2005, and his Ph.D. in public policy from the Kennedy School in 2010. He was an assistant professor at Carnegie Mellon prior to joining the Harvard faculty.

Deming’s research focuses broadly on the economics of skill development, education, and the labor market. He received the Early Career Award from the Association for Education Finance and Policy and was named a William T. Grant Scholar in 2013.

### The Value of Soft Skills in the Labor Market

David J. Deming

Economists are increasingly focused on the importance of so-called “soft skills” for labor market success. The evidence is overwhelming that these skills—also called “non-cognitive skills”—are important drivers of success in school and in adult life.<sup>1</sup> Yet the very term soft skills reveals our lack of understanding of what these skills are, how to measure them, and whether and how they can be developed. And the term “non-cognitive” is simply used to mean “not predicted by IQ or achievement tests.”

The job market is way ahead of the ivory tower in emphasizing soft skills. Employers frequently list teamwork, collaboration, and oral and written communication skills as highly valuable yet hard-to-find qualities in potential new hires.<sup>2</sup> A 2017 survey by the National Association of Colleges and Employers found that “ability to work in a team” was the most commonly desired attribute of new college graduates. Teamwork was followed closely by written and verbal communication skills and was listed ahead of problem-solving skills, analytical/quantitative skills, and other attributes that are emphasized in formal educational settings.<sup>3</sup> Yet, until recently, economists have had very little to say about the importance of soft skills in the workplace.

In contrast, a large body of work in economics focuses on the importance of cognitive skills for wage determination. These studies typically track survey respondents from youth to adulthood and show that a “pre-market” test of cognitive skills is strongly predictive of labor market success, even after conditioning on family background, years of completed education, and other important factors.<sup>4</sup> At the macro level, advances in information technology and computerization that began in the 1980s increased the return to cognitive skills and years of completed education, which contributed to growing inequality at the upper end of the wage distribution in the 1980s and 1990s.<sup>5</sup>

#### STEM Jobs and the Slowdown in Demand for Cognitive Skills

While cognitive skills are still important predictors of labor market success, their importance has declined since 2000. An important recent paper finds significantly smaller labor market returns to cognitive skills in the early and mid-2000s, compared with the late 1980s and early 1990s.<sup>6</sup> It compares the returns to cognitive skills across the 1979 and 1997 waves of the National Longitudinal Survey of Youth (NLSY)—the same survey that was used to document the importance of cognitive skills in several influential early papers.<sup>7</sup> In a 2017 study, I replicate this finding and also show that returns to soft skills increased between the 1979 and 1997 NLSY waves.<sup>8</sup> Moreover, recent findings suggest that employment and wage growth for managerial, professional, and technical occupations stalled considerably after 2000, which the researchers argue represents a “great reversal” in the demand for cognitive skills.<sup>9</sup>

The slow overall growth of high-skilled jobs in the 2000s is driven by a decline in science, technology, engineering, and math (STEM) occupations. STEM jobs shrank as a share of all U.S. employment between 2000 and 2012, after growing strongly between 1980 and 2000. This relative decline of STEM jobs preceded the Great Recession. In contrast, between 2000 and 2012 non-STEM professional occupations such as managers, nurses, physicians, and finance and business support occupations grew at a faster rate than during the previous decade. The common thread among these non-STEM professional jobs is that they require strong analytical skills and significant interpersonal interaction. We are not witnessing an end to the importance of cognitive skills—rather, strong cognitive skills are increasingly a necessary—but not a sufficient—condition for obtaining a good, high-paying job. You also need to have social skills.

Between 1980 and 2012, social skill-inten-

sive occupations grew by nearly 12 percentage points as a share of all U.S. jobs. Wages also grew more rapidly for social skill-intensive occupations than for other occupations over this period. In contrast, both employment and wages grew more slowly for occupations with high math but low social skill requirements, including many STEM jobs. Directly comparing the returns to social skills in the NLSY 1979 and 1997 surveys, I find that social skills are a significantly more important predictor of full-time employment and wages in the more recent cohort. Employment and wage growth have been especially strong for professional jobs that require both analytical and social skills. In today's economy, workers must be able to solve complex problems in fluid, rapidly changing, team-based settings.<sup>10</sup>

