Reach for the STARs

Realizing the Potential of America's Hidden Talent Pool

STARs*
SKILLED THROUGH ALTERNATIVE ROUTES

Opportunity @Work

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Acknowledgements

Foreword

My father had a good high school education but dropped out of college after one year. He worked in a series of retail, customer service and logistics jobs before he enrolled in a 6-month course on COBOL programming for IBM mainframes, then a fast-growing "job of the future." The year was 1971 in Detroit, Michigan. Despite not having a college degree and having never worked in an office, my father's new skills earned him an entry-level programming job at his local electric utility, marking a trajectory shift in his earnings and our family's path into the American middle class.

How can an economy realize its potential if it excludes 60% of its workforce?

What would my father's prospects have been in today's U.S. labor market? It would be more difficult now for him to be hired into entry-level technical roles or to convert his on-the-job learning to higher earnings in subsequent roles. Although 60% of US workers don't have a 4-year college degree, U.S. employers have made these degrees prerequisites even to be considered for the vast majority of new jobs paying a middle-class wage or better. Coincidentally or not, inflation-adjusted earnings for workers without college degrees fell by 13% in the past 40 years. This raises a profound question: Can an economy realize its potential if it prevents 60% of workers from reaching their potential? If 4-year degrees are not the be-all and end-all of skills, then employers lose out on talent, workers are denied opportunity and our economy is both less innovative and less inclusive than it could and should be.
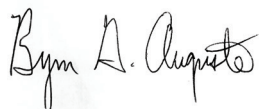
Almost everyone knows high performing, resourceful, skilled colleagues without college degrees, and intuitively the idea that talent can surface through many alternative routes makes sense. This study and its underlying analysis quantifies that intuition: working adults who do not have 4-year degrees, and who are "Skilled Through Alternative Routes" (STARs), are engaged problem-solvers with a wide range of skills that are highly prized in dozens of well-paid current and emerging skilled jobs. Millions of STARs develop the foundational and behavioral skills that employers say they need, through their civilian or military work experience. Millions more acquired technical and functional skills in community college, last-mile training programs, or on-the-job. In fact, 5 million STARs work successfully in high-wage roles today. They are 5 million proof points debunking the damaging myth that no degree means no skills.

Besides their many non-career benefits, bachelor's degree programs are - and will continue to be — exceedingly important routes to middle- and high-wage skilled work. Yet the reality is that colleges alone lack the capacity to meet the full needs of the U.S. labor market and adult working learners to master constantly evolving skill requirements. Filling the demand for workers in 21st-century jobs will require employers to seek talent among college graduates and among workers who have built skills through alternative routes. College must remain a bridge to opportunity for millions; we cannot let it be a drawbridge pulled up to leave millions more unable to convert their learning into higher earning.

At a time when government, industry, educators and citizens are grappling with many conflicts and difficult tradeoffs, the implications of this analysis suggest that companies, workers, and communities of all kinds can benefit from recognizing the talent and activating the skills of STARs in our midst.

We hope this report raises awareness and spurs concerted action. Over 70 million STARs show up each day and work hard to learn, perform and progress. It's time our institutions showed up for them.

Byron Auguste

CEO and Co-Founder, Opportunity@Work

Executive Summary

Through an analysis of the largest public datasets on U.S. occupational roles, skills, wages, and workers, our research identifies a talent pool of 71 million workers who are Skilled Though Alternative Routes (STARs). Each of these workers is currently active in the workforce, has a high school diploma and does not have a four-year bachelor's degree. All have suitable skill sets to succeed in work that is more highly valued and therefore better paid than the work they do now. But few realize such upward job mobility today. Our findings challenge conventional wisdom about the skills of workers without bachelor's degrees, and present some important implications for companies, workforce organizations, analysts, and STARs.

Finding #1: Low-wage does not mean low skill.

It is a common assumption that lower wage jobs require fewer or lower level skills than higher-wage occupations. However, we find this is frequently not the case. When we compared skill sets for jobs across wage categories, we found that many low-wage jobs require skills that are similar to middle-wage jobs and middle-wage jobs require skills that are also required in high-wage jobs. In other words, workers are developing and deploying marketable skills on the job at all rungs on the wage ladder. Our research demonstrates that conflating wage levels with skill levels often underestimates and undervalues low-wage workers' skills and the potential to fill open positions employers need to be successful.

Finding #2: STARs represent a vast overlooked pool of talent.

71 million STARs are currently active in the workforce, account for slightly less than half the working population and are represented in all regions, races, ethnicities, genders and generations across the United States. Our skills analysis shows all STARs have the potential to perform a different role for higher wages. Specifically, there is an occupational role in their geography with skill demands similar to their current job that pays at least 10% more, and, for almost half of STARs, there are such roles paying over 50% more than what they currently earn today. By including barriers such as four year degree requirements, and limiting access to roles in their companies, employers are missing out on this large and diverse talent pool, which includes military veterans, opportunity youth, returning citizens, workers in rural communities and smaller metro regions.

Finding #3: STARs have different trajectories to increase wages.

A meaningful way to begin understanding this large group of workers – and how best to support them in their career journeys – is through a segmentation of the STARs population by their skills-readiness for higher wage work:

- **5 million STARs (Shining STARs)** currently work in high- wage jobs today, despite the barriers to entry they faced. Shining STARs are proof of what is possible.

- **30 million STARs (Rising STARs)** currently work in jobs with skill requirements suggesting they can perform a job in the next highest wage category. They have the skills and potential today to see transformative wage gains of, on average, more than 70%.

- **36 million STARs (Forming STARs)** have skills for occupations paying at least 10% higher than their current jobs, but are not well situated for job transitions that would provide transformative wage gains. Low-wage Forming STARs are especially susceptible to the impact of automation.

Call to Action: Realize the potential of STARs as a talent pipeline.

These findings illustrate that STARs are doing the hard work everyday to learn and earn given the constraints presented by the opportunity gap. It is now time for the rest of the workforce ecosystem to match their efforts.

Employers (Hiring and HR Teams)

Stop using 'pedigree' to limit recruiting; shift to skills–based hiring and talent development practices.

- End four–year degree requirements that prevent your company from seeing the STARs you'd want to hire.

- Identify and intentionally source from 'alternative routes' to find the STARs talent you need.

- Invest in training and open career pathways for the STARs already inside your company.

Companies that Shape the Workforce Ecosystem

Large companies and industry networks can shape the broader workforce ecosystem to scale up opportunities for STARs:

- Engage supplier and partner ecosystem networks to hire and develop STARs. Companies can encourage smaller businesses in their supply chain to hire STARs.

- Enhance products and services for STARs. Job search, applicant tracking and talent management systems can be improved to ensure access and visibility for STARs.

- Inform state and national policy. Policymakers and companies can shape a collective agenda to support STARs across their lifetime.

Workforce Development Leaders

Align efforts around STARs to multiply collective impact:

- Adopt the STARs terminology and narrative to support the shift in corporate practices and to attract the resources to this movement.

- Continue designing and building training programs targeting STARs based on their skills and needs.

- Define a collective, STARs–focused call to action that establishes specific targets for wage gain and/or number of jobs opened to STARS in the coming decade.

Academic Researchers, Market Analysts and Policymaking Community

Build a robust a research agenda and better measurement tools to make STARs visible and inform effective employer practices and public policies for STARs economic mobility.

- Engage public statistical agencies to define and standardize STARs skills, earnings, and longitudinal data.

- Pursue cross-sector research collaborations – accessing both public and robust proprietary data sets to answer key questions about STARs.

Importance of a Labor Market that Works for STARs

Our understanding about the skills of workers without a BA degree is relatively elementary as a field, thereby limiting our understanding of the value this population brings to our labor market. These workers are also often defined by what they lack (e.g., "non–BA" or "sub–baccalaureate"), instead of what they have to offer (e.g., real skills developed through work experience). This report rejects that limited frame of reference, defines STARs and introduces quantitative methods to identify and size the gap between current wages and higher paid roles for which STARs have skills and potential to succeed.

These findings beg the question: How can a widespread "war for talent" co-exist with stagnant wages and perceived under–utilization of the talent of so many workers? A part of the explanation is that job mobility for STARs is far less than what an efficient labor market with high demand for marketable skills should deliver.For instance, out of roughly 16 million STARs whose skills align with profiles of high wage roles (paying over double U.S. median earnings), only 5 million STARs currently work in such jobs.

This foundational research should inform and ultimately improve practices and policies throughout the U.S. labor market which currently limit – but should enable – STARs to work, learn and earn to their full potential.

Introduction

Companies are at war for talent while millions of workers' skills are underutilized.

As American companies of all sizes seek to maintain their competitive edge, they continue their search for talented workers. This challenge is complicated by projected skill needs for the future of work, as automation and artificial intelligence shift the landscape of occupations.[1] Seventy percent of C-suite and business leaders indicate that the role-specific skill shifts their companies require will be significant.[2] Some of the most important skills they will need in the workforce include creativity, socio-emotional intelligence and complex reasoning.[3]

While employers lament the dearth of talent, more than 60% of the active U.S. workforce who lack a four-year college degree express high levels of dissatisfaction with their current job opportunities.[4]

And with good reason: Individuals without degrees experienced a real wage decline of 13% in the past generation,[5] and have fewer job opportunities that pay above median wage; in fact, 74% of new jobs created between 2007 and 2016 were in jobs where employers typically require a 4-year college degree leaving only 26% of new jobs available to 60% of the population.[6] They are the first generation to be worse off financially than their parents.[7] In focus groups and interviews, some of these workers explain that they could do more if they were given the chance, and believe they are passed over for higher-paying jobs in which they could be successful.[8]

The data and analysis presented in this study make the argument that millions of American workers

STARs' career paths include many types of alternative routes

The most commonly recognized pathway to high-wage work is a four-year college degree. This pathway is an important one for millions of workers who create significant value for our economy. However, a four-year college degree is not the only way that people build critical skills for our workforce. Other routes include associate degrees; credentialized training programs and bootcamps; on-the-job learning and training; self-guided learning and even entrepreneurship.

Workers **S**killed **T**hrough **A**lternative Routes, **STARs**, have a high school diploma and do not have a college degree.

Each has the potential to perform a different role than they do now for higher wages based on skills they have developed through alternative routes. This study focuses on on-the-job learning as the primary route because it is accessible to all workers, but we share more about other routes throughout the report.

without a four-year college degree have the valuable skills needed to perform higher-wage work. They are Skilled Through Alternative Routes, or STARs.[9] They make up a significant portion of our active labor force and bring important skills, talent and diversity to our labor market.

Our first finding shows evidence that earning a low wage does not mean workers are low skilled. In fact, many workers in low-wage jobs have skills relevant for middle- and high-wage jobs. Our second finding illustrates the implications of the first finding: The pool of overlooked talent is vast. There are 71 million STARs in our workforce today. Finally, our third finding details important differences within this pool of workers by segmenting STARs based on their skills readiness for higher-wage work. Through segmentation, we can see important differences in this population across gender, age, education, race and ethnicity.

Defining and understanding this pool of workers is the first step to unleashing STAR talent in ways that could have transformative effects on our economy, helping employers to fill open positions required for their businesses and assisting workers to reach their potential. We discuss some implications of our findings and present calls to action for companies, analysts, workforce organizations and workers.

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Millions of workers without a four-year college degree have the valuable skills needed to perform higher-wage work. They are Skilled Through Alternative Routes, or STARs.

Low wage does not mean low skill

One important alternative route for workers to acquire skills is on-the-job learning or work experience, even in lower wage jobs.[10] Workers routinely cite on-the-job learning as critical for their performance,[11] while team managers routinely look for work experience and applied skills when recruiting for new roles.[12] It signals that the worker brings knowledge and abilities to accomplish a given set of tasks.

Low- and middle-wage workers often have the skills that higher-wage work requires.

We studied the skills of workers without bachelor's degrees by inferring the skills required in their current occupation.[13] It is a common assumption that fewer (or lower-level) skills are required in lower-wage jobs than higher-wage, higher-value occupations. This is true for occupational skills that are scarce, in-demand and easily verifiable (e.g., cardiothoracic surgeon). It is also true that some low-wage work is designed to require limited skill sets. However, when we compared skill sets for jobs across wage categories, we see that many low-wage jobs require skills that are similar to middle-wage jobs and many middle-wage jobs require skills that are also required in high-wage jobs.[14]

Figure 1 illustrates the skill similarity in a pairing of an origin and destination job. In the first example, the sales representative is the "origin job;" in this case, a low-wage job which requires the skills listed on the left. The ad sales job is a "destination job" that requires the skills listed on the right. The skills required for both of these roles are almost identical, but the wage difference between them is significant: the ad salesperson will earn almost $40,000/year more than the sales representative. While the various skills may differ in importance slightly, the overlap of skills between the origin and destination jobs is significant, especially for many foundational skills. Another example is represented in the second pairing of origin and destination jobs in Figure 1, between a customer service representative ($15.90/hour) and an HR specialist. ($28.20/hour). These jobs also have many similar skills but pay different wages.

