

Apprenticeship Needs Assessment in Heavy Highway Construction Workforce
Interim Report #2
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Project Objective

To gain an understanding of the reasons that women and men of color are not retained in apprenticeships relevant to the heavy highway trades at the same rate as are white men. Particular attention shall be focused on the reasons that apprentices refuse job assignments/dispatches, leave assignments before the contractor's job is finished, and retention in the third period of apprenticeships. Differences in motivations, the nature of obstacles faced and the type and effectiveness of particular supports to affect retention rates shall be considered, with attention to the potentially different experience of people in different trades and regions, as well as to key demographic variables such as gender, race, ethnicity, age, and family status.

PROGRESS OF PROJECT

Outline of Completed Activities by Month

September

- Planning: Reviewed existing studies; developed initial interview guide for staff and apprentice interviews; organized the BOLI apprentice data set to allow for the creation of a sampling frame for the selection of apprentices to be interviewed; met with consultant Leslie Hammer to finalize details of interview guides and research design; and submitted the study for approval by the Portland State University Institutional Review Board.
- Analysis of BOLI/ODOT database of current and past apprentices: we obtained apprentice data from BOLI; resolved data issues through consultation with BOLI; created a data set by merging agreement and action data for each of the ten (2001-2010) apprentice cohorts; and began statistical analyses to determine different rates of completion by gender, race/ethnicity, region, trade, and union status.

October

- Planning: study under review by the Portland State University Institutional Review Board; met with BOLI for further background on apprenticeship programs and to discuss initial list of relevant individuals to invite to participate in staff interviews
- Analysis of BOLI/ODOT database of current and past apprentices: statistical analyses to determine different rates of completion by gender, race/ethnicity, region, trade, and union status.

November

- Analysis of BOLI/ODOT database of current and past apprentices: statistical analyses to determine different rates of completion by gender, race/ethnicity, region, trade, and union status.
- Staff interviews: conducted 17 interviews with staff of apprentice programs and staff of other organizations related to apprenticeships
- Apprentice interviews: conducted 3 interviews with apprentices who either completed or were cancelled from apprenticeship programs

December

- Analysis of BOLI/ODOT database of current and past apprentices: statistical analyses to determine different rates of completion by gender, race/ethnicity, region, trade, and union status.
- Staff interviews: conducted 3 interviews with staff of apprentice programs and staff of other organizations related to apprenticeships (a total of 20 individuals from 15 organizations were interviewed; staff interviews complete)
- Apprentice interviews: conducted 5 interviews with apprentices who either completed or were cancelled from apprenticeship programs (a total of 8 apprentices were interviewed; 16 more apprentices to be interviewed in 2012)
- Interim Report #1 by December 31, 2011: Report on preliminary findings based on the analysis of BOLI/ODOT database, staff interviews, and interviews with apprentices.

January

- Apprentice interviews: conducted 3 interviews with apprentices who either completed or were cancelled from apprenticeship programs (a total of 11 apprentices have been interviewed; 13 more apprentices to be interviewed)
- Planning: Identified and hired graduate students to assist with survey (mailing and data entry) in Spring term.

February

- Apprentice interviews: conducted 11 interviews with apprentices who either completed or were cancelled from apprenticeship programs (a total of 22 apprentices have been interviewed; 3 more apprentices to be interviewed).

March

- Apprentice interviews: conducted 3 interviews with apprentices who either completed or were cancelled from apprenticeship programs (a total of 25 apprentices have been interviewed; apprentice interviews are now complete).
- Develop survey instrument. We developed a survey instrument based on the information gathered from the review of the literature, the analysis of the BOLI/ODOT database, the informational interviews, and the in-depth interviews.

Outline of Activities for Remaining Activities

Analysis of interview data: We will analyze the transcripts of the 20 staff and 24 apprentice interviews to expand on the general themes outlined in the interim reports. (April/May)

Mail survey of current and past apprentices: We will mail out approximately 1,000 surveys, comprised primarily of closed-ended questions aimed at quantifying the reasons why women and men of color are not retained in apprenticeships at the same rate as are white men. Our sampling frame will consist of current and previous apprentices who registered in the heavy highway trades since 2006, providing us with five cohorts of apprentices. This sampling frame will enable us to compare, within cohorts, the experiences of those graduating/ currently in the program to those who have dropped out. We will stratify our sample by apprenticeship status, gender, race/ethnicity and region to ensure sufficient variation for statistical analyses. With the expectation that not all apprentices contacted will complete the questionnaire, we will mail a reminder postcard to non-respondents about 10 days after the initial mailing. If the response rate is still unacceptable, we will follow-up again with non-respondents via mail or phone (April)

Data entry and analysis of survey data: After achieving a sufficient response rate, we will begin data entry followed by quantitative analysis of the survey data. We will also integrate results obtained from the surveys with findings from the qualitative in-depth interviews (May-July).

Final Report by August 1, 2012: The final report will include findings from the BOLI/ODOT database, staff interviews, interviews with current and past apprentices, and surveys of current and past apprentices. Specific attention will be paid to identifying the child care and special needs of women and minority apprentices and how these needs vary by region, trade, and apprenticeship status. The final report will also identify additional barriers to successful completion of the apprenticeship program among women and minority apprentices.

METHODS

BOLI/ODOT Data 2001-2010

Data

The quantitative component of this study uses data from the Oregon Apprenticeship System database of current and past apprentices to examine different rates of apprenticeship completion in the heavy highway construction trades by gender and race/ethnicity as well as other key variables including region, trade, and union status. We also use the Oregon Apprenticeship System database to examine reasons given for the cancellation of apprentice agreements. The following trades are included in this study: electrician, painter, plumber, sheet metal worker, sign maker/installer, carpenter, cement mason, operating engineer, laborer, and ironworker. The unit of analysis used for the database is individual apprentice agreements, rather than individual apprentices, with many apprentices having more than one agreement. Because we are interested in the completion of agreements, we primarily focus on apprentice agreements as the unit of analysis; however, we also briefly describe the characteristics of individual apprentices,

including the average number of agreements of individual apprentices, by gender, race/ethnicity, and completion rates.

We limit our sample to all new registrations in the Oregon Apprenticeship System from January 1, 2001 to December 31, 2010 that were not cancelled with less than zero hours of credit, resulting in an analytic sample of apprentice agreements of 11,390. This translates into an analytic sample of individual apprentices of 10,472. Table 1 provides characteristics of apprentice agreements by gender and race/ethnicity. The total sample of agreements includes 793 (7%) initiated by women, 10,597 (93%) initiated by men, 180 (1.6%) initiated by women of color, 613 (5.4%) initiated by non-Hispanic white women, 1,616 (14.2%) initiated by men of color, and 898 (78.9%) initiated by non-Hispanic white men.

Measures

Variables representing gender, race/ethnicity, age, cohort, trade, status, union status, and ODOT region were taken directly from the Oregon Apprenticeship System database of current and past apprentices. For the purposes of this study, individuals of color, or racial/ethnic minorities, include African Americans, Native Americans, Asians, and Latinos. The variable representing education was created by adding the number of years the apprentice reported being in high school and college, resulting in a continuous variable ranging from 9 to 18. The variables representing reasons for cancellation were created using action history data provided by BOLI/ODOT. Each time an action such as a hold, suspension, or cancellation is taken on an apprentice agreement that is cancelled, the reason for the action is reported. The reasons included in this study (see Table 1) represent the most frequently occurring reasons reported for actions leading to cancellation. Given that each cancelled agreement may have multiple actions, the total of the percentage for each reason in Table 1 is greater than 100%.

Variables representing credit hours completed at time of cancellation, average monthly credit hours among cancelled, and average and yearly credit hours among completed are created using the following variables: `apr_credit_when_cancelled`, `stt_ojt_total`, `apr_indent_effect_date`, `apr_ending_date`, and `apr_prior_credit`. The variable representing credit hours completed at time of cancellation represents `apr_credit_when_cancelled` minus `apr_prior_credit`. To get average monthly credit hours among cancelled we divided credit hours by the number of months the apprentice was in the program, which was created using the `apr_indent_effect_date` and `apr_ending_date` variables. Similarly, to calculate the average and yearly credit hours among completed we subtracted prior credits from `stt_ojt_total` and divided by number of months and then number of years taken to complete the program.

Analytic Techniques

In order to examine different rates of apprenticeship completion in the heavy highway construction trades by gender and race/ethnicity we first examine differences in completion by gender and race/ethnicity (see Table 1) as well as differences in key variables, including union status, region, trade, and reasons for cancellation, by gender and race/ethnicity. Because we are interested in both gender and race/ethnic differences, we first examine differences by gender and then examine differences by race/ethnicity within each gender. To determine if differences in

completion rates and other key variables are statistically significant we use chi-square tests for nominal variables and t-tests for continuous variables (Table 1). In analyses not shown, we also employ multivariate logistic regression to test whether or not the gender and race/ethnic differences in completion are due to potential confounders, including age, education, cohort, union status, trade, and region.

