

Advancing Women in Manufacturing

Perspectives
from Women
on the Shop Floor



ABOUT THIS REPORT

Careers in manufacturing can provide high earnings and good benefits. After years of decline, the manufacturing industry is growing again. Manufacturing employs one in ten workers in the United States but fewer than a third of workers are women, and women are particularly underrepresented in many higher-earning shop floor positions that typically do not require a four-year college degree. This report draws on responses to the 2022 IWPR Women in Manufacturing Survey, which was specifically designed to capture the experiences of women working on the shop floor. It was conducted in collaboration with the AFL-CIO Industrial Union Council. The report discusses what factors help and hinder women's access to and advancement in manufacturing, including awareness of career opportunities available in manufacturing, access to employment, training and skills development, availability of respectful working environments, and the intersection with caregiving responsibilities. The report highlights changes that are required to help the manufacturing industry build and sustain a skilled workforce that reflects the population of the 21st century.



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INSTITUTE FOR WOMEN'S POLICY RESEARCH

1200 18th Street NW, Suite 301
Washington, DC 20036

www.iwpr.org
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EXECUTIVE SUMMARY

The manufacturing industry employs one in ten workers in the United States. Compared to many other private sector jobs for workers without four-year college degrees, manufacturing jobs pay higher wages and are more likely to provide benefits. Women, including women of color, are underrepresented in manufacturing, particularly in better paying shop floor jobs. Women hold three in ten manufacturing jobs, and just over a quarter of production jobs; however, they are only one in seven of production workers who are paid at least \$1000 per week and hold fewer than one in ten higher-paying skilled shop floor jobs as machinists, welders, or CNC numerical tool programmers and setters.

In the coming decade, the manufacturing industry is poised to grow as the nation invests in infrastructure, clean energy, and strengthening domestic production of strategic energy, vehicle, and semiconductor technologies. Such funds come with an expectation of strong labor standards, workers' rights, and equity and fairness in access to quality jobs. For the industry to fulfill these objectives and be successful in meeting its skills needs, and do so in an equitable manner, it needs to identify and remove the barriers that now keep so many women, particularly women of color and rural women, in lower-paid jobs or out of the industry altogether.

This report draws on the 2022 IWPR Women in Manufacturing Survey and in-depth interviews to help policymakers and labor and industry stakeholders understand what helps and hinders women's equal representation in manufacturing. Among the 424 women who answered the survey, 58.5 percent were union members and 46.7 percent completed or are pursuing an apprenticeship. The sample is not representative of the manufacturing industry, as in 2022 only slightly more than one in ten production workers were union members and apprenticeships have until recently been relatively uncommon in manufacturing. However, the sample is highly relevant to current efforts to revitalize and grow the manufacturing industry by emphasizing "Good Jobs" that promote workers' rights and improve working conditions, and by building apprenticeships as a key component in creating a skilled and diverse workforce.

The report shows that many women are thriving in manufacturing but also highlights practices that need to change for the industry to attract and retain a diverse set of women.

Women Join Manufacturing in Search of Good Family-Supporting Jobs.

- Over two-thirds of respondents report that the opportunities for a stable full-time job (68.9 percent), good benefits (such as healthcare) (68.2 percent), and high earnings (67.9 percent) were "very important" for starting to work in manufacturing.

Outreach and recruitment efforts are failing to reach women.

- Fewer than one in ten respondents learned about manufacturing opportunities from high school counselors (2.1 percent), during their military service (0.7 percent), or at an American Job Center/ Career One stop (9.5 percent).
- Fewer than half (45.1 percent) of respondents say that they are always or frequently treated equally as men in recruitment and hiring, while just one in five (20.4 percent) say this is never or rarely the case.

The majority of respondents, including respondents of color, report largely equitable and harassment-free workplaces, yet for a substantial minority discrimination and harassment are common.

- In important features of employment such as safety, pay, access to overtime and good shifts, lay-off, and work assignments, roughly twice as many respondents report always or frequently being treated equally to men than those who state they are rarely or never treated equally. Respondents are least likely to report equal treatment in leadership development (44.2 percent said always/frequently compared with 26.6 percent who said never/rarely).
- Union members are more likely than non-union members to report always or frequently being treated equally when it comes to pay (73.4 and 58.8 percent, respectively), access to good shifts (68.9 and 54.3 percent, respectively), layoffs (60.0 and 43.0 percent, respectively) and recruitment (49.4 and 39.4 percent, respectively).
- Harassment and discrimination are the norm for a substantial minority of respondents; 16.9 percent report sexual harassment occurring frequently or always, while 17.8 percent of respondents of color report racial harassment and discrimination occurring frequently or always.

Many are happy with training opportunities provided by their employers, particularly respondents with apprenticeship experience.

- Close to nine in ten respondents (87.5 percent) report having received some training from their employer during the last five years, and more than eight in ten (80.9 percent) are very or somewhat happy with their training opportunities.
- Respondents who completed or were in an apprenticeship program were more than twice as likely to say that they are very happy with training opportunities provided by their employer than others (48.7 and 22.5 percent, respectively).
- Apprenticeship programs are more likely to result in worker certification than other types of training, but certification is far from universal. Just over half (54.7 percent) of respondents who completed/are currently apprentices report some form of certification for the training they completed, and only 40.1 percent of other respondents.
- Respondents who are considering leaving the industry are almost three times as likely as others to be not very happy or unhappy with training opportunities provided by their employer (29.0 and 10.7 percent, respectively).

During the last five years, close to half of all respondents have seriously considered leaving the manufacturing industry.

- Whether grouped by age, caregiver or parental status, apprenticeship experience, race and ethnicity, or union membership, at least four in ten respondents have seriously considered leaving the industry during the last five years. Leave intentions are highest for respondents who are Black (60.2 percent), who have caregiving responsibilities (56.5 percent), or who have children under the age of 13 (49.5 percent).
- Lack of respect/ harassment is the most common reason rated as 'very important' by those with leave intentions (40.1 percent), followed by 'wanted to spend more time with my kids' (38.8 percent), and 'lack of prospects for promotions/advancement' (38.6 percent).

- Those who consider leaving are 1.6 times more likely than others to say that they would like to work less overtime (35.7 and 24.9 percent, respectively) and 1.3 times more likely to say that they work overtime every or most weeks (39.1 and 30.6 percent, respectively).

Caregiving responsibilities for children, other loved ones, or both, are the norm for many in manufacturing.

- Almost half of respondents (47.2 percent) have children younger than age 13, and three in ten (30.3 percent) have children younger than six.
- More than a third of respondents (35.7 percent) have caregiving responsibilities for a parent, disabled spouse, disabled child, or close friend.
- Among parents of young children who seriously consider leaving the industry, the most common 'very important' reason is 'lack of advancement and promotion opportunities' (40.1 percent of those who consider leaving), substantially more than 'difficulties with arranging childcare' (31.7 percent). The survey cannot capture the voices of those who never joined or who left manufacturing due to childcare difficulties.
- Of those respondents with young children, one in four (25.0 percent) say their employer provides workplace childcare, and one in nine (11.7 percent) use a workplace childcare center.
- Fifty-six percent of respondents with young children have access to paid family and medical leave, while fewer than half say that their employer provides pregnancy accommodation (49.1 percent) or paid paternity leave (46.1 percent). Although federal law has required since 2010 that employers provide break time and clean places for mothers to pump milk, fewer than half of respondents (46.1 percent) report access to these facilities.

Respondents and interviewees point to policies and practices that helped them, and that can help the industry to build a more diverse workforce.

- Over seven in ten respondents report that they stay and succeed in the industry helped by pride in their work (73.1 percent) and opportunities for learning new skills (71.7 percent).
- Close to seven in ten (68.5 percent) highlight the importance of support from their union locals for their success and staying power in manufacturing. Union members point to the collective voice they have as members, as well as mentorship, and support from other women.
- Over six in ten respondents (64.2 percent) identify the role of formal policies to create equitable workplaces, including anti-harassment policies and commitments to equitable hiring and diversity goals.
- Pre-apprenticeship programs are an important entry point to manufacturing jobs and provide mentorship and support in the longer term. Close to six in ten (58.9 percent) of respondents who completed such programs attest to their importance for their success.

THE WAY FORWARD: CONCLUSION

In summary, to attract, retain, and advance women in manufacturing, we urgently need to address the challenges and take advantage of the opportunities that survey respondents identified. That means more systematic outreach and recruitment as well as effective anti-harassment and diversity, equity, and inclusiveness training, monitoring and complaint processes. Expansion of and access to training

including apprenticeship and pre-apprenticeship is key. To ensure that women and all workers with caregiving responsibilities are able to work in manufacturing, childcare and caregiving support should be expanded and comprehensive paid leave policies must be instituted that are accessible to all. Finally, the data and responses from respondents show that unions are key to ensuring that manufacturing jobs are good jobs; unions play a key role in creating the conditions needed for women to thrive in manufacturing.

I. WHY WE NEED TO ACT ON GENDER AND RACIAL EQUITY IN MANUFACTURING

INTRODUCTION

In the United States, one in ten workers is employed in manufacturing and the sector contributes \$2.3 trillion to GDP. With a historic national focus on strengthening domestic manufacturing supply chains and with major federal investments underway in infrastructure, clean energy and advanced technology production, the sector is poised to grow rapidly. The sector is also expected to play a key role in meeting federal objectives to build more and broader access to family-supporting jobs (Executive Office of the President 2022).

Manufacturing can provide good jobs with good benefits, and provide access to opportunity for workers of color, particularly for workers who do not have a four-year college degree, a reflection of historically strong union presence (Western et al. 2021). Yet today women and male workers of color are much less likely to be in such jobs than White men (Scott et al. 2022, U.S. Bureau of Labor Statistics (BLS 2023a). During the late 90's and 2000's, poor trade and related policies devastated U.S. manufacturing and manufacturing communities. This industry crisis disproportionately impacted Black workers, who lost, and did not regain, around half a million, highly unionized manufacturing jobs (30% of black manufacturing employment). This had major negative impacts on overall wage disparities, the poverty rate for Black women, and other economic outcomes. (Scott et al. 2022, Western et al. 2021).

After years of decline—with particularly large job losses for women and men of color and a dramatic decline in the number of workers covered by union contracts (Scott et al. 2022)—jobs in manufacturing began to grow again in the late 2000s. In 2022 alone, the sector on average added over 30,000 jobs each month.¹ The industry is projected to continue to grow over the next few years, and, together with the need to replace workers who are expected to retire, will need to attract more than four million new workers before the end of the decade (Wellener et al. 2021).

From the executive office to the shop floor, three in ten jobs in manufacturing (29.3 percent) are held by women, much lower than the share of all jobs in the economy held by women (46.8 percent).² Women who work in manufacturing are also less likely than men to be in the higher-paying subsectors of the industry, and they are particularly unlikely to work in higher-paid skilled technical or supervisory positions.

¹ IWPR calculations based on U.S. Bureau of Labor Current Employment Statistics series CES3100000001 and CES3200000001; December 2022 < <https://www.bls.gov/data/>.

² IWPR calculations based on U.S. Bureau of Labor Statistics 2023b, and 2023c; women's share of manufacturing jobs is substantially higher than in some other traditionally male industries, such as construction (10.8 percent female in 2022).

WOMEN ARE MUCH LESS LIKELY THAN MEN TO BE IN HIGHER PAYING MANUFACTURING JOBS

These disparities in positions create disparities in earnings. In 2022, the median weekly full-time earnings for all women production workers were just \$700, and \$943 for men (a gender earnings ratio of 74.2 percent). Four in ten (39.1 percent) of production workers were paid at least \$1,000 per week; women were less than half as likely as men to be in this higher earning bracket (20.3 percent of women compared with 46.4 percent of men).³

These inequalities in earnings partly reflect women's underrepresentation in better paid shopfloor occupations. Welders (5.1 percent women) have median weekly earnings of \$996, machinists (6.8 percent women) of \$1,036, and CNC tool programmers and setters (10.3 percent) median weekly earnings of \$1,088. The Bureau of Labor Statistics (BLS) cannot estimate women's median earnings in these occupations because too few women work in each (BLS 2023 b, c).⁴

While women are less severely underrepresented among supervisors (22.7 percent women) and inspectors, testers, sorters, samplers, and weighers (38.6 percent women), a look at average earnings in these jobs further illustrates the disparity in pay between women and men. Women supervisors of production workers had median weekly earnings of \$888 compared to men, who earned \$1,157, an earnings ratio of 76.7 percent; likewise, the median weekly earnings for women inspectors were just \$719, while men in the same occupation earned \$1,033, an earnings ratio of 69.6 percent (BLS 2023c, d).

Race exacerbates these pay disparities. Latinas and Black women are particularly likely to work in lower-paid jobs or sectors in the industry. In 2022, the median weekly earnings for full-time work for Hispanic/Latinas working in production occupations were only \$654, while just 11.5 percent of them earned at least \$1,000 per week. The median weekly earnings for Black women were slightly higher, at \$704, with only 20.5 percent being paid at least \$1,000 per week. The median weekly earnings of White non-Hispanic men, by contrast, were \$1,023, and 53.6 percent had earnings of at least \$1,000.⁵

Union representation helps reduce racial and gender disparities. In the economy overall, unionized workers make 10 percent more than comparable workers in a similar nonunionized workplace, and the union premium – the amount wages are higher for union workers – is even higher for Black men and women (13 percent) and for Hispanic workers (19 percent) than for all workers (12 percent; Economic Policy Institute 2021). Manufacturing production workers covered by union contracts make twelve percent more than non-union workers (Bayard, Cajner, Gregorich, and Tito 2022). And collective bargaining makes a difference for gender pay equity. In 2022, for weekly full-time workers the earnings ratio between union women and union men was 89.6 percent, compared to 82.0 percent women and men not covered by union contracts.⁶

³ IWPR calculations based on "Table A-2. Usual weekly earnings of employed full-time wage and salary workers by intermediate occupation, sex, race, and Hispanic or Latino ethnicity and Non-Hispanic ethnicity, Annual Average 2022" (Current Population Survey, unpublished tables provided by the U.S. BLS)

⁴ The BLS only publishes estimated earnings for occupations with at least 50,000 workers; see U.S. BLS 2023c.

⁵ IWPR calculations based on "Table A-2. Usual weekly earnings of employed full-time wage and salary workers by intermediate occupation, sex, race, and Hispanic or Latino ethnicity and Non-Hispanic ethnicity, Annual Average 2022" (Current Population Survey, unpublished tables provided by the U.S. BLS)

⁶ IWPR calculation based on U.S. BLS (2023e).

If the industry is to be successful in meeting its skills needs, and doing so in an equitable manner, it needs to identify and remove the barriers that now keep so many women, particularly women of color and rural women, in lower paid jobs in the industry, and which keep even more women out of the industry altogether.⁷

The goal of this report is to improve understanding of the perspectives and experiences of women working in shop floor positions, focusing on what helps and hinders their recruitment, retention, and advancement in manufacturing, and what needs to change to help the industry build and sustain a diverse and skilled workforce.

THE 2022 IWPR WOMEN IN MANUFACTURING SURVEY

The report draws on qualitative interviews and on the 2022 IWPR Women in Manufacturing Survey, distributed electronically between April and September 2022. By focusing on women on the shop floor, in production jobs predominantly characterized as 'middle-skilled' occupations that typically require at least high school completion but not a four-year college education, the survey complements other industry efforts that focus more on gender diversity in professional and managerial manufacturing jobs (see for example Deloitte 2020; McKinsey Institute and Lean In 2021; Wellener et al. 2021).

The survey asked what attracts women to shop floor manufacturing positions, how they learned about opportunities in the industry, what it is like to work in manufacturing, including their perceptions of equal treatment vis-a-vis men, how they fare as parents, and what may drive them out of the industry. Finally, the survey asked what helps women succeed in manufacturing, and what policy changes they want to see.

The survey was developed and disseminated in collaboration with the AFL-CIO's Industrial Union Council and Chicago Women in the Trades National Center for Women's Equity in Apprenticeship and Employment, as well as other partners of IWPR's project for Women's Advancement in Construction and Manufacturing. As a result, the 424 women who answered the survey strongly reflect two groups of women working in manufacturing: union members (58.5 percent of respondents) and current apprentices or those who completed an apprenticeship program (46.7 percent; the two are not exclusive). The sample is not representative of manufacturing as an industry: slightly more than one in ten production workers were union members in 2022 (U.S. BLS 2023e) and apprenticeships have until recently been relatively uncommon in manufacturing (see, for example, Fortwengel, Gospel and Toner 2021). However, the sample is highly relevant to current efforts to revitalize and grow the manufacturing industry by emphasizing "Good Jobs" that promote workers' rights and improve working conditions, and by building apprenticeships as key components in creating a skilled and diverse workforce (see, for example, U.S. Department of Labor 2022; The White House 2022).

The sample captures the diversity of women working in manufacturing. Over half of the sample—54.3 percent—are respondents of color, including one in five (20.8 percent) who identify as Hispanic or Latina, and slightly more than one in seven (16.0 percent) who identify as Black non-Hispanic.⁸ The sample represents women from all age groups: four in ten (40.8 percent) are 25 to 34 years old, three in

⁷ See also Moutray (2022) and Wellener et al. (2021).

⁸ For a fuller discussion of the survey methodology and sample distribution, see Appendix, Methodology.

ten (29.5 percent) are between 35 and 44, nearly one in four (24.2 percent) are 45 and older, and fewer than one in twenty (4.2 percent) are younger than 25 (Appendix Table 1).

The racial and ethnic composition of the sample differs between younger and older women, as does the likelihood of belonging to a union or having experienced apprenticeship. The share of Latinas is higher among workers younger than 35 than among older workers (29.8 and 13.7 percent, respectively). By contrast, the share of White respondents is higher among older than younger respondents, and the same holds for Black respondents. White respondents are 54.9 percent of older respondents, compared with 35.1 percent of all younger respondents; the share of Black women among all older respondents is 19.3 percent, compared with 12.6 of younger respondents (data not shown elsewhere in report). Younger workers in the survey were also less likely than older workers to be union members (45.0 and 70.0 percent, respectively), and much more likely than older respondents to have completed or currently be pursuing an apprenticeship (66.3 and 32.0 percent). These differences reflect industry changes over time (see, for example, Haumesser and Mahoney 2021) as well as peculiarities of the sample; whatever the reason, this should be kept in mind when reading the analysis.