Further, our analysis demonstrates that many low-wage jobs require key foundational skills critical to 21st-century jobs, such as service orientation, social perceptiveness, active listening, time management and interpersonal communication. These are skills that employers often cite as missing in their search for talent at many different wage-levels.

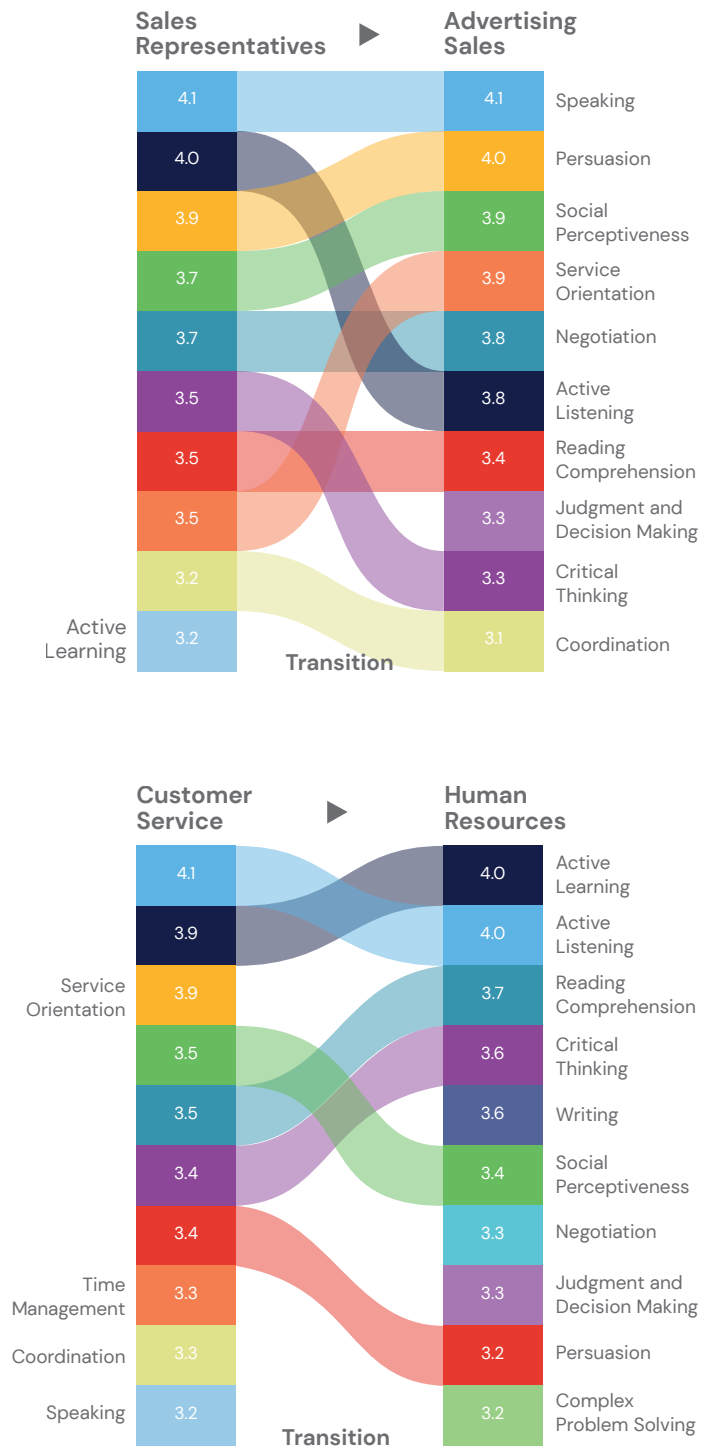## FIGURE 1. SKILL SIMILARITY ACROSS JOBS

Figure 1 illustrates similarity of skills across two jobs - in this case for an early career worker in Washington, DC. There are hundreds of similar pairings in our analysis.

The skills overlap is not always perfect across occupations. For example, the skills required for low-wage jobs do not, on average, require as much operations analysis, science and systems evaluation as middle-wage jobs.

Skill Similarity Across Jobs Suggests Transitions Are Possible

We studied the Bureau of Labor Statistics' O*NET to define the skills of more than 750 occupations – analyzing over a hundred thousand pairings – and compared each occupation to each other occupation to understand the similarity of skills across pairings. This allowed us to understand what possible transitions could exist for workers. We asked: Based on their skills and other criteria – such as whether such a transition has occurred – what potential transitions could a worker make to a destination job? Figure 2 illustrates the possible transitions that workers could make based on their current skills across the main job groups within these approximately 750 occupations.[15] This analysis shows that every experienced worker has the potential to perform a different role for higher wages if they have successfully demonstrated the skills required in their current role.[16] Possible transitions for workers vary depending on their origin jobs, but each worker in this dataset has a transition opportunity available to them based on their skills.

Implications and Examples

By studying the overlap of skills in these occupations across wage categories, we can see that wages are not always an accurate reflection of skill. For each STAR there is an occupational role in their geographic area with skill demands similar to their current job paying at least 10% more than they currently earn, and, for almost half of STARs, there are such roles requiring proximate skills but paying over 50% more than what they currently earn today.

Moreover, skill similarities across occupations suggest that the assumption that a low-wage or middle-wage occupation is only performed by low-skill or middle-skill workers is harmful. It discounts both existing capabilities and upward potential of workers. It also causes the labor market to overlook high-value, in-demand skills that many lower-wage workers practice on the job, such as active listening, coordination and social perceptiveness. Further, it ignores the learning that happens on the job and permanently consigns lower-wage workers to a group that we consider incapable of growth without significant investments. Employers that fail to consider these workers for other roles will miss out on the skilled talent they need, and as a result of these missed signals, will unnecessarily limit STARs' job mobility.

ALTERNATIVE ROUTE SPOTLIGHT

Employers Opening Up Educational Opportunities

Employers can play a critical role in a worker's professional journey through their talent development efforts. Nationwide, companies invest an estimated $590 billion in worker education benefits, in-house training and employee certifications. Strategic investments in skills development allow workers to leverage existing capabilities to transition to higher-paying jobs.[17]

Through their Live Better U initiative, **Walmart** is helping their workers identify and develop their skills. Partnering with **Guild Education**, Walmart gives employees access to high school, college and credential-based education. One innovative aspect of the program is that employees can earn credit through training courses as well as work experience. The program identifies the skills people perform in their jobs and creates curricula and leveling exams that recognize what workers already know and do.

FIGURE 2: PREDICTED STAR JOB TRANSITIONS FROM ORIGIN TO DESTINATION OCCUPATION

Figure 2 illustrates the job transitions we predict for STARs based on their current skills. The x-axis displays the "Origin," or current occupation of the STAR within one of the 23 major job families in the O*NET, and the Y-axis displays the "Destination," or predicted occupation from our analysis based on the STAR's skills. For instance, most workers in the Personal Care and Service job family have skills to transition to another role in that job group, but some have the skills to transition to the Healthcare and Support job group.

There are many pathways to an occupation.

Given the high level of skill similarity across occupations, it follows that workers can learn skills on the job that are transferable to other roles. But do such transitions occur in real life?

Opportunity@Work partnered with LinkedIn to study the career pathways of STARs who have profiles on LinkedIn. This data in Figures 3 and 4 illustrates that there are thousands of pathways STARs took to build skills for the jobs they're in today. The LinkedIn analysis of jobs people held prior to filling an IT support specialist role found more than 3,000 different paths to this role. The ten most commonly held positions prior to this job often included similar experience, like computer technician or information technology specialist, but also included non–technical roles, such as customer service representative and salesperson. There were more than 2,500 routes taken by STARs to get to an inside sales job, and while the ten most commonly held roles prior to the inside sales job included sales specialist and account manager, it also includes customer service specialist, office manager and administrative assistant.

FIGURE 3: JOB FUNCTIONS PRIOR TO JOB AS IT SUPPORT SPECIALIST

What job functions were STARs in before their first job as IT Support Specialist?

67% Joined from non–tech industries

61% Joined from non–IT functions

Information Technology
Operations
Support
Engineering
Unclassified Function
Sales
Administrative
Education
Arts and Design
Business Development
Military and Protective Services
Finance
Quality Assurance
Healthcare Services
Media and Communication
Accounting
Program and Project Management
Community and Social Services
Research
Marketing
Human Resources
Consulting
Legal
Real Estate
Purchasing

IT Support Specialists

An analysis by LinkedIn shows that STARs acquire relevant skills in many different functions. There are more than 3000 pathways into the IT Support Specialist role.

Linked in

FIGURE 4: JOB FUNCTIONS PRIOR TO JOB AS INSIDE SALES

What job functions were STARs in before their first job as Inside Sales Specialist?

73%
Joined
from
non–sales
functions

Sales

Operations

Support

Administrative

Unclassified Function

Information Technology

Business Development

Engineering

Marketing

Finance

Purchasing

Arts and Design

Accounting

Healthcare Services

Program and Project Management

Human Resources

Education

Community and Social Services

Military and Protective Services

Media and Communication

Real Estate

Quality Assurance

Legal

Consulting

Research

Entrepreneurship

Inside Sales Specialists

An analysis by LinkedIn shows that STARs acquire relevant skills in many different functions. There are more than 2500 pathways into the Inside Sales Specialist role.

Linked in

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STARs represent a vast overlooked pool of talent.

There are 71 million workers in the STARs talent pool, all of whom are currently active in the workforce, demonstrating real skills on the job. These are millions of people across all occupations with valuable skills and experience who could fill in-demand jobs if employers better understood and recognized their potential.

STARs represent approximately half the workforce and are in all occupations.

We find there are 71 million workers in the STARs talent pool. Each of these workers is currently active in the workforce, has a high school diploma and does not have a four-year bachelor's degree. All STARs are over the age of 25, except for 3 million STARs who are Opportunity Youth. Given the skills required of their current roles, our occupational and skills analysis shows that STARs can be found in every occupation, and that each of them has the skills today to perform higher-wage work. Figure 5 illustrates the workers we define as STARs in relation to the full population in the United States.

FIGURE 5: COUNT THE STARS (IN MILLIONS)

Value	Category
323	Total US Population*
159	Inactive Population (not in the workforce)
74	Children <18
35	Over 65
50	18–65 (Going to School, Ill, Disabled, Other Reasons)
161	Active Population (currently in the workforce)
60	With Bachelors
14	With Less than High School
13	With less than BA degree, 18–24
71	All STARs
68	STARs with High School, no BA, 25+
3	STARs who are Opportunity Youth with High School

*Missing data accounts for inexact totals.

Out of 161 million active adult workers in the U.S., 60 million have BA degrees, 14 million do not have a high school diploma, and 71 million are STARs (including 3 million Opportunity Youth).

STARs reflect the full diversity of the American workforce.

STARs represent a significant share of all regions, races, ethnicities, genders and generations across the United States. STARs include a majority of people encompassed in several workforce segments that HR and talent development leaders have begun to proactively incorporate into talent pipelines: military service veterans, opportunity youth, returning citizens and workers in rural communities and smaller metro regions, as well as workers vulnerable to automation who are typically the focus of upskilling and reskilling initiatives. Our analysis shows that 50% of African Americans, 44% of Hispanics and 55% of veterans are STARs.

Implications

The enormous size of this STARs talent pool suggests that there are millions with important skills who could be leveraged to fill in-demand jobs across the country if they were sought out by employers for better-paid jobs based on their skills profiles. While the magnitude of this mutual opportunity is promising, its diversity demands a closer look to understand possible trajectories for these workers.

