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Whiting

CBSC-250

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Job Project Report

Executive Summary

SciCorp asked to have a statistical analysis done on their hiring process. When encountering the question of which factors were most important in the hiring process, it was found that the variables (in order from most important to least important) were: applicant self-rated confidence before interview, strength of letter of recommendation, proficiency with R, applicant self-rated confidence after interview, and extroversion of the applicant. By far, pre-interview confidence was the most important factor when it came to the likelihood of an applicant getting a job. Another question posed asked about discrimination during the hiring process. We found that there was a significant amount of discrimination during the hiring process, with race and gender playing significant roles. Overall, black women were characteristically less likely to get hired, even though they were capable applicants. Not only black women but black men and white women were often labeled as lower quality candidates than white men, even if they were adequately capable.

Influences on Hiring

To find the most significant predictor in the hiring rate in terms of the application variables. Bivariate correlations were conducted to explore the association between the likelihood of getting hired and all application variables. The only variable that was not shown to

have any correlation was GPA, meaning that there was no correlation between GPA and the likelihood of getting a job. Overall, all the other variables (applicant self-rated confidence before interview, strength of letter of recommendation, proficiency with R, applicant self-rated confidence after interview, and extroversion of the applicant) were found to be statistically significant in their correlations, meaning they all played a role in the hiring process.

Next, we conducted a simultaneous multiple regression using the likelihood of getting a job as the DV and the other application variables as predictors. This data can be seen in Table 1 shown below.

Multiple Regression Table: Predictors in Hiring

Regression results using job as the criterion

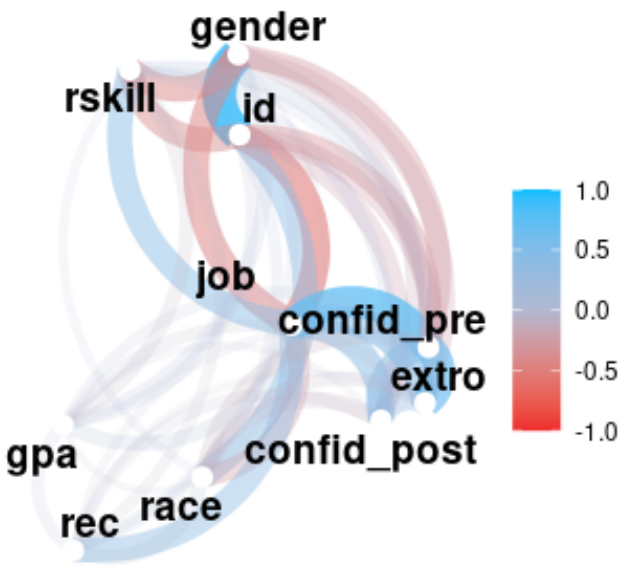
Predictor	*b*	*b* 95% CI [LL, UL]	*beta*	*beta* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	*r*	Fit
(Intercept)	-4.55**	[-5.14, -3.97]						
R Skill	0.28**	[0.24, 0.33]	0.36	[0.30, 0.41]	.12	[.08, .17]	.42**	
Recomm	0.64**	[0.56, 0.73]	0.41	[0.36, 0.47]	.17	[.11, .22]	.38**	
Post Confid	0.28**	[0.20, 0.37]	0.19	[0.13, 0.25]	.03	[.01, .05]	.45**	
Pre Confid	0.75**	[0.66, 0.84]	0.60	[0.53, 0.68]	.19	[.13, .25]	.73**	
Extro	0.02	[-0.04, 0.08]	0.03	[-0.04, 0.10]	.00	[-.00, .00]	.48**	
								R^2 = .850** 95% CI[.81,.87]

Note. A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. sr^2 represents the semi-partial correlation squared. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
* indicates $p < .05$. ** indicates $p < .01$.

The table shows which variables are the strongest predictors in terms of the likelihood to get a job. The greatest predictor was shown to be the confidence of an applicant before the interview (Pre Confid). This can be seen with the beta values. Pre-confidence has the highest with a beta score of 0.60, followed up by the strength of an applicant's recommendation letter, $B = 0.41$. Another aspect to consider within the data is the shared variance between the variables.

Pre-meeting confidence still was the strongest predictor, with an sr^2= 0.19