To assess variation in completion rates by gender and race/ethnicity by trade, we compute completion rates for each demographic sub-group within each trade and test differences using chi-square tests (Table 2). We do the same to assess variation in completion rates by gender and race/ethnicity by region, union status, and cohort (Table 3). Given that the unit of analysis of the Oregon Apprenticeship System database is the apprentice agreement rather than the individual apprentice, we felt it was important to assess the frequency at which multiple registrations occur and whether or not this frequency varied by gender and race/ethnicity as well as by the likelihood of completing at least one agreement. Tables 4 and 5 present this descriptive analysis. In addition, we examine how the reasons given for cancellation among those cancelled vary by gender and race/ethnicity within each trade, and present these results in Table 6. Finally, because research and theory suggests that a key factor in preventing completion of apprentice agreements is lack of OJT hours, we examine variation in the total number of credits earned by those cancelled as well as the average monthly credits earned. In addition, we examine variation in average monthly credits earned among agreements that have been completed. We also look at variation by gender and race/ethnicity within trade (Table 7).

Interviews

Staff Interviews

In order to understand apprenticeship programs from a variety of perspectives, we conducted a total of 20 interviews with individuals currently working in positions related to apprenticeship programs relevant to the highway trades. Staff interviews included participants from 15 different organizations including: union and open-shop apprentice programs, contractors employing apprentices, pre-apprenticeship training programs, and state agencies and departments working on programs or policies related to apprenticeship programs.

An initial list of possible participants and relevant organizations was provided by BOLI. Letters of invitation were sent out to these individuals by BOLI. We followed up with phone calls to schedule interviews. As we conducted the interviews, we identified a small number of additional individuals to invite to participate. These individuals were contacted by phone or email to set up interviews.

Apprentice Interviews

In order to gather information about the experiences of female apprentices and apprentices of color, we interviewed apprentices who had either completed or been cancelled from an apprenticeship program. Apprentices were identified using the Oregon Apprenticeship System database. In order to ensure the best recall of specific experiences in apprenticeship programs, we interviewed participants who had recently completed an apprenticeship program or had

recently dropped out of a program. Apprentices who had zero hours of credit were excluded. All Non-Hispanic white women and men of color we interviewed had completed or dropped out in 2011; women of color we interviewed had completed or dropped out of a program between 2008 and 2011 (the expanded date range was necessary due to the overall small number of women of color participating in apprenticeship programs). Apprentices were mailed a letter describing the study and inviting them to participate. We followed up with phone calls to set up interviews.

We completed a total of 25 interviews with apprentices, systematically sampled from a list of all apprentices who had recently completed or failed to complete apprenticeship programs relevant to the highway trades. One interview is excluded from the analysis because the apprentice was currently in an apprentice program and had never left the program. The final sample consisted of 8 Non-Hispanic white women, 8 men of color, and 8 women of color. Within each of these three groups, half of the participants successfully completed an apprenticeship and the other half left an apprenticeship program prior to completion.

Participants were chosen to reflect diversity in racial/ethnic background, type of trade, union and non-union program, and region of the state. Racial/ethnic groups represented in the sample included: Non-Hispanic white (33%), African American (33%), Latino/a (17%), Asian American (13%), and Native American (4%). Trades represented in the sample included: laborer (46%), electrician (20%), painter (13%), carpenter (13%), cement mason (4%), and operating engineer (4%). 67% were in union sponsored apprentice programs and 33% were in non-union (open shop) apprentice programs. Regions included Portland OR (67%), Vancouver WA (17%), Salem, OR (13%), and southern OR (4%).

Surveys

See attached draft of survey tool

FINDINGS

BOLI/ODOT Data 2001-2010

Gender

In Table 1 we see statistically significant gender differences in completion and cancellation, with men's agreements more likely to be completed than women's and women's agreements more likely to be cancelled than men's. Specifically, 24.5% of agreements initiated by women were completed compared to 39.7% of agreements initiated by men. Gender differences in completion rates remain after controlling for potential confounding variables, including age, education, cohort, trade, union status, and region. Gender differences also can be seen in union status, region, average credit hours completed, trade, reasons for cancellation, age, and education. Women's agreements are more likely to be affiliated with a union or a mixed program, while men's agreements are more likely to be non-union. Women's agreements are more likely to be located in region one and less likely to be located in region two or four. Women's agreements that were cancelled are associated with fewer completed credit hours at time of cancellation and

fewer average credit hours completed per month. In addition, agreements that were completed by women are associated with fewer average completed credits per month and per year.

In Table 1 we also see gender differences in trades affiliated with agreements. Women's agreements are more likely to be in the following trades: carpenter, cement mason, operating engineer, laborer, and painter, relative to men's agreements. Men's agreements are more likely to be in electrician and plumbing trades. In terms of reasons for cancellation, women are more likely to be cancelled due to apprentice request. Men's agreements are more likely to be cancelled due to failure to appear before committee and related training attendance. Finally, men who enter into apprentice agreements are younger and have less education, on average, than women who enter into apprentice agreements.

The first two columns of Table 2 show gender differences in the percentage of apprentice agreements completed by trade. Again we see that, overall, men's apprentice agreements are more likely to be completed than women's. When we look within trade, we see statistically significant gender differences in the following trades: pile driver, operating engineer, electrician, and sheet metal/worker (see Figure 1). However, results within some trades should be interpreted with caution due to small sample sizes of women within these trades. For example, as seen in Table 1, only nine women's agreements were initiated in scaffold erecting, only ten women's agreements were in ironworking, and only two women's agreements were initiated in sign making/installing between 2001 and 2010. Thus, in addition to retention, the recruitment of women into heavy highway construction trades clearly needs to be addressed, particularly in certain trades.

In Table 3 we see gender differences in the percentage of agreements completed by region, union status, and cohort. We see statistically significant gender differences in all regions except for region five (see Figure 4), which only had sixteen agreements initiated by women between 2001 and 2010. Thus, gender differences in completion of agreements appear to be pervasive throughout the state. We also see gender differences in completion rates within all types of union status (see Figure 5) and in all cohorts that have had a reasonable amount of time to complete agreements (2001-2006).

Table 4 shows that women, particularly African American women, appear to be more likely to have initiated more than one agreement between 2001 and 2010. While 6.4% of men entering the apprentice program between 2001 and 2010 entered into more than one agreement, 7.8% of women did so, and 19.1% of African American women did so. It is unclear how to interpret this gender and race difference given that individuals who initiate more than one agreement also appear to be more likely to complete at least one agreement (see Table 5).

Table 6 shows reasons for cancellation of agreements by trade by gender and race/ethnicity. Overall, women's agreements are more likely than men's agreements to be cancelled due to apprentice request, and this difference seems to be largest in trades such as carpentry, painting, and plumbing. In sheet metal working and electrician trades, trades that we see a statistically significant gender difference in completion (see Table 2), women's agreements also appear to be cancelled more than men's due to apprentice request. However, in additional trades that we see gender differences in completion rates, including operating engineer and pile driving, women are

not more likely to be cancelled due to apprentice request. In the trade of pile driving, women's agreements appear to be cancelled more than men's due to insufficient OJT hours completed. Interestingly, among both women and men, across all trades, insufficient OJT hours appear to be a common reason leading to the cancellation of agreements. Trades with a larger gender disparity in cancellation due to OJT hours include iron working, scaffold erecting, pile driving, plumbing, and sheet metal working, with women's agreements more likely to be cancelled due to insufficient OJT hours in these trades.

Finally, Table 7 shows differences in completed credit hours among those cancelled, average credit hours completed per month among cancelled agreements, and average credit hours completed among completed agreements, all within trades. Overall we see that men's agreements that are cancelled, on average, have accumulated more credit hours by the time of cancellation. We see this particularly in the trades of scaffold erecting, electrician, and sign maker/installer. Similarly, we see that men's cancelled agreements, on average, accumulate more credit hours per month than do women's cancelled agreements. Within trades, we only see a statistically significant difference in this variable within scaffold erecting. Finally, we also see in Table 7 that, among completed agreements, men's agreements accumulate, on average, more average credits per month than do women's. We see this gender difference particularly in the trades of operating engineer, laborer, electrician, and plumber (see Figure 6).