STARs Snapshot

50%
African Americans are STARs
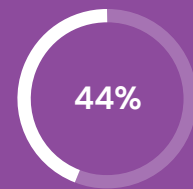
44%
Hispanics are STARs
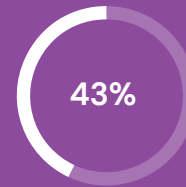
43%
Non Hispanic Whites are STARs

Accenture Research based on IPUMS CPS data, 2018

How we conducted this study

We used two public datasets to conduct the analyses in this report so that other analysts can replicate our results: the O*NET and Current Population Survey (CPS). The Bureau of Labor Statistics' O*NET database is a primary source of occupational information[18] and was especially useful as it defines skills based on extensive surveys, expert observation and analysis. O*NET skill requirements measure the importance of several dozen basic and cross-functional skills, in areas such as content, process, social, complex problem solving, technical, system and resource management skills.

To compile this report, we first focused our study on all active workers in the U.S. population over the age of 25 (161 million), as well as Opportunity Youth — those between the ages of 16 and 24 who are neither working nor in school (4 million). We then excluded those with a bachelor's degree (60 million), those without a high school diploma or the equivalent certification (14 million) and those workers for whom we have no occupational data (5 million).

We then gathered data about the remaining workers' current occupations from the CPS and used the O*NET to infer their skills. O*NET defines the tasks, skills, activities and knowledge required for each of the almost 900 occupations in the U.S. labor force. We understand this inference about workers' skills is incomplete, as it does not account for any current training, past work experience or the myriad other ways a worker gains skills. We also understand that there are varying degrees of mastery of those skills. In addition, data about contingent work (e.g., the gig economy) is limited; we were therefore unable to study the skills of many workers performing these roles.

Despite its limitations, O*NET is the most comprehensive and consistent data source that maps the skills profiles of a given occupation. For our purposes, it is a useful proxy because we could gather the data across the entire working population. Our hope is that this analysis can be furthered as data about workers and their occupations improve.

Finally, we were interested in whether workers' skills for their current jobs can transition to other occupations. To identify potential transitions for each worker, we came up with a measure of skill similarity between occupations by measuring the Euclidean distance between skills performed in current occupations and potential "destination" occupations. We then applied a few boundaries around these transitions, for instance, we eliminated destination occupations that do not happen in reality. We detail our methods in the technical appendix and in Blair et al., 2020.

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We used public datasets to define the population, determine their occupations, and infer their skillsets. We also analyzed potential job transitions.

STARs segments have different trajectories to increase wages

STARs are at different places in their professional journeys with meaningfully different trajectories to higher-wage jobs. We segmented the STARs population into three groups based on their skills-readiness for higher-wage work. Each segment needs different types of investment and support to transition to higher-paying work.

The Three STARs Segments
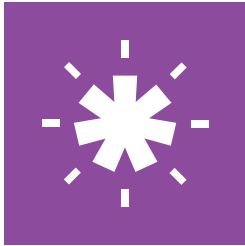
Shining STARs

STARs who are in high wage roles today

Rising STARs

STARs who have skillsets to transition to high- or middle-wage work
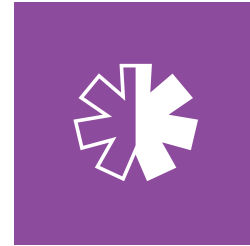
Forming STARs

STARs who have skills to see a small increase in wages, but not to transition to a higher wage group.

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A meaningful way to understand variation within this population is to segment STARs by their skills-readiness for higher-wage work.

Shining STARs earn at least $77,000 annually.[19] Their success illustrates that the skills required for high wage work can be acquired through alternative routes to four-year degrees, despite the institutional barriers STARs typically face along the way. The most common occupations for Shining STARs include software developers and chief executives of mostly small and mid-sized businesses. Other common roles Shining STARs occupy include registered nurses and urban planners. Though Shining STARs represent 7% of the STARs population, the fact that there are 5 million individuals in this group demonstrates that there are already alternative routes to work that is highly valued by employers — though institutional barriers make those routes rare.

There are 30 million Rising STARs, who, with the skills based on their current role, could transition to jobs that pay wages in the next highest wage group. Nineteen million of these STARs are currently in low-wage jobs and 10 million are in middle-wage jobs, but all have the potential skills to realize transformative wage gain in their local markets.

For middle-wage Rising STARs, the highest volume "origin occupations" include managers, nurses, accountants and teachers. Some sample transitions for these occupations include moving from an accountant to a financial manager (a middle- to high-wage transition), or from postsecondary teacher to an occupational therapist (a middle- to high-wage transition). For the 20 million low-wage Rising STARs, the most common "origin occupations" are retail sales and customer service representatives. Transitions available to this group include retail

sales to advertising sales (a low- to middle-wage transition), or customer service representative to human resources specialist (a low- to middle-wage transition).

There are 36 million Forming STARs, defined as STARs in low-wage or middle-wage occupations who have skills that are valued in jobs that pay at least 10% in their local region, but not skills that are valued in jobs that pay wages in the next wage group.[20] There are 14 million low-wage Forming STARs who are currently active in the workforce, 3 million current Opportunity Youth with high school diplomas, and 19 million middle-wage Forming STARs.

Some of the most common low-wage occupations among Forming STARs include cashiers, drivers and janitors. For the middle-wage sub-segment, the two most common occupations are operations managers and administrative service workers. Transitions available to Forming STARs allow for wage increases of at least 10%. Thus, while a taxi cab driver could transition to becoming a truck driver in our analysis, that destination occupation pays little more than 10% more than current wages. And an administrative service worker could transition to be a transportation manager, but that destination occupation also pays a similar salary.

Credentialed Training Delivered Through Flexible Models

Among the barriers faced by STARs is access to training and credentialing that accommodate their schedule. As STARs balance work, family and other obligations, many share that they lack time and resources to invest in training and professional development. Research shows that credentials can provide upward mobility for workers without BA degrees.[21]

Merit America offers a flexible training model tailored to advance careers in high-demand fields like information technology, advanced manufacturing and health care, and earn industry-recognized credentials such as the Google IT Certificate. The program combines online learning with in-person support to facilitate scheduling. It also offers a small living stipend to offset some of the costs of participation. The training process includes online modules that can be completed at any time of day, weekly small-group meetings, a dedicated coach and networking events.

Entry into the program is selective, with a multi-step process that includes baseline aptitude testing, a video interview, background reference checks and an assessment of the applicant's collaboration skills. Participants are organized into a cohort, or "squad," to provide community support through what can be an extensive job search process. The participant must be dedicated to the program, but they have options for how to meet its requirements and can do so while working full time. To date, Merit America graduates have found new positions with an average annual wage gain of more than $17,800.

Flexible training and credentialing programs like Merit America could be helpful to STARs, all of whom are employed in full-time jobs today but who might need a credential or additional skill to make a transition. There is critical work to do in order to scale solutions like these to meet STAR needs.

Community College

With more than five million students enrolling annually nationwide, community college is currently the most common alternative route pursued by STARs in the U.S. Our data shows that STARs in higher-wage positions are more likely to have an associate degree or have attended some college. For example, 60% of Shining STARs (STARs in high-wage roles) have an associate degree or some college.

To better understand the professional pathways facilitated by community college, Chegg, an education technology company, aggregated anonymized information on the career trajectories of more than 600,000 workers who began their education since 2010. Their findings show variation in outcomes from students investing in an associate degree. Approximately a quarter of the students had low-wage jobs, and almost a fifth had high-wage jobs after their community college programs. Almost 60% of graduates were in middle-wage positions.

Chegg's analysis identified that where a community college graduate was able to breakthrough into a higher-wage role tended to be in fields tied with defined career paths and certifications, for example medical certifications (registered nurse, dental hygienist), expertise in specific tools and processes (CAD designer, graphic design, IT help desk) or well-developed roles and paths (law enforcement, paralegal). These findings are consistent with other evidence that technical training can produce meaningful outcomes for workers.[22,23]

As we consider the tens of millions of STARs that could enter the middle- and high-wage jobs of the 21st century, the community college network is a promising avenue. With over 1,500 institutions across the country[24] enrolling millions of students, the associate degree represents a pathway that can support STARs at the scale required. To realize this potential, it is critical to continue identifying the most impactful practices, pathways and certifications offered by community colleges that support STARs in attaining higher-wage work.

FIGURE 6: DISTRIBUTION OF WAGES OF COMMUNITY COLLEGE GRADUATES POST-DEGREE

High-wage >$77,000

Middle-wage $37,500–$77,000

Low-wage <$37,500

Analysis from **Chegg**®

n=600,000
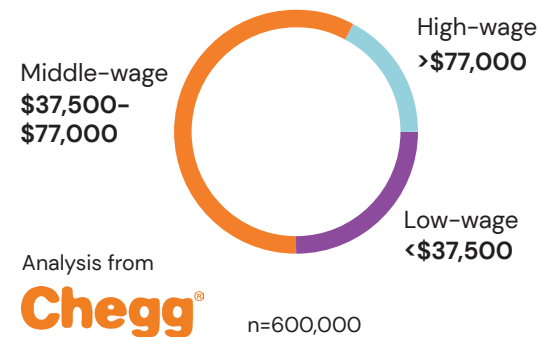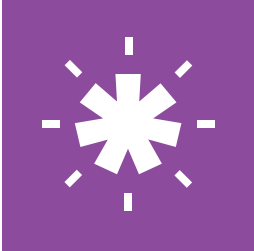
Shining STARs

5 million Shining STARs are in high-wage roles today and are proof of what is possible.

Potential transitions to increase wages

Origin Job		Destination Job
Accountants ($55.10/hour)	▶	Personal Financial Advisor ($75.78/hour)
Computer Hardware Engineer ($55.30/hour)	▶	Web Developer ($73.85/hr)
Pharmacist ($56.70/hour)	▶	Dietician/Nutritionist ($88.30/hour)

Selected Demographics

AGE:

Shining STARs are older than other STARs

70% over 45 — Shining STARs

53% over 45 — All STARs

GENDER:

Shining STARs are disproportionately men

69% men / 31% women — Shining STARs

54% men / 46% women — All STARs

RACE:

Shining STARs include a higher proportion of white STARs than non-white STARs

77% white — Shining STARs

63% white — All STARs

EDUCATION:

Have more formal education than other STARs

Have some college education:

67% — Shining STARs

52% — All STARs

Geography — While they are distributed across the country, Shining STARs are most likely to be found in several **midwest states**.

(see our Appendix B for more details about the demographics of Shining STARs)

LaShana Lewis

LaShana Lewis grew up in East St. Louis. She took an early interest in computers and volunteered her time to IT professionals who taught her the computer science basics. After high school, LaShana was accepted into a strong computer science program at a technical university in Southern Illinois, but when her mother got sick, she had to drop out.

Because she had built important skills, she believed she could land a tech job. However, for 10 years, she applied to these jobs but got nowhere. She worked in call centers, drove buses and even found part-time work as a substitute teacher for a computer class. When the instructor left, LaShana applied for the full-time job, but the school told her they couldn't hire her without a degree. "But you know I can do it," she said. Their answer? "We do. It's such a shame."

Eventually, LaShana connected with LaunchCode, which helped her demonstrate her skills and land her first tech job as a software engineer at MasterCard. She flourished in that role. Since then, she has become the Chief Technology Officer of a startup in St. Louis and founded her own consulting company. She even has a patent in her name.

Now a Shining STAR, LaShana brings skills, passion and ingenuity to the workforce. Her journey highlights her resilience despite the barriers she faced and proves the often overlooked potential of STARs.

"I had tried for many years to get jobs in the tech sector, only to be told that I could not get a job because I did not finish the degree. I was never tested on my technical skills. I never made it past the first interview."

Years of Work Experience:
20 years

Location:
St Louis, MO

Current Role:
IT Consultant

Previous Role:
Bus Driver

Core Skills:
Software Development Management

Speaking

Critical Thinking

Active Listening

Social Perceptiveness

Reading Comprehension

Rising STARs

30 Million Rising STARs have skills to transition to an occupation in the next highest wage category. Twenty million of these STARs are currently in low-wage jobs with skills to do middle-wage work, and ten million are in middle-wage jobs with skills to do high-wage work. All have the potential skills to realize transformative wage gain in their local markets.

Potential transitions to increase wages

Origin Job		Destination Job
Social and Human Services Assistant ($17.90/hour)	▶	Human Resources ($37.50/hour)
Sales Rep ($18.90/hour)	▶	Real Estate Agent ($34.21/hour)
Retail Sales ($12.40/hour)	▶	Sales Representative ($35.72/hour)

Selected Demographics

AGE:

Low-wage Rising STARs are younger while Middle-wage Rising STARs are slightly older than the rest of the STARs population.