### Why Are Social Skills Important in the Labor Market?

Why are social skills valued in the labor market, and why have they become more important in recent years? One possible cause is technological change. In a review article about the history of workplace automation, David Autor argues that new technologies generally increase the importance of skills and tasks for which there is still no good substitute. Machines are generally quite good—at performing routine, codifiable tasks according to a set of explicit rules. However, people are still much better at open-ended tasks that require flexibility, creativity, and judgment. Often we perform these tasks with great skill despite lacking any explicit understanding of “rules,” as when we divine the motives of a person we just met, or when we quickly determine whether it is appropriate to laugh at an off-color joke.<sup>11</sup>

Social interaction is perhaps the most necessary workplace task for which there

is currently no good machine substitute. Software exists that can manage investment portfolios, diagnose cancer and develop treatments for it, and beat humans in complex games such as chess, Go, and Jeopardy. Yet it has proven devilishly difficult to program a machine for even a short, unstructured conversation with a human being, much less to engage in the kind of flexible teamwork that is increasingly needed in the modern economy. The reason is that our ability to read and react to others is based

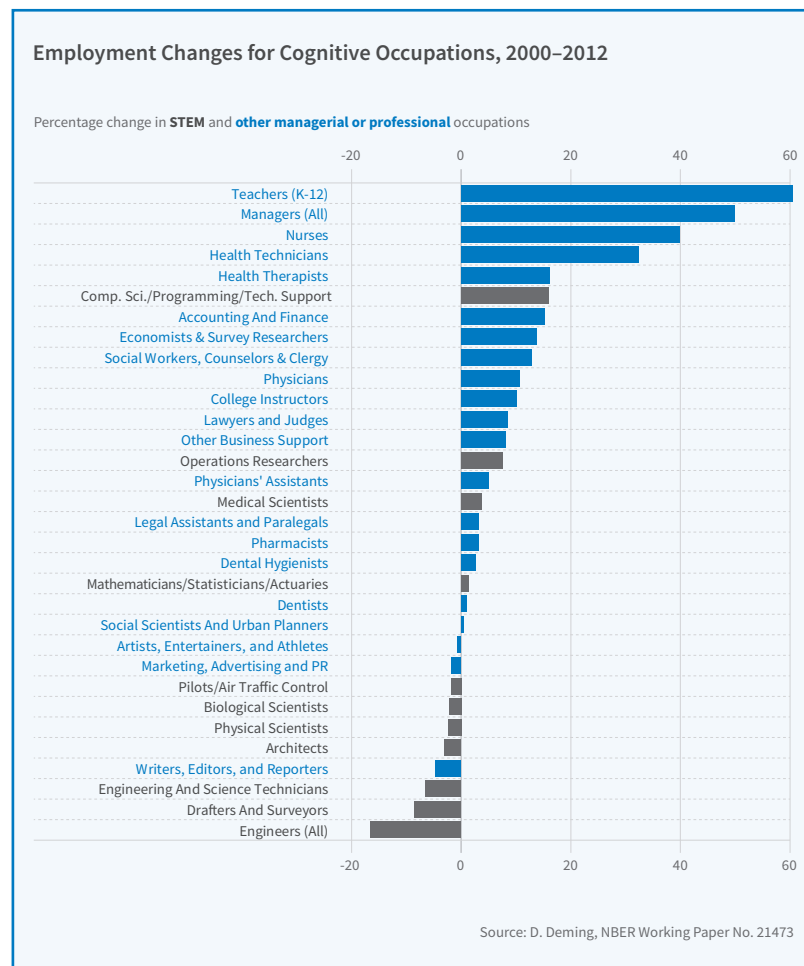


Figure 1

on tacit knowledge that has evolved over thousands of years. It is difficult to reverse-engineer a process that we do not explicitly understand.