Men of Color

While it is clear from the analyses presented above that gender difference in completion rates of apprentice agreements are pervasive and need to be addressed, it is also important to examine any race/ethnic variation in completion rates among men and among women. In Table 1 we see an overall race difference in completion rates among men that is statistically significant. Specifically, we see that 41.1% of agreements initiated by non-Hispanic white men between 2001 and 2010 have been completed, compared to only 31.8% of agreements initiated by men of color during the same period. Table 1 also shows race/ethnic differences among men in union status, with agreements of men of color less likely to be in non-union programs and more likely to be in mixed programs. Agreements among men of color are more likely to be initiated in ODOT region one and less likely in all other regions. We also see difference by race/ethnicity among men in average credit hours completed among cancelled agreements, average credit hours completed per month among cancelled agreements, and average credit hours completed per year among completed agreements. We also see that men of color are less likely than white men to be in the following trades: electrician, plumbing, and sheet metal worker. Men of color are more likely than white men to be in carpentry, cement masonry, pile driving, laboring, ironworking, and painting. Agreements of men of color are more likely than those of non-Hispanic white men to be cancelled due to failure to submit progress reports and related training attendance. Finally, in terms of age, men of color are, on average, older than non-Hispanic white apprentices upon entry into the apprentice program.

In Table 2 we see, again, that agreements of men of color are less likely to be completed than those of non-Hispanic white men. We see that this difference in completion is more likely in the trades of carpentry, scaffold erecting, and pile driving. In Table 3 we see rates of completion among men by race/ethnicity by region, union status, and cohort. Men of color are less likely to

complete relative to non-Hispanic white men only in region one and region two. Agreements of men of color are less likely to be completed within all union statuses, although the difference appears smallest within mixed programs.

In Table 4, we see that, overall, the agreements of men of color are more likely to be cancelled due to failure to submit progress reports, and this difference appears to be largest in sheet metal working and sign making/installing. In the two trades that men of color are less likely to complete relative to non-Hispanic white men, scaffold erecting and pile driving, men of color's agreements appear to be more likely to be cancelled due to apprentice related training and insufficient OJT hours. We also see in Table 7 that the agreements of men of color in these two trades accrue fewer completed credits at the time of cancellation and fewer averaged credit hours per month by completion, although these differences are not statistically significant. However, it is also important to recognize that many of these cells have very small sample sizes due to the small number of men of color completing some trades (see Table 2).

Women of Color

In Table 1 we see that only 180 apprentice agreements were initiated by women of color in the state of Oregon between 2001 and 2010. In some trades, such as scaffold erecting, ironworking, plumbing, sheet metal working, and sign maker/installer the number of agreements initiated by women of color is less than five. Thus, clearly there is a potentially large issue of recruitment of women of color into heavy highway trades. For example, the 2001 cohort included a total of only eight agreements initiated by women of color. While later cohorts include a greater number of agreements among women of color, the maximum number is thirty in 2007 and the minimum is five in 2010. Because of the smaller number of agreements among women of color, and women overall, statistical inferences comparing women of color and non-Hispanic white women are difficult to make. As seen in Table 1, we see no statistically significant difference in completion rate between non-Hispanic white women and women of color. However, we do see that the agreements of women of color are less likely to be in union programs and more likely to be in mixed programs. Agreements among women of color are also overrepresented in ODOT region one and underrepresented in ODOT region two and six. Cancelled agreements among women of color accumulate fewer credit hours by the time of cancellation and fewer average credit hours completed per month. Women of color, relative to non-Hispanic white women, appear to be overrepresented in carpentry, labor, and sign making/installing and underrepresented among electricians. Agreements among women of color are more likely than those of non-Hispanic white women to be cancelled due to failure to submit progress reports. Finally, women of color initiating agreements tend to have, on average, less education than non-Hispanic white women apprentices.

In Table 2 we see no statistically significant differences in overall completion rates or completion rates within specific trades between women of color and non-Hispanic white women. But again, it is important to remember that small cell sizes make it difficult to make statistical inferences about these two groups. Descriptive results do suggest that agreements among women of color are less likely to be completed in plumbing, iron working, painting, and labor. We also do not see any statistically significant differences in rates of completion by race/ethnicity among women in Table 3, which examines completion rates by region, union status, and cohort.

However, as mentioned previously, there does appear to be something unique about women of color in terms of the likelihood of initiating more than one agreement, particularly among African American women (see Table 4).

Staff and Apprentice Interviews

Reasons for leaving apprentice programs

In this section of the report, we discuss the preliminary findings of the interviews. Due to the large number of interviews, analysis of the transcripts is still ongoing. Drawing on the 20 interviews with staff and 24 interviews with apprentices, we seek to further examine the reasons why apprentices choose to leave or are dismissed from their programs, with a particular emphasis on potential differences based on gender and race/ethnicity. We also address supports that may help to address the disparities in completion rates by gender and race/ethnicity. Based on the interviews conducted, we have found that when individuals choose to leave their apprentice programs or are dismissed from the programs, there are often multiple factors. We have identified key themes regarding the reasons why apprentices do not complete their programs:

- Lack of work
- Job assignments
- Staying on the job after a reduction in force
- Supports needed to accept or complete jobs
- Poor performance
- Appropriate on the job training
- Mentoring on the job
- Fit for the work
- Prejudice, discrimination, and harassment
- Health/injuries
- Personal issues

Lack of work. When asked about the reasons why apprentices do not complete their programs, the most common response from the study participants was a lack of work. The economic conditions of the last several years have posed major challenges for construction trades. Even though apprenticeship programs have decreased the number of apprentices they accept into their programs, there are still many apprentices out of work. When apprentice are out of work for long periods of time or are only called for jobs sporadically, some will leave their programs to take other jobs that offer more dependable income (although the jobs often provide lower hourly wages). While the lack of available work is potentially a problem for all apprentices, it seems to pose particular difficulties for women. As noted in the discussion of the quantitative data above, women accrue fewer completed credits at the time of cancellation and fewer averaged credit hours per month by completion. There is also some evidence that in some trades, men of color accrue fewer hours than non-Hispanic white men. There are several explanations to explain why women and men of color work fewer hours on average during their apprentices.

Job assignments. One reason why non-Hispanic white men have an advantage in accruing OTJ hours is that jobs may not be assigned as equitably as they might be. While most apprentice programs operate from an “out of work list” in which individuals who have been out of work the longest are the first to be contacted when new jobs become available, interviews with staff and apprentices indicate that there are often deviations from this protocol. In some apprentice programs, contractors may be able to request apprentices by name if they have worked with them before. This may lead to an advantage for non-Hispanic white men, who are more likely to have stronger personal relationships with the foremen or supervisors they have worked with in the past (predominantly also non-Hispanic white men). Research consistently shows that people demonstrate an affinity for people with the same characteristics as themselves (such as gender and race/ethnicity). Thus, as most supervisors and foremen are non-Hispanic white men, non-Hispanic white male apprentices have an advantage in creating closer personal relationships and building their professional networks. In programs where apprentices are encouraged to seek out their own jobs rather than waiting to be contacted by the program, the dynamics of gender and race/ethnicity in creating personal networks may also be relevant. Non-Hispanic white men may not only be more able to form new personal relationships with others in the trades (who are overwhelmingly also non-Hispanic white men) but they are more likely to have family or friends in the trades who may have their own personal contacts or may be able to offer advice about how to seek out jobs. These trends may also be influenced by the fact that some contracts require contractors ensure that a percentage of apprentices be women and people of color, leading women (and to a lesser degree men of color) to have a small advantage in being called for a job before they reach the top of the “out of work list.” It is not clear how these requirements shape the overall trends in OTJ hour accrual.

Staying on the job after a reduction in force. Another reason why non-Hispanic white men might fare better at accruing more OTJ hours is that they may stay longer on jobs while others are let go as part of the cyclical reductions in force that occur as projects change or jobs wind down. We found that several of the study participants (staff and apprentices) had the perception that women and men of color were more likely to be let go when a project had a reduction in force, even if there were other apprentices who were more recently hired or less effective workers. An issue to be further explored in the survey of apprentices is ways in which personal relationships and informal networks function in assisting apprentices in obtaining work and remaining steadily employed throughout their apprenticeship.

Supports needed to accept or complete jobs. When asked how often apprentices refuse jobs or leave jobs before they are completed, both staff and apprentices reported that this very rarely happens. Some programs have explicit rules regarding refusing jobs (e.g. apprentice must have a legitimate and documented reason; apprentices may only refuse one job before they are put on the bottom of the out of work list). However, some apprentices face challenges in accruing OTJ hours when they are not able to accept jobs that are offered to them or are unable to complete jobs once they are started due to a lack of resources (i.e. fuel; food and lodging while working out of town; child care; and tools, clothing, and protective equipment). For example, one African American male apprentice we interviewed indicated that the reason he left his apprentice program was that he did not have reliable transportation and could not afford to keep his car in working condition to drive the long distance to his job site. In the survey of apprentices, we will

explore the ways in which a lack of resources may be affecting decisions about accepting or completing jobs.