55% under 45 — Low-wage
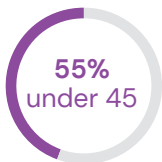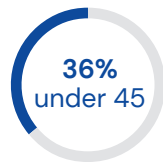
36% under 45 — Middle-wage

GENDER:

Low-wage Rising STARs are almost equally men and women while Middle-wage Rising STARs are disproportionately men
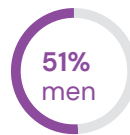
51% men 49% women — Low-wage
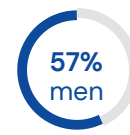
57% men 43% women — Middle-wage

RACE:

While low-wage Rising STARs are representative of the U.S. population, the middle-wage Rising group have a higher proportion of white STARs.

Low-wage **66%** white
Middle-wage **70%** white

EDUCATION:

More half of low-wage Rising STARs and 45% of middle-wage Rising STARs have no formal education beyond high school.

Have no formal education beyond high school:

Low-wage **54%**
Middle-wage **45%**

Geography

While they are distributed across the country, Rising STARs are more than **25% of the population in 10 states**.

(see our Appendix B for more details about the demographics of Rising STARs)

Source: Accenture Research based on IPUMS CPS data, 2018 average

Zach Pierobello

Zach Pierobello joined the Marine Corps after high school, and specialized in signals intelligence, gathering information from various communication platforms for military use. Near the end of his time in the Marines, Zach worried his skills wouldn't translate to civilian work outside of intelligence or security. However, before his service finished, he found Workshops for Warriors, an organization that helps servicemen and women train for jobs, get certifications, prepare for interviews and find careers in advanced manufacturing.

Through Workshops for Warriors, Zach studied computer programming and learned how to run the specialized machines used on a factory floor. The program also offered professional and personal development workshops to help him prepare for the civilian job market. At the end of the program, Solar Turbines hired Zach as a Rotor CNC machinist. Today, he is the youngest safety team leader at Solar Turbines, rising to the position in under a year. Zach's military experience creating safety plans and managing risk on the battlefield made him a perfect fit for the promotion, which normally takes around 10 years to achieve.

Veterans leave the military with strong skills and discipline. The transition to the civilian workforce can be challenging, but if done right, can yield benefits to both the veteran and the larger workforce. Programs like Workshops for Warriors that provide training on in-demand skills and support job readiness help Rising STARs like Zach make transitions to higher-value and higher-wage roles.

Workshops for Warriors builds on the skills foundation that veterans bring from their military service and focuses on the additional skills they need to transition to the civilian workforce. The program has connected 94% graduates to meaningful middle- and high-wage employment in advanced manufacturing.

Years of Work Experience:
6 years

Location:
San Diego, CA

Current Role:
CNC Machinist, Safety Team Lead

Previous Role:
Marine

Core Skills:
CAD Programming

Reading Comprehension

Operations and Control

Operations Monitoring

Critical Thinking

Forming STARs

36 Million Forming STARs have skillsets not matched to significantly higher-wage work. They are especially susceptible to the impact of automation and require additional support. There are 11 million low-wage Forming STARs who are currently active in the workforce, 3 million current Opportunity Youth with high school diplomas, and 19 million middle-wage Forming STARs.

Potential transitions to increase wages

Origin Job		Destination Job
Cafeteria Counter Attendant ($8.50/hour)	▶	Cook ($10.90/hour)
Taxi Driver ($14.00/hour)	▶	Truck Drivers ($18.30/hour)
Ushers, Lobby Attendants & Ticket Takers ($8.10/hour)	▶	Restaurant Host ($8.90/hour)

Selected Demographics

AGE:

Low-wage Forming STARs are younger than the rest of the STARs population.

56% under 45 — Low-wage

46% under 45 — Middle-wage
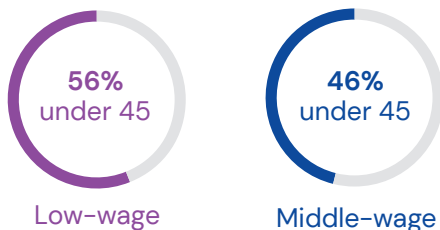
GENDER:

Low-wage Forming STARs are disproportionately women.

44% men 55% women — Low-wage

60% men 40% women — Middle-wage
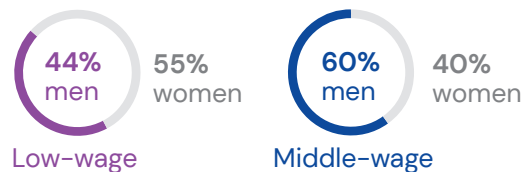
RACE:

A disproportionate number of Forming STARs are from underrepresented groups.

Low-wage **46%** non-white
Middle-wage **43%** non-white

EDUCATION:

While more than half of low-wage Forming STARs have no formal education beyond high school, more than half of middle-wage Forming STARs have some formal education.

Have no formal education beyond high school:

55% Low-wage   **44%** Middle-wage
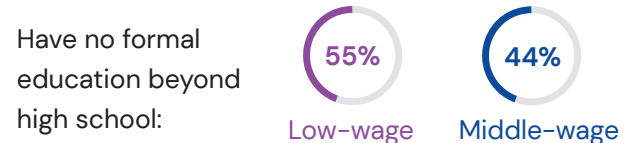
Geography — Forming STARs make up **more than a fifth** of the population in 40 states in the U.S.

(see our Appendix B for more details about the demographics of Forming STARs)

Milena Perryman

Milena Perryman got married a few months out of high school and started a family right away. With a new baby, she didn't have the time or money to get her bachelor's degree, so instead she took a job as a clerical worker.

Milena was eager to learn, and constantly looked for ways to build her skills. But without a degree, she was denied advancement opportunities, forcing her to move from company to company to grow her career. Over 13 years, she gained experience and expertise in HR and accounting departments, growing more familiar with key office management programs, as well as strengthening her communication and critical thinking skills and building her process expertise. She also expanded her knowledge outside the office, often reading technical literature that helped in her current role and gave her a better understanding of possible career paths.

Working in H.R. departments, Milena learned that small companies were less likely to use software that screens applicants based on college degree requirements. She became adept at demonstrating her abilities and finding jobs that leveraged her experience. Today, Milena is pursuing the licensure requirements to become a mortician. It's a three-year program, which she will complete while continuing to work in office administration.

Like so many Rising STARs, Milena created a career without a degree in spite of obstacles. Still, over the years, she's lost out on opportunities and income. Without unnecessary pedigree barriers, and with a little training, Milena's ingenuity, grit and talent could better benefit both her family and our workforce.

Years of Work Experience:
13 years

Location:
Chicago, IL

Current Role:
Office Administrator

Previous Role:
Clerical Worker

Core Skills:
Mathematics

Active Listening

Reading Comprehension

Critical Thinking

Speaking

Time Management

Expanding Access to Apprenticeships

Apprenticeship programs are remarkably effective as pathways to permanent employment; the Department of Labor reports that nine in ten apprentices are employed upon completion of their apprenticeships. By combining hands-on training and work experience, they allow workers to learn and earn as they build valuable workplace-specific skills. This is good news for the roughly one million people who are participating in some type of apprenticeship program in the U.S. this year. While that number is significantly less than the 20 million people enrolled in colleges and universities, the Department of Labor reports steady growth in the number of apprentices across a range of industries nationwide.

Most apprenticeships are still in skilled trades, such as plumbing and carpentry, but more than 700 programs created in the past two years were in newer fields, such as financial services, information technology and health care. **IBM** is collaborating with **The Consumer Technology Association** to share learnings from its "new collar" apprenticeship, which hires apprentices for roles including software engineer, cybersecurity analyst, junior data scientist and hardware design technician. Instead of degrees, IBM looks for competencies in adaptability, communication, client focus, problem solving and teamwork. By bringing this program to its member companies nationwide, CTA's stated goal is to open pathways to "new-collar" jobs in communities across the country, not just in traditional tech hubs.

In another effort to expand apprenticeships, Accenture and Aon created the *Chicago Apprentice Network*. Both companies started their own programs to increase the diversity of their hiring pipeline and create local employment opportunities. They began with a handful of apprentices and grew programs across their businesses, focusing on departments such as insurance, human resources, cybersecurity and data analytics. The Network seeks to replicate these models in other businesses in Chicago and nationally by sharing best practices and creating opportunities for employers and apprentices to connect. They have developed an employer playbook and organized trainings, workshops and networking events. The Network has connected close to 500 apprentices to 25 companies across Chicago and aims to grow the program to 1,000 apprenticeship opportunities in Chicago this year.

Research supports that scaling apprenticeships across industries, both regionally and nationally, would create a reliable pipeline of talent for employers and support upward mobility for millions of Forming and Rising STARs.[25]

Tino Lei'a

In high school, Tino Lei'a slept on friends' couches after his mother lost her job and they lost their home. Still, he was the first person in his family to get a high school diploma. He enrolled in community college, but balancing both school and a job, he was not able to finish his degree. He knew his career prospects were bleak. Tino's trajectory changed when his cousin introduced him to Year Up, a nonprofit that helps disadvantaged youth develop professional skills with a six-month business bootcamp and subsequent internship placement.

Year Up is a demanding program, and Tino struggled at first with things like making it to class on time and speaking up in formal settings. But over time, he gained self-discipline and confidence. Year Up recognized that Tino's affinity for computers made him a natural fit for the technology industry, and the program helped him get a quality assurance internship with the software company Workday. Having been successful in that role, he was hired as a contractor and, eventually, an employee. Today, Tino is, as he puts it, "financially self-supporting — and then some." He trains Workday teammates and volunteers as a mentor for people with similar backgrounds who are hoping to break into tech.

Tino's career journey went from being a Forming STAR when he enrolled in Year Up to a Rising STAR when he was employed as a contractor at Workday. In his current full-time roll, he is now considered a Shining STAR, and is working to help others follow a similar path.

> "I've also come to realize that it doesn't matter where I come from. What matters is the work that I do."

Tino Lei'a, "My Journey from Couch-Surfing Kid to Tech Engineer, Entrepreneur, January 26, 2018.)

Years of Work Experience:
5 years

Location:
San Francisco, CA

Current Role:
QA Engineer

Previous Role:
Camp Counselor

Core Skills:
Quality Assurance

Software Devewlopment

Critical Thinking

Reading Comprehension

Judgement and Decision Making

Systems Analysis Active Listening

Implications of STARs Trajectories: Each segment requires a different response

The demographic data about STARs shares a similar story to other work in the field. There are a disproportionate number of white, male workers in the Shining STAR segment, and a disproportionate share of women from underrepresented racial categories in the low-wage Forming STAR segment. These statistics are unsurprising given past research on low-wage work and workers.[26] While the full set of causes for these differences are beyond the scope of this report, it is an area that requires further research, an interdisciplinary understanding, and cross-sector action if we hope to support all STARs in realizing upward mobility and the potential to contribute to our economy.

First, there is much to learn from Shining STARs. By understanding their career pathways, these STARs shine a light for others on how to break through barriers to success. Through a systematic study of the challenges Shining STARs face, we can learn about which barriers must be removed to ensure STARs reach their potential. Importantly, we must also understand the ongoing support they need,

as many Shining STARs continue to face barriers to realizing their full potential.

Millions of Rising STARs are well positioned for middle- and high-wage roles if employers deliberately recruit from this segment and remove barriers to these opportunities. Individuals in this group exhibit many of the foundational behavioral skills required for most of today's tech-enabled roles, such as active listening, coordination and social perceptiveness. Employers should better understand these workers who have such valuable skills for the labor market, learn from their qualities and pathways and proactively expand and diversify alternative routes to high-value, in-demand jobs for prospective Shining STARs.

Finally, much of the workforce field is focused on Forming STARs. We must invest in and strengthen alternative routes for these STARs. Based on Accenture analysis, 38% of the low-wage occupations Forming STARs hold are at high risk of job displacement by automation in the coming years, compared to less than 1% of the jobs of Shining STARs. Providing critical information to and investing in this group can ensure that those Forming STARs seeking opportunity to transition will be able to do so.

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Further research, interdisciplinary understanding, and cross sector action are needed to realize a labor market that values the potential contributions of all workers.

Conclusion

STARs face an opportunity gap in today's broken labor market.

How can a widespread "war for talent" co-exist with stagnant wages and perceived under-utilization of the talent of so many workers? Job mobility in our economy is far less than what it should be in an efficient labor market, with 16 million STARs positioned for high wage work but only 5 million STARs in those positions. Why aren't they making these transitions? And, perhaps more surprisingly, given the competition for workers, why aren't employers tapping this pool of talent?