We also see evidence of the growing importance of social skills in studies of how information and communication technology (ICT) has changed the organization of the workplace. Case studies of ICT implementation show that computerization leads to the reallocation of skilled workers into

flexible, team-based settings that facilitate adaptive responses and group problem-solving.<sup>12</sup> Across all industries and occupations, job design has shifted away from rigid categorization and toward increased job rotation and worker multitasking.<sup>13</sup>

Firms have developed automation technologies for simple social exchanges such as customer service telephone calls and requests for tickets from airport and train station kiosks. Yet this is a far cry from true social interaction, which requires not just algorithmic conversation but understanding. Teamwork requires the capacity to understand the motivations of others. Working effectively with others means not only observing their behavior but also understanding *why* they act the way they do. Psychologists call this “theory of mind”—the ability to attribute mental states to others based on their behavior, or, more colloquially, to “put oneself into another’s shoes.”<sup>14</sup>

Why would theory of mind be useful in the workplace? Workers vary naturally in their abilities over a large variety of workplace tasks, and thus individuals with similar average skill levels have a comparative advantage in different tasks. Much as Ricardo postulated that countries specialize in the production of goods and trade for mutual benefit<sup>15</sup> I conceptualize teamwork as workers “trading tasks.” Social skills increase productivity because they reduce the cost of trading tasks with other workers.<sup>16</sup> Workers with high social skills earn higher wages because they can specialize in their most productive tasks and trade their output with others. I develop a number of other predictions from this simple model—including the prediction that cognitive skills and social skills are complements—and find strong support for them in the data.

Defining social skills has important

real-world implications. First, social skills are conceptually distinct from *sociability*. A high-pressure sales representative might be gregarious and talkative, but not particularly good at understanding colleagues and working with them. Second, workers with strong social skills are more responsive to changes in their comparative advantage when “trading tasks” with different sets of teammates. They are *flexible* and can adapt to changing circumstances. Teamwork often involves playing different roles in different settings. For example, I might specialize in statistical analysis when working with my senior colleagues, but in writing and motivation when working with my junior colleagues. More generally, effective teamwork requires a complex and context-dependent understanding of one’s team members and their likely responses to a wide range of scenarios. This is intuitive for most people, but it is very difficult to codify as a set of explicit instructions.

### Measuring Soft Skills

Many studies have found that soft skills are important predictors of earnings and other adult outcomes. Some studies also associate gains in long-run outcomes with gains in soft skills.<sup>17</sup> Yet the study of soft skills is hamstrung by poor measurement and lack of definitional clarity. Most often, inferences about soft skills are made indirectly. For example, a consistent pattern in early childhood interventions is that these programs have long-run impacts on adult outcomes such as educational attainment and earnings, despite “fade-out” of test score gains. This has led researchers to conclude—indirectly—that the causal mechanism might be soft skills.<sup>18</sup>

While no measure is perfect, cognitive skills are much better measured than soft skills in terms of both validity and reliability. One might conclude from this that the construct of cognitive skill is inherently more valid. However, this ignores the history of measurement. Psychologists—and

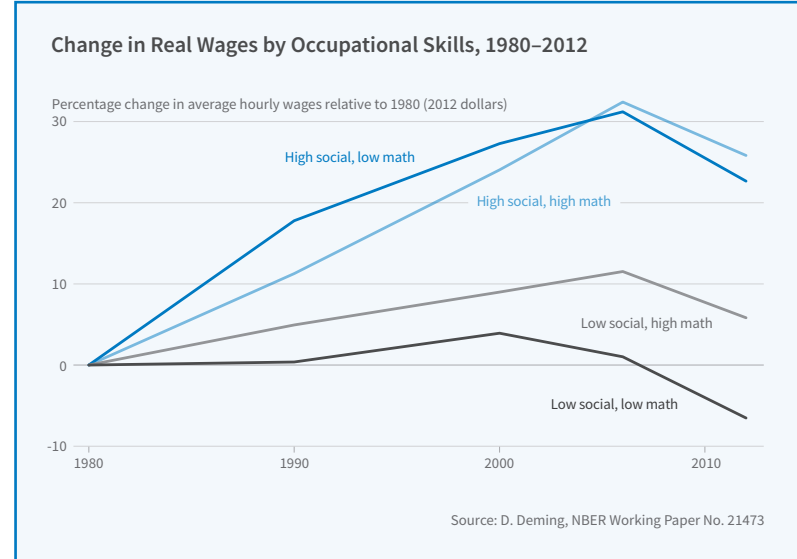


Figure 2

the testing industry—have spent several decades and millions of dollars systematically improving and refining the measurement of cognitive skills. The modern IQ test was created as a tool to diagnose intellectual delay, with lower scores simply indicating that children were unable to perform tasks that were “typical” for their same-age peers. Psychologists only later discovered that IQ test scores predict a variety of other outcomes such as grades, achievement test scores and earnings. By comparison, measurement of soft skills is in an embryonic stage.

