



# The Changing Nature of Work

*Italo Lopez Garcia, Nicole Maestas, and Kathleen J. Mullen\**

We provide new evidence on the changing nature of work and its influence on individuals' capacity to work by linking historical measures of occupational job demands with harmonized data on individuals' abilities from a unique survey conducted in the RAND American Life Panel in 2018. We start by examining how job demands have evolved over time between 2003 and 2018 for different dimensions of abilities (cognitive, psychomotor, physical, and sensory), overall and by educational group. We then decompose job demand changes into within-occupation changes and changes in the distribution of occupations in the national economy (see working paper). Finally, we provide evidence on how measures of individuals' work capacities have evolved over time due to job demand changes. Combining panel data on job demands with contemporaneous data on individual abilities, we construct time-varying measures of work capacity, holding individuals' abilities fixed in 2018. This enables us to assess how many jobs of the past today's individuals would have been able to perform given their current abilities.

Figure 1 presents comparisons of average job demands between 2003 and 2018 by domain, overall and by educational level. Consistent with previous literature,

we find that overall, on average, cognitive job demands increased between 2003 and 2018 and physical job demands decreased. Mirroring cognitive and physical job demands, respectively, sensory job demands increased and psychomotor job demands decreased, although this last result is not statistically different from zero.

However, as Figure 1 demonstrates, the changes in job demands over time are highly unequal across educational groups. For example, among the set of jobs held by those with a high school degree or less, ability requirements increased in all four domains, including physical requirements. At the same time, among the set of jobs held by those with a college degree or more, ability requirements decreased in three out of the four domains. Only sensory job demands increased significantly across all educational groups, though they increased the most for low-skilled workers. These changes are all statistically significant ( $p < 0.05$ ). These results suggest that the changing nature of work over the last 15 years may have deepened inequality across educational groups, as jobs held by less educated workers have become more difficult on average while jobs held by more educated workers have become easier.

---

\* **Italo Lopez Garcia** is an economist at the RAND Corporation and an IZA Research Fellow. **Nicole Maestas** is an associate professor of health care policy at Harvard Medical School. **Kathleen J. Mullen** is a senior economist at RAND, director of the RAND Center for Disability Research, and editor-in-chief of the RAND Journal of Economics. This research brief is based on working paper [WP 2020-415](#), UM20-03.

How have changes in job demands over the last 15 years translated into changes in individuals' capacity to perform jobs in the national economy? We address this question by using our measures of self-reported abilities on the same scale that O\*NET uses to rate occupational requirements. We estimate individuals' work capacity as the fraction of jobs individuals would be able to do given the functional abilities they possess and the ability requirements for all jobs in the economy in either 2003 or 2018.

Figure 2 summarizes these results. In the top-left and bottom-left panels we present the levels and change in total work capacity by educational group, respectively, assuming an individual possesses the functional abilities to perform an occupation if she possesses all the abilities required for that occupation ( $T=1$ ). In top-right and bottom-right panels we present the analogous results where we adopt a partial credit approach in which an individual is assumed to possess the functional abilities to perform an occupation if she possesses 91% of the abilities required for that occupation ( $T=0.91$ ).

Regardless of the threshold used, the same pattern by education arises: With one exception, the fraction of jobs individuals can perform in 2018 is greater than the

percentage of jobs they would have been able to do in 2003 with the same abilities. This increase in work capacity is greater for individuals with more education. The exception is individuals with a high school degree or less, whose work capacity did not increase or decrease statistically under either threshold. Setting  $T=1$ , we find that the fraction of jobs individuals can do increased 3.5 percentage points for those with some college education, 4.5 percentage points for those with a bachelor's degree, and 5.7 percentage points for those with postgraduate education. Under  $T=0.91$ , increases in work capacity at higher levels of education are even more dramatic. These changes are all statistically different from zero ( $p<0.05$ ).

In sum, we find that while individuals with a high school degree or less can perform statistically the same fraction of jobs in 2018 as in 2003, individuals with more education have likely expanded their work capacity over time due to changing job demands. These results are consistent with the evidence on changes in average job demands by educational groups suggesting that individuals with low educational attainment have been penalized by the changing nature of work while those with more education have benefited by those changes. ❖

**Michigan Retirement and Disability Research Center**

Institute for Social Research  
426 Thompson Street, Room 3026  
Ann Arbor, MI 48104-2321

**Phone:** (734) 615-0422 **Fax:** (734) 615-2180  
[mrdrumich@umich.edu](mailto:mrdrumich@umich.edu) [www.mrdrc.isr.umich.edu](http://www.mrdrc.isr.umich.edu)