The reasons are myriad. They include global market forces such as industry consolidation, de-unionization, technology advances and geographic concentrations of industries and professions.[27] Employer behavior plays a role as well, as hiring practices become more routinized through technology, educational expectations shift[28] and credential expectations increase.[29,30] Workers also face broad structural barriers to upward mobility characterized by lack of access to jobs because of inequities in many areas from education to housing to social networks.[31] In short,

an opportunity gap prevents them from translating their learning to earning.

All of these dynamics are important to consider as this baseline analysis of STARs skills, wages, occupations, and demographics provides a platform for further research and deeper insights.

This initial work on the STARs talent pool demonstrates that we are early in the journey to recognize and realize the potential of these workers. While many promising efforts across the workforce ecosystem touch the STARs population, we need to learn faster and expand our focus – e.g., from the effectiveness of training programs to the impact of employer practices. Many institutions can make a difference. We outline implications and calls to action for employers of all sizes, for the largest companies, for workforce organizations, and for analysts. As we learn together, share success stories, and improve our strategies, we will collectively evolve these actions to be more specific, measurable and policy-oriented in the next few years.

LinkedIn Analytics: STARs Have Less Social Capital

LinkedIn research shows that the strength of your network influences your access to opportunity: Applicants who are referred to a job by a current employee are more likely to get hired. LinkedIn collaborated with Opportunity@Work to understand the skills, networks and career pathways of STARs on their site.[32] They find degree holders are 3 times more likely to have a strong network* than STARs. This network gap puts non-degree holders at a significant disadvantage in securing job opportunities.

3x
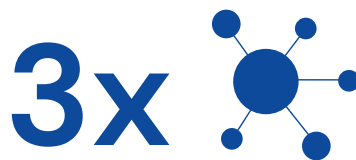
Degree holders are 3 times more likely to have a **strong network** than non-degree holders in the USA

*A strong network is defined in relative terms. In this study, someone with a strong network is someone who has a network strength score in the top 20% among U.S. members.

Linked**in**

Calls to Action

We must expand our focus from thousands to millions of workers.

Employers (Hiring and HR Teams)

Given the findings of this report, it is clear that employers can tap into this significant talent pool to meet their business needs. This requires that executives, senior leadership, hiring managers and recruiters shift to skills–based hiring and talent development practices and enable, support and encourage one another in doing so. There are several immediate actions employers can take to break down barriers, source and develop STARs talent:

• **Break down barriers:** For roles without regulatory requirements and highly specific skills (e.g., doctors), end four–year degree requirements that prevent your company from seeing STARs.

• **Source STARs talent, on purpose:** Just as they choose which campuses from which to recruit, employers must decide which alternative routes are best to find the STARs talent they need.

• **Invest in your own STARs:** Identify currently employed STARs; invest, train and ensure upward career pathways are available to them; and share their stories.

Over time, companies must expand their practices by developing metrics and systems to institutionalize these changes. Further, they must promote a culture of belonging and respect for STARs. Ultimately, these efforts will lead to companies fulfilling their talent needs faster, to more inclusive businesses with broader and deeper talent pools and to more STARs in higher wage roles.

Companies that Shape the Workforce Ecosystem

Large companies and industry networks seeking to take an active role in shaping the broader workforce ecosystem on behalf of STARs talent can take several actions to support STARs at scale:

• **Engage ecosystems and supplier networks to hire and develop STARs:** The networks of large companies include businesses of all sizes with talent needs across the country. Companies must develop incentives, messaging and playbooks to invite smaller businesses in their supply chain to hire more STARs.

• **Invest in developing or enhancing products and services for STARs:** From job search to candidate assessment and applicant tracking systems to talent management and human resources information systems, there are numerous ways to ensure the skills of STARs are visible and better understood.

• **Inform state—and national policy:** Policymakers and companies can shape a collective agenda across many topics, including through the creation of more training and education funding models that support working adults, through incentives to train incumbent workers, and through an increase in career services to support STARs across their lifetime.

Workforce development leaders

Workforce development leaders are laying the foundation for a productive dialogue with the business community on this subject. By coordinating efforts around a well–defined population, narrative and goal, the workforce development community can collectively multiply its efforts to meet the scale of the challenge. The workforce community can:

• Adopt the STARs terminology and narrative to support the shift in corporate practices and to attract the resources to this movement.

- Continue designing and building training programs targeting STARs based on their segment: Ensure that STARs have access to training programs with transparent outcomes and track key metrics (including STARs' application, enrollment and graduation rates from programs).

- Define a collective, STARs-focused call to action that establishes specific targets for wage gain and/or number of jobs opened to STARS in the coming decade.

Academic Research, Analyst and Policymaking Community

The study of skills in the workforce is still in its infancy and we have much to learn. To advance a collective research agenda on STARs, we need better data on who these workers are, their skills, career paths and transitions, as well as better occupational data on viable pathways, market data on job trends and much more. This improved data on STARs would inform stronger workforce planning at companies, investment decisions among training providers and policymaking at national and local levels. Analysts can:

- Engage public statistical agencies to expand and standardize critical data on the STARs population.

- Pursue cross-sector research collaborations to access additional data sets and answer key questions about STARs.

* * *

Our understanding as a field about the skills of U.S. workers without a bachelor's degree is still limited, so we don't have the full picture of the value this population brings to the workforce. These workers are also often defined by what they lack (e.g., "non-BA" or "sub-baccalaureate"), instead of what they have to offer (e.g., real skills developed through work experience).

This report rejects that limited frame of reference, defines STARs and introduces a methodology to identify and measure the gap between current wages and higher-paid roles for which STARs have both the skills and potential to succeed. Through this foundational research, it is our hope to inform and ultimately improve the practices and policies throughout the U.S. labor market that currently limit STARs from working, learning and earning to their full potential.

✳

We all have a responsibility to support STARs to work, learn and earn to their full potential.

Appendix A: Technical Appendix

We used several public datasets for this analysis to ensure that it could be replicated by other researchers. We share our methodology in detail here.[33]

Figure 1. illustrates the five stages of our approach. In the first two stages, we gathered data on the target population, their jobs and their wages using the Current Population Survey (CPS), and the O*NET from the Department of Labor. Next, we used each worker's current occupation to infer their skills (we thereby assumed a certain mastery and readiness based on their current role). We then calculated the distance score between a worker's origin occupation and potential destination occupation to understand potential transition opportunities. We set some criteria for these transitions. Finally, we quantified the STARs population and defined their segments based on their transition opportunities. We also analyzed each segment based on geography, industry and other demographics. We elaborate on each stage below.

FIGURE A.1: VISUAL SUMMARY OF OUR METHODOLOGY

1– DEFINE TARGET STUDY POPULATION

We first define our **Target Study Population** (TSP) as individuals with less than a Bachelor's Degree. This population totals around 124 millions persons.

2– DEFINE INCOME GROUPS

We then define **income groups** for the employed TSP, using their occupation's hourly median wages for their state and age group.

3– STUDY TRANSITION OPPORTUNITIES

We infer worker skills from their occupation and look for roles that require similar skills, that can be transitioned to a higher income occupation.

4– DEFINE STAR WORKER SEGMENTS

We use transition opportunities and income groups to quantify STARs and segment the population.

5– ANALYZE SEGMENTS

We study each segments biggest skill gaps, composition, most common occupations, demographics, and geographical distribution.

Stage 1. Define the Target Study Population (TSP)

Our analysis began by understanding the educational attainment of the population. We focused on adults above the age of 25 without a bachelor's degree. This population includes 121 million individuals. We also included 4 million Opportunity Youth, defined as individuals between the ages of 16 to 24 who neither work nor attend high school or college. We then excluded individuals — including within the Opportunity Youth population — without a high school diploma or the equivalent certificate.[34]

Because we are interested in possible occupational transitions, we further refined the population in analysis to those without a college degree who are active in the workforce. This reduced our study population to 73 million. A small number of this sample is active in the workforce but not currently employed or did not have occupational data available in the Current Population Survey (CPS). In addition, we do not have occupational data about Opportunity Youth, but given the significant investment in ensuring this population acquires skills for meaningful career pathways, we include them in our estimate. This further refined our sample to 68 million employed individuals. This is the population on which we focused our analysis.

Stage 2. Define Income Groups

With our population defined, we split it into three groups using the wages associated with individuals' current occupations. Median hourly wages were localized based on state, age and occupation and used to break the active target study population into three groups. Specifically, we used the state level median wage to define the income thresholds (low, mid, high). Then we calculated the median wages for each occupation, state and age group (16–24, 24–34, 35–44, 45–54, 55–64, 65+), and compared it with the state median wage to assign the workers in each group accordingly:

- **Low-wage:** those in an occupation with median hourly wage (for that state and age cohort) below than the state median wage. As a reference, the national median approximately $37,500/year, with a substantial degree of state-level variation (e.g., Mississippi $32,000/year, Colorado $42,000/year).

- **Middle-wage:** those in an occupation with median hourly wage above the state median wage and below two times that measure. On average, this includes all occupations where the worker earns between $37,500 and $77,000. We use two times the median wage as a simple cut point between middle- and high-wages.[35]

- **High-wage:** those in an occupation with median hourly wage above than two times the state median wage. On average, this includes workers in occupations that earn above a $77,000/year threshold.[36]

Stage 3. Study Transition Opportunities

Our goal was to ascertain a worker's skills, not their educational attainment, current role or hourly wage, to understand whether — given their skills — each worker could improve their wages through a transition from their current occupation to a destination occupation with a similar skills profile but with a higher income.

Since we were not able to directly observe skills, the methodology we devised was to proxy individual skills through their declared occupation in the CPS sample and match it with the O*NET skill requirements for that role.[37] Note that the matching

was done between CPS OCC codes and O*NET SOC codes. O*NET provides skills for occupations at an 8-digit level, while the CPS OCC Codes are at a 6-digit SOC code level. We first took the 6-digit skill averages from the O*NET Skill database. We then matched those averages with the CPS Codes. Most of the occupations matched at the 6-digit level (65%), but we leveraged 5-digit (23%) and 4-digit (12%) averages for the ones that didn't match at the 6-digit level.

Then, based on the skills of the current occupation, we calculated the Euclidean distance between the current occupation (the origin occupation) and all other potential occupations (the destination occupations).

FIGURE A.2: TRANSITION OPPORTUNITIES METHODOLOGY

INDIVIDUAL OCCUPPATION (CPS-OCC) + OCCUPATION REQUIRES SKILLS (O*NET-SOC)

INFERRED SKILLS OF INDIVIDUAL

We infer the Target Study Population skills by gathering occupation data from CPS and skills data from the O*NET database

We also gather data on the skills required of all other occupations

We then estimate the skill gap between each occupation using the Euclidian distance of the skill vector

In addition to measuring the Euclidean distance skill gap, we add other important criteria: e.g. we discard potential transitions that don't happen in practice using CPS transitions data

Finally, we use the potential transitions and the resulting incomes to define the STAR Segments