Poor performance. According to the study participants, another common reason for why apprentices do not complete their programs is the broad category of poor performance. This can take a variety of forms: the apprentice does not learn necessary skills; he/she has a bad attitude at work; he/she does not submit progress reports, he/she does not attend classes; or he/she is not successful in classes. As noted in the quantitative analysis above, agreements of men of color and women of color are more likely than those of non-Hispanic white men and women to be cancelled due to failure to submit progress reports and related training attendance. We also heard in interviews that it was a challenge for some apprentices to submit progress reports. Electrician programs seem to be unique in that the classroom work is particularly difficult and that more apprentices are dismissed for failing classes compared to other trades. One electrician program coordinator suggested it might be helpful to offer additional tutoring sessions. In other trades, it is more common for apprentices to fail to attend the classes, which can lead to being dismissed from the program. As one program coordinator stated: “The hard part is people don’t want to leave work to come to the training center and that’ll get them in trouble because they get so far behind in the class and then they can’t go to work.” In interviews with staff and apprentices, we found that in some trades with very physically demanding work, women who are not as physically big and strong as other apprentices have some challenges completing the work assigned to them (or they are assigned less physically demanding work, which may result in being evaluated as a less capable worker). However, no participants interviewed so far expressed the belief that that women were on the whole less effective workers than non-Hispanic white men. We also did not find any references to the perception that men of color were less capable workers than non-Hispanic white men.

Appropriate on the job training. A problem that some apprentices face is that in the course of their OTJ hours, they do not learn all the varied skills they need to learn to be successful journey workers. A female program coordinator who had also completed an apprenticeship in the same trade stated: “I really think the largest part of their frustration in on the job training and lack of varied work from their contractors. A lot of women, I think end up getting put with just the easier work. When I was an apprentice, I had to really ask for the other kind of work and that’s something that I reiterate to our apprentices.” This coordinator explained that she thought that mandatory rotation would help alleviate this issue for her program. In the survey of apprentices, we will investigate how common these types of experiences are and if they are more commonly experienced by women and/or people of color.

Mentoring on the job. Across staff and apprentice interviews, there is a consensus that good mentoring on the job is very important. One apprentice coordinator stated that one of the biggest challenges for apprentices was to understand what was expected of them. She said “If you aren’t from the construction culture, you don’t know what to expect. If you show up in khakis and you’re expected to be in Carhartts, you’re immediately discredited, and so you need to have kind of an education of what to expect on the jobsite before you ever get to the jobsite. Then once you’re there, you really need someone to show you around. And you know, ‘This is how we dress. This is how we act. This is where we go to the restroom, where we eat, all those things.’” As noted in this quote, preparation and support ideally would start before apprentices arrive on

the job site. Among the apprentices we have interviewed thus far, most reported mostly good mentorship by journeyworkers. One male apprentice of color stated that he had good mentors throughout his apprenticeship program. One African American male laborer reported good experiences with mentoring on the job: "They all wanted to show me a little something, something here, something there and they were always continuously trying to point things out to teach me things. So, you know, when I did journey out, I would be a good laborer." One non-Hispanic white female apprentice reported that she had mostly good experiences with journeyworkers. However, she noted: "When I very first started out...not so much. They wanted me to material handle, which I guess is really common. But, again, being the kind of person that I am, I said, 'Hey. There are material handlers to do this kind of stuff. I'm supposed to be learning something. You need to teach me something. Or send me somewhere where I can learn something.'" Clearly, good mentoring and appropriate on the job training are closely connected. Apprentices experiences with mentoring will be further investigated in the survey of apprentices.

Fit for the work. According to the study participants, a common reason why apprentices leave programs is that they are not a good fit for the work, that is, the apprentice does not enjoy the work, the work is too physically difficult, or work conditions are uncomfortable (e.g. weather, working overnight). However, for some apprentices, the work may be "not a good fit" because of challenges they face on the job (which may or may not be perceived as related to being a woman or person of color). As one program coordinator explained: "One [female apprentice] is on a leave of absence because she's trying to figure out if this is really what she wants to do. But she had a real frustrating experience with her contractor not training her properly and then when she went to go work for another contractor, they were like "where have you been your whole apprenticeship? Why don't you know how to do this yet?" Interestingly, quantitative analysis of the Oregon Apprenticeship System database show that women and men of color, particularly African-American women and men, appear to be more likely than their non-Hispanic white counterparts to initiate multiple agreements (see Table 4), which may potentially signal a sense of not being a good fit for the work. As we go forward with the apprentice survey, we will carefully examine all the reasons why an apprentice might view the program as "not a good fit" any why men and women of color are more likely to participate in multiple programs.

Prejudice, discrimination, and harassment: As more recent entrants into the construction trades and as often the statistical minority on job sites, women and people of color face particular challenges that shape their experiences at work and influence their decisions whether or not to complete their programs. As one program coordinator stated "I think anybody who kind of sticks out, whether it's a woman, a person of color, or maybe a real skinny guy, for example, I think they can all run into issues. And there's definitely a culture about construction that's about hunting and fishing and good old boys club. I think that is definitely changing but there are definitely remnants of it." Female apprentices' experiences of prejudice, discrimination, and harassment on the job range from occasional and mild to regular and severe. Women apprentices commonly perceive that they are viewed as less competent workers and are treated differently from their male counterparts. Some women report experience unwanted sexual attention, most commonly in the form of being repeatedly asked out on dates, although we also heard incidences of women being touched and grabbed. Many of the participants interviewed for this project noted that although there are still occasional incidences of racial/ethnic prejudice and discrimination, men of color tend to have an easier time being accepted on the job site than women. However,

several participants offered examples of challenges faced by male apprentices of color. For example, one program coordinator stated “There’s definitely backlash and resentment regarding affirmative action and some misconceptions I think... I’ve heard things like ‘Well they didn’t even have to take the aptitude test.’ Which is not true, not true at all... There’s a general feeling that or rules are looser for people of color making mistakes or breaking rules, which really isn’t true.” A variety of experiences of harassment on job sites were also reported, ranging from racial slurs written on bathroom walls, urinating in the water bottle of a male apprentice of color, to one incident where a noose was found on a jobsite where an African American male apprentice was working. In the apprentice survey, we will continue to investigate experiences of prejudice, discrimination, and harassment, with a particular emphasis on how these issues may hinder apprentices’ progress through their programs.

Health/injuries: Many staff and apprentices commented on how physically taxing construction work can be and the resulting strain on the body. Several apprentices who dropped out of apprentice programs did so because they experienced physical problems related to their work. Others noted that although health problems were not the main reason why they left their apprenticeship problem, it was something that concerned them and contributed to their decision to leave.

Personal issues: Staff of apprenticeship programs stated that some apprentices left the programs for personal reasons, such as alcohol/drugs, legal trouble, domestic violence, or sick children. Several participants reported that not having a driver’s license was a problem for some apprentices, and some study participants perceived was a problem that disproportionately affected people of color. One apprenticeship coordinator stated that she would like to be able to offer apprentices with personal issues to referrals to services or programs; however, personal issues were largely viewed as apprentices’ responsibilities.

Supports

In the interviews with staff and apprentices, we asked about specific types of supports that might be implemented in order to promote the retention of women and people of color. These types of supports included:

- Fuel assistance
- Support for overnight travel
- Childcare
- Tools, clothing, and protective equipment
- Mentoring on the job
- Mentoring programs

Fuel assistance: Staff and apprentices viewed fuel assistance as a very useful form of support for apprentices. In many trades, there are jobs that are out of town that require apprentices to travel significant distances to work.

Support for overnight travel: Support for overnight travel was also viewed as very important. Offering this form of assistance can enable some apprentices to take out-of-town jobs that they

might otherwise have to decline. As one apprenticeship coordinator who had helped apprentices access assistance for overnight travel stated: “I mean, we’ve seen it just by being able to offer it and there’s people who have taken work that they wouldn’t have otherwise accepted especially if it’s, you know, overnight travel or travel, any kind of travel. The assistance has made it possible for a lot of apprentices to take that that work that wouldn’t have been able to do it otherwise.”

Childcare: Staff of apprentice programs indicated that assistance with childcare would be very helpful, particularly to single mothers and single fathers. One apprentice coordinator stated: “The child care, you know, we have apprentices that are just amazed that they’re able to get that because they’ve been struggling with it. It’s very expensive for an apprentice just starting out, it may be almost impossible for them to afford that child care if they’re not getting some assistance.” However, several study participants noted that the work often required early morning shifts, night shifts, and out of town work. Thus, many parents *cannot* rely only on paid childcare; they must have other support in place to assist with childcare given their irregular schedules.

Tools, clothing, and protective equipment. Across different trades, there are different requirements for the tools, clothing, and protective equipment apprentices need to buy. Staff and apprentices indicated that some assistance in purchasing these items would be very helpful to apprentices.