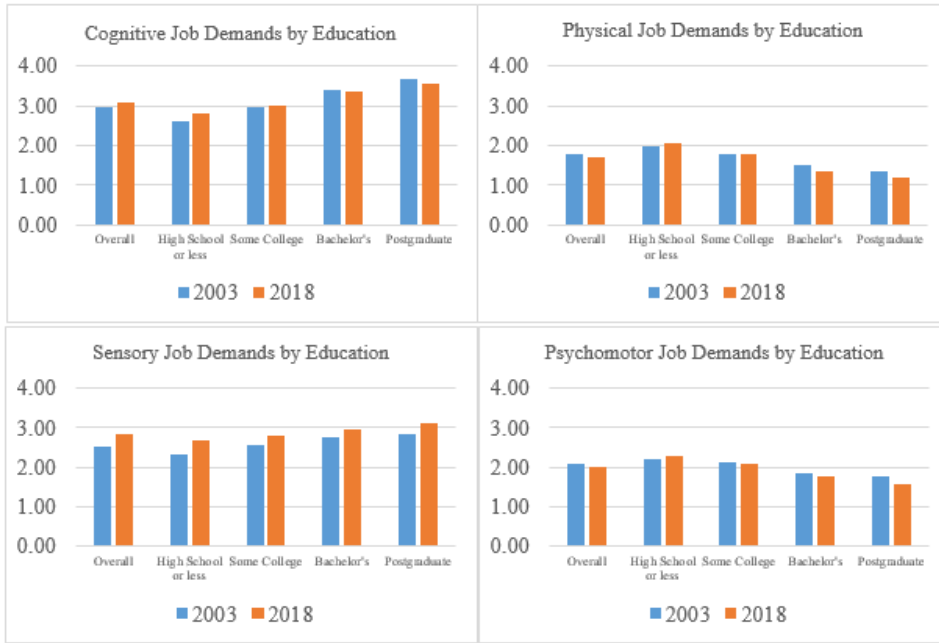
**Sponsor information:** The research reported herein was performed pursuant to grant RDR18000002 from the U.S. Social Security Administration (SSA) through the Michigan Retirement and Disability Research Center (MRDRC). The findings and conclusions expressed are

solely those of the author(s) and do not represent the views of SSA, any agency of the federal government, or the MRDRC.

**Regents of the University of Michigan:**

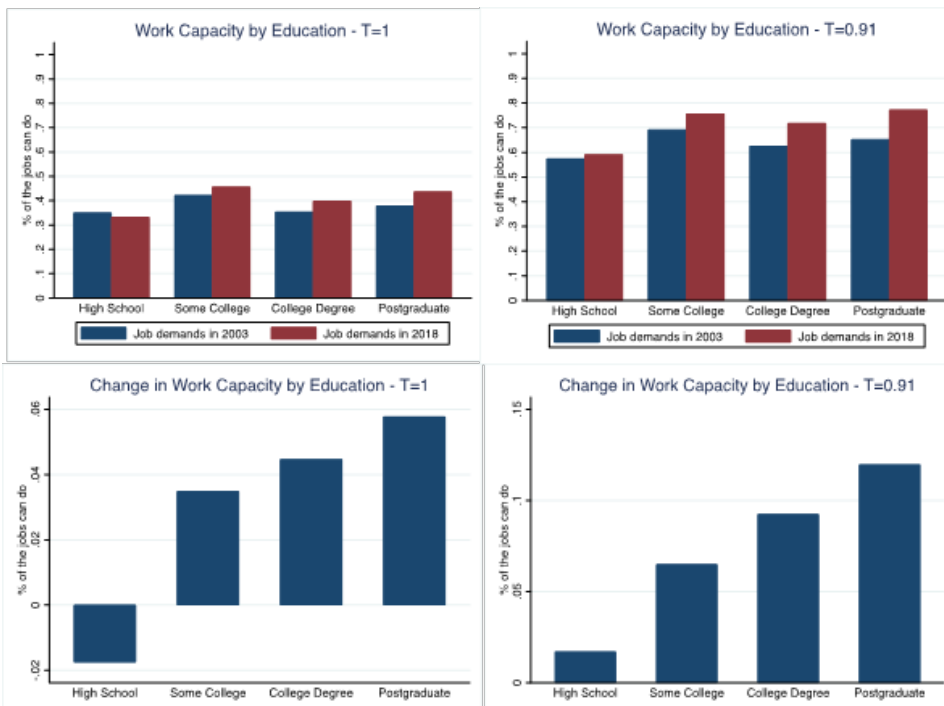
Jordan B. Acker, Huntington Woods; Michael J. Behm, Grand Blanc; Mark J. Bernstein, Ann Arbor; Paul W. Brown, Ann Arbor; Sarah Hubbard, Okemos; Denise Ilitch, Bingham Farms; Ron Weiser, Ann Arbor; Katherine E. White, Ann Arbor; Mark S. Schlissel, *ex officio*

**Figure 1: Average job demands by education in 2003 versus 2018**



**Note:** The graphs show weighted average job demands by functional ability dimensions, overall and by educational level, obtained from O\*NET data for years 2003 and 2018. Average ability levels for a given functional dimension and occupation are weighted by the relative importance of abilities for that occupation, normalized to sum 1. Weighted averages across occupations are obtained using occupational job shares by educational level obtained from Current Population Survey data for each year. The sample is 753 combinations of 2000/2010 Standard Occupation Classification codes, which correspond to 731 occupations in 2003 and 740 occupations in 2018.

**Figure 2: Change in the fraction of jobs in the economy individuals can do by education, 2003 to 2018**



**Note:** The figures in the top panels show the fraction of the economy's jobs individuals can perform by education in 2003 and 2018 holding fixed their own abilities measured in 2018 if: a) (top-left) they are required to have all abilities to perform each job ( $T=1$ ), and b) (top-right) they are required to have at least 91% of the abilities to perform each job ( $T=0.91$ ). The bottom panels show the change in the fraction of jobs individuals can perform between 2003 and 2018 by educational level under  $T=1$  (bottom-left) and  $T=0.91$  (bottom-right).