Once the destination occupations were calculated, we defined several rules to evaluate if such a destination occupation should qualify as a potential transition from the origin occupation. If the occupation met each of these transition rules, we surmised that the individual could move to this occupation. If not, we assumed the transition was not possible. The order of operations of the rules we used are illustrated in Figure 3:
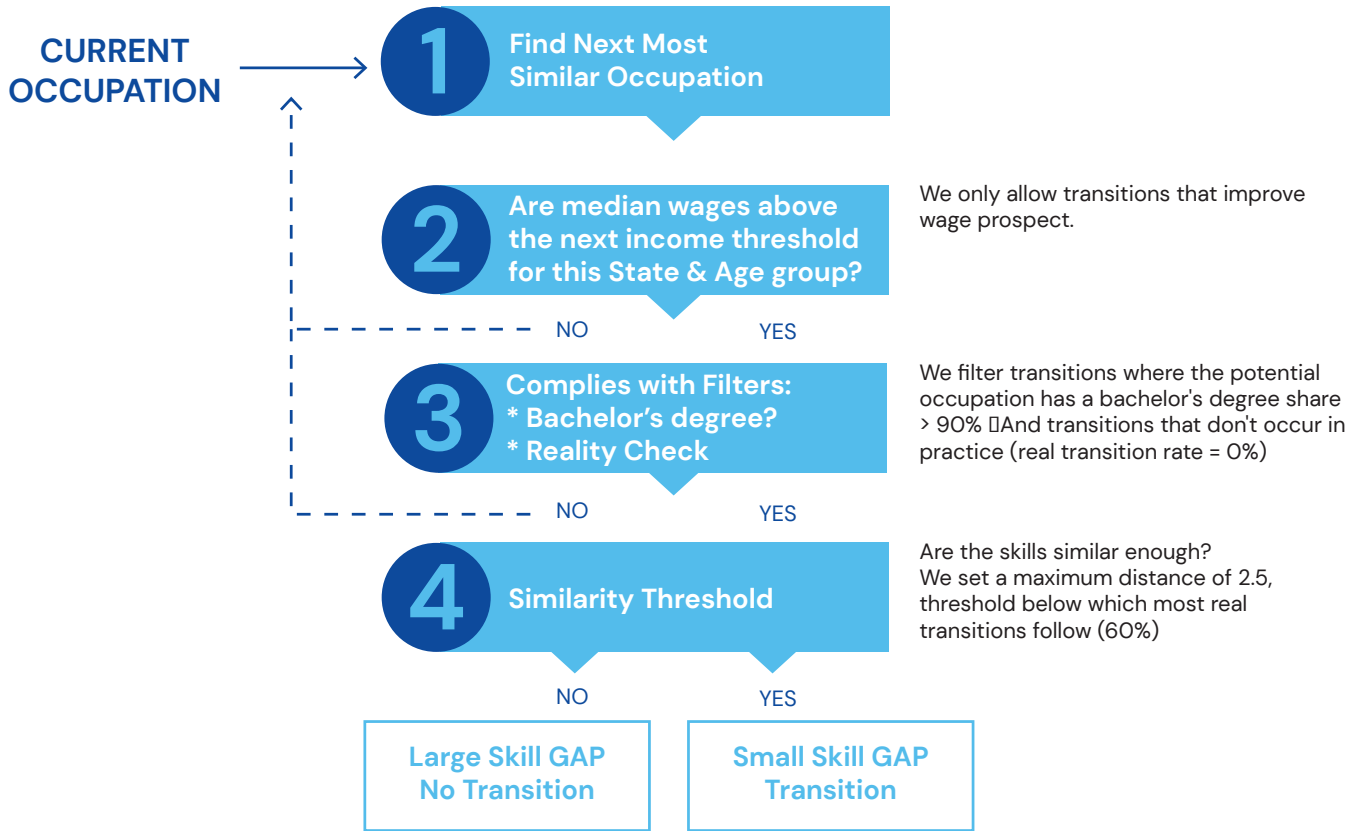
- **Wage increase:** The destination occupation had to have a higher wage than the origin occupation. First, we sought to understand if a destination occupation was in the next wage category, i.e. from low- to middle- or high-wage, or from middle- to high-wage. If a destination occupation did not exist in the next wage category, we sought to understand if there was a different destination occupation within the income segment.

- **Barriers to entry:** The destination occupation was excluded if more than 90% of individuals within it have a college degree. This was to rule out transitions into roles where professional degrees are necessary (e.g., doctors). We used the CPS microdata to build the college degree shares, but we also tried O*NET reported degree requirements, finding no significant differences in our results.

- **Reality check:** There had to be proof that this transition has occurred in the labor market. We studied transitions in year-to-year CPS data to ensure that at least some individuals made a transition between our defined origin and destination occupation. To assess the transitions, we compared the current and previous year occupations for each individual, as declared in the CPS's Annual Social and Economic Supplement (ASEC) during the last 5 years. We then ruled out any predicted transitions that had zero cases. Thus, if the transition did not occur in reality, it was excluded as a predicted transition in our own dataset. We also tried to use the monthly CPS transitions, matching the occupation reported by the same individuals with a one-year difference for the last five years, however, the low retention rate of the sample made us prefer the ASEC approach.

- **Skill gap:** Occupation similarity had to be below a selected distance threshold: if the closest predicted destination occupation was too far away, the transition was not considered valid. Threshold selection was empirically based to represent the distance below which most real transitions occur. The 2.5 threshold which we used, encompasses 70% of all year-to-year CPS real transitions. Real transitions were taken from the ASEC current versus previous year occupations, as in the reality check step, and then matched with the Euclidean distances to build the transition/distance density.

FIGURE A.3: DETAILED TRANSITION RULES ALGORITHM

CURRENT OCCUPATION →

1 Find Next Most Similar Occupation

2 Are median wages above the next income threshold for this State & Age group?

We only allow transitions that improve wage prospect.

NO — YES

3 Complies with Filters:
* Bachelor's degree?
* Reality Check

We filter transitions where the potential occupation has a bachelor's degree share > 90% ⬜And transitions that don't occur in practice (real transition rate = 0%)

NO — YES

4 Similarity Threshold

Are the skills similar enough? We set a maximum distance of 2.5, threshold below which most real transitions follow (60%)

NO — YES

Large Skill GAP No Transition | **Small Skill GAP Transition**

We measured the skill differences between occupations by calculating the Euclidean distance. We took the O*NET skill importance vector for each occupation, added the squared differences between them and built a square distance matrix. This method allowed us to understand absolute magnitudes when measuring skill distances. We considered other measures that are also used in the literature, most prominently the cosine similarity, but because the Euclidean distance allowed us to consider absolute magnitudes, we chose to deploy this method.

FIGURE A.4: EUCLIDEAN DISTANCE MEASUREMENT OF SKILL DIFFERENCES IN OCCUPATIONS

SKILL 1
MATHEMTICS

OCCUPATION 1
Computer Scientists

EUCLIDIAN DISTANCE (d)

OCCUPATION 2
Computer and information
System Managers
MATHS: 2,
PROGRAMMING: 2,

OCCUPATION 3
Computer Programmers
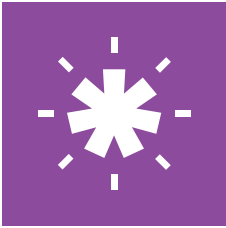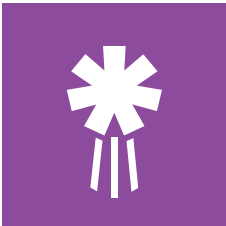**MATHS:** 1,
PROGRAMMING: 1,
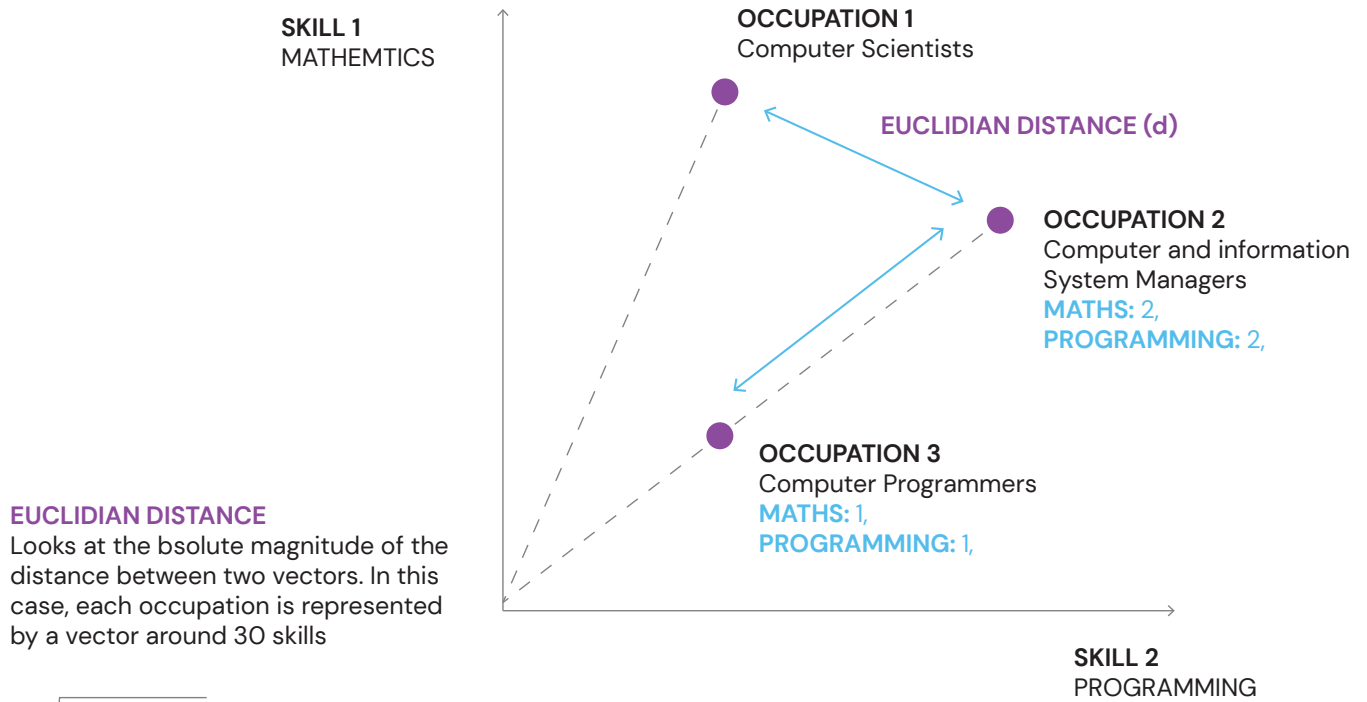
EUCLIDIAN DISTANCE
Looks at the bsolute magnitude of the distance between two vectors. In this case, each occupation is represented by a vector around 30 skills

SKILL 2
PROGRAMMING

$$d = \sqrt{\sum_{i=1}^{\pi} (x_i - y_i)^2}$$

Stage 4. Quantify STARs and Define STAR Segments

Equipped with the income groups definition and the potential transitions, we could quantify the workers in the target study population who transitioned to destination occupations with higher wages, at a total of 68 million individuals. In addition, we were able to segment the 68 million in the four categories below based on a worker's ability to move between income groups, based on the guidelines outlined in Figure A.5 below.

FIGURE A.5: DEFINITIONS OF STAR SEGMENTS

STAR	SEGMENT	CONCEPTUAL DEFINITION
SHINING STARS	Workers without a four-year degree who are in high-wage roles today	Target Study Population (TSP) **already working in high-wage** occupations (above two median wages)
RISING STARS	Workers without a four-year degree who have skillsets to transition to high- or middle-wage work	TSP with **high- or middle-wages after transitions** They are currently in low- or middle-income occupations, but have skills similar to the ones required by high-income roles
FORMING STARS	Workers without a four-year degree in low- or middle-wage roles who have skills to transition to a higher-wage role in their wage category, but not to transition to the next wage group. Includes Opportunity Youth who have finished high school	TSP in **low- or middle-income roles** who do not have skills to transition to the next income threshold but who do have skills to transition to a higher wage. NEETs (Not in Education, Employment, or Training) are also included in this group

STAGE 5. Analyze Segments

Finally, we could better understand important variation in the STARs population through our analysis of the following information:

- The **demographics** and **geographical** distribution of STARs and each STAR segment,

- The most **common occupations** and potential **transitions** available to STARs,

- The **key skill gaps** for STARs to transition to the next segment, by comparing the average importance for each skill in the skill vector between the referenced groups,

- The distribution of **current hourly wages**,

- The **increased wage** potential for each STAR transition,

- The **potential disruption due to automation of the occupation** the STAR occupies using the results of previous Accenture's analysis (found in "It´s learning, just not as we know it," 2018),

- The **growth potential of the occupation**, as measured by BLS 2028 forecasts.

Commentary on Data Sources Used

O*NET

O*NET is the most comprehensive public datasource for occupational information. O*NET provides a periodically updated and standardized content model for each individual occupation (currently 974), assessing topics such as required education, experience, tasks and skills.

For this work, we used mainly occupational skill requirements, taking them as a proxy for the skills possessed by each worker sampled in the Current Population Survey (CPS). We did that by matching each individual's declared occupation with the O*NET skill requirements for that role.

O*NET skill requirements measure the importance (0–5) of 35 basic and cross-functional skills, in areas such as content, process, social, complex problem solving, technical, system and resource management skills.

Current Population Survey (CPS)

The CPS is a monthly household survey providing one of the most important sources for labor force economic and social statistics. It is conducted by the US Census Bureau for the Bureau of Labor Statistics (BLS). Along with O*NET, this is the main source of data for our study.

We use the CPS first to quantify what we called our Target Study Population, people without a bachelor´s degree and Opportunity Youth and second, to model with CPS and O*NET data so that we could identify and classify STARs.

The CPS also allowed us to explore critical issues like real year–to–year transitions across different occupations, compare them with our predicted transitions (based on skill similarity), get demographic and geographic distribution insights and build median hourly wages (we use the Annual Social and Economic supplement (ASEC)).