Parenthood is common among survey respondents. Seven in ten (70.5 percent) of respondents have children, including 55.4 percent with children younger than 18, and 30.2 percent with children under the age of six. One in five (20.5 percent) is a single parent, i.e., divorced, separated, widowed, or never married. The report discusses the challenges parents face in manufacturing and highlights how working hours and child care difficulties can create obstacles. The biggest factor leading respondents with young children to consider leaving the industry, however, is lack of advancement opportunities.

Respondents highlight the potential for rewarding, family-supporting jobs for women in the industry, and the need for change if the industry wants to maintain and improve gender diversity. Women respondents cited many of the same factors that attracted men to the industry: comparatively high wages, employee benefits, and stable employment. Many respondents work in workplaces that have made significant strides towards providing a non-discriminatory harassment-free working environment. However, almost half of all respondents (46.5 percent) report that they have seriously considered leaving manufacturing, with "lack of respect/ harassment" being the most commonly identified 'very important' reason for those who consider leaving. Given the difficulties of surveying a sizeable sample of women who have left manufacturing and directly hearing their reasons for leaving, the survey adopts a proxy method by asking whether respondents have considered or are considering leaving manufacturing, and then asking what factors are making them consider leaving.

To ensure a healthy, vibrant workplace that truly values and supports women of all races, ethnicities, and parental status, whether they live in rural or urban areas, broader efforts to create more inclusive workplaces are needed. Survey respondents shared their challenges—from harassment to poor advancement opportunities and a lack of work-family supports—and pointed to recommendations to tackle these.

II. GETTING INTO MANUFACTURING: WHAT ATTRACTS WOMEN TO THESE JOBS AND HOW THEY FIND OUT ABOUT MANUFACTURING OPPORTUNITIES

"I knew a good Union job would provide for my family for many years."

Millwright, Union, White

"Customer service jobs, call center jobs, retail jobs...They were literally draining my soul. And that was really all that was available to me and other women in this area."

Team Assembler, Non-Union, White

"Since childhood ambition, parents also want me to engage in this line."

Technician/ Electrician, Union, Latina

PAY, BENEFITS, STABLE WORK

Jobs in manufacturing can provide stable employment with higher pay and more regular hours for workers without 4-year college degrees than in many jobs traditionally dominated by women, such as in leisure, hospitality, care, and administration (Hegewisch, Bendicks, Gault, Hartmann 2016). Manufacturing jobs are also more likely to come with benefits such as healthcare or retirement benefits. Nationally, 81 percent of production workers have access to employer-supported medical benefits, and 73 percent have access to retirement benefits, compared with just 43 and 42 percent of workers, respectively, in service occupations (BLS 2022a). Moreover, it has become increasingly difficult to find steady full-time work in many traditionally female jobs (Shaw et al. 2016), making manufacturing jobs that offer full-time predictable employment a more attractive option regardless of their pay rates (see, for example, Hegewisch 2018).

Survey respondents frequently cite these 'good jobs' aspects of manufacturing—comparatively high pay and benefits—as the reasons they work in manufacturing. Over two-thirds of respondents state that the opportunities for a stable full-time job (68.9 percent), good benefits (such as healthcare) (68.2 percent), and high earnings (67.9 percent), were "very important" for starting to work in manufacturing (data not shown elsewhere).

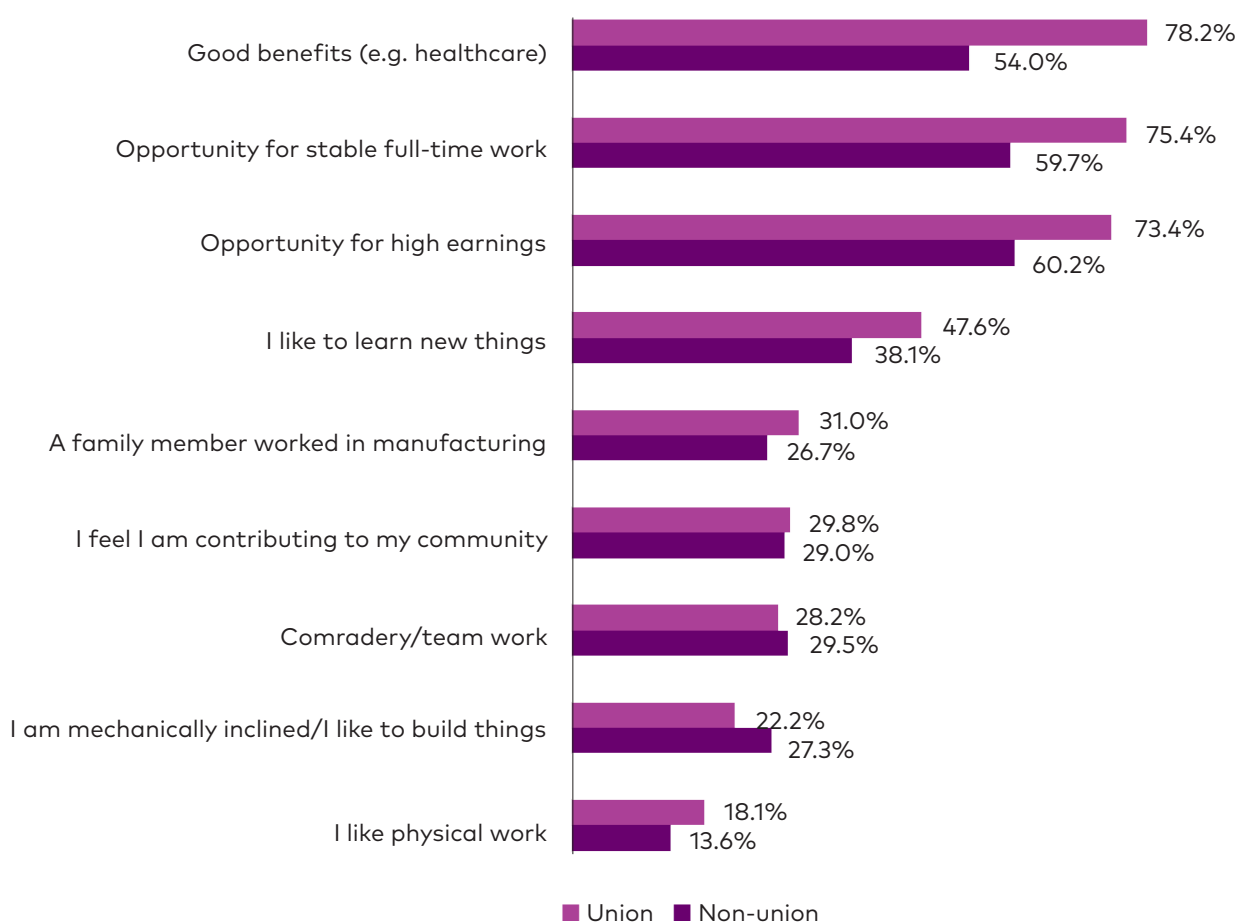
Decades of attacks on workers' rights and declines in union density have directly paralleled a decline in wages, benefits, and working conditions across the industry (Bayard, Cajner, Gregorich, and Tito 2022). These declines affect not just working families, but the availability and stability of the manufacturing workforce as a whole. Many manufacturers find themselves at a disadvantage when competing for workers because starting wages in manufacturing have fallen behind other sectors such as transportation and warehousing (Moutray 2022). The survey responses suggest that wages and conditions indeed remain important factors in efforts to recruit and retain women in the industry, and efforts to improve industry conditions are likely to improve recruitment and retention across the board.

It is noticeable that union members are substantially more likely than non-union members to rate these three factors—pay, benefits, and stable full-time work—as "very important" (Figure 1). This likely

reflects the fact that unionized plants (covered by collective bargaining agreements) typically offer better terms and conditions of employment than plants that are not subject to such agreements (Scott et al. 2022) and working for a non-union plant simply makes it less likely that these factors would stand out for choosing a job in the industry.

Non-union respondents, moreover, are more than twice as likely as union respondents to work for an employment agency or as an independent contractor (29.5 and 11.8 percent, respectively); terms and conditions typically are substantially worse for workers in such nonstandard work arrangements (see, for example, National Employment Law Project 2022).

FIGURE 1: Why did You Start to Work in Manufacturing? Top Reasons Rated as “Very Important” by Union and Non-Union Respondents



Notes: Respondents could indicate whether an item was “not important, slightly important, somewhat important, or very important.”

Source: 2022 IWPR Women in Manufacturing Survey

Apart from earnings and benefits, opportunities to learn are also a significant reason that many women joined manufacturing. Close to half of all union respondents (47.6 percent) compared to 38.1 percent of non-union respondents indicate this as “very important” (Figure 1).

HOW DO WOMEN FIND OUT ABOUT MANUFACTURING OPPORTUNITIES? HAPHAZARDLY.

"We have all these colleges at our fingertips here. And I don't feel they are going to these colleges and participating in the job fairs like they should. And high schools.... I have never heard of anybody who said 'I was recruited at college or high school'. Usually it is all word of mouth."

Paper Mill Worker, Union, White

"My mom was a supervisor in a pretzel packing plant. I worked night shift there because she needed people who would show up and work hard. That was me and my sisters... Then a sister worked for [electronics equipment company]. A very good job. I got in when she got me an application. So I followed family through manufacturing."

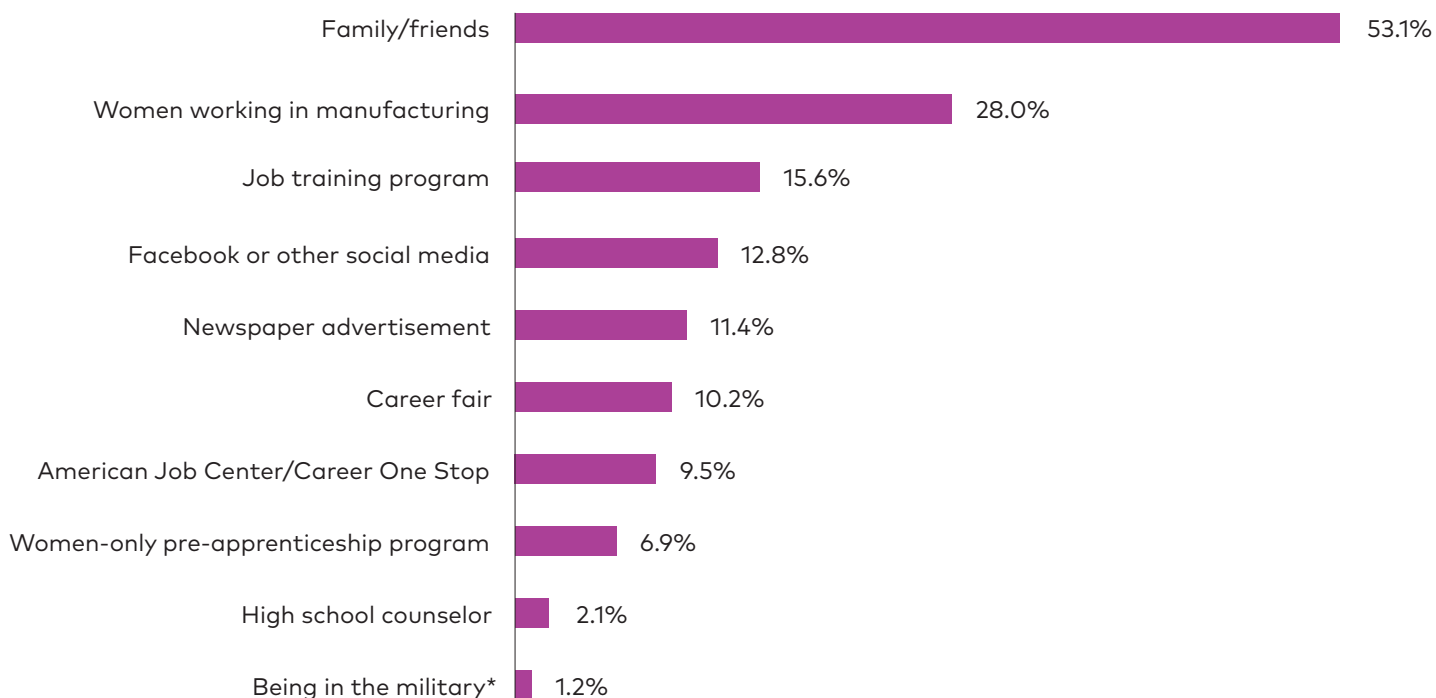
Production Worker/Packer, Union, White

High School Counselors and Job Centers are Failing

Educational and training institutions such as schools or jobs centers largely failed to alert respondents to opportunities in manufacturing. Just two in one hundred respondents (2.1 percent) learned about manufacturing opportunities from their high school counselor, and slightly more (9.5 percent) at a Job Center. Likewise, while in recent years the military has emphasized helping those leaving service transition to good civilian jobs, only a tiny fraction (1.2 percent) of respondents who were veterans described the military as a source of information (Figure 2).



FIGURE 2: How did You Find Out About Opportunities in Manufacturing?



Notes: Respondents could select all options that applied to them. *Responses only shown for veterans of the armed forces.
Source: 2022 IWPR Women in Manufacturing Survey

Many Women are Proactively Seeking Career and Technical Education to Prepare for Manufacturing Opportunities

Despite a lack of encouragement to enter manufacturing by career counsellors and other organizations, the majority of respondents (56.1 percent) pursued some manufacturing training or education before taking their job. This includes over a quarter of respondents who took a manufacturing-related internship through school (28.5 percent), slightly under a fifth (18.9 percent) who took community college classes and/or had an industry-recognized certification (18.2 percent), one in seven (14.4 percent) who took a shop class in high school, and 7.3 percent who had an Associate's degree or higher when they entered the manufacturing industry.⁹

Notably, women younger than 35 are much more likely to have taken classes or courses in manufacturing-related topics than older women (73.3 and 42.9 percent respectively).

⁹ Respondents could choose all of these options that applied; hence percentages of education pursued sum up to more than 56.1 percent.

Friends and Family are an Important Channel to Good Manufacturing Jobs but a Channel that can Replicate Existing Inequalities

The main source of information about manufacturing opportunities for women are friends, family, and acquaintances; over half of respondents (53.1 percent) learned about these opportunities in this manner (Figure 2). Friends and family can be a valuable source of information and can also facilitate the adjustment to a male-dominated environment. As one woman responded in the survey, “proud second-generation union steel-worker.” In interviews, other women, both Black and White, recounted that having the support and encouragement of their father or uncle was crucial in convincing them to apply for a job, and helped them gain acceptance.

Yet, while friends and family as a recruitment channel may help increase gender diversity, more typically this type of recruitment will replicate the primarily male and Whiter profile of the current workforce. This is also borne out by survey responses: White respondents were substantially more likely to cite friends, family and acquaintances as a source for jobs than were respondents of color (60.0 and 46.5 percent respectively, data not shown elsewhere).

Pre-Apprenticeship Programs Provide Pathways to Manufacturing Jobs

Over half of all respondents (54.7 percent) completed a pre-apprenticeship program, and, of these, 29.8 percent finished a women-focused pre-apprenticeship program. Pre-apprenticeship programs can broaden and diversify the pipeline of workers entering manufacturing. Graduates of pre-apprenticeship programs do not necessarily become apprentices but are provided with a range of academic and work-readiness training and supports that help them overcome obstacles and enter manufacturing-specific training and jobs. Women-focused pre-apprenticeship programs help participants develop the skills and tools needed to cope with challenges in a male-dominated shop floor environment. The curriculum also often includes an introduction to the role and function of unions in the industry (Hegewisch 2018; Nanda et al. 2018; U.S. Department of Labor Women’s Bureau 2021).

The majority of those who completed pre-apprenticeship programs (58.7 percent) see them as “very” or “somewhat” important for their success in the industry. Further, women-only pre-apprenticeship programs often remain an important resource for graduates, providing help with finding new jobs, advice in case of harassment or discrimination, and opportunities for networking and access to mentorship (Hegewisch 2018).

Women Already Working in Manufacturing are an Underutilized Recruitment Resource

It is notable that nearly three in ten respondents (28.0 percent) point to other women already working in manufacturing as their source of information about job opportunities (Figure 2).¹⁰ In a highly male-dominated field, a woman can be the best and most credible messenger that such work is appropriate and possible for women (see, for example, Nanda et al. 2018). Yet, the survey results suggest that the industry is underusing women employees as potential ambassadors in recruitment efforts. The large majority of respondents (72.6 percent) say they would be interested in helping with the recruitment of

¹⁰ Respondents could indicate ‘friends/family/acquaintance’ as well as ‘women acquaintance;’ very few respondents indicated both.

women to the industry. Yet, only about half as many (35.8 percent) were ever asked by their employer to participate in recruitment efforts, and only one in four women union members (25.5 percent) were asked by their union to help recruit other women.

KNOWING ABOUT OPPORTUNITIES IS THE FIRST STEP, OVERCOMING POTENTIALLY BIASED HIRING PROCESSES THE NECESSARY SECOND

Finding out about job opportunities in male-dominated fields is the first step, getting hired the second. Fewer than half (45.1 percent) of all women respondents feel that they are always or frequently treated equally with men during the recruitment and hiring process, and one in five (20.4%) say that this is never or rarely the case. Research finds that women are less likely to get a call-back than men when they apply for male-dominated jobs (Adamovic and Leibbrecht 2023). When women are included in the selection process, they may be required to perform tasks that women are statistically less likely to be able to perform. This includes lifting requirements that in practice are never or rarely part of the job, and if they were, would be potentially unhealthy for male and female job-holders alike. Chicago Women in the Trades, a pre-apprenticeship program focused on preparing and supporting women in non-traditional occupations, frequently encountered such requirements when trying to find manufacturing jobs for women who completed their pre-apprenticeship program (Hegewisch 2018).



As one survey respondent pointed out, insisting on prior industrial experience is another recruitment criterion that is much more difficult for women to meet: “[Women] are not given the opportunity. At [company] now you have to have industrial experience; experience driving a fork lift/truck. How is that going to happen if they are a recent college graduate or there are no other manufacturers in the area?” Last but not least, those who make hiring decisions more often than not reflect the existing workforce: they are White, male, and middle-aged, and are more likely to employ a White male workforce (see, for example, Bilimoria 2015; Bielby 2000; Heilman, Manzi, and Braun 2015).