The scholarly consensus about the importance of different human capacities is driven by how well these capacities can be measured. If we could develop reliable and context-invariant tests of important soft skills such as self-control and social intelligence, I would not be surprised if they ended up being equal or better predictors of labor market outcomes than IQ.

Soft skills are most often measured using survey questions that ask respondents to self-assess their personality characteristics. A prominent example is the Big 5 personality inventory, a rigorously developed psychological model that distills human personality into five factors—extraversion, conscientiousness, agreeableness, neuroticism, and openness to experience.<sup>19</sup> Big 5 personality measures—especially conscientiousness—are strongly positively correlated with educational attainment, labor market earnings, and other important life outcomes.<sup>20</sup>

However, self-assessments have a number of important problems that limit their usefulness for research and policy-making. First, they are highly context-dependent. Some recent evidence suggests that the cross-country correlation between conscientiousness and average hours worked is negative.<sup>21</sup> South Koreans report working nearly 2,500 hours per year, compared to around 1,500 hours for workers in France. Yet out of 26 countries, France places fourth and South Korea places 25th in self-reported conscientiousness.<sup>22</sup> Another recent study

finds that students who are randomly assigned to a set of schools known for their emphasis on character-building and hard work (so-called “no excuses” charter schools) self-report lower levels of conscientiousness, self-control, and “grit.”<sup>23</sup> In both cases, respondents are comparing themselves with those around them.<sup>24</sup>

Some recent research uses behavioral measures such as school absences or suspensions to measure soft skills.<sup>25</sup> These studies argue that behavioral measures are better because they are more predictive and less context-dependent. However, Shelly Lundberg shows that using school suspensions as a behavioral measure of impulsivity is problematic, since suspensions are also determined by school context, racial discrimination, and other unknown factors.<sup>26</sup> The deeper issue with using behaviors to measure soft skills is that sometimes behaviors are too predictive—they measure the underlying soft skill, but also many other things.<sup>27</sup>

Researchers ought to stop relying on convenient, off-the-shelf measures of soft skills and start creating metrics that are theoretically sound and suitable for the task at hand. I am as guilty as anyone else when it comes to using poor measures of soft skills. Here, economists may be able to learn from psychologists, who have carefully developed measures that map cleanly to underlying constructs but mostly have not subjected these measures to rigorous testing in a variety of field settings.

One possibly useful measure of social intelligence is the Reading the Mind in the Eyes Test (RMET), a measure of emotion recognition or social sensitivity.<sup>28</sup> The RMET was originally created to diagnose “theory of mind” deficits such as Asperger syndrome and high-functioning autism. However, much like IQ, psychologists have discovered that the RMET has predictive power for a wide variety of outcomes within a general population.

While the RMET is not perfect, it has two advantages relative to existing measures of soft skills. First, there are correct answers to the questions, which prevents reference group bias. Second, there is a well-grounded theory of how the underlying capacity (theory of mind) relates to task performance (emotion recognition in human faces). While there are many studies that probe the validity and reliability of the RMET across settings, I am not aware of any large-scale study that measures RMET performance in a broader population, and that addresses the correlation between social intelligence and measures of socioeconomic status such as income and parental education. There are many open questions to be answered. Does the RMET predict life outcomes at all? Is it differentially predictive for some groups? A research program that carefully builds out a mapping between theoretical constructs and measurement strategies for other soft skills such as creativity, self-control, and adaptability would be a foundational contribution.

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<sup>19</sup> See O. John and S. Srivastava, “The Big Five Trait Taxonomy: History, Measurement, and Theoretical Perspectives,” in L. Pervin, O. John, eds., *Handbook of Personality: Theory and Research*, New York: The Guilford Press, 1999, pp. 102–38 for an overview and history of the Big Five. [Return to Text](#)

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