Other sources for this kind of data also exist, the American Community Survey (ACS) being one of the most common in similar studies. We cross checked some of our results with the ACS, arriving at similar values. The ACS has better geographical coverage, providing a bigger sample, but has a lower sampling frequency (1, 3 or 5 years) and does not provide information about occupational transitions, which was critical information for our study. Thus, we focused on using the CPS for our purposes.

Appendix B: STARs Demographics

Shining STARs: DEMOGRAPHICS

We share demographic information about the age, race, gender and educational attainment of the Shining STARs segment on this page.
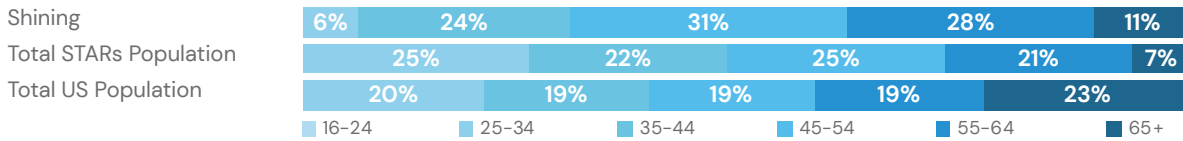
Distribution By Age Range

Shining	6%	24%	31%	28%	11%
Total STARs Population	25%	22%	25%	21%	7%
Total US Population	20%	19%	19%	19%	23%

Legend: 16–24 · 25–34 · 35–44 · 45–54 · 55–64 · 65+

Distribution By Gender

Shining	69%	31%
Total STARs Population	54%	46%
Total US Population	48%	52%

Legend: Males · Females

Distribution By Race

Shining	77%	8%	3%	10%
Total STARs Population	63%	13%	4%	17%
Total US Population	65%	12%	6%	15%

Legend: White · Black · American Indian · Asian · Hispanic · Other

Educational Attainment

Shining	33%	35%	32%		
Total STARs Population	48%	30%	22%		
Total US Population	10%	29%	16%	10%	35%

Legend: Incomplete high school · high school · bachelor or more · some college but no degree · associate´s degree

Distribution across Geography

While they are distributed across the country, they are most likely to be found in several midwest states.
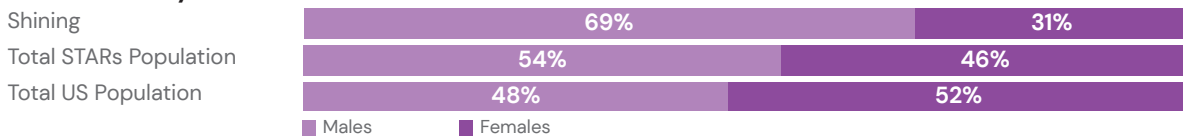

Share (%): 5.0% · 4.0% · 3.0% · 2.0% · 1.0%

Rising STARs: DEMOGRAPHICS

We share demographic information about the age, race, gender and educational attainment of the Rising STARs segment on this page.
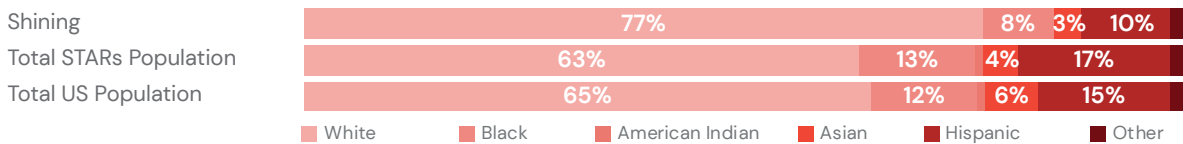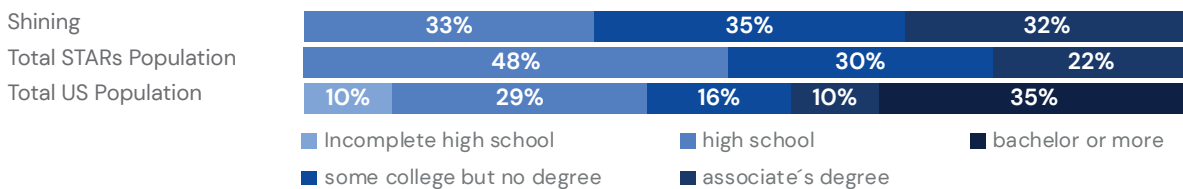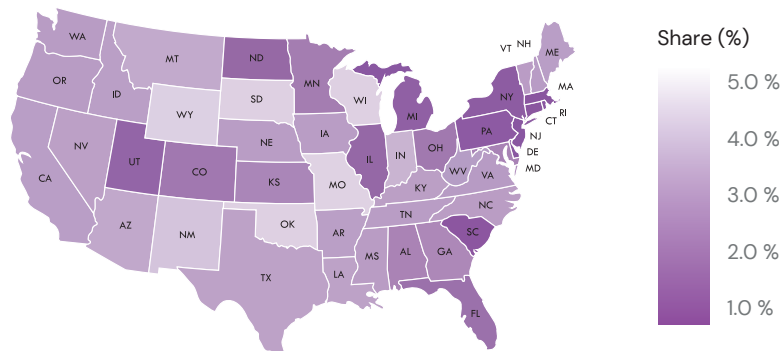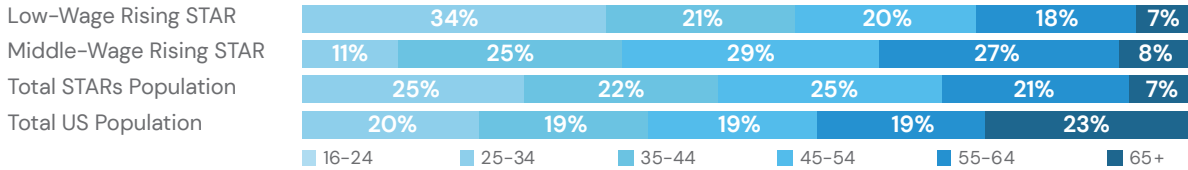
Distribution By Age Range

	16-24	25-34	35-44	45-54	55-64	65+
Low-Wage Rising STAR	34%	21%	20%	18%	7%	
Middle-Wage Rising STAR	11%	25%	29%	27%	8%	
Total STARs Population	25%	22%	25%	21%	7%	
Total US Population	20%	19%	19%	19%	23%	

■ 16-24 ■ 25-34 ■ 35-44 ■ 45-54 ■ 55-64 ■ 65+

Distribution By Gender

	Males	Females
Low-Wage Rising STAR	51%	49%
Middle-Wage Rising STAR	57%	43%
Total STARs Population	54%	46%
Total US Population	48%	52%

■ Males ■ Females

Distribution By Race

	White	Black	American Indian	Asian	Hispanic	Other
Low-Wage Rising STAR	66%	12%		3%	16%	
Middle-Wage Rising STAR	70%	11%		3%	14%	
Total STARs Population	63%	13%		4%	17%	
Total US Population	65%	12%		6%	15%	

■ White ■ Black ■ American Indian ■ Asian ■ Hispanic ■ Other

Educational Attainment

	Incomplete high school	high school	some college but no degree	associate's degree	bachelor or more
Low-Wage Rising STAR		54%	29%		17%
Middle-Wage Rising STAR		45%	31%		24%
Total STARs Population		48%	30%		22%
Total US Population	10%	29%	16%	10%	35%

■ Incomplete high school ■ high school ■ bachelor or more
■ some college but no degree ■ associate's degree

Distribution across Geography

While they are distributed across the country, they are more than 25% of the population in 10 states.
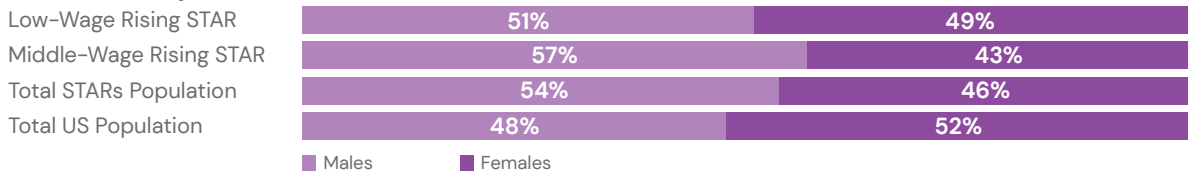

Share (%)
25.0 %
20.0 %
15.0 %
10.0 %

Forming STARs: DEMOGRAPHICS

We share demographic information about the age, race, gender and educational attainment of the Forming STARs segment on this page.
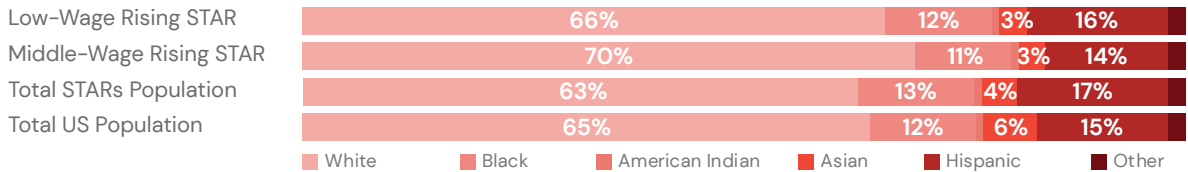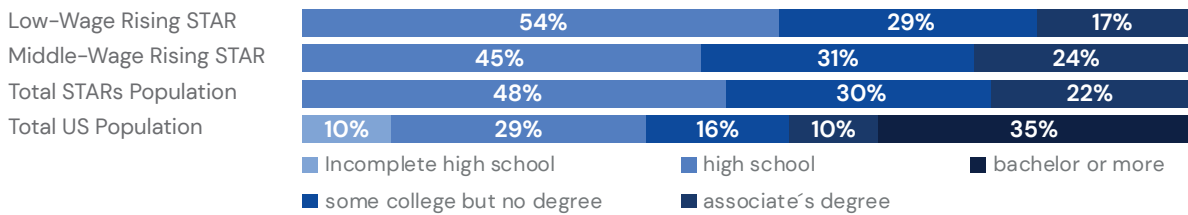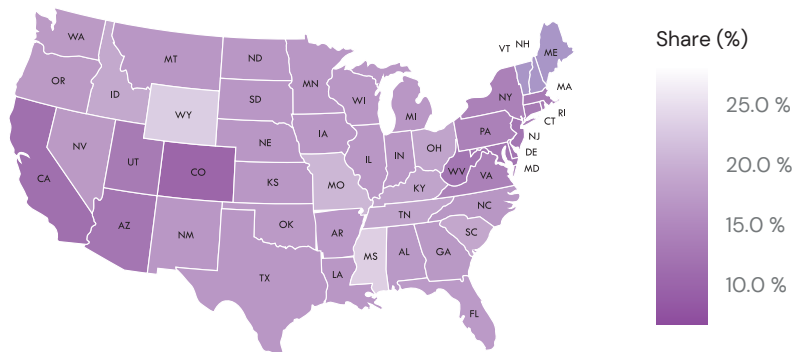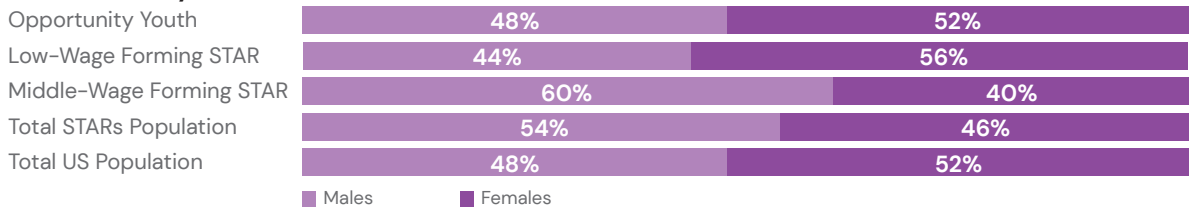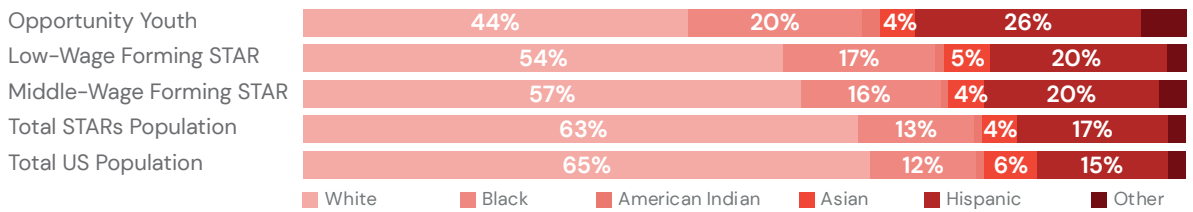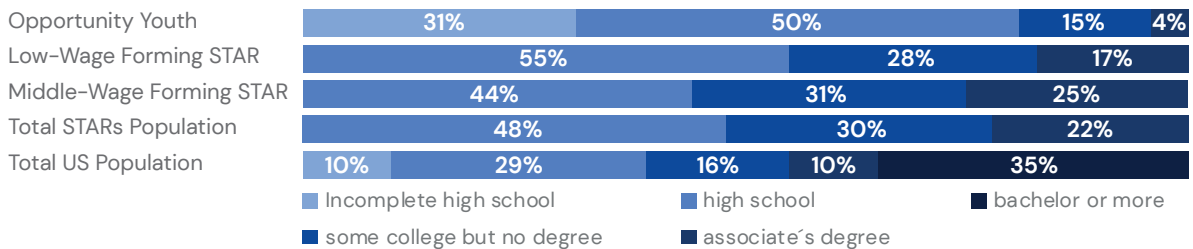
Distribution By Age Range