One person interviewed added that an additional barrier is the predominant focus on young workers. As she explained, promoting manufacturing work to younger women can be a hard sell “because they have stars in their eyes and think that the world is their oyster.” While young workers would likely contest this characterization, the average age of women enrolling

in pre-apprenticeship and similar programs preparing women for manufacturing careers, such as Philadelphia Works Women in Nontraditional Careers¹¹ or West Virginia Women Work¹², is thirty or higher. Women with greater family and economic obligations, including returning workers who may have stepped out of paid work while their children were young or because of other caregiving obligations, and/or who may be the main breadwinner in their family, may be particularly interested in exploring the benefits of a well-paid stable manufacturing job. Reaching the next generation of workers in schools and colleges is clearly an important part of building the future manufacturing workforce, but needs to be complemented by reaching out to the many women of all ages who are looking for good jobs with family-sustaining wages.

In summary, survey results reviewed in this section suggest that many women who found work in manufacturing did so in spite rather than because of active outreach and information, be that from school, job centers, or proactive industry sources. The next section discusses women's experiences and views of what it is like to work in manufacturing.

¹¹ Philadelphia Works Women in Nontraditional Careers: <<http://philaworks.org/winc/>>; information from Lark Jackson, Associate Director, Chicago Women in Trades' National Center for Women's Equity in Apprenticeship and Employment.

¹² West Virginia Women Work: <<https://westvirginiawomenwork.org/step-up-manufacturing>>; see also Hegewisch 2018.

II. WORKING IN MANUFACTURING: HOW DO WOMEN FARE?

"Equal pay to a male. Equal benefits same seniority nowhere other than a union could I have had that."
Assembler, Union, White

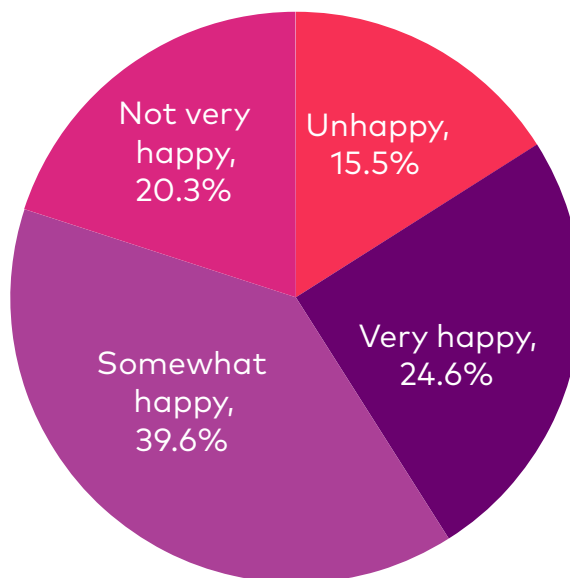
"My employer is fair at giving everyone the same opportunity to succeed"
Technician, mechatronics, Non-Union, White

"I don't get the respect I deserve here."
Production Worker, Union, Asian

"So it took me four years to get us a woman-only bathroom, and it took the men three days to break it, and we have not had one since."
Production Worker, Union, White

Many women who responded to the survey report liking their work and their work environment and feeling treated equally to men. Almost two-thirds (64.2 percent) say that they are "very" or "somewhat" happy with the work culture and work environment in their current job. Yet, a substantial minority of 35.8 percent report feeling "unhappy" or "not very happy" about the work environment (Figure 3).

FIGURE 3: How Happy Are You with the Work Culture/Environment at your Current Job?



Note: Respondents who answered "don't know/missing" are excluded from the calculation.

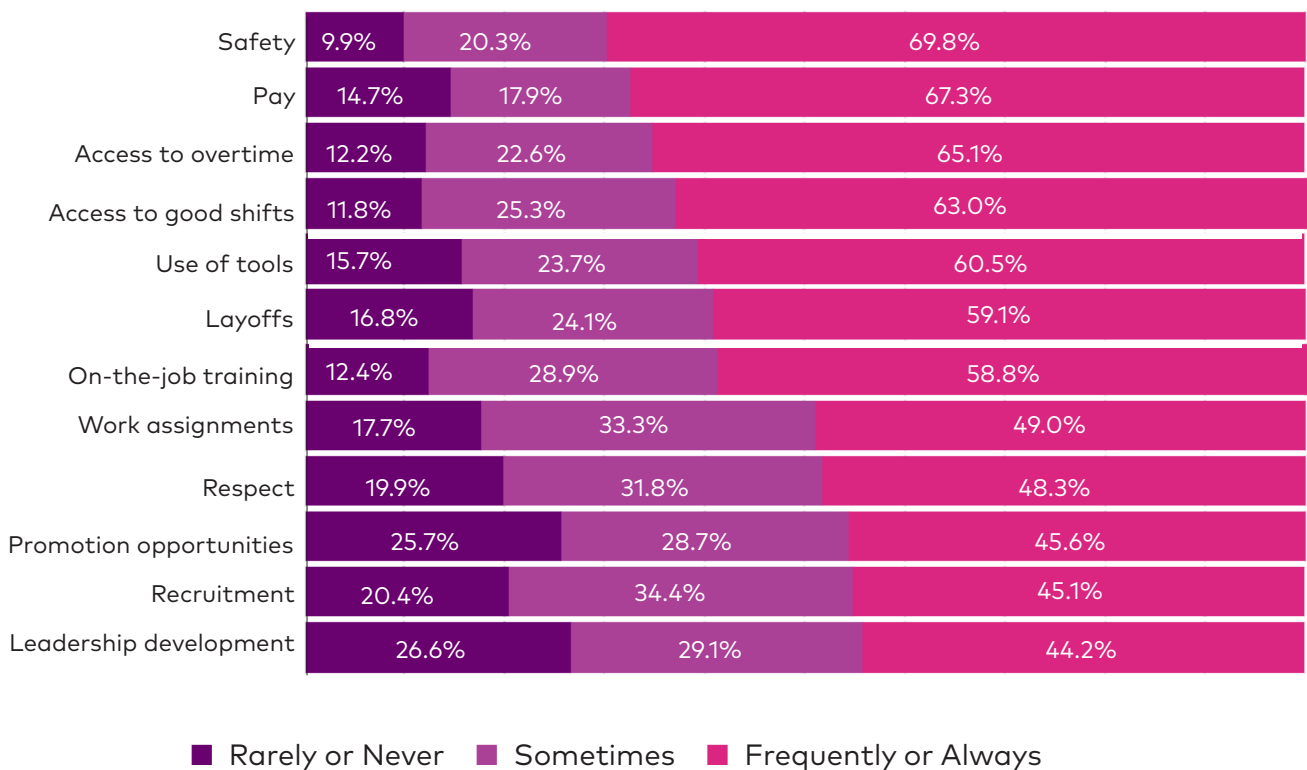
Source: 2022 IWPR Women in Manufacturing Survey

EQUAL TREATMENT

Sixty percent or more of respondents say that they are always or frequently treated equally when it comes to safety, pay, access to overtime and good shifts, use of tools, lay-offs and on-the-job training. For work assignments, respect, promotion opportunities, and leadership development, slightly fewer than half feel always or frequently treated equally but here, too, they clearly outnumber those who feel they are never or rarely treated equally (Figure 4).

FIGURE 4: Do You Think You are being Treated Equally as Men at Work?

Respondents (%)



Notes: Respondents who answered "don't know/missing" are excluded from the calculation; responses combine answers to "rarely" and "never"; and to "frequently" and "always."

Source: 2022 IWPR Women in Manufacturing Survey

Union Members are More Likely to Report Equal Treatment in Basic Employment Conditions

Union membership makes a difference to experiences of equal treatment. This is particularly so in key aspects of employment such as pay, benefits, and advancement where procedural equity and transparency are included in collective bargaining agreements. Union members are substantially more likely than non-union members to believe that they are always or frequently treated equally when it comes to pay (73.4 and 58.8 percent, respectively), access to good shifts (68.9 and 54.3 percent, respectively), layoffs (60.0 and 43.0 percent, respectively) and recruitment (49.4 and 39.4 percent, respectively; data not shown elsewhere). There was no significant difference between union and non-union respondents in relation to training and development, such as on-the-job training, work assignments, use of tools,

and leadership development, with a little under half saying they were treated equally—and, conversely, a little more than half saying “sometimes” or “rarely or never.”

Yet even when it comes to rates of pay, where union women typically have high levels of confidence that they are treated equally, respondents provided examples of pay and hiring practices that fall short in delivering equity, and highlight the critical role of transparency and procedures to address these shortfalls.

One Black woman, with an Associate’s degree in engineering, was recruited to move between plants owned by a large unionized corporation. However, management failed to take her prior experience into account and she was brought in on the lowest pay scale. After considerable effort, she was successful in having her grade and pay adjusted and getting backpay but “I had to go through all of this stuff, fight and fight and fight, because I knew my pay was wrong, to try to recoup some of my monies back. And then you find out, when you are just sitting at a casual lunch... you are still lower than other people that came in [the same way].”

Unequal Treatment is Highest for Access to Leadership Development and Promotions

A substantial number of respondents report that they are never or rarely treated equally in key aspects of employment, including a fifth who report unequal treatment in recruitment (20.4 percent) and the respect they receive (19.9 percent), and over a quarter who report unequal treatment in relation to promotion opportunities (25.7 percent) and leadership development (26.6 percent). The shares of respondents reporting such unequal treatment are roughly the same for union and non-union members. Respondents of color are slightly less likely than White respondents to report such unequal treatment. Given the higher average age of White respondents compared to respondents of color, it is possible that White women express greater frustration with access to promotion opportunities at least in part because they have more years on the job and thus have encountered such opportunities at higher levels than their counterparts of color.

The challenges women may face in access to promotions and leadership development are borne out by other research on the manufacturing industry. For example, Birdwell’s case studies of a manufacturing plant (2020) found that women in shop floor, maintenance or warehouse positions were rarely promoted, and that, whether in shop floor or professional positions, women tended to be consigned to positions that men did not want. Other studies confirm that women in manufacturing who work in professional positions experience lower rates of advancement (McKinsey and Lean in 2022; 2021; Deloitte and Manufacturing Institute 2020).

Some Respondents Cannot Take Basics such as Safety Equipment and Women-Only Toilets for Granted

Some women in manufacturing report that the most basic provisions such as safety equipment and tools in the right sizes, or convenient and safe women-only toilets, are out of reach. More than one in ten (11.2 percent) of respondents do not have access to convenient or sufficient toilets for their use, and 16.3 percent are never or rarely provided with right-sized tools or safety equipment. Union respondents are somewhat more likely to report never or rarely having access to these than non-union members (18.4 and 13.4 percent, respectively; data not shown elsewhere), likely because union respondents are particularly likely to work in the branches of manufacturing that are more male-dominated. Not

making equipment available to fit a diverse workforce is a significant safety hazard, and it is also a clear statement of indifference if not hostility towards those workers who do not fit male body norms, communicating that they do not belong.

HARASSMENT AND DISCRIMINATION

The Majority of Respondents Report That Their Workplaces are Largely Free of Harassment

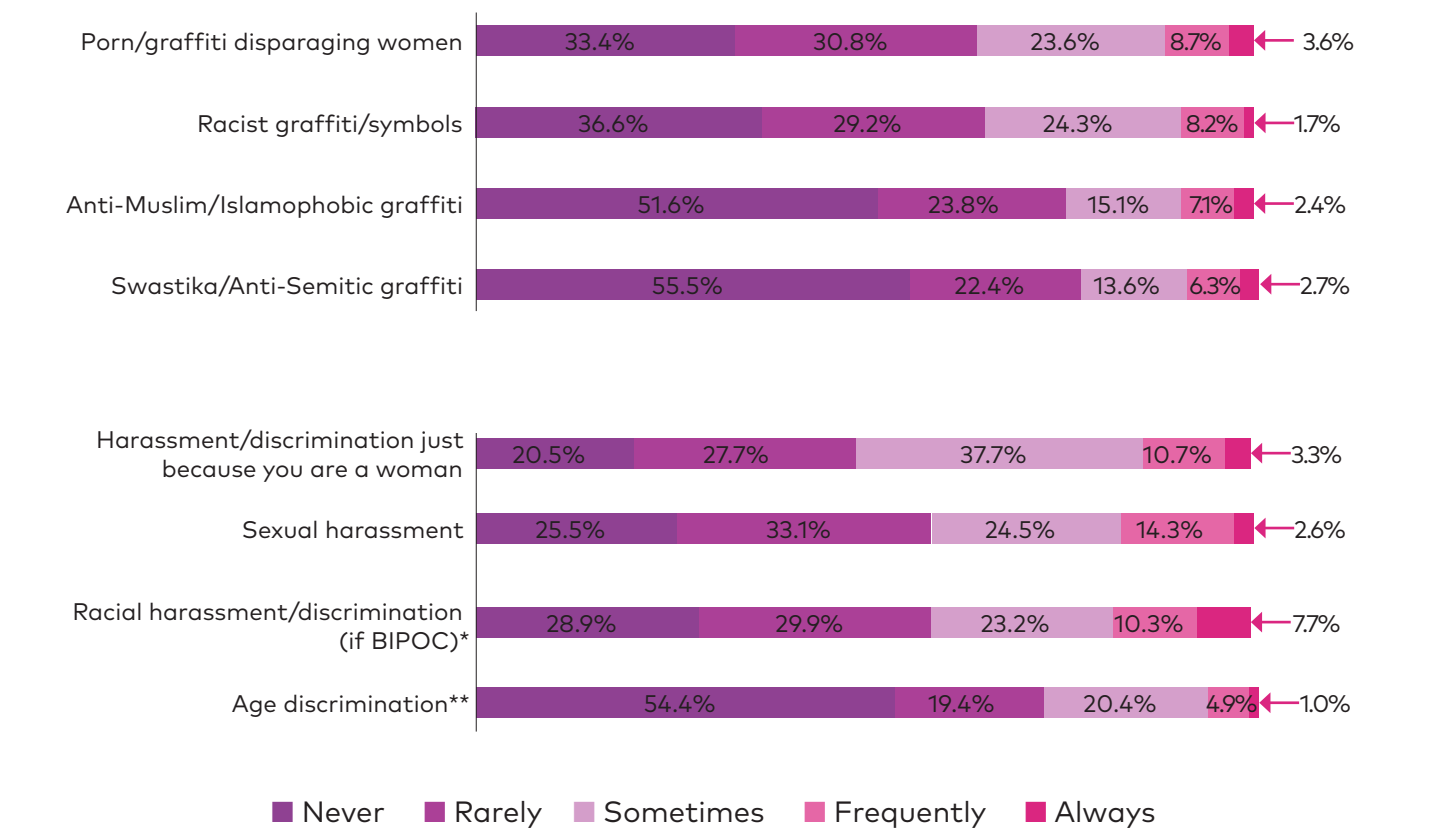
Sexual harassment was only legally recognized as employment discrimination in the 1980s. In manufacturing, horrendous incidences of systemic sexual and racial harassment came to light in the 1990s in lawsuits filed against Mitsubishi and Ford Motor Company and soap manufacturer Dial (Chira and Einhorn 2017; EEOC 1998). The settlements of the large class action lawsuits against Mitsubishi and Dial also set valuable and high-profile precedents for policies and processes designed to create harassment-free workplaces (Hegewisch, Deitch, and Murphy 2011). Union agreements can provide structured grievance processes and women's and civil rights committees, among others, that can help prevent or address harassment. Unfortunately, while there has been significant progress, harassment is far from eliminated and major incidents and even systemic problems continue to occur (Frye 2017).

The survey results reflect this dual reality. Survey results, as well as interviews, suggest that many women working in manufacturing experience a working environment mostly free of harassment, including one that is largely free of racist and other disparaging and hostile symbol and graffiti. That said, a hostile working environment is still the reality for a substantial minority of women, and too many other women are at least sometimes exposed to such hostilities.

Six in ten respondents report that, while working in manufacturing, they never or rarely encounter disparaging racial or sexual graffiti or symbols. Over half of all respondents say they never (25.5 percent) or rarely (33.1) experience sexual harassment, while slightly higher proportions of respondents of color report that they never (28.9 percent) or rarely (29.9 percent) experience racial harassment or discrimination. A workplace mostly free of harassment or discrimination just for being a woman is slightly less likely, with 20.5 and 27.7 percent of respondents reporting this as never or rarely happening (Figure 5).



FIGURE 5: How Often Do/Did You Experience the Following While Working in Manufacturing, Directed at You Personally?



Notes: Respondents who answered "don't know" or are missing are excluded from the calculation. *Results only shown for respondents who identified as Black, Indigenous, People of Color (BIPOC); ** results only shown for respondents ages 45 or older.
Source: 2022 IWPR Women in Manufacturing Survey

Fewer than a quarter of respondents (23.8 percent) report that they never experienced any form of disparaging graffiti, and only 10.6 percent that they never experienced any form of discrimination or harassment during the last five years. The respondents who report such a truly harassment-free environment, which should be standard in the industry, are about as likely to be union or non-union members as the general sample, and as likely to be in larger or smaller plants.

The 2022 IWPR Women in Manufacturing survey asks women to limit their responses to experiences during the last five years, as well as asking them to differentiate between the frequency of occurrences. While any incident of harassment is always unacceptable, finding that a relatively high number of women report that on the whole they judge their workplace to be harassment-free, and that they are happy with the working environment, is notable.¹³

¹³ There is no universally accepted measure of harassment and estimates of harassment strongly depend on the type of questions asked; survey estimates of workplace sexual harassment range from 25 to 85 percent of all women workers (Feldblum and Lipnic 2016). A survey of women working in manufacturing conducted pre-COVID by the American Association of University Women in collaboration with the IBEW estimated much higher levels of harassment, with over 80 percent of women in their survey reporting, for example, that they had experienced unwanted touching, kissing, or other unwanted sexual physical advances at least once while working in manufacturing (Haumesser and Mahoney 2021).

Harassment and Discrimination is the Norm for a Substantial Minority of Women

At the same time, for a substantial minority of women, harassment is the norm. More than one in six (16.9 percent) of women report sexual harassment occurring frequently or always and a similar percentage of women of color (18.0 percent) report that racial harassment and discrimination occur frequently or always (Figure 5). About one in ten report frequently or always being exposed to hostile and disparaging graffiti, including anti-Semitic or Islamophobic symbols (Figure 5).