In the survey of apprentices, we will further address how supports (i.e. fuel assistance; support for overnight travel; childcare; tools, clothing, and protective equipment) might be best allocated. We will examine the relative needs for these supports across different groups, focusing on key variables such as region of the state, type of trade, gender, and racial/ethnic background.

Mentoring on the job. As described above, both staff and apprentices indicated that on the job mentoring is critical to the success of apprentices. The good and bad experiences of apprentices interviewed depended largely on the personality of the individuals they come into contact with on the job sites. We have not yet found any systematic approach to ensure good mentoring of women and people of color on job sites. However, the findings we have discussed here suggest that it would be helpful to encourage an effort to assign women and people of color to journeyworkers who are capable mentors and to more vigilant in addressing conflicts between journeyworkers and apprentices as they arise.

Mentoring programs. In several staff interviews, the need for formal mentoring programs was raised. Some study participants felt that apprentices, particularly those who do not have experience in construction or do not have family or friends in the trades (including many women and people of color) would greatly benefit from having a mentor assigned. However, some of the staff members we interviewed were skeptical about how a formal mentoring system would be managed or who would serve as the mentors. Others were not sure that many apprentices would want to participate in such a system. Some of the women and men of color we interviewed said they would have participated in a mentoring program if it had been offered while others stated that they would not, citing either that they did not have the time or did not need any additional support. There are some models from pre-apprentice programs that follow up with participants after the pre-apprentice program is complete, such as the Oregon Tradeswomen Inc (which

provides ongoing mentoring and support throughout the career) and the ETAP program (which provides follow up support for a year). As one apprentice who had participated in the Oregon Tradeswomen program stated “I did use [mentoring provided by OTI]. It was pretty cool to talk with them about stuff.”

In the survey of apprentices, we will explore apprentices’ experiences with informal and formal mentoring as well as gauge the need for different forms of mentoring.

Table 1. Apprenticeship Characteristics by Gender and Race

	Women		Men		Wom of Color		NH Wh Whom		Men of Color		NH White Men		Total	
	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD
Total	7.0	793	93.0	10597	1.6	180	5.4	613	14.19	1616	78.9	8981	100	11390
Status														
Completed	24.5	194	39.7	4209***	19.4	35	25.9	159	31.8	514	41.1	3695***	38.7	4403
Active	17.5	139	20.5	2168*	16.7	30	17.8	109	20.5	332	20.4	1836	20.3	2307
Cancelled	48.1	381	32.9	3491***	50.0	90	47.5	291	40.6	656	31.6	2835***	34.0	3872
Moved	8.5	67	5.8	609**	11.7	21	7.5	46	5.9	95	5.7	514	6.0	676
Other	1.4	12	1.1	120	2.8	4	1.3	8	1.2	19	1.2	181	1.0	132
Union Status														
Union	42.6	338	36.0	3816***	31.7	57	45.8	281***	37.6	608	35.7	3208	36.5	4154
Non-Union	31.8	252	45.3	4804***	35.0	63	30.8	189	41.6	672	46.0	4132**	44.4	5056
Mixed	25.6	203	18.7	1977***	33.3	60	23.3	143**	20.8	336	18.3	1641*	19.1	2180
ODOT Region														
One	50.7	402	39.4	4171***	68.9	124	45.4	278***	54.8	885	36.6	3286***	59.9	6817
Two	17.2	136	25.4	2686***	10.0	18	19.3	118**	18.1	293	26.7	2393***	24.8	2822
Three	7.3	58	8.1	855	3.9	7	8.3	51*	6.4	104	8.4	751**	8.0	913
Four	4.5	36	7.0	742**	2.2	4	5.2	32	4.8	77	7.4	665***	6.9	778
Five	2.0	16	2.2	237	2.2	4	2.0	12	2.5	40	2.2	197	2.2	253
Six (Out of State)	18.3	145	18.0	1902	12.8	23	19.9	122*	13.4	216	18.8	1686***	18.0	2047
Average Credit Hours														
Completed by Cancelled	1412	1847	1717	1472***	1021	1310	1532	1500**	1363	1602	1798	1890***	1687	1816
Completed per Month by Cancelled	71	48	85	55***	59	44	75	49**	72	51	88	56***	84	55
Completed per Month by Completed	139	42	156	39***	131	50	141	41	153	44	156	38	155	39
Completed per Year by Completed	1610	442	1790	377***	1517	538	1630	416	1758	436	1795	367*	1782	382

Note: *p≤.05; **p≤.01; ***p≤.001 based on chi-square tests for nominal variables and t-tests for continuous variables
Sample includes all agreements begun 2001-2010 that were not terminated with 0 hours cancelled (N=11,390)

Table 1, cont. Apprenticeship Agreement Characteristics by Gender and Race

	Women		Men		Wom of Color		NH Wh Wom		Men of Color		NH White Men		Total	
	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD	%/Mean	N/SD
Trade														
Carpenter	23.3	185	17.2	1817***	31.7	57	20.9	128**	23.6	382	16.0	1435***	17.6	2002
Scaffold Erector	1.1	9	1.0	108	1.7	3	1.0	6	1.2	19	1.0	89	1.0	117
Cement Mason	2.4	19	1.4	152*	2.8	5	2.3	14	2.6	42	1.2	110***	1.5	171
Pile Driver	1.9	15	1.2	128	2.8	5	1.6	10	1.8	29	1.1	99*	1.3	143
Operating Engineer	7.9	63	2.7	283***	6.7	12	8.3	51	3.0	48	2.6	235	3.0	346
Laborer	19.3	153	7.4	779***	31.1	56	15.8	97***	18.3	296	5.4	483***	8.2	932
Ironworker	1.3	10	5.8	610***	0.6	1	1.5	9	10.0	161	5.0	449***	5.4	620
Electrician	25.6	203	36.6	3882***	10.6	19	30.0	184***	22.0	355	39.3	3527***	35.9	4085
Painter	6.7	53	2.7	286***	6.7	12	6.7	41	4.3	69	2.4	217***	3.0	339
Plumber	3.8	30	14.9	1580***	2.2	4	4.2	26	9.2	149	15.9	1431***	14.1	1610
Sheet Metal Worker	6.4	51	8.4	887	2.2	4	7.7	47**	3.8	62	9.2	825***	8.2	938
Sign Maker/Installer	0.3	2	0.8	85	1.1	2	0.0	0**	0.3	4	0.9	81	0.8	87
Reasons for cancellation														
Apprentice Request	48.0	241	38.1	1742***	45.6	56	48.8	185	30.6	270	39.8	1472***	39.1	1983
Failure to Appear before Committee	18.4	85	24.2	1175*	17.8	20	18.6	65	24.9	211	24.0	964	23.6	1260
Failure to Submit Progress Reports	25.5	160	24.6	1625	37.8	56	21.7	104**	28.4	324	23.7	1301*	24.6	1785
Related Training Attendance	17.3	115	22.9	1798*	20.0	40	16.5	75	25.8	304	22.2	1494*	22.3	1913
Insufficient OJT Hours	44.6	399	44.1	5134	45.6	101	44.3	298	42.7	807	44.4	4327	44.1	5533
Age	32.7	8.7	28.3	7.9***	33.4	8.5	32.5	8.7	30.1	8.3	28.0	7.8***	28.6	8.0
Education	13.2	1.4	12.6	1.2***	12.9	1.3	13.2	1.5**	12.6	1.2	12.7	1.1**	12.7	1.2

Note: *p≤.05; **p≤.01; ***p≤.001 based on chi-square tests for nominal variables and t-tests for continuous variables
Sample includes all agreements begun 2001-2010 that were not terminated with 0 hours cancelled (N=11,390)

Table 2. Percentage of Apprentice Agreements Completed by Gender and Race, by Trade

Trade	Women		Men		Women of Color		NH White Women		Men of Color		NH White Men	
	%	N	%	N	%	N	%	N	%	N	%	N
All Trades	24.5	194	39.7	4209***	19.4	35	25.9	159	31.8	514	41.1	3695***
Carpenter	23.8	44	30.1	546	21.1	12	25.0	32	23.8	91	31.7	455**
Scaffold Erector	0.0	0	26.9	29	0.0	0	0.0	0	5.3	1	31.5	28*
Cement Mason	15.8	3	15.8	24	20.0	1	14.3	2	19.1	8	14.6	16
Pile Driver	13.3	2	40.6	52*	20.0	1	10.0	1	24.1	7	45.5	45*
Operating Engineer	14.3	9	32.9	93**	16.7	2	13.7	7	27.1	13	34.0	80
Laborer	26.1	40	28.8	224	21.4	12	28.9	28	26.4	78	30.2	146
Iron Worker	10.0	1	34.4	210	0.0	0	11.1	1	37.3	60	33.4	150
Electrician	35.0	71	49.7	1931***	31.6	6	35.3	65	46.5	165	50.1	1766
Painter	15.1	8	17.5	50	8.3	1	17.1	7	17.4	12	17.5	38
Plumber	33.3	10	46.9	741	0.0	0	38.5	10	42.3	63	47.4	678
Sheet Metal Worker	11.8	6	32.5	741**	0.0	0	12.8	6	24.2	15	33.1	273
Sign Maker/Installer	0.0	0	24.7	21	0.0	0	0.0	0	25.0	1	24.7	20