Opportunity Youth	100%					
Low-Wage Forming STAR	36%	20%	21%	16%	7%	
Middle-Wage Forming STAR	22%	24%	27%	22%	5%	
Total STARs Population	25%	22%	25%	21%	7%	
Total US Population	20%	19%	19%	19%	23%	

■ 16–24 ■ 25–34 ■ 35–44 ■ 45–54 ■ 55–64 ■ 65+

Distribution By Gender

Opportunity Youth	48%	52%
Low-Wage Forming STAR	44%	56%
Middle-Wage Forming STAR	60%	40%
Total STARs Population	54%	46%
Total US Population	48%	52%

■ Males ■ Females

Distribution By Race

Opportunity Youth	44%	20%	4%	26%	
Low-Wage Forming STAR	54%	17%	5%	20%	
Middle-Wage Forming STAR	57%	16%	4%	20%	
Total STARs Population	63%	13%	4%	17%	
Total US Population	65%	12%	6%	15%	

■ White ■ Black ■ American Indian ■ Asian ■ Hispanic ■ Other

Educational Attainment

Opportunity Youth	31%	50%	15%	4%	
Low-Wage Forming STAR	55%	28%	17%		
Middle-Wage Forming STAR	44%	31%	25%		
Total STARs Population	48%	30%	22%		
Total US Population	10%	29%	16%	10%	35%

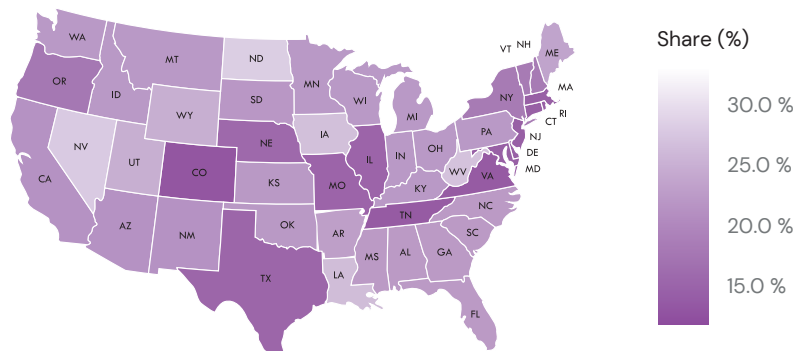■ Incomplete high school ■ high school ■ bachelor or more
■ some college but no degree ■ associate's degree

Distribution across Geography

Forming STARs make up more than a fifth of the population in 40 states in the U.S.

Share (%)

30.0 %
25.0 %
20.0 %
15.0 %

Endnotes

1. Annette LaPrade, Janet Mertens, Tanya Moore,and Amy Wright, "The Enterprise Guide to Closing the Skills Gap: Strategies for Building and Maintaining a Skilled Workforce," IBM Institute for Business Value, 2019. James Manyika, Susan Lund, Michael Chui, Jacques Bughin, Jonathan Woetzel, Parul Batra, Ryan Ko, and Saurabh Sanghvi, "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation," McKinsey Global Institute, 2017.

2. Joseph B. Fuller, Judith Wallenstein, Manjari Raman, Alice de Chalendar, "Future Positive: How Companies can Tap into Employee Optimism to Navigate Tomorrow's Workplace," 2019.

3. "It's Learning. Just Not as We Know It: How to Accelerate Skills Acquisition in the Age of Intelligent Technologies," Accenture, September 2018.

4. "The State of American Jobs: How the shifting economic landscape is reshaping work and society and affecting the way people think about the skills and training they need to get ahead," Pew Research Center, October, 2016.

5. David Autor, "Skills, Education, and the Rise of Earnings Inequality among the Other 99 Percent," Science, May 23 2014: Vol. 344, Issue 6186, pp. 843–851. David Autor, "Work of the Past, Work of the Future," AEA Papers and Proceedings 2019, 109: 1–32.

6. Carnevale et al find that the share of "good jobs" (defined as jobs that pay $35,000 for those under the age of 45 and those that pay $45,000 for workers over the age of 45) has declined from 60 percent to 45 percent since 1991. Anthony P. Carnevale, Jeff Strohl, Ban Cheah, and Neil Ridley, "Good Jobs That Pay without a BA," Georgetown University Center on Education and the Workforce, 2017. Other sources: Chad Sherer and Isha Shah, "Opportunity Industries, Exploring the Industries that Concentrate Good and Promising Jobs in Metropolitan America," 2018. And, Bureau of Labor Statistics, U.S. Department of Labor, "Occupations typically requiring high school for entry lost 1.3 million jobs", The Economics Daily, May 2007–16 on the Internet at https://www.bls.gov/opub/ted/2017/occupations-typically-requiring-high-school-for-entry-lost-1-3-million-jobs-may-2007-16.htm (visited March 04, 2020).

7. Congressional Research Service, "Real Wage Trends 1979 to 2018," July 2019. Raj Chetty, David Grusky, Nathaniel Hendren, Maximilian Hell, Robert Manduca, and Jimmy Narang, "The Fading American Dream: Trends in Absolute Income Mobility Since 1940," Science, 2017.

8. Skilled Through Alternative Routes Consumer Interviews, Tempo Consulting, October 2019.

9. We also include 3 million Opportunity Youth who have a high school diploma in our definition. While the focus of this study is on the pool of workers without a BA degree who have a high school degree or equivalent, further study of the population of workers without a high school diploma is needed to shed light on the skills that population brings to the workforce.

10. This analysis for this study of work experience as a job market signal is detailed in Peter Blair, Tomas Castagnino, Erica Groshen, Papia Debroy, Byron Auguste, Shad Ahmed, Fernando Garcia Diaz, Cristian Foschiatti, "Searching for STARs: Work Experience as a Job Market Signal for Workers without Bachelor's degrees," National Bureau of Economic Research Working Papers, March 2020.

11. "The State of American Jobs," Pew Research Center, 2016.

12. "Strada–Gallup Education Consumer Insights," Education Consumer Survey, 2018.

13. We detail the methods for our study in the technical appendix.

14. We defined wage categories to be low if the occupation average was below the median wage in the state (on average, this value is $37,500), to be middle-wage if the occupation average was between the median and twice the median (on average, $37,500 –$77,000), and high-wage if the occupation earns more than twice the median wage (on average, $77,000). See our technical appendix for more detail.

15. We looked at the 23 major job groups defined by the Bureau of Labor Statistics.

16. The Technical Appendix discusses in detail the transitions we predict based on skills similarities across occupations.

17. Anthony P. Carnevale, Jeff Strohl, Artem Gulish, "College Is Just The Beginning: Employers' Role in the 1.1 Trillion Post Secondary Education and Training System," Center on Education and the Workforce, 2015.

18. O*NET, "O*NET Occupation Database," February 2020.

19. This number varies across geographies; in our analysis we calculate the STARs wages based on localized estimates. Given the average of median wages across the country, a high wage is considered to be above $77,000.

20. We define a significant wage gain as an increase of at least 50% over current earnings.

21. "Certified Value: When do Adults without Degrees Benefit from Earning Certificates and Certifications?" Strada Education Network and Lumina Foundation, 2019.

22. Veronica Buckwalter and Taylor Maag, "Closing the Credit-Non Credit Divide: Bridging the Gap in Post Secondary Education to Expand Opportunity for Low-Wage Working Adults," JFF, 2019.

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24. U.S. Department of Education, National Center for Education Statistics. (2019). Digest of Education Statistics, 2017 (NCES 2018-070), Table 105.50.

25. James Bartlett and Karen Kahn, "Filling Critical Positions and Increasing Workforce Diversity Through Registered Apprenticeships," National Fund for Workforce Solutions, 2019.

26. Marcela Escobari, Ian Seyal, and Michael Meany, "Realism about Reskilling," Workforce of the Future Initiative, Brookings Institution, November 2019. Marth Ross and Nicole Bateman, "Meet the Low Wage Workforce," Brookings institution, November 2019. Fay Hanleybrown, Lakshmi Iyer, Josh Kirschenbaum, Sandra Medrano, and Aaron Mihaly, "Advancing Frontline Employees of Color Innovating for Competitive Advantage in America's Frontline Workforce," FSG, 2020.

27. José Azar, Ioana Marinescu, and Marshall I. Steinbaum, "Labor Market Concentration," NBER Working Paper No. 24147, 2019. Lawrence Mishel, "Unions, Inequality, and Faltering Middle-Class Wages," Economic Policy Institute, 2012. Daron Acemoglu and Pascual Restrepo, "Artificial Intelligence, Automation and Work," NBER Working Paper No. 24196, 2018.

28. Kyle Fee, Keith Wardrip and Lisa Nelson, "Opportunity Occupations Revisited, Exploring Employment for Sub-Baccalaureate Workers Across Metro Areas and Over Time," Federal Reserve Bank of Philadelphia, Federal Reserve Bank of Cleveland, 2019.

29. Joseph B. Fuller and Manjari Raman, "Dismissed by Degrees: How Degree Inflation is Undermining U.S. Competitiveness and Hurting America's Middle Class," 2017.

30. "Moving the Goalposts: How Demand for a Bachelor's Degree Is Reshaping the Workforce," Burning Glass Technologies, 2014.

31. Raj Chetty, "The Fading American Dream: Trends in Absolute Income Mobility Since 1940," Science, April 28, 2017: Vol. 356, Issue 6336, pp. 398-40.

32. Meg Garlinghouse, "Closing the Network Gap" LinkedIn Official Blog, September 26, 2019.

33. We publish our methods in more detail in the following paper: "Peter Blair, Tomas Castagnino, Erica Groshen, Papia Debroy, Byron Auguste, Shad Ahmed, Fernando Garcia Diaz, Cristian Foschiatti, "Searching for STARs: Work Experience as a Job Market Signal for Workers without Bachelor's degrees," National Bureau of Economic Research Working Papers, March 2020.

34. Institutionalized people are not included in our analysis. Our main source, the CPS, does not include institutional group quarters such as correctional or juvenile facilities, or mental hospitals.

35. At a national level, wages above two times the median represent approximately the highest 20%. Pew Research Center uses a similar upper limit to define the American "middle class." (https://www.pewresearch.org/topics/middle-class/) Specifically, they define "middle-income" Americans are adults whose annual household income is two-thirds to double the national median, after incomes have been adjusted for household size.

36. Pew Research Center uses a similar range to define the American "middle class".

37. Martin Fleming, Wyatt Clarke, Subhro Das, Phai Phongthiengtham, and Prabhat Reddy, "The Future of Work: How New Technologies Are Transforming Tasks, " 2019 MIT-IBM Watson AI Lab.

About Opportunity@Work

Opportunity@Work is a nonprofit social enterprise with a mission to increase career opportunities for the 71 million adults in the U.S. who do not have a four-year college degree but are Skilled Through Alternative Routes (STARs). For STARs, the American Dream has been fading due in part to an "opportunity gap," in which access to the good jobs required for upward mobility often depends less on people's skills and more on whether and where they went to college, who they know professionally and socially, or even how they look. We envision a future in which employers hire people based on skills rather than their pedigree. We are uniting companies, workforce development organizations and philanthropists in a movement to restore the American Dream so that every STAR can work, learn and earn to their full potential.

Visit us at www.opportunityatwork.org.

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