Complaint Processes Matter

For women who work in plants where most of their coworkers are men or where the workforce is predominantly White, it is particularly hard to speak up against harassment. Even if a complaint process is formally anonymous, in practice it is not hard to figure out who may be behind a complaint. A woman machinist interviewed explained her feeling when she filed a complaint about a notorious harasser (who was subsequently moved to another area, but not dismissed): “the thing that I had to accept about making that complaint—that there are not enough women around, that it is so easy to pinpoint who it is—I had to accept—it is either going to come down on me or it is going to come down on someone I care about.”

Altogether, well over half (57.2 percent) of those who experienced any form of harassment notified someone official, such as their supervisor, an HR official, a shop steward, or the Women’s or Civil Rights committee. Two thirds (66.2 percent) reported that their complaint was successfully resolved, while one third did not. Of those who experienced harassment but felt unable to make a complaint, 36.3 percent feared being negatively labeled by coworkers, 30.3 percent feared losing their job and/or did not think it would help (30.5 percent; data not shown elsewhere). One respondent explained that she did not file a complaint because “it is not management who is fired as a result but a coworker....: [Lodging a complaint] puts a large target on you for all workers and management.”

In summary, for the majority of respondents, including women of color, manufacturing provides a largely equitable and largely harassment-free workplace. Yet, for a considerable number, harassment is frequent or constant, another substantial minority report at least some harassment or discrimination in key aspects of employment, and no more than one in ten respondents have not experienced any type of harassment during the last five years. Section V will discuss how such experiences can push women out of the industry.

IV. MANUFACTURING SKILLS: TRAINING AND EDUCATION AND APPRENTICESHIPS

"I am finally at a position/spot in my work history that I am making a way better living working as an electrical apprentice than I did after having 2 college degrees and lots of student loan debt! Wish I would have gotten into the manufacturing/apprentice program long before."
Mechatronic Apprentice, Non-Union, White

"I'm a training coordinator now. I'm a hands-on trainer, so I work with people on the floor showing them the jobs and just doing the job safely and doing it by standard, conspicuous standard."
Operator, Union, Black

Technological change, including integration of high levels of automation and robotics, is a constant in manufacturing. To meet changing skills needs, the industry has trained and retrained new and incumbent workers, with a heavy emphasis on on-the-job training. Competitiveness in the industry—and the industry's ability to support comparatively high-skill, high-wage jobs—will continue to depend on work systems that effectively integrate skilled workers and advanced technology. Training, and expanded and more equitable pathways into manufacturing employment and training, are key for both existing and new staff. This challenge is recognized by a large majority of manufacturing employers but implemented very unevenly, particularly by smaller and medium-sized manufacturers (Deloitte and The Manufacturing Institute 2020; Waldman-Brown 2020).

The survey confirms that some training, particularly on-the-job training, is very common. A large majority of respondents (87.5 percent) reports having received training for their job function when they started in their current position, and only 8.0 percent say that they received no training in their current job during the last five years. The majority of respondents also report having received training related to new technology or to quality and customer requirements, though such training is somewhat less widespread: 22.1 percent of respondents report not having received new technology-related training during the last five years, while 19.6 percent say they have received no training in quality & customer requirements (not shown elsewhere).

While the experience of training is common, just over half (54.7 percent) of all respondents (and just 40.1 percent of those who did not complete or are currently in an apprenticeship) report receiving some form of certification for the training they completed (data not shown elsewhere). Certification is critical to help workers demonstrate skills in ways that help them move between employers, and can help them stack up credentials over time to a postsecondary educational qualification.

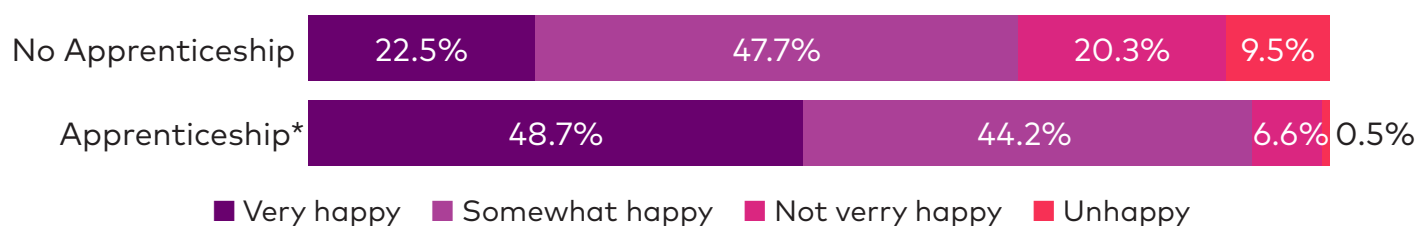
THOSE WHO WENT THROUGH APPRENTICESHIPS ARE NOTICEABLY HAPPIER WITH TRAINING OPPORTUNITIES PROVIDED BY THEIR EMPLOYERS

The large majority of respondents (80.9 percent) are either very or somewhat happy with the training opportunities they receive from their employer. Yet there is a stark difference between respondents who completed/are currently in an apprenticeship and those who did not. Those with apprenticeship

experience are more than twice as likely as others to say they are very happy with training opportunities (48.7 and 22.5 percent, respectively), and are over four times less likely to say that they are not very happy/unhappy with such opportunities (7.1 and 29.9 percent, respectively; Figure 6).

FIGURE 6: On the Whole, How Happy are You with the Training Opportunities You have Received from Your Employer?

Respondents who completed/are in an apprenticeship compared with respondents who did not



Notes: Respondents who answered "don't know/missing" are excluded from the calculation. *Apprenticeship includes respondents who have completed or are currently in an apprenticeship.

Source: 2022 IWPR Women in Manufacturing Survey

According to The Manufacturing Institute's 2020 training survey, nearly four in ten manufacturers use apprenticeship as one means of filling skills needs (Deloitte and The Manufacturing Institute 2020). While apprenticeships have long been part of manufacturing, until recently, they were typically limited to a relatively small number of incumbent workers moving into more technical trades and not, as in the construction trades, a primary pathway to skilled jobs in the industry. Instead, most manufacturing workers are trained over the course of their employment by the employer either on the job, via paid or unpaid classroom or online training, or, in the case of some unionized facilities, through labor-management training partnerships or centers. In 2021, there were 23,720 active apprentices in manufacturing compared with 197,421 in construction (U.S. Department of Labor 2022).¹⁴ Since the Department of Labor Apprenticeship Initiative from 2015 onwards, apprenticeships have become somewhat more common in manufacturing. A number of new apprenticeship models specifically for manufacturing are currently being established, and, as a sign of the federal government and other stakeholders' commitment to greater diversity in access to manufacturing jobs, have also attracted an increasingly diverse set of apprentices (Katz, Lerman, Kuehn, and Shakespeare 2022; Walton, Gardiner and Barnow. 2022). Some of this survey's respondents were recruited through these manufacturing apprenticeship programs.

Among respondents with apprenticeship experience, three quarters (74.0 percent) report having finished their apprenticeship, and the large majority of these (75.8 percent) did so within the last five years. As discussed above, training is particularly common for newer workers, and this, as well as the more structured training process during apprenticeships, may also contribute to greater satisfaction with training that is on offer than for other respondents. Apprentices/ apprenticed respondents in the sample are less likely to be union members than those without apprenticeships (44.0 and 70.8 percent,

¹⁴ These data refer to federally registered apprentices and do not include apprentices in states with a state-level apprenticeship system such as Massachusetts, Oregon, and Washington. The survey did not ask whether respondents participated/ completed a registered apprenticeship. While the U.S. Department of Labor collects data on apprentices, no data are available to estimate the number of workers in manufacturing who have completed an apprenticeship.

respectively) and more likely to work for smaller plants with 500 or fewer workers (73.2 and 38.0 percent, respectively) that are not part of a larger group of companies (38.9 and 13.7 percent, respectively; data not shown elsewhere). While these shares may be strongly influenced by the channels through which respondents were recruited, it is still notable that this pattern differs from the construction trades where union apprenticeships account for the large majority of apprentices (Hegewisch and Mefferd 2021; NABTU 2021).

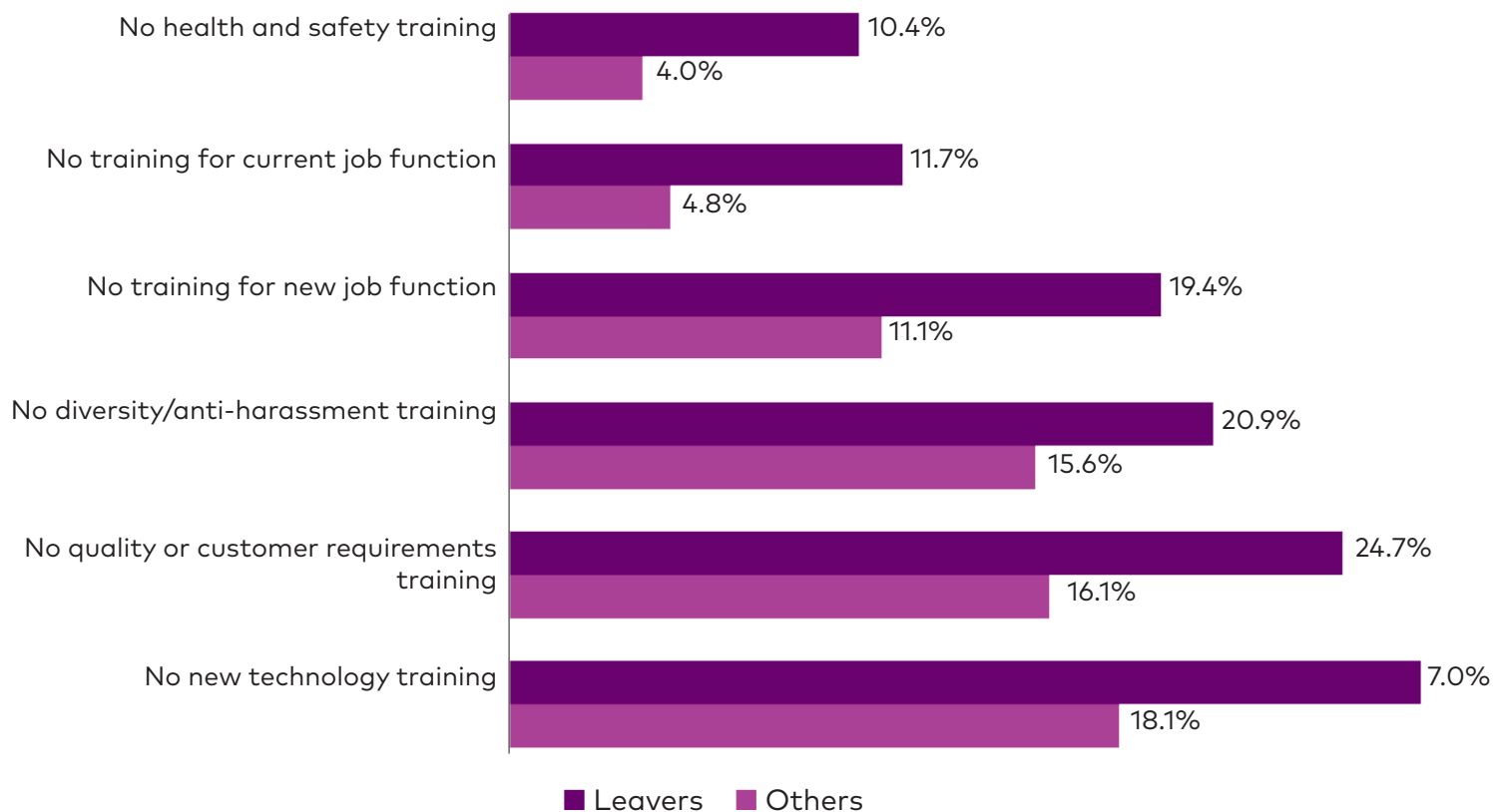
TRAINING OPPORTUNITIES MATTER FOR RETENTION

One in four (24.8 percent) of those who are considering leaving manufacturing say that lack of opportunities to build their full skill set and/or low quality of training is a very important reason for their inclination to leave (Figure 7). Other researchers also find that dissatisfaction with training opportunities may drive women out of the industry (Deloitte and Manufacturing Institute 2020). Respondents who are considering or have considered leaving the industry during the last five years are almost three times as likely to be not very happy or unhappy with their training opportunities (29.0 and 10.7 percent, respectively, data not shown elsewhere). Regardless of the type or timing of training, be it training at the start of the job, for a new job function, for health & safety, for diversity and anti-harassment, for new technology, or for quality and customer care, they are substantially more likely than others not to have received any training at all (Figure 7).



FIGURE 7: In the last Five Years in Manufacturing, Have You Received Training in the Following from Your Employer?

Respondents (%) who considered leaving manufacturing compared to others



Notes: Leavers are respondents who answered 'yes' to the questions whether in the last five years they seriously considered leaving the industry, had left the industry, or left and returned; others are respondents who answered 'no'.

Source: 2022 IWPR Women in Manufacturing Survey

In summary, responses to the survey highlight substantial training activity in manufacturing, and the potential of apprenticeships for skilling, attracting, and retaining a new generation of workers in manufacturing occupations. At the same time, not all respondents feel that their employer provides them with the training they need, and those who are unhappy with training opportunities or do not receive any training are less motivated to stay in the industry. Training matters both for providing skills to and for attracting, retaining, and motivating workers. The next section will discuss the factors influencing retention in greater detail.

V. PUSHED OUT: WHAT IS DRIVING WOMEN OUT OF MANUFACTURING

"The work environment is absolutely toxic, mentally and physically exhausting, and we are treated with no respect whatsoever."

Team Assembler, Union, White

"Working mandatory 7 days—missing family time."

Team Assembler, Union, White

"Supply Chain after Covid has everything hectic. Shortage of workers has us working 3 to 4 people's job. With no difference in pay either. It has become so stressful."

Production Worker, Non-Union, White

Much of the current discussion on increased diversity in manufacturing focuses on recruitment, yet survey results suggest that retention—keeping and advancing the women who already work in the industry—may be as big a concern. Almost one in two respondents (46.5 percent) say that they have seriously considered leaving the industry altogether. Surveys of professional women working in manufacturing find similar leave intentions, and that women are much more likely to consider leaving than men (Wellener et al. 2021). While leave intentions are not the same as actually leaving, they are a good predictor, and the most feasible path for asking about the reasons behind such intentions. Surveys taken in the same time frame find high leave intentions for workers across the economy (Ewell 2022); yet a recent pre-COVID-19 labor market analysis confirms that this is not a COVID-19 specific reaction and that women are indeed more likely than men to leave manufacturing for other sectors (Haumesser and Mahoney 2021).

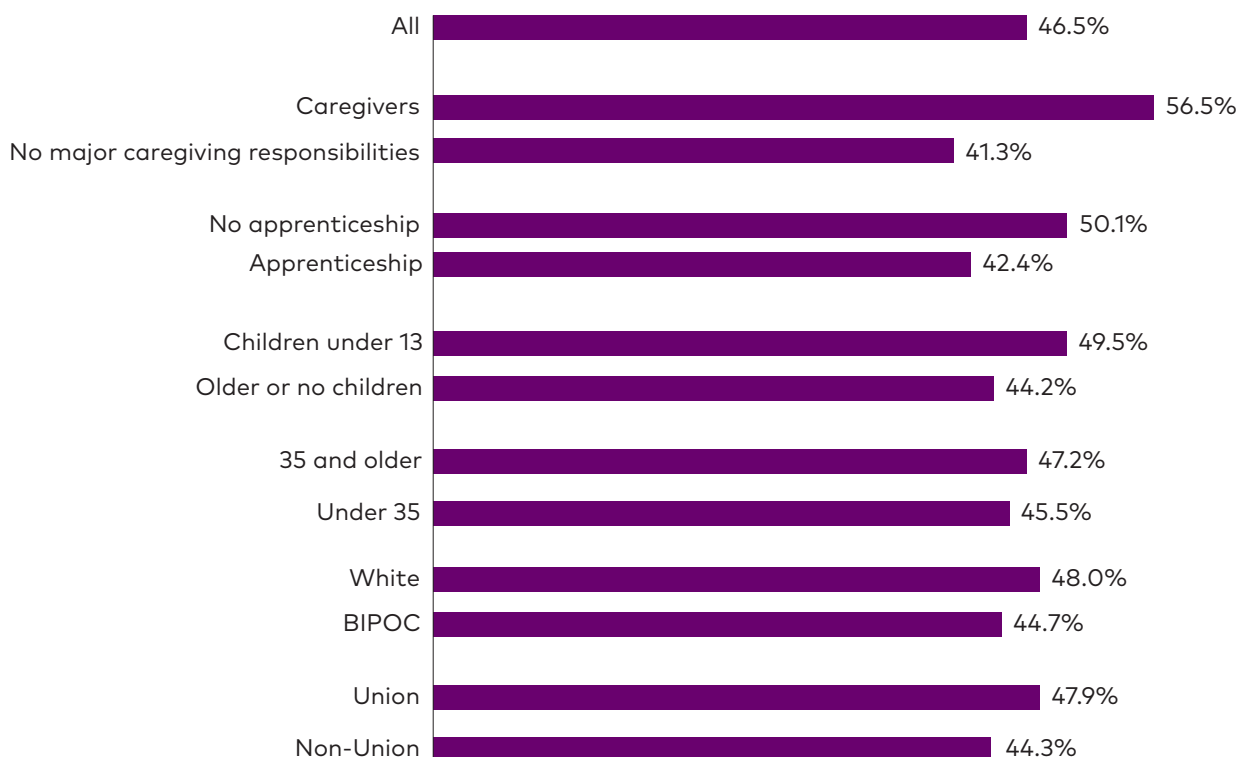
Whether grouped by age, caregiver or parental status, apprenticeship experience, race and ethnicity, or union membership, at least four in ten respondents profess serious leaving intentions. Least likely to say they want to leave are respondents who completed an apprenticeship or are apprentices (42.4 percent; Figure 8). While younger women are somewhat less likely to want to leave than older women (45.5 and 47.2 percent, respectively), and non-union women less likely than union women (44.3 and 47.9 percent, respectively), these differences are not substantial (Figure 8).

Leave intentions are highest for those who have care responsibilities for a spouse, disabled child, or close friend (56.5 percent), higher than for those who have children younger than 13 (50.1 percent, Figure 8). Caregivers are about a third of respondents (34.7 percent).