Note: *p≤.05; **p≤.01; ***p≤.001 based on chi-square tests

Sample includes all agreements begun 2001-2010 that were not terminated with 0 hours accumulated (N=11,390)

Table 3. Percentage of Apprentices Agreements Completed by Gender and Race, by Region, Union Status, and Cohort

	Women		Men		Women of Color		NH White Women		Men of Color		NH White Men	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	24.5	194	39.7	4209***	19.4	35	25.9	159	31.8	514	41.1	3695***
Region												
One	26.1	105	37.9	1580***	21.0	26	28.4	79	28.8	255	40.3	1325***
Two	21.3	29	41.3	1108***	22.2	4	21.2	25	34.5	101	42.1	1007*
Three	27.6	16	43.5	372*	0.0	0	31.4	16	40.4	42	43.9	330
Four	33.3	12	44.7	332***	0.0	0	37.5	12	36.4	28	45.7	304
Five	25.0	4	32.9	78	0.0	0	33.3	4	27.5	11	34.0	67
Six	19.3	2	38.8	738***	21.7	5	18.9	23	35.2	76	39.3	662
Union Status												
Union	29.9	101	42.2	1612***	26.3	15	30.6	86	34.1	207	43.8	1405***
Non-Union	17.1	43	39.5	1896***	9.5	6	19.6	37	30.4	204	41.0	1692***
Mixed	24.6	50	35.5	701**	23.3	14	25.2	36	30.7	103	36.4	598*
Cohort												
2001	28.6	18	55.1	505***	0.0	0	32.7	18	46.4	58	56.5	447*
2002	40.7	37	59.5	705***	37.5	9	41.8	28	51.8	88	60.8	617*
2003	31.9	22	58.1	504***	22.2	2	33.3	20	46.9	52	59.7	452*
2004	34.9	37	57.5	675***	31.8	7	35.7	30	46.6	75	59.2	598**
2005	37.2	35	55.6	841***	27.6	8	41.5	27	46.6	97	57.0	744**
2006	24.8	28	39.3	616**	23.5	4	25.0	24	37.4	86	39.6	530
2007	9.7	11	16.6	260	10.0	3	9.6	8	16.5	41	16.6	219
2008	7.8	5	8.7	80	11.8	2	6.4	3	7.2	12	9.0	68
2009	2.3	1	4.2	16	0.0	1	4.2	1	4.7	4	4.1	12
2010	0.0	0	1.8	9	0.0	0	0.0	0	0.9	1	2.0	8

Note: *p≤0.05; **p≤0.01; ***p≤0.001 based on chi-square tests

Sample includes all agreements begun 2001-2010 that were not cancelled with 0 hours accumulated (N=11,390)

Table 4. Individual Apprentices by Number of Agreements, by Gender and Race

Number of Agreements	Women		Men		Women of NH White Color		African American Women		Men of Color		NH White Men		African American Men			
	%	N	%	N	%	N	%	N	%	N	%	N	%	N		
One	92.2	658	93.6	9138	86.2	125	94.5	533	81.0	51	93.2	1366	93.9	7772	91.2	343
Two	6.7	48	5.8	563	12.4	18	4.8	27	15.9	10	6.4	94	5.5	454	8.8	33
Three	1.1	8	0.5	50	1.4	2	0.7	4	3.2	2	0.3	4	0.5	45	0.0	0
Four	NA	0	0.1	7	NA	0	NA	0	NA	0	0.1	1	0.1	6	NA	0
> One	7.8	56	6.4	620	13.8	20	5.5	31	19.1	12	6.8	99	6.4	506	8.8	33

Table 5. Percentage of Apprentices Completing At Least One Agreement by Number of Agreements, by Gender and Race

Number of Agreements	Women		Men		Women of NH White Color		African American Women		Men of Color		NH White Men		African American Men	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N
One	25.8	42.1	49.2	42.1	19.2	19.2	27.4	25.5	33.2	33.2	43.7	43.7	20.1	20.1
Two	37.5	49.2	49.2	49.2	33.3	33.3	33.3	30.0	53.2	53.2	48.9	48.9	39.4	39.4
Three	37.5	62.5	62.5	62.5	50.0	50.0	50.0	50.0	50.0	50.0	60.0	60.0	0.0	0.0
Four	NA	100.0	100.0	100.0	NA	NA	NA	NA	100.0	100.0	100.0	100.0	NA	NA
> One	7.8	50.6	50.6	50.6	35.0	35.0	35.5	33.3	53.5	53.5	50.4	50.4	34.4	34.4

Sample includes individuals with at least one agreement begun between 2001-2010 that was not cancelled with 0 hours accumulated (N=10,472)

Table 6. Reasons for Cancellation of Agreements by Gender and Race, by Trade

	Apprentice Request						Failure to Appear						Failure to Submit Progress Reports					
	W of NHW		M of NHW		W of NHW		M of NHW		W of NHW		M of NHW		W of NHW		M of NHW			
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%			
All Trades	48.0	38.1	45.6	48.8	30.6	39.8	18.4	24.2	17.8	18.6	24.9	24.0	25.5	24.6	37.8	21.7	28.4	23.7
Carpenter	52.0	35.5	53.6	51.4	29.7	37.4	37.8	40.0	39.3	37.1	33.7	41.9	61.2	62.0	67.9	58.6	56.8	63.7
Scaffold Erector	NA	42.0	NA	NA	41.7	42.5	66.7	53.9	0.0	66.7	66.7	50.0	66.7	65.4	0.0	66.7	50.0	70.0
Cement Mason	50.0	41.7	50.0	50.0	40.9	41.9	30.0	35.4	0.0	37.5	45.5	32.4	0.0	3.8	0.0	0.0	0.0	3.8
Pile Driver	25.0	30.8	66.7	NA	22.2	33.3	50.0	61.5	66.7	40.0	44.4	66.7	100.0	76.9	100.0	100.0	66.7	80.0
Operating Engineer	41.7	50.0	40.6	45.1	46.7	44.7	2.8	11.0	0.0	3.1	6.7	11.8	11.1	7.7	0.0	12.5	6.7	7.9
Laborer	32.4	25.5	16.7	43.2	25.2	25.8	13.5	14.5	6.7	18.2	15.5	13.8	21.6	23.2	33.3	13.6	23.9	22.7
Electrician	59.7	51.2	88.9	55.2	45.1	51.9	11.9	18.7	0.0	13.8	22.5	18.3	1.5	4.0	0.0	1.7	5.6	3.8
Painter	48.7	21.8	66.7	45.2	26.1	20.4	8.1	18.1	16.7	6.5	23.9	16.3	8.1	13.5	16.7	6.5	13.0	13.6
Plumber	69.2	39.3	66.7	70.0	36.2	39.6	0.0	23.4	0.0	0.0	25.5	23.1	7.7	7.2	0.0	10.0	8.5	7.1
Sheet Metal Worker	64.0	46.0	50.0	65.2	35.0	46.7	8.0	17.8	0.0	8.7	20.0	17.7	8.0	23.3	50.0	4.4	30.0	22.8
Sign Maker/Installer	50.0	61.4	50.0	NA	50.0	61.9	0.0	4.6	0.0	0.0	0.0	4.8	0.0	18.2	0.0	0.0	50.0	16.7
Iron Worker	25.0	20.9	0.0	28.6	19.0	21.4	0.0	9.0	0.0	0.0	10.3	8.6	0.0	1.5	0.0	0.0	3.5	1.0

Sample includes all cancelled agreements begun 2001-2010 that were not cancelled with 0 hours accumulated (N=3,872)

Table 6, cont. Reasons for Cancellation of Agreements by Gender and Race, by Trade

	Apprentice Related Training						Insufficient OJT Hours					
	W of Color		NHW Wom		M of Color		NHW Wom		M of Color		NHW Men	
	%	%	%	%	%	%	%	%	%	%	%	%
All Trades	17.3	22.9	20.0	16.5	25.8	22.2	44.6	44.1	45.6	44.3	42.7	44.4
Carpenter	29.6	38.4	28.6	30.0	39.7	38.0	58.2	57.5	67.9	54.3	48.2	60.4
Scaffold Erector	33.3	26.9	0.0	33.3	58.3	17.5	66.7	25.0	0.0	66.7	41.7	20.0
Cement Mason	10.0	28.1	50.0	0.0	36.4	25.7	80.0	83.3	50.0	87.5	81.8	83.8
Pile Driver	62.5	46.2	33.3	80.0	66.7	40.0	75.0	56.0	100.0	60.0	66.7	53.0
Operating Engineer	22.2	11.0	0.0	25.0	13.3	10.5	61.1	59.3	75.0	59.4	46.7	61.8
Laborer	17.6	17.9	20.0	15.9	20.7	16.0	29.7	35.0	26.7	31.8	36.8	33.8
Electrician	4.5	22.2	11.1	3.5	18.3	22.6	26.9	34.9	33.3	25.9	35.2	34.9
Painter	8.1	15.5	16.7	6.5	10.9	17.0	21.6	28.0	0.0	25.8	19.6	30.6
Plumber	7.7	18.7	0.0	10.0	27.7	17.6	69.2	50.2	66.7	70.0	48.9	50.4
Sheet Metal Worker	8.0	9.1	0.0	8.7	5.0	9.3	48.0	36.9	50.0	47.8	55.0	35.6
Sign Maker/Installer	0.0	31.8	0.0	0.0	50.0	31.0	0.0	18.2	0.0	0.0	0.0	19.1
Iron Worker	0.0	7.1	0.0	0.0	3.5	8.1	75.0	37.3	100.0	71.4	39.7	36.7

Sample includes all cancelled agreements begun 2001-2010 that were not cancelled with 0 hours accumulated (N=3,872)

Table 7. Mean of Credit Hour Variables by Gender and Race, by Trade

	Number Completed by Cancelled						Average Completed per Month by Cancelled							
	W		NHW		M of Color		W of Color		NHW		M of Color		NHW	
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
All Trades	1412	1717***	1021	1532	1363	1798***	71	85***	59	75	72	88***		
Carpenter	1001	1225*	800	1082	1111	1260	57	70	55	58	71	69		
Scaffold Erector	316	991***	NA	316	560	1120	26	78***	NA	26	46	88		
Cement Mason	1159	1247	199	1399	1443	1189	62	66	21	72	68	65		
Pile Driver	1030	1392	615	1279	2059	1191	50	78	20	68	86	75		
Operating Engineer	1926	1824	2061	1909	1092	1969	81	85	83	80	58	90		
Laborer	922	1004	748	1040	1046	976	49	52	46	51	47	55		
Electrician	1866	2434**	2056	1837	2296	2449	102	113	104	102	116	113		
Painter	967	1167	577	1042	815	1277	69	76	48	73	73	77		
Plumber	2555	2261	2343	2619	2718	2204	112	98	107	113	108	97		
Sheet Metal Worker	2907	2119	1639	3017	1517	2161	100	103	75	103	94	104		
Sign Maker/Installer	832	2800*	832	NA	2147	2831	83	127	83	NA	81	129		
Iron Worker	1629	1474	2639	1485	1292	1525	54	67	64	52	62	69		

Note: *p≤05; **p≤01; ***p≤001 based on t-tests

Sample includes all cancelled agreements begun 2001-2010 that were not cancelled with 0 hours accumulated

Table 7, cont. Mean of Credit Hour Variables by Gender and Race, by Trade

	Average Completed per Month by Completed											
	W		M		W of Color		NHW W		M of Color		NHW Men	
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
All Trades	139	156 ***	131	141	141	153	175	156	177	170	180	170
Carpenter	174	176	163	179	179	175	177	177	177	170	180	170
Scaffold Erector	NA	219	NA	NA	NA	240	218	218	218	170	180	170
Cement Mason	180	168	154	193	193	165	170	170	170	170	180	170
Pile Driver	154	184	141	168	168	209	180	180	180	170	180	170
Operating Engineer	104	170 ***	58	118	118	158	172	172	172	170	180	170
Laborer	108	130 ***	96	114	114	118	137	137	137	170	180	170
Electrician	138	153 ***	150	137	137	149	153	153	153	170	180	170
Painter	152	148	163	151	151	159	145	145	145	170	180	170
Plumber	129	151 **	NA	129	129	151	151	151	151	170	180	170
Sheet Metal Worker	129	152	NA	129	129	147	152	152	152	170	180	170
Sign Maker/Installer	NA	162	NA	NA	NA	154	163	163	163	170	180	170
Iron Worker	92	155	NA	92	92	170	148	148	148	170	180	170

Note: *p<.05; **p<.01; ***p<.001 based on t-tests

Sample includes all cancelled agreements begun 2001-2010 that were not cancelled with 0 hours accumulated

Figure 1. Percentage of Agreements Completed by Gender, by Trade

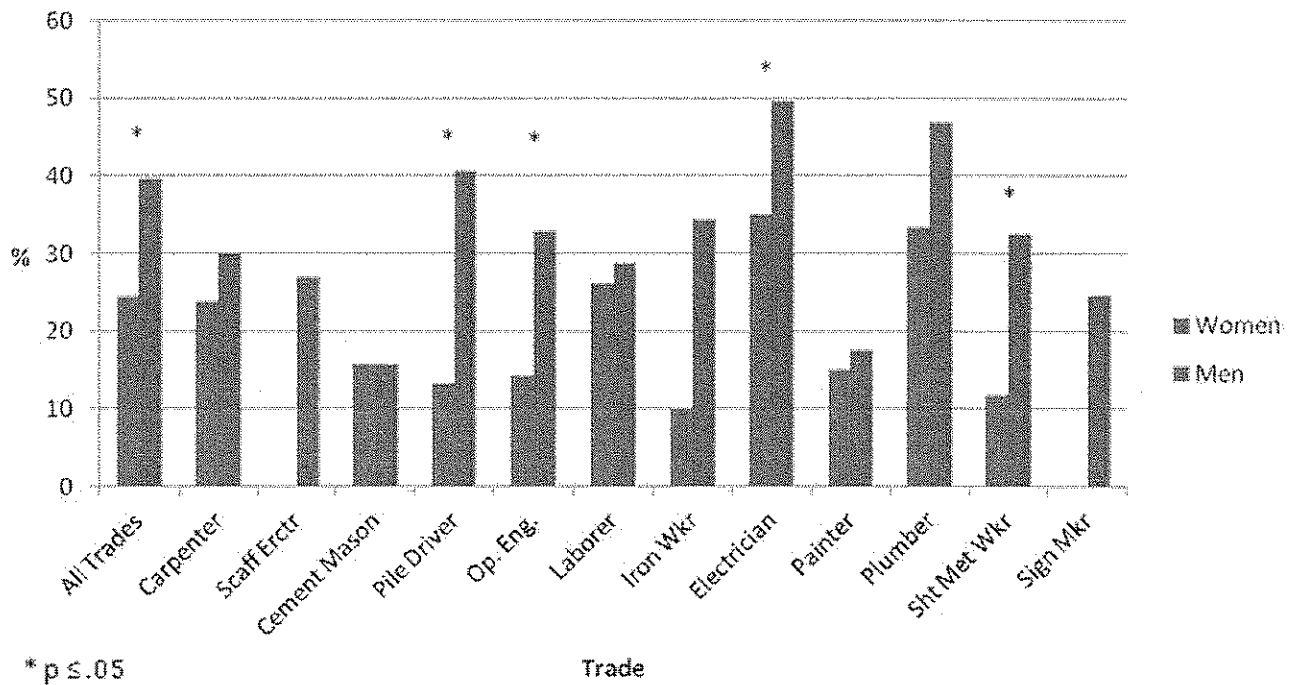


Figure 2. Percentage of Agreements Completed Among Men by Race/Ethnicity, by Trade