Leave intentions differ substantially by race and ethnicity. Black respondents are by far the most likely to say that they have seriously considered leaving the industry (60.3 percent), substantially higher than White respondents (47.0 percent), Latinas (40.9 percent), or all respondents of color (44.7 percent).

FIGURE 8: In the last Five Years, Have You Seriously Considered Leaving the Manufacturing Industry Altogether?

Respondents (%) by caregiver status, age of youngest child, apprenticeship, age, race/ethnicity, and union membership



Notes: "Caregivers" are respondents who answered yes to "Do you have major caregiving responsibilities such as for a parent, disabled spouse, disabled child, or close friend?" "Apprenticeship" describes respondents who have completed or are currently in apprenticeships. "White" is non-Hispanic; Black, Indigenous, People of Color (BIPOC): for composition of sample by race/ethnicity, see Methodology.

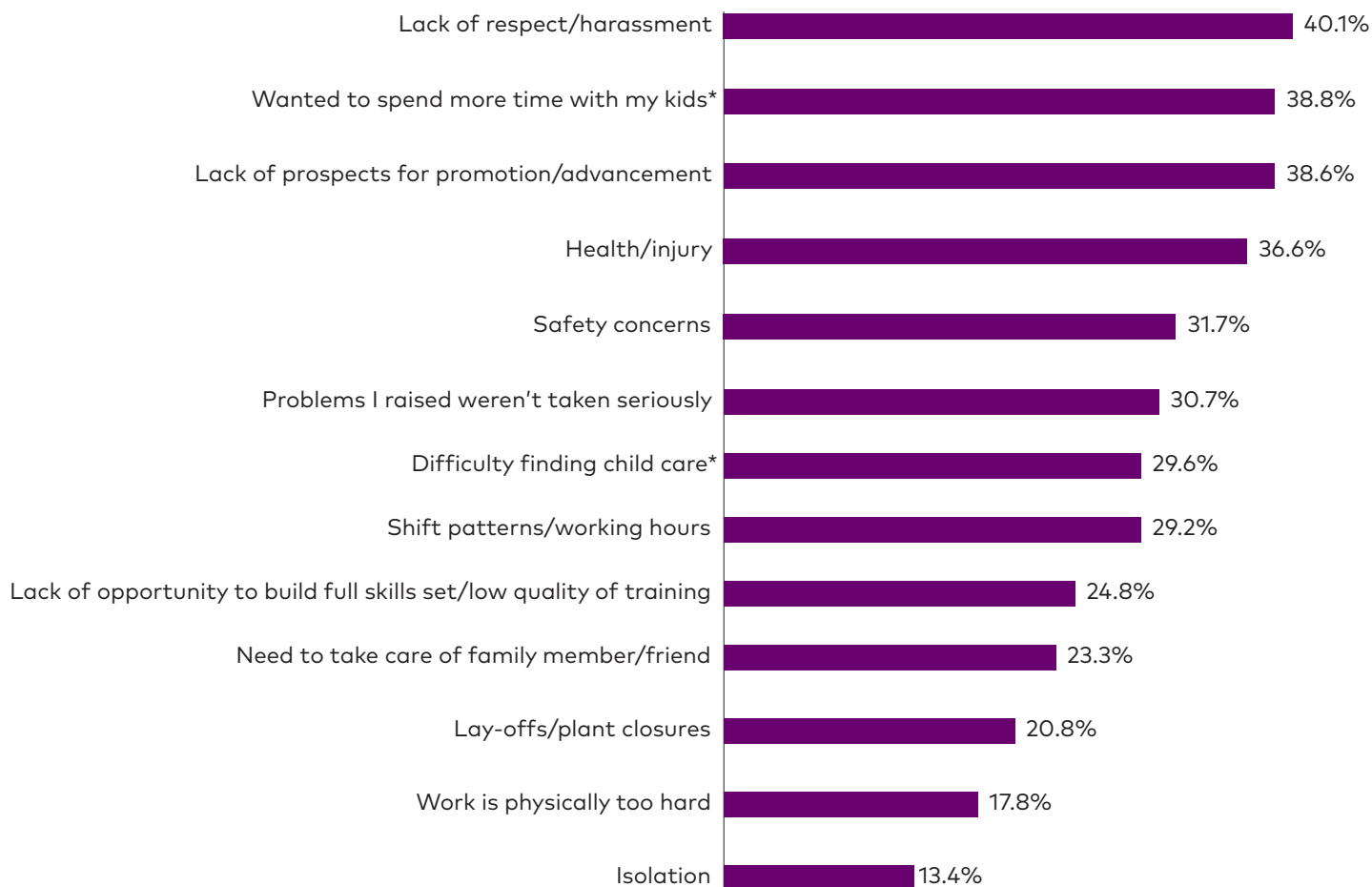
Source: 2022 IWPR Women in Manufacturing Survey

HARASSMENT AND DISRESPECT ARE THE MOST COMMON REASONS FOR WANTING TO LEAVE

The reason rated as most important for women's leave intentions is harassment and disrespect, indicated as very important by four in ten of those with leave intentions (40.1 percent, Figure 9). Leavers are twice as likely to report that sexual harassment occurs frequently or always (22.9 and 11.5 percent, respectively), and almost twice as likely to report unequal treatment with men occurring frequently or always when it comes to promotions (34.4 and 18.3 percent, respectively; data not shown elsewhere). A previous survey likewise found that harassment, disrespect, and lack of advancement opportunities were the key reasons distinguishing leavers from non-leavers (Haumesser and Mahoney 2021).

FIGURE 9: What were/are Your Main Reasons for Leaving/ Thinking about Leaving?

Share of respondents with leave intentions who rated Item as 'very important'



Notes: Respondents were asked to rate the items above against a scale of very important, somewhat important, slightly important, and not important; items were only shown to those who said that they were seriously thinking of leaving the industry/had left the industry. *Questions asked only of those with children younger than 13.

Source: 2022 IWPR Women in Manufacturing Survey

LEAVERS ARE SUBSTANTIALLY LESS HAPPY WITH OVERTIME DEMANDS

Stable full-time work, income, and benefits are main draws for women in manufacturing, especially compared to alternatives in the service sector. But manufacturing workers still face challenges—albeit different ones—with respect to hours and scheduling in an industry that often relies on round-the-clock operation and significant overtime. Almost four in ten of respondents with children under 13 (38.8 percent, Figure 9) say that they want to leave to be able to spend more time with their children, and three in ten respondents (29.2 percent, Figure 10) say that shift patterns and hours of work are a very important reason that makes them want to leave the industry.

Whether respondents are happy with the amount of overtime they work, and the type of overtime practices at their workplace, is highly correlated with whether they want to leave the industry. Leavers

are less likely to say they are happy with the amount of overtime they are working (52.1 and 71.1 percent, respectively). They are more likely to say that overtime is mandatory at their workplace (46.8 and 34.2 percent, respectively), and are 1.6 times as likely to say that they would like to work less overtime (35.7 and 24.9 percent, respectively) and 1.3 times as likely to say that they work overtime every/most weeks (39.1 and 30.6 percent, respectively, Figure 10).

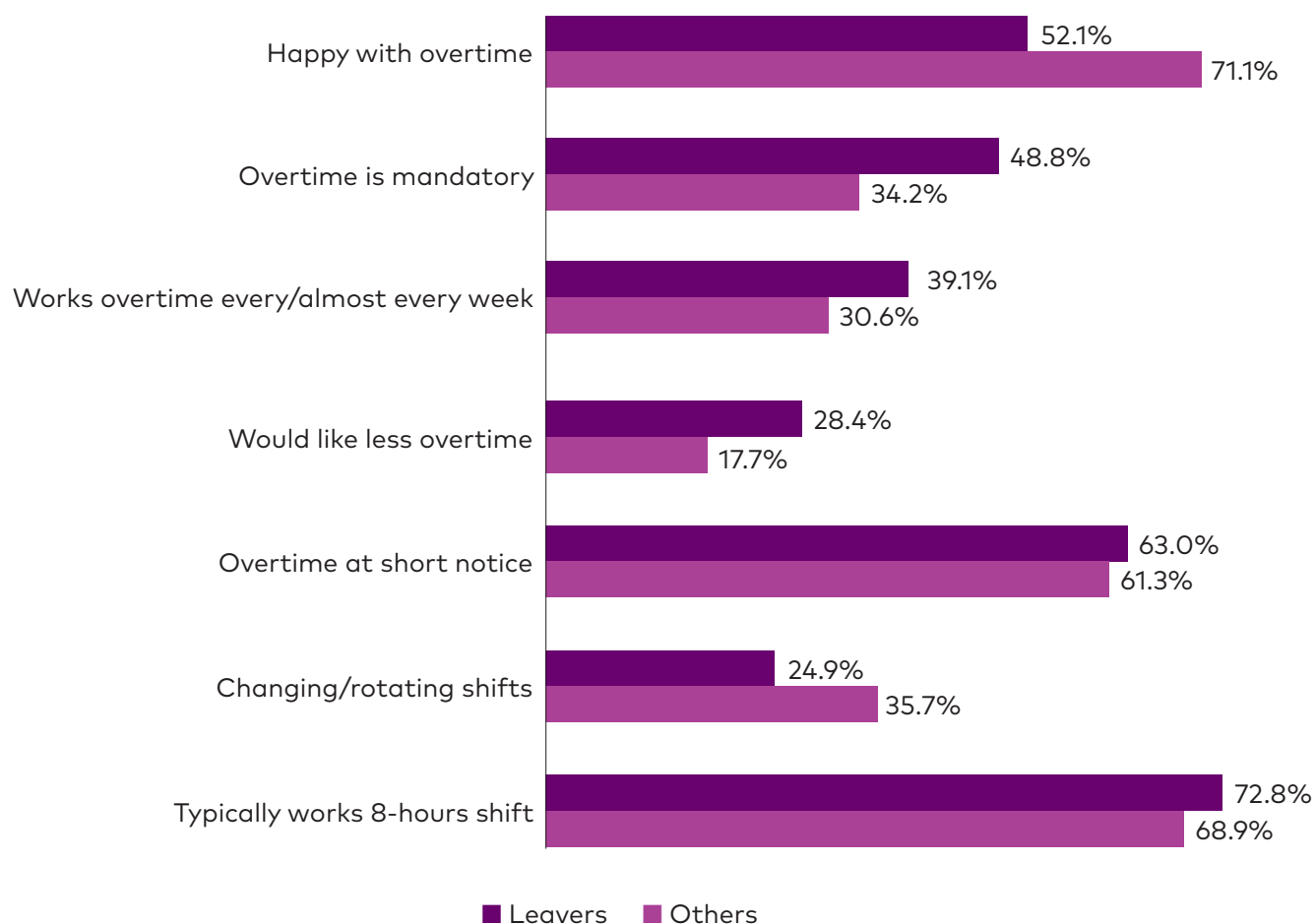
The confluence of pandemic health and supply-chain crises put great pressure on the manufacturing sector and manufacturing workers. Almost sixty percent (59.2 percent) of respondents worked throughout the pandemic; the majority of those who had to leave or stop work left due to child care or caregiving obligations or because they contracted COVID-19. But as survey responses underscore, pandemic pressures only aggravated longstanding issues related to pay, staffing levels and excess working hours that likely stand in the way of retaining workers of all genders.

On the other hand, large majorities of both leavers and non-leavers report that overtime is often scheduled at short notice (61.3 and 63.0 percent, respectively), and there are no substantial differences between leavers and others regarding the typical length of shifts; in the sample, 8-hour shifts are most common (68.9 and 72.8 percent, respectively, for leavers and others). While permanent evening and nightshift work is not very common among respondents, leavers are more likely than non-leavers to work nightshifts (8.2 and 2.7 percent, respectively) or evening shifts (7.8 and 6.7 percent, respectively). While it seems intuitively difficult to craft a life around rotating shift patterns, this does not affect respondents' stated desire to leave manufacturing; leavers are less likely than others to work rotating shifts (24.9 and 5.7 percent, respectively, Figure 10). The challenge—or task—is to design scheduling in consultation with workers and management, allowing workers to find hours of work that fit rather than clash with their lives.



FIGURE 10: Overtime and Shift Patterns.

Respondents (%) who considered leaving compared to others



Notes: "Leavers" are respondents who answered "yes" to the question, "In the last five years, have you seriously considered leaving the manufacturing industry altogether?" and includes respondents who said they left, but returned; who seriously considered leaving but are still in the industry; and who left and returned. "Others" are those who answered "no".

Source: 2022 IWPR Women in Manufacturing Survey

SAFETY AND HEALTH ARE KEY REASONS FOR WANTING TO LEAVE

"We have to fight for the tools that we need to perform our job and it's like the guys get it before we do.

Same thing with PPE... We have small hands and you have to have certain gloves for certain jobs, and trying to get extra smalls is like pulling teeth."

Machinist, Union, White

Well over a third of respondents who consider leaving manufacturing point to health and safety concerns as very important reasons (Figure 9). Leavers are less likely than non-leavers to say that they worked throughout the COVID-19 pandemic (55.3 and 62.6 percent, respectively); their answers may reflect specific concerns they had about COVID-19-related safety issues. Some respondents describe

high levels of infection in their plants, and fear of bringing the virus back home to family members. But others describe the impact on their health of working conditions unrelated to COVID-19, such as standing for long hours on concrete floors, or the physical and mental exhaustion from long working hours.

In addition, those with leave intentions are more than twice as likely as others to say that they are never or rarely treated equally as men regarding safety (13.8 and 6.3 percent, respectively) and that they never or rarely receive safety equipment and tools in the right sizes (21.8 and 11.7 percent, respectively; data not shown elsewhere).

In summary, many who consider leaving are motivated not by a single issue but by a combination of poor management, an unwelcoming work environment, and lack of prospects for change. The most important factors differentiating women who say they want to leave from others are perceptions of opportunities to advance and grow in their jobs and to get the respect they deserve. These factors matter more than child care difficulties, the physical nature of work, or workplace isolation as the only or one of a few women. Notably, all of these obstacles to retaining women are within companies' ability to address.

As noted at the beginning of this chapter, leave intentions are not the same as actually leaving. One respondent explains why she is still there as follows: "That is how I feel. You are not going to break me. You are not going to win. You are not going to push me out. I am not just fighting for me. I'm fighting for every woman that comes after me and I refuse to go down to their will."

VI. TACKLING CARE: PARENTHOOD AND CAREGIVING RESPONSIBILITIES IN MANUFACTURING

"I want to give my kids the best education."

Production worker, Union, Black

"If there were better benefits for women, more women would join manufacturing."

Production Worker, Non-Union, American Indian/Alaska Native

"We have no support for our kids and get harassed."

Cutter/Welder, Union, Black

Responsibilities for family care are common to a high number of respondents. The large majority (69.6 percent) of women who responded to the survey have children, including nearly half (47.2 percent) with children under 13 years of age, and 30.3 percent with children younger than six years old. Over a third of respondents (34.7 percent) have care responsibilities for a parent, disabled spouse, disabled child, or close friend. Although this section primarily focuses on the experiences of parents of young children, it also examines access to leave benefits more broadly.

Respondents with young children (under six years of age) differ from all respondents in several ways. They are more likely to be Hispanic/Latina than all respondents (33.6 and 20.8 percent, respectively). They are also more likely to work for plants with fewer than 500 workers (65.7 and 54.7 percent, respectively). As to industry, these respondents are more likely to work in food processing (18.8 and 13.7 percent, respectively) or textile, leather, and apparel (12.5 and 7.1 percent, respectively). By contrast, they are less likely to work in automotive and transportation equipment-producing plants (19.6 compared with 11.7 percent). However, there is little difference in terms of union membership (55.5 and 58.5 percent, respectively).

While the factors behind these differences need further investigation, it may suggest that larger plants in more traditionally male-dominated sectors have particular problems in attracting and supporting mothers of young children.

PARENTS JOIN MANUFACTURING IN SEARCH OF STABLE WORK, AND MAY LEAVE DUE TO LACK OF ADVANCEMENT OPPORTUNITIES

Stable full-time work, high earnings, and good benefits are the key motivating factors for parents to join manufacturing¹⁵, and many mothers and other parents thrive. But one-half of all respondents with children under six (49.8 percent) say that they have considered leaving manufacturing during the last five years. For these respondents, the most important reason is lack of advancement/promotion opportunities (42.9 percent, Figure 11), a slightly higher share than all respondents (38.6 percent, see Figure 9 above).

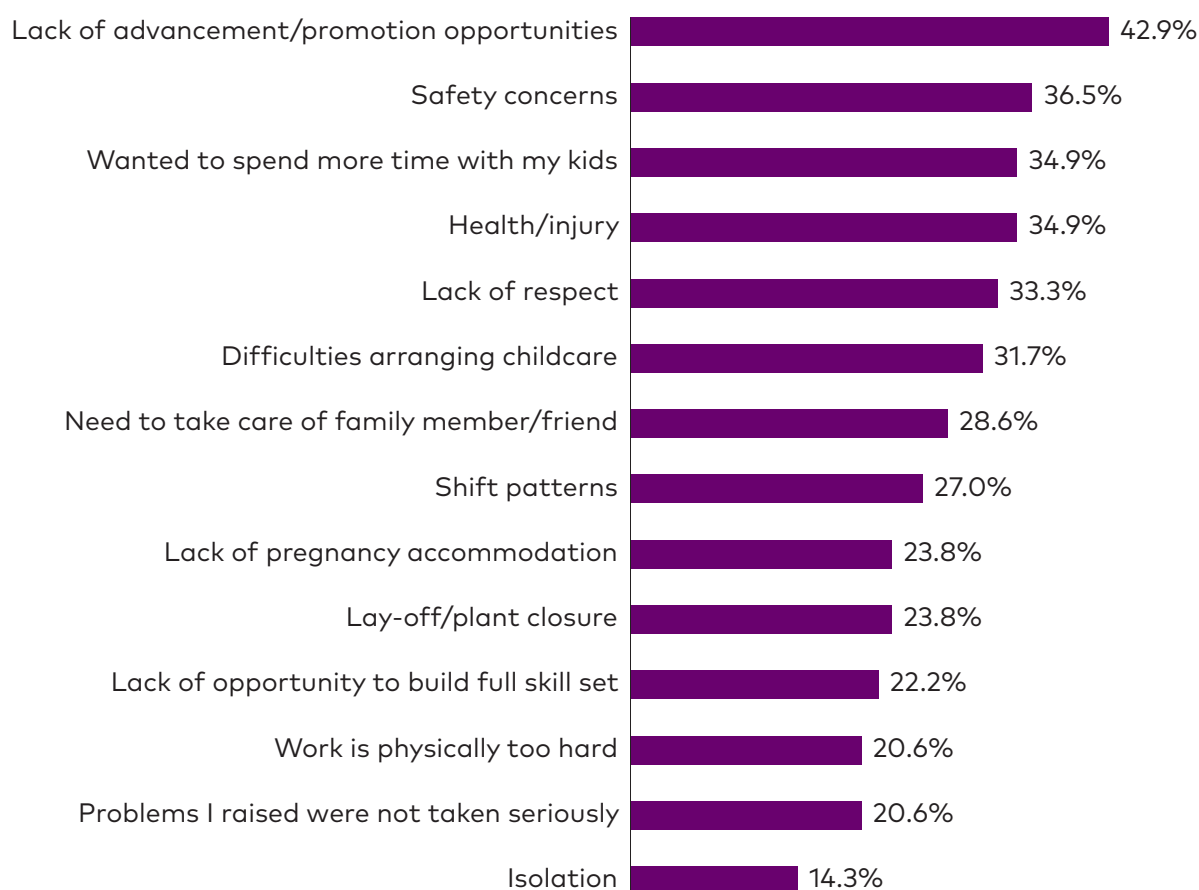
¹⁵ Two-thirds of mothers with children younger than six (67.2 percent) identified opportunities for stable full-time work as very important for joining the industry, followed by opportunities for high earnings (64.8 percent) and good benefits (62.5 percent).

Lack of advancement opportunities, and concerns around safety (36.5 percent), health/injury (34.9 percent), and harassment/lack of respect (33.3 percent) are also very important—more so than difficulties arranging child care (31.7 percent, Figure 11). This does not indicate that quality child care is widely accessible and affordable. To the contrary: it likely reflects the fact that many respondents somehow found a way of addressing child care needs. Those who left because of child care difficulties, or never joined because they could not imagine how to be a parent in manufacturing, are missing.

Difficulties arranging child care are likely magnified for single parents. Several women interviewed for the study pointed to the difficulties faced by single mothers because of the lack of flexibility in the shift system. A Black union woman recalled that she was lucky to have her mother live with her because working swing shifts made it impossible to find child care coverage.

FIGURE 11: What were/are Your Main Reasons for Leaving/Thinking about Leaving?

Share of respondents with children younger than six (%) with leave intentions who rated item as 'very important'



Notes: Respondents with leave intentions are those who answered the question: "In the last five years, have you seriously considered leaving the manufacturing industry altogether" with "Yes, and I no longer work in manufacturing," "Yes, but I am still here; or "Yes, I left but returned."

Source: 2022 IWPR Women in Manufacturing Survey

MOST PARENTS OF YOUNG CHILDREN USE A MULTITUDE OF CHILD CARE ARRANGEMENTS

How do the parents who are in manufacturing meet their child care needs, and how do employers support them? This section will begin by looking at pregnancy and child care-specific arrangements and supports for respondents with children under six years of age; for access to broader leave policies, the chapter will use data for all respondents, irrespective of parenthood status.

For the majority of respondents—as for parents anywhere (see, for example, Sonenstein et al. 2002)—child care means cobbling together a number of different arrangements to ensure that children are cared for throughout the working day (or night). The majority of respondents rely at least partly on paid and unpaid help from family members and/or share care with their spouse (the large majority of respondents with children under age six, 82.0 percent, are married¹⁶). Over half (54.3 percent) pay family members for some child care, and also depend on family members other than their spouse for unpaid help (45.3 percent). More formal arrangements with child care centers, after/before school care centers, and family daycare providers are also common, but less so than family care (Figure 12).

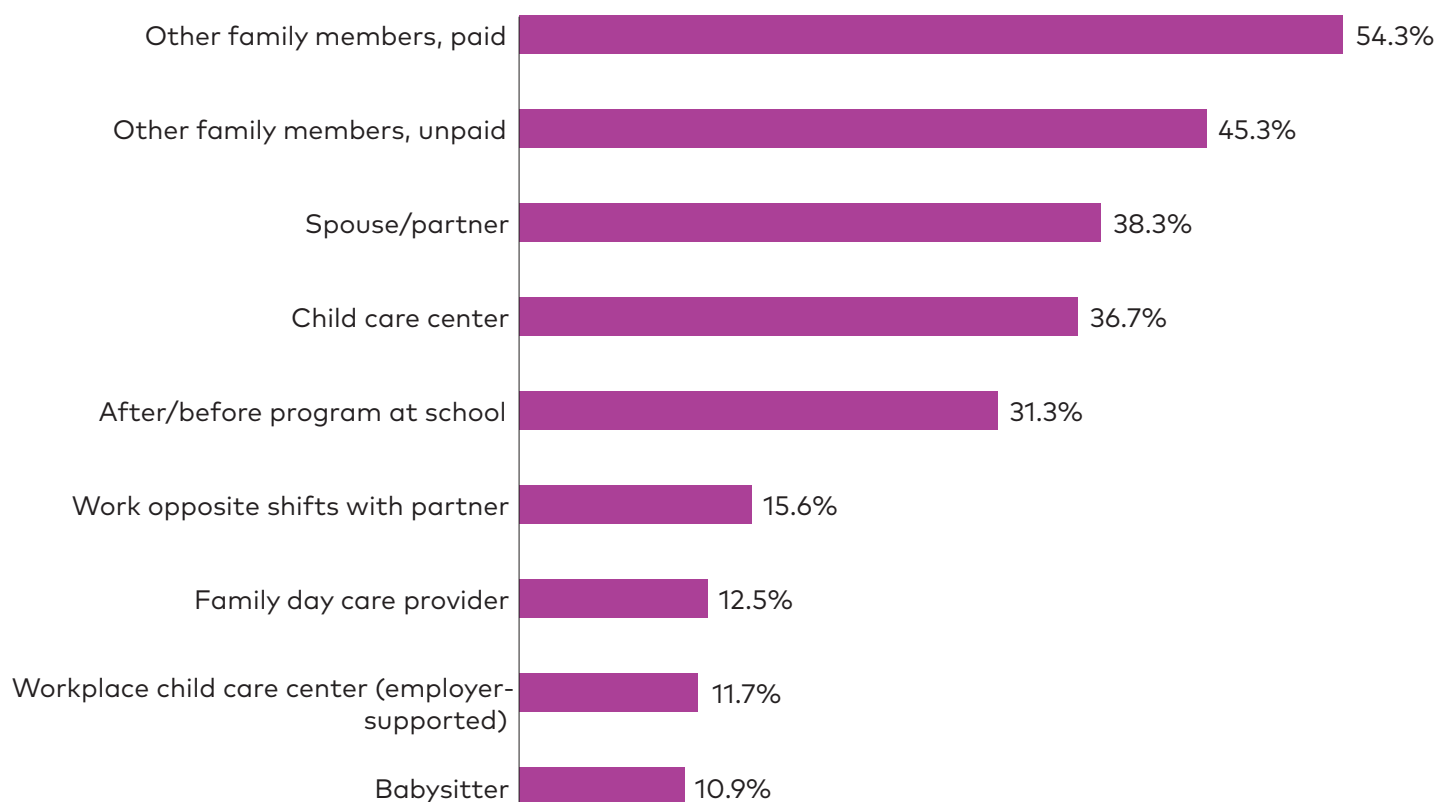
One in seven respondents (15.6 percent) mentioned working opposite shifts from their spouse/partner to cover working hours (Figure 12). One Black union member, who worked in the same plant as her ex-wife, described managing to work opposite shifts to handle child care. Sharing child care with a spouse who works opposite shifts is a well-established pattern in manufacturing; doing so can save child care costs and allow parents to care for their children themselves, something that parents may prefer particularly for young children, but at the potential costs of greater stress on and higher divorce rates among parents and developmental challenges for some children (Hattery 2001; Li et al. 2014; Presser 2005).



¹⁶ Nationally, in 2021, 72.4 percent of employed mothers of children under 3 were married (U.S. BLS 2022b). Among respondents, the higher rate (82.0 percent) of married mothers of children age six or younger may suggest that manufacturing is less attractive to single mothers than other sectors, particularly for those with younger children. The share of married respondents is lower, at 70 percent, for those who have children younger than 13.

FIGURE 12: What Child Care Arrangements do You Usually Use while You are at Work?

Respondents (%) with children younger than six years of age



Notes: Respondents could choose all applicable options.

Source: 2022 IWPR Women in Manufacturing Survey

EMPLOYER-PROVIDED BENEFITS HELP MANY RESPONDENTS MEET CHILD CARE AND CARING RESPONSIBILITIES

Child Care Supports

More than one in ten respondents with children younger than 6 (11.7 percent) report having their child in an employer-supported workplace child care facility (Figure 12), and 25.0 percent report that their employer provides a workplace child care center, whether they use it or not (Figure 13). Workplace child care continues to be rare in the United States; the most recently-published national data, for 2014, indicate that just one in 10 private sector employees had access to employer-supported child care (Stolzfus 2015). Amid the care crisis following the COVID-19 pandemic, awareness of the critical need for child care has increased, and more employers say they are offering child care benefits (Care.com 2022; Hau 2022), including in manufacturing (The Manufacturing Institute 2022b). Tax credits of up to \$150,000 are available to employers for expenses for child care centers, and there may be other ways to offset child care costs against business expenses (Lobell 2020; U.S. GAO 2022).

Even with pressing need, a child care center may not be the only or the optimal solution for all workplaces. Supporting the costs of child care—especially during the current child care crisis—can be a helpful alternative or complementary strategy for employers. Collaborating with other employers or with unions to establish joint centers is another fruitful alternative (IFC 2017). One in two respondents with children under 6 (49.1 percent) report that their employer provides some type of child care subsidy (Figure 13); the survey asked only whether a respondent’s employer offered such benefits, not about the form these take, or whether they go beyond facilitating dependent flexible spending account benefits.

Emerging apprenticeship and pre-apprenticeship programs in manufacturing are increasingly including child care supports or partnerships with child care providers. In the face of the current crisis, unions are negotiating additional child care benefits for their members (Green 2021). Efforts from the building trades union¹⁷, the long-standing success of the SEIU1199Childcare Fund in New York¹⁸, and the Boston based Care that Works Coalition¹⁹ provide examples of unions working to expand child care availability. Unions and employer associations such as the Chamber of Commerce and the National Manufacturing Institute are also organizing to make the case for greater federal, state, and local investment in the child care infrastructure (Saputo 2022; The Manufacturing Institute 2022).

Pregnancy Accommodation and Parental Leave Benefits

Over three quarters of respondents with young children (78.1 percent) say that their employers provide paid maternity leave (Figure 13)—a much higher proportion than have access to such benefits nationally. Paid maternity leave is crucial for the health of both parent and child to recover physically from labor and delivery as well as provide time for bonding and adjustment (Aitken et al. 2015; Bartel et al. 2022). Those with access to paid maternity leave are also much more likely to return to work, ensuring greater economic security for themselves and their families as well as helping employers with critical retention needs (Rossin-Slater 2017).

Despite the well-established benefits that paid childbirth leave affords to all family members, respondents are much less likely to report that male colleagues also have access to paid leave for the birth of a child. Paid maternity leave is 1.7 times more likely than paid paternity leave, offered by employers of slightly under half (46.1 percent) of respondents with young children (Figure 13). While paternity leave access is also much higher than one would expect based on national data (Petts, Knoester, and Li 2020; U.S. Department of Labor 2016), the big gap between maternity and paternity leave access suggests that parenthood is still treated primarily as something that happens to birthmothers rather than requiring input and time from all parents. Such an imbalance in care-related benefits reinforces traditional gender roles and diminishes the other parent’s rights and time to be involved in their children’s care, increases time burdens placed on birthmothers, and can also increase bias and stigma against women as potentially less reliable and career-oriented than men.

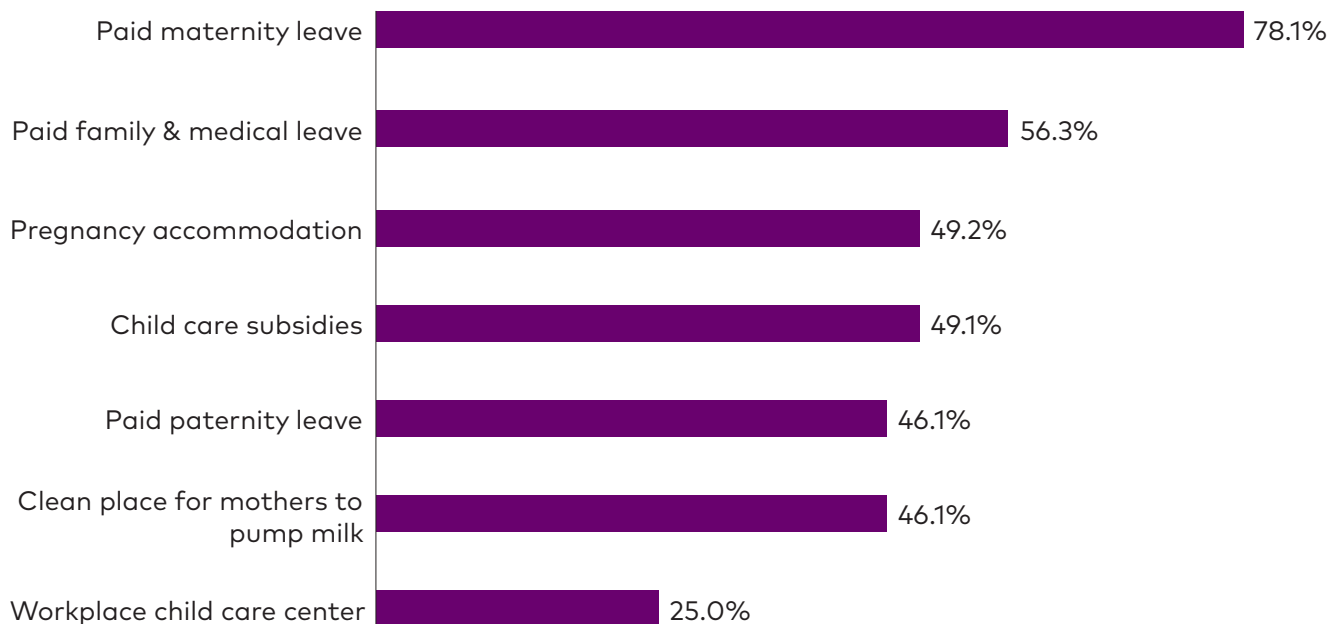
¹⁷ See Tradesfutures <<https://tradesfutures.org/initiatives/child-care-pilot/>>.

¹⁸ See 1199SEIU Childcare and Youth Services <<https://www.1199seiubenefits.org/childcare/>>.

¹⁹ See Care that Works <<https://carethatworks.org/>>.

FIGURE 13: Employer-Provided Child Care and Pregnancy-Related Benefits.

Benefits provided to respondents (%) with children under 6 years



Source: 2022 IWPR Women in Manufacturing Survey

Work on the shop floor is often physically strenuous. Having work adjusted to guarantee safe pregnancy is especially important, and one in two respondents with young children (49.2 percent) say that pregnancy accommodation/shifting to light duty is a given at their workplace. UAW's collective agreement with General Motors includes the provision of rooms for nursing or expressing breast milk for nursing mothers. Notably, over half of respondents with young children (50.8 percent) report that such accommodations are not guaranteed at their workplace. The recently- passed Pregnant Workers Fairness Act (PWFA)²⁰ and the Providing Urgent Maternal Protections for Nursing Mothers Act (PUMP Act)²¹ are designed to increase access to such supports across all workplaces, including manufacturing. But legislation alone may not suffice to ensure full implementation of such basic aspects of safe and healthy workplaces. Since 2010 federal law has required that employers provide hourly-paid workers with a clean place to pump milk²²—yet fewer than half (46.1 percent; Figure 13) of respondents say that their workplace supplies such a facility.

CARE TAKES TIME: LEAVE-RELATED BENEFITS

Whether caring for children, older relatives, family members, or friends in need of support, caregiving takes time. Time is needed to get through school vacations, accompany children or other loved ones

²⁰ H.R.1065 - Pregnant Workers Fairness Act <<https://www.congress.gov/bill/117th-congress/house-bill/1065>>

²¹ H.R.3110 - PUMP for Nursing Mothers Act <<https://www.congress.gov/bill/117th-congress/house-bill/3110/text>>

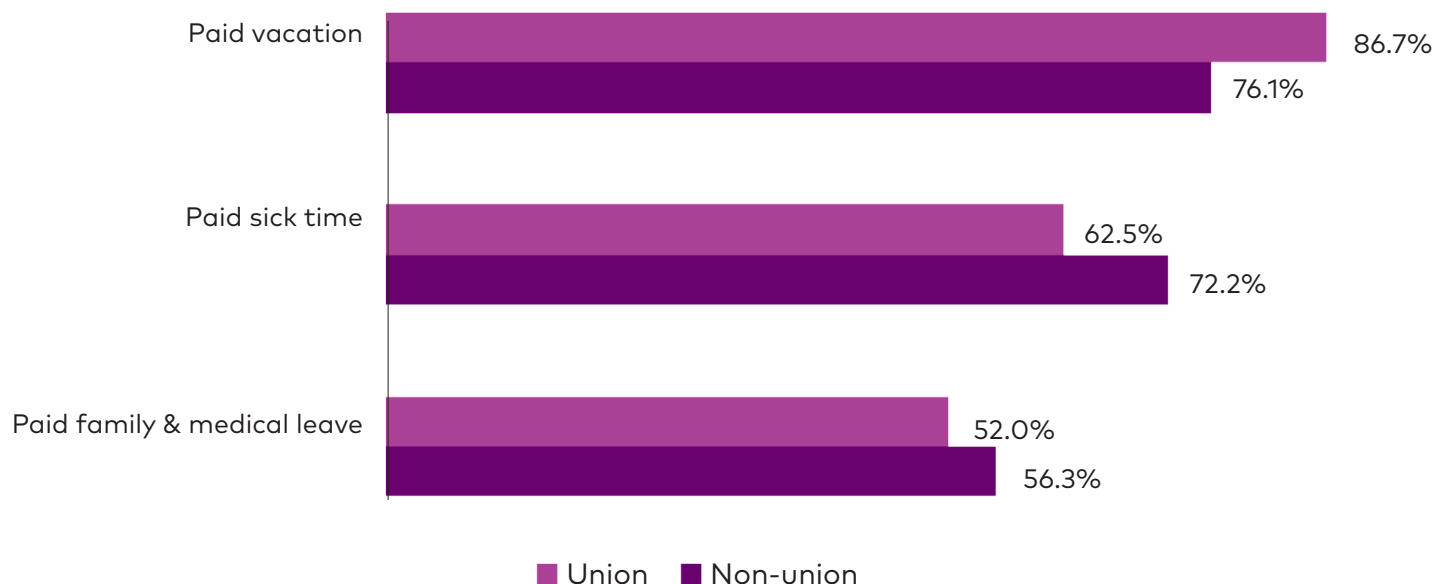
²² The Patient Protection and Affordable Care Act (P.L. 111-148, known as the "Affordable Care Act") amended section 7 of the Fair Labor Standards Act ("FLSA") to require employers to provide "reasonable break time for an employee to express breast milk for her nursing child for one year after the child's birth each time such employee has need to express the milk," as well "a place, other than a bathroom, that is shielded from view and free from intrusion from coworkers and the public, which may be used by an employee to express breast milk." (U.S. Department of Labor, Wage and Hour Division n.d.)

to medical appointments, or provide at-home care when they are ill. While paid vacation and paid sick time are very important for a worker's own health and well-being, paid leave is also a vital work-family benefit.

The large majority of respondents report access to paid vacation time, with union members more likely to have such access than non-union members (86.7 and 76.1 percent, respectively). Paid sick time is slightly less common for both union members and non-members (62.5 and 72.2 percent, respectively). Just over half of respondents say that they have access to paid family and medical leave (52.0 and 56.3 percent of union and non-union members, respectively, Figure 14). In the National Compensation Survey, manufacturing employers report similar figures regarding access to paid vacation, but report much lower levels of access to paid sick time and paid family and medical leave. In March 2022, 90 percent of private sector employers with production workers reported providing paid vacation, but just 44 percent reported paid sick leave, and only 16 percent paid family leave (U.S. BLS 2022a).²³ The higher rates of leave access among survey respondents reflect high rates of union membership, and may also indicate that those respondents who hold non-union jobs are employed by firms with better than average employment practices for the industry. Yet, many women working in shop floor manufacturing jobs still lack basic leave supports to help care for themselves as much as for their families and loved ones.

FIGURE 14: Does Your Employer Provide the Following Paid Leave Benefits?

Share (%) of all respondents by union membership



Notes: Includes all respondents, irrespective of whether they are parents.

Source: 2022 IWPR Women in Manufacturing Survey

²³ The leave questions included in the NCS are more detailed than those in the 2022 IWPR Women in Manufacturing survey and include data on length of leave as well as Paid Time Off practices where employees do not receive separate entitlements for each type of leave they may need. Data here are taken from "Table 7. Leave benefits by occupational group, private industry workers, March 2022," US BLS 2022a).

In summary, caregiving responsibilities, whether for children, other loved ones, or both, are the norm for many in manufacturing. The responses show that many who are now working in manufacturing find child care and caring responsibilities compatible with their manufacturing careers, including a substantial number in the sample reporting that their employers directly help them meet their child care needs. Yet, finding child care, and particularly having enough time to be with children, rank highly for parents, including as a possible reason for leaving manufacturing. Around one in two respondents lack basic work-family supports such as paid family and medical leave, paid sick time, or a clean space for new mothers to pump milk. The survey points to the need for considerable improvements in work-family benefits for its workers, benefits and working time arrangements that meet care needs across the life cycle, including child care that matches manufacturing hours, self-care, and care for elder parents, spouses or other family members in need of care.

At the same time—and likely also a reflection of the fact that the survey only captures respondents who are able to manage care needs—child care problems are not the most common concerns of respondents with young children. Instead, their concerns mirror those of others: having a well-paid quality job with advancement opportunities and a respectful working environment. The final section will look more directly at what helps women enter, stay and thrive in manufacturing.

VII. STAYING POWER: POLICIES AND PRACTICES THAT HELP WOMEN SUCCEED IN MANUFACTURING

"The union helps me to be the most successful. [It] has the best training and schooling opportunities I know of."

Machine Operator, Union, White

"Start going to schools and educate our youth about jobs for them."

Production Worker, Union

"I used a lot of the skills learned in my pre-apprenticeship program about how to behave as a woman in a male dominated field to continue working for this company as long as I did."

Machine Operator, Non-union, White

"Provide FREE childcare onsite, vouchers, paid family leave."

Electrician, Union, Latina

"More woman in trades need to step forward and talk to other women. Sometimes that MAY be the only type of encouragement they get."

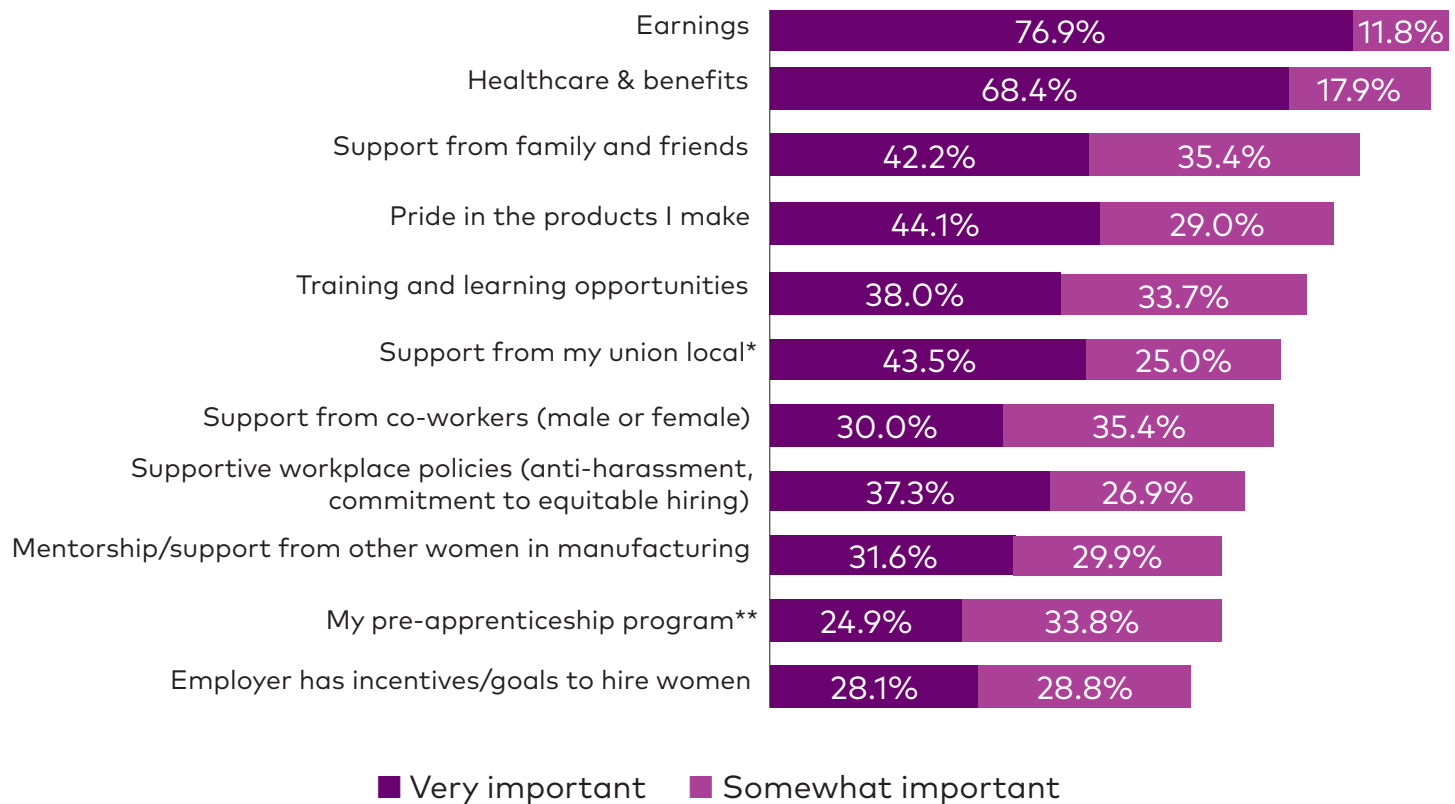
[no job title] Union, Asian American

Numerous respondents have spent many years in manufacturing, building successful careers with economic security for themselves and their families. What keeps these women in manufacturing jobs? Many respondents cite the same reasons that attracted them to the industry in the first place: the opportunity to earn a good living in a job with health care and other benefits (Figure 15). Other factors that respondents identify include supportive workplace policies, access to training, apprenticeship programs and mentorship, support from their unions.

This section discusses policies and practices that can enhance and expand access to these workplace features, which are needed to attract, retain, and ensure equitable career pathways for women in manufacturing. Implementing these measures is key for the industry to make good on its commitment to create a diverse workforce and provide equitable access to good jobs for all.

FIGURE 15. What Helped/Helps You Succeed and Stay in Manufacturing?

Respondents (%) selecting each item as 'very important' or 'slightly important'



Notes: Respondents could rate each item as Very Important, Somewhat important, Slightly Important, or Not at All Important *Responses shown for union members only. ** Responses shown only for those who completed a pre-apprenticeship program.

Source: 2022 IWPR Women in Manufacturing Survey

ENSURE A WELCOMING WORKING ENVIRONMENT, WITH PROACTIVE AND ENFORCEABLE POLICIES FOR FAIR AND EQUITABLE WORKPLACES

Offering a welcoming working environment free from harassment, and with complaint processes that are accessible and effective when incidents do occur, should be standard in any workplace. Happily, many respondents experience workplaces that are largely free of discrimination and harassment, with a majority reporting that they never or rarely experience harassment, and with those who experience discrimination in major aspects of employment clearly outnumbered by those who do not, as discussed in Section III. Yet, for far too many respondents, a working environment free of harassment and discrimination is not the norm. Further, too many cannot even take for granted the basics of safe working conditions, such as safety equipment in the right sizes and clean and convenient bathrooms. Especially as substantial new funds are flowing into the industry to establish or expand manufacturing supply chains in emerging industries, employers need to be held accountable for the working environment they provide.

Clear formal policies, and mechanisms for accountability and enforcement. Nearly two-thirds of respondents (64.2 percent, Figure 15) point to the role of formal policies to create equitable workplaces, including anti-harassment policies and commitments to equitable hiring and diversity goals. The White House Strategy for Advanced Manufacturing (Executive Office of the President 2022) emphasizes the need for explicit policies to ensure greater diversity and equity in access to manufacturing jobs, and related metrics, evaluation, and accountability (Executive Office of the President 2022). Regular monitoring of gender and racial/ethnic equity in recruitment, pay, training, and promotions can help eliminate bias and discrimination and promptly identify barriers to meeting equity and diversity goals.

Where workers are represented by a union, policies and processes related to pay equity, hiring, advancement, and anti-harassment measures are further specified in and enforced via the collective bargaining agreement. Labor-management structures provide additional support and structured processes for workers seeking to address incidents of bias or harassment.

Official hiring goals that apply to companies receiving federal funds have also helped some women enter the manufacturing industry. Hiring goals can be a mixed blessing, with some women being told that they were hired solely because of quotas. Several Black women interviewed noted that they presented a double or "triple whammy" to recruiters: being Black, female, and a veteran. At the same time, at least one woman highlighted the potential of such hiring goals to encourage outreach to other women of color about these well-paid jobs.

Effective anti-harassment and diversity, equity, and inclusion (DEI) training. As discussed in Section IV, one in six respondents have received no anti-harassment or diversity, equity, and inclusion (DEI) training during the last five years. However, the large majority of respondents reports receiving some type of anti-harassment and DEI training during their tenure in the industry. The quality of anti-harassment and DEI training can differ widely; online training, which is the form of training received by 34.0 percent of respondents, has shown limited impact to date in creating harassment-free workplaces.²⁴ In recent years, new methods such as Green Dot programs²⁵ or the Rise Up program in Seattle²⁶ have been developed both to help bystanders find ways to intervene and stop harassment, and to develop shorter, more practical discussion points that can help tailor training to a shop floor environment. Such programs are particularly relevant in male dominated technical fields. A number of pre-apprenticeship and other similar programs provide anti-harassment and DEI training and technical assistance specifically tailored to manufacturing and construction workplaces, on topics such as respectful workplaces, harassment prevention, and mentorship to address the disparities highlighted by survey respondents.²⁷

INCREASE AND SUPPORT EQUITABLE AND REWARDING CAREER PATHWAYS FOR WOMEN IN MANUFACTURING

More systematic outreach and recruitment. For far too many women, finding out about opportunities in manufacturing is the luck of the draw, and perhaps growing up in a family with manufacturing

²⁴ See Feldblum and Lipnic (2016) for a comprehensive review of the evidence.

²⁵ See Alteristic <<https://alteristic.org/>> for examples of Green Dot By-stander intervention programs.

²⁶ See City of Seattle Rise Up <<https://riseup4equity.org/public-partnerships/>> or ANEW <<https://anewcareer.org/31611-2/>>.

²⁷ Many women-focused pre-apprenticeship programs, including ANEW in Seattle, CWIT National Center for Women's Equity in Apprenticeship and Employment, Oregon Tradeswomen, and Tradeswomen Inc. (Northern California) offer relevant technical assistance.

connections. Official career counselors in high schools, the military, and at job centers very largely fail to point women in the direction of manufacturing. Respondents ask for much more proactive outreach, starting with programs and initiatives for middle school girls, and the large majority are willing to be a messenger to inform other women about the opportunities that are available for women in manufacturing.

A comprehensive training and learning infrastructure for manufacturing. More systematic outreach and recruitment. For far too many women, learning about opportunities in manufacturing depends on luck or comes with growing up in a family with manufacturing connections. Career counselors in high schools, the military, and job centers almost never point women toward jobs in manufacturing. Respondents ask for much more proactive outreach, starting with programs and initiatives for middle school girls. The large majority are also willing to carry the message to others about opportunities for women in manufacturing.

A comprehensive training and learning infrastructure for manufacturing. Over seven in ten respondents say what helps them stay and succeed in the industry is having pride in their work and opportunities to learn new skills (Figure 15). Developing new skills can often be a prerequisite for moving to better-paid positions, but it can also a more interesting working environment. Women whose workplace provides regular training opportunities are much more likely to be happy with their working environment and less likely to want to leave the industry. Building on well-established training and apprenticeship programs, including those sponsored by labor-management partnerships, can help increase women's desire to stay in manufacturing. Newly-emerging models can also provide critical foundational skills for advanced manufacturing.²⁸ Deliberate efforts to expand labor-management training partnerships and maximize the engagement of women and BIPOC workers in established and emerging training and employment pathways will be crucial.²⁹

Utilizing apprenticeship pathways will be critical to the skill development women workers want and the industry urgently needs. The generally more positive experiences of respondents who came through an apprenticeship program point to the success of recent proactive strategies to create a skilled and diverse manufacturing workforce. But training and skill-development efforts need to reach beyond apprenticeship. Many women with years of seniority in the industry find it difficult to access training in new skills, technologies, or job functions. In places where training is standard, it is often not supported by a formal certification process that would allow women to build on and transfer their qualifications within the industry.

A key role for pre-apprenticeship programs. Pre-apprenticeship programs can play a particularly important role in broadening and diversifying the pipeline of workers entering manufacturing. Pre-apprenticeship programs go beyond preparing graduates for formal apprenticeships; they also can prepare their graduates to work in the industry (Hegewisch 2018; Nanda, Corea, Roy, and Patterson 2018; U.S. Department of Labor Women's Bureau 2021). The majority of respondents who completed pre-apprenticeship programs (58.7 percent) see them as very or somewhat important for their success

²⁸ One example is the Industrial Manufacturing Technician program; see Industrial Manufacturing Technician Apprenticeship (<https://www.imtapprnticeship.org/>).

²⁹ Technical assistance to improve diversity and retention in manufacturing apprenticeships is available from Jobs for the Future's Center for Apprenticeship & Work-Based Learning through organizations such as CWIT National Center for Women's Equity in Apprenticeship and Employment, and the Working for America Institute. These innovative programs are supported by grants from the U.S. Department of Labor.

(Figure 15). However, those who completed pre-apprenticeship programs are less likely than others to be members of unions (44.1 for those who completed a women-only program, compared to 72.3 percent of other respondents). This disparity may suggest that union plants—which typically provide higher pay and benefits and thus are likely to be particularly attractive to graduates of such programs—could more effectively work with pre-apprenticeship programs to reach historically underrepresented workers.

Apart from preparing women for employment in manufacturing, women-focused pre-apprenticeship programs typically are also a source of technical assistance to employers seeking to improve workforce equity and diversity. For example, with the help of a grant from the U.S. Department of Labor, Jobs for the Future's Center for Apprenticeship & Work-Based Learning³⁰ is working with organizations such as the Chicago Women in the Trades National Center for Women's Equity in Apprenticeship and Employment and the Working for America Institute to enhance diversity and retention in manufacturing apprenticeships through technical assistance. Similarly, the Women in Apprenticeship and Nontraditional Occupations (WANTO) grant program, administered by the U.S. Department of Labor Women's Bureau, has been a vital funding source for technical assistance through pre-apprenticeship programs.³¹

Mentorship matters. Six in ten respondents (61.5 percent) say that mentorship from other women is very or somewhat important for their success and staying power in the industry (Figure 15). Workplace mentorship is often informal, but research suggests that more formal mentorship programs can help women's retention and advancement, including within unions (Hess 2012).

Unions in the manufacturing sector frequently have women's committees at the plant level and may also have national women's departments (such as the UAW's Women's Department) or union-wide women's leadership programs, such as the IAM's LEADS³² or the USW's Women of Steel programs, to address women's issues on the shop floor. These committees and programs also help members build networks and find mentors at the workplace, regional, and national levels within the union. USW Women of Steel also partners with community groups to provide mentorship and training for manufacturing jobs.³³

Women-focused pre-apprenticeship programs also typically provide mentorship opportunities, including piloting different formal mentoring programs.³⁴ In addition, the Manufacturing Institute has established a program to train 1000 women mentors and mentees as part of its Women MAKE America Initiative (Manufacturing Institute 2022).

³⁰ See note above.

³¹ For a list of current and past grantees, see <https://www.dol.gov/agencies/wb/grants/wanto>.

³² For more on the 'Leadership Excellence Assembly of Dedicated Sisters' (LEADS), see <https://www.goiam.org/news/ma-chinists-union-launches-groundbreaking-program-to-increase-women-involvement-in-union/>.

³³ See, for example, USW Local 13-227/ Women of Steel partnership with The Bridge Over Troubled Waters program, and scholarship for manufacturing skills certification at: <<https://www.usw.org/news/media-center/articles/2016/usw-cares-usw-2016-community-service-champion-and-d13-jefferson-award-winner>> and Local 9-1535's partnership with Alabama Sheriffs Girls Ranch at: <https://youtu.be/_9VLic5CR-E>.

³⁴ The CWIT National Center for Women's Equity in Apprenticeship and Employment provides examples; see <<https://womensequitycenter.org/>>; Tradeswomen Inc. in Northern California, with the help of a WANTO grant, is piloting three alternative models for mentorship by and for women in different apprenticeship settings (see <<https://www.dol.gov/sites/dolgov/files/WB/media/Tradeswomen-Inc.pdf>>). Philadelphia Women in Nontraditional Careers (WINC) offers training for women who want to become ambassadors for their industry to other women <WINC - Philadelphia Works <philaworks.org>.

BENEFITS AND WORKING CONDITIONS THAT ARE FIT FOR THE 21ST CENTURY

Comprehensive leave policies. Manufacturing offers better benefits than many other private industries. Unfortunately, too many respondents lack the basics of paid sick time and paid family leave. Although many respondents have access to at least some paid maternity leave, paid leave for fathers is much less common. The benefit structure in too many workplaces diminishes men's roles and rights as caregivers, thus putting additional burdens on women. Women need workplaces where both women and men are able and expected to care for their families with time as well as money, based on a robust federal program that provides all workers with job-protected family leave and meaningful wage replacement.

Tackling child care. Manufacturing workers are not alone in facing a child care crisis. A substantial number of respondents receive some support for their child care needs via employer subsidies and/or on-site child care services. Unions can play a key role either by negotiating child care assistance in collective bargaining agreements or by providing care directly. But the child care crisis extends well beyond individual employers. The U.S. Chamber of Commerce has established an initiative whereby groups of employers are advocating greater investments in child care and partnering with state and local providers to expand the supply of child care (Saputo 2022). Similarly, federal agencies should encourage recipients of substantial public investments to expand affordable and accessible child care. The U.S. Department of Commerce' recent requirements to include child care plans in bids from companies for funds released under the CHIPS Act of 2022 recognize the need for such investments as part of an overall industrial strategy for advancing U.S. economic and national security (U.S. Department of Commerce 2023). Child care benefits also need to be extended to pre-apprenticeship and other training programs so that all workers can pursue training regardless of any child care responsibilities.

Working hours that work. While opportunities for stable full-time work draw many women to manufacturing, rigid scheduling and, at least for some, excessive mandatory overtime can drive out some workers; others may be deterred from entering the industry altogether. Case studies show the potential of engaging workers to develop solutions that work for both employer and workers (Fagan, Hegewisch, and Pillinger 2006). Unions have long advocated and negotiated for staffing levels that do not necessitate excessive hours of work and for humane scheduling. Some manufacturers have adopted split or staggered shifts to help workers manage commuting, family, and school schedules (Smith 2022). The manufacturing industry is not alone in often requiring round-the-clock operations; hospitals, with predominantly female workforces, typically have the same requirements—and many of the same challenges. More work is needed in manufacturing and other sectors to develop and implement equitable staffing and scheduling models that are critical to sustain a robust and stable workforce.

SUPPORTING UNIONS, WORKERS' RIGHTS AND WOMEN'S VOICE AT WORK

Unions play a key role in creating the conditions needed for women to thrive in manufacturing. Unions' traditional strength in manufacturing helped create the family-supporting jobs that characterized the industry. While wages and working conditions have eroded in the sector, in tandem with declining union density, unions still play a critical role in securing the wages, benefits, and stable employment that workers depend on. Collective bargaining agreements also mandate pay equity, provide transparency and consistency across many workplace systems, and embed procedures to address discrimination.

Strengthening and enforcing workers' rights on the job, including their ability to organize and bargain collectively, will be fundamental to ensuring the conditions necessary to make the industry more diverse, equitable, and resilient. And unions themselves need also continue to make progress towards equitable representation and participation of all members.

Over two-thirds (68.5 percent) of union respondents rate support from their union local as very or somewhat important (Figure 15). Many of the respondents are active in their unions. Over six in ten (63.3 percent) are currently elected members of union committees or have been so in the past; more than four in ten (45.2 percent) are currently shop stewards or have been in the past; and about half (49.2 percent) say they regularly attend their union's women's committee meeting.³⁵ For several women interviewed for the study, their union was the only reason they stayed in a working environment that in many ways feels disrespectful and discouraging. Unions can offer opportunities to meet and work with other women; as one White woman machinist put it, "you are just dismissed so often, and told that however you feel is invalid and to be around people that have had similar experiences and similar trials is just so rewarding, cathartic ... and have someone be like "yeah, you are not crazy—this is really happening, and we deserve better."

For many respondents, union membership means they have a voice and can stand up against management practices that disrespect and may even endanger workers. Union-negotiated safety and health committees can help ensure universal access to safety training and equipment and can help address the kinds of shortfalls that some respondents mentioned. Unions can and do bargain over the safe and fair adoption of technology on the shop floor. Joint labor-management training programs enable workers to participate in developing and administering the content, duration, and structure of skills acquisition courses. Women's, civil rights, and other committees provide support systems within the plant, and structured grievance and representation processes help combat bias and harassment.

Working in a male-dominated field can be difficult. Unions are developing new mechanisms to support women in these industries and within the labor movement itself. Women in the construction trades, another industry where women are still a minority of workers, have long benefitted from an annual cross-union and cross-trades conference that allows women to recharge, learn from, and organize with each other. In 2022, the Tradeswomen Build Nations (TWBN) conference attracted close to 3000 tradeswomen, one of the largest gatherings of union members anywhere.³⁶ This conference also provides a forum for senior union officials to hear directly from women members and has helped speed unions' actions to enhance equity and inclusiveness.³⁷

³⁵ The survey was distributed to union members through women's committees; this likely accounts for respondents' high levels of union experience and engagements.

³⁶ See Tradeswomen Build Nations <<https://nabtu.org/twbn/>>. The conference was first held in 2001 in Northern California, organized by Tradeswomen Inc with the support of the California State Building and Construction Trades Council (Martin 2015).

³⁷ One direct outcome of such exchanges at the TWBN conference has been the International Association of Sheet Metal, Air, Rail and Transportation Workers (SMART) Belonging and Excellence for All (BE4ALL) initiative; SMART also organizes workers in production/ manufacturing. As part of the initiative, the union established a recruitment and retention council and has adopted ambitious goals for making the union more inclusive. See SMART <<https://smart-union.org/our-priorities/diversity-equity-and-inclusion/be4all/>>.

IN CONCLUSION

Rebuilding domestic manufacturing and manufacturing supply chains, strengthening unions and worker empowerment, and achieving Justice40 commitments³⁸ to racial and economic equity and inclusion are at the heart of the federal government's commitment to rebuilding the economy. A 'high road' manufacturing strategy based on strong labor-management partnerships and a well-paid and highly-trained workforce is central to the nation's competitiveness and its economic and national security. The White House Strategy for Advanced Manufacturing sets ambitious goals for advanced manufacturing in the coming years (White House EOP 2022), while government and industry stakeholders alike recognize the need to increase diversity and tackle the social and structural barriers facing historically marginalized groups.

Survey respondents spell out what helps them succeed in the industry and what they think is needed to improve women's access to and retention in high-quality manufacturing jobs. For many respondents, manufacturing offers good wages and working conditions, opportunities to learn, and—largely—a respectful and nondiscriminatory work environment. But too many respondents, around a fifth in some categories, labor in unacceptable conditions where discrimination and harassment are the norm and respect is nowhere to be found. Intentional policies, including a focus on creating inclusive, harassment-free workplaces, mentorship and community supports, data tracking and oversight to ensure equitable recruitment and promotions, and work-family policies that acknowledge that many workers of all genders have families, can help the industry build on the current momentum and continue to recruit and retain a more diverse workforce.

The 2022 IWPR Women in Manufacturing Survey lifts up the experiences of two subsets of women working in shopfloor positions, women who belong to unions and women who completed or are currently enrolled in an apprenticeship program. Union members and apprentices are a minority of those working on the shop floor. The survey focuses on women who are in manufacturing now, who largely have found a way to make the industry work for them. The survey does not capture the voices of the many women who left the industry or never saw it as an option, whether because they could not find or envision workable solutions to child care and other care responsibilities, were not satisfied with safety and health provisions, or found more promising advancement opportunities elsewhere. Also missing are the voices of men working in the industry, describing their experiences and priorities as parents and caregivers and their views of what is needed to ensure equitable and diverse access to quality manufacturing jobs. But survey respondents articulate a clear mandate for change. Their views and experiences point the way to a future for manufacturing where women, including women of color, are no longer concentrated in the lowest paying positions in the industry, where investments in skills and safe and respectful workplaces are the norm, and where manufacturing careers and parenthood and caregiving are complementary options for all workers.

³⁸ For more on Justice40, see The White House <https://www.whitehouse.gov/environmentaljustice/justice40/>.

APPENDIX: METHODOLOGY

The 2022 IWPR Women in Manufacturing Survey collected responses from women and non-binary people working in shop floor positions in manufacturing—a largely male-dominated sector and occupations. The objective of the survey is to better understand how and why women enter manufacturing jobs, what it is like to work in such jobs (including access to training and the work environment such as (un) equal treatment, harassment, and discrimination), whether and why women are considering or have considered leaving manufacturing, what it is like to be a parent while working in such jobs, and what helps them succeed in manufacturing jobs.

The survey was designed and distributed in collaboration with the AFL-CIO Industrial Union Council³⁹ and with Chicago Women in the Trades and other women-focused pre-apprenticeship programs partnering with IWPR's project on Women's Retention and Advancement in Construction and Manufacturing.

The survey design was informed by focus groups and individual interviews with women working in shop floor manufacturing jobs. Survey questions were reviewed by members of manufacturing union women's committees and staff of the Industrial Union Council and were piloted with both union and non-union women manufacturing workers. Survey questions and distribution methods were approved by the Institutional Review Board of American University. The survey was available only in English. The survey was hosted on Qualtrics.

Dissemination

The survey was distributed via e-mail and text, using a snowball convenience sampling method, encouraging women working in manufacturing to share the survey with others. Two main channels were used to disseminate the survey: members of AFL-CIO Industrial Union Council-affiliated unions' Women's Committees and other manufacturing union lists, and graduates of women-focused pre-apprenticeship programs who completed manufacturing programs (including Chicago Women in the Trades, Philadelphia Women in Nontraditional Careers, Oregon Tradeswomen, West Virginia Women Work, Mississippi Women in Construction at Moore Community House, and ANEW in Washington State, as well as partners of Jobs for the Future's National JFF's National Innovation Hub for Diversity, Equity, Inclusion, and Accessibility in Registered Apprenticeship⁴⁰). As a result, responses overrepresent union members as well as individuals who entered manufacturing through an apprenticeship.

Individuals who participated in the survey had the option to enter a raffle to win one of 50 gift cards worth \$50 each. Entry into the raffle did not require completion of the survey. The survey was open for six months starting in April 2022.

³⁹ <https://aflcio.org/issues/manufacturing>

⁴⁰ <https://info.jff.org/apprenticeshipdeia>

Data Cleaning

To reduce the number of sham responses such a reward may encourage, the survey was not advertised publicly or distributed widely on social media. Nevertheless, the survey generated a high level of bot and fraudulent responses. The dataset was cleaned extensively to identify and eliminate bot and fraudulent responses based on the following flagging criteria: responses that did not come from a unique IP address, identical responses (where all write-in answers were the same and multiple-choice answers were the same or similar), and/or responses with identical starting times, responses with a very short duration, and nonsense write-in responses. These criteria were used to cross-check suspicious responses and remove those with significant evidence to suggest fraud.

Respondents who identified as cisgender men and respondents outside the United States were also excluded from this analysis.

Altogether, 2,198 responses were received of which 1,774 were identified as likely fraudulent or otherwise not fitting the criteria of the survey. The cleaned survey data of 424 responses were subsequently analyzed in STATA. All data are presented unweighted.

Geographic and industry distribution of responses

Responses were received from 45 states and DC, with the largest number of responses received from Michigan (13.8 percent), California (10.6 percent), New York (8.0 percent), and Illinois (7.5 percent). Respondents represent a cross-section of fifteen manufacturing sub-sectors. The largest number of responses came from those working in automotive & transportation equipment (19.6 percent); food processing (13.7 percent); machinery manufacturing (9.7 percent); aerospace and defense (7.5 percent); and textiles, leather, and apparel (7.1 percent); see Appendix Table 1 for full breakdown.

Race, ethnicity, and age

This report follows the U.S. Census Bureau definitions for major racial and ethnic groups; racial groups are non-Hispanic, and those who indicated that they are Hispanic or Latina ethnicity (88 respondents) can be of any race. Appendix Table 1 shows the race and ethnic composition of the sample. Where the term "People/Respondents of Color" is used, it refers to any respondent who indicated that they are Asian or Pacific Islanders, Black, Native American, two or more races, or Hispanic or Latina. For sample reliance reasons, results are only reported for subgroups with at least 100 respondents.

LBGTQ+ refers to respondents who indicated that they are gay or lesbian, bisexual, transgender, or gender non-conforming; 6.9 percent identify as gay or lesbian or bisexual. The report refers to individuals who responded to the survey as "respondents" because the individuals are either women (cisgender and transgender) or non-binary people. When referring more broadly to policies and conditions in manufacturing, we use women rather than "women and non-binary people" for the sake of brevity, and because the scope of this paper and its policy recommendations is limited and does not address policies and issues specific to non-binary people working in manufacturing. We are unable to report on non-binary respondents specifically in this report because the sample size is too small (10 respondents identified as nonbinary/gender nonconforming, and 3 as transgender). Further research is needed on the experiences of transgender and non-binary workers in manufacturing.

Overrepresentation of Union Members and Apprentices

As a result of the distribution of the survey through AFL-CIO Industrial Union affiliates and women-focused pre-apprenticeship partners, the sample overrepresents both union members and women workers who have either completed or are pursuing apprenticeships.

Union members are overrepresented: 58.5 percent of respondents are union members, while nationally in 2022 just 11.4 percent of production workers, and 7.8 percent of all workers in the manufacturing industry, were union members (U.S. BLS 2023e). Union membership is similar among White respondents (59.9 percent) and all respondents of color (56.9 percent) but there are substantial differences between workers of color; Black respondents overall are most likely to be union members (71.0 percent), followed by Latinas (56.8 percent) and the remaining group of Asian and Pacific Islanders and Native Americans (43.7 percent).

Union respondents include members of the following unions: IAM—International Association of Machinists and Aerospace Workers; IBB—International Brotherhood of Boilermakers, Iron Shipbuilders, Blacksmiths, Forgers, and Helpers; IBEW—International Brotherhood of Electrical Workers; IUE-CWA—Communications Workers of America; SMART—Sheet Metal, Air, Rail and Transportation Workers; UAW—International Union, United Automobile, Aerospace & Agricultural Implement Workers of America; UFCW—United Food and Commercial Workers; and USW—United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial & Service Workers International Union.

The sample also overrepresents workers who either completed an apprenticeship (34.7 percent) or were in an adult or youth apprenticeship at the time of the survey (12.1 percent). While there are no data available nationally on the number of workers in manufacturing who completed an apprenticeship, until recent efforts to expand and revitalize apprenticeships in manufacturing occupations, apprenticeships were not common in manufacturing (see, for example, Fortwengel, Gospel and Toner 2021). The recent American Apprenticeship Initiative, which began in 2015, however, resulted in an expansion of manufacturing apprenticeships in particular, including for a substantial number of women (Walton, Gardiner, and Barnow 2022).

While the survey is not random and does not present a representative sample of the national population of women working in shop floor positions in U.S. manufacturing, respondents reflect a diversity of experiences across age, race and ethnicity, education, sexuality, parental status, trade, status, union membership, and geography. This contributes valuable insight to the lives, concerns, and priorities of women working in manufacturing.

APPENDIX TABLE 1: Sample Composition by Age, Union Membership, Apprenticeship Status, Number of Children, and Industry.

ALL respondents	100%	424
16-19 years	0.2%	1
20-24 years	4.0%	17
25-34 years	40.8%	173
35-44 years	29.5%	125
45-54 years	13.4%	57
55 years or older	10.8%	46
Prefer not to answer	1.2%	5
Union member	58.5%	248
Not a union member	41.5%	176
Completed apprenticeship/Journey level	34.7%	147
Apprentice (incl. in youth apprenticeship)	12.1%	51
No apprenticeship	51.9%	220
Don't know/decline	1.4%	6
Youngest child under 6	30.2%	128
Youngest child 6 to 12	15.8%	67
Youngest child 13 to 17	7.3%	31
Youngest child 18 and older	15.1%	64
No Children	31.6%	134
Asian/Pacific Islander non-Hispanic	5.7%	24
Black non-Hispanic	16.0%	68
Hispanic/Latina (any race)	20.8%	88
American Indian or Alaska Native non-Hispanic	4.2%	18
White non-Hispanic	48.6%	206
Other or two or more races	2.6%	11
Prefer not to answer	2.1%	9
Aerospace and defense	7.5%	32
Automotive & transportation equipment	19.6%	83
Beverage and tobacco products	5.4%	23
Chemicals & Pharmaceuticals	4.5%	19
Computers, electronics, and semiconductors	5.2%	22
Food processing	13.7%	58
Furniture & wood products	2.6%	11
Glass	1.2%	5
Machinery	9.7%	41
Paper	4.2%	18
Plastic & rubber	3.1%	13
Printing and related	1.2%	5
Shipbuilding	3.1%	13
Steel, aluminum, and other metals	5.9%	25
Textiles, leather, & apparel	7.1%	30
Other	5.0%	21
Don't know / Decline	1.2%	5

Source: 2022 IWPR Women in Manufacturing Survey

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