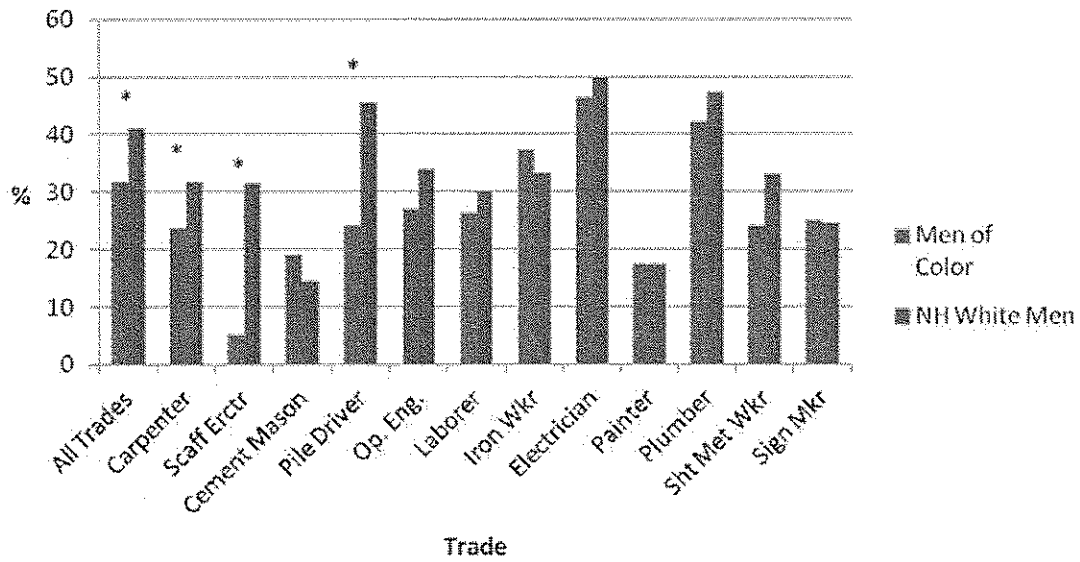
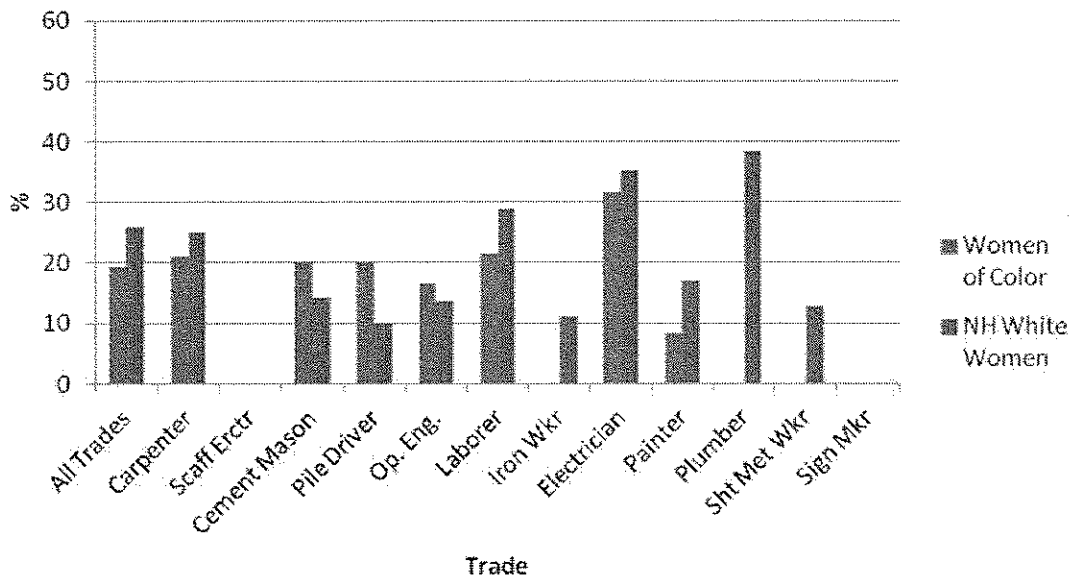


Figure 3. Percentage of Agreements Completed Among Women by Race/Ethnicity, by Trade



* p ≤ .05

Figure 4. Percentage of Agreements Completed by Gender, by Region

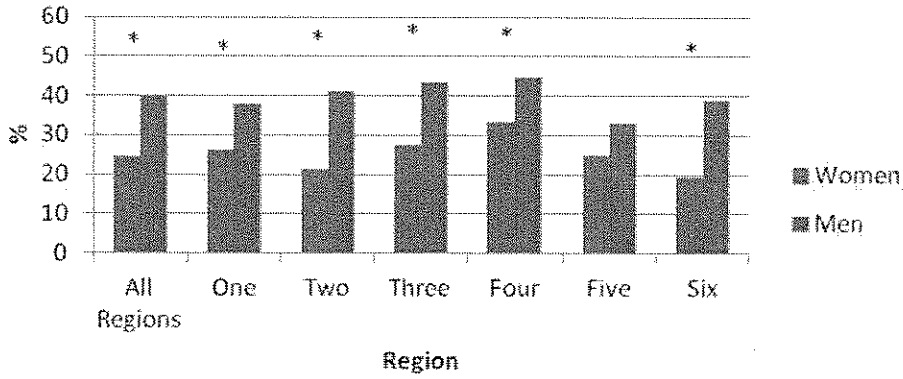


Figure 5. Percentage of Agreements Completed by Gender, by Union Status

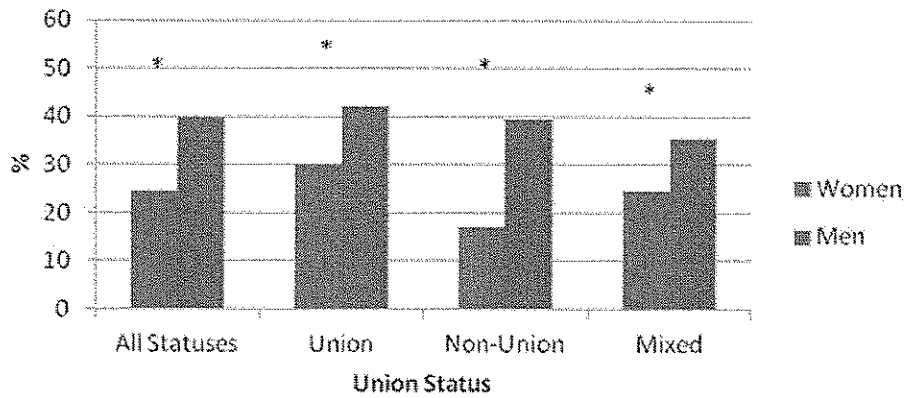
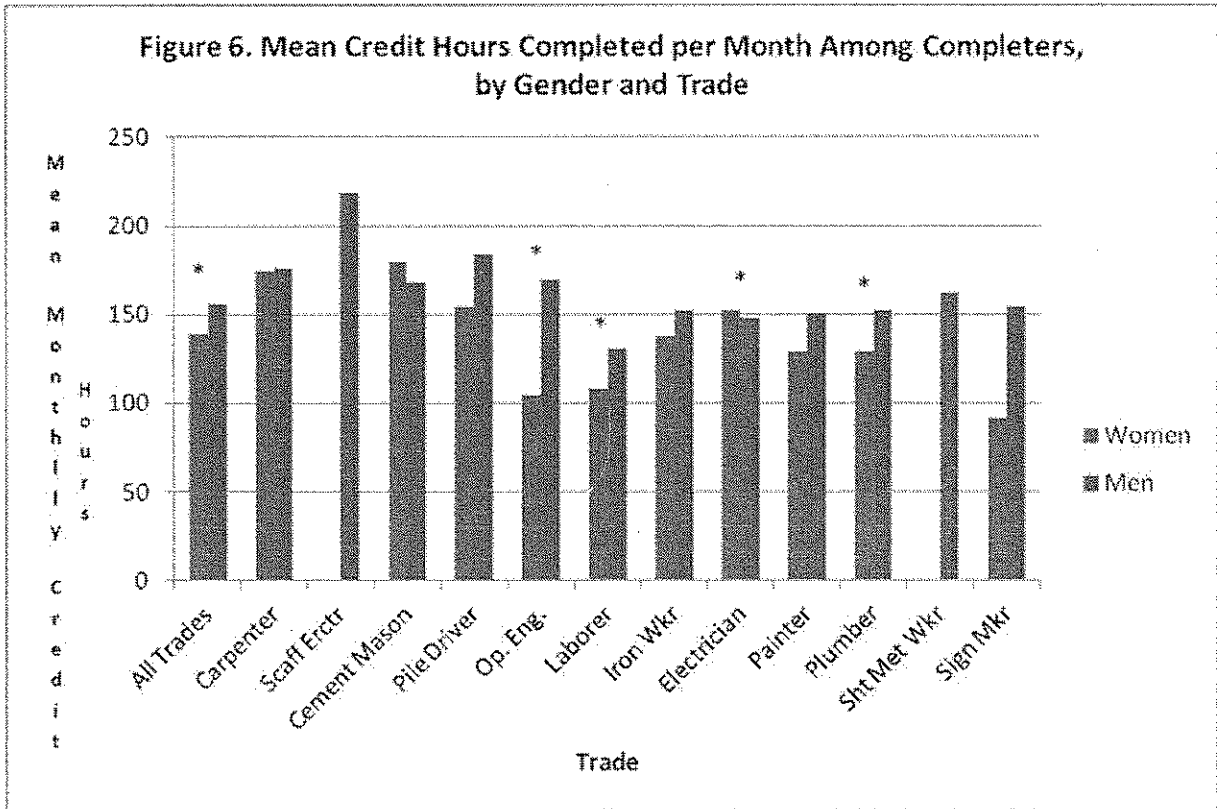


Figure 6. Mean Credit Hours Completed per Month Among Completers, by Gender and Trade



* $p \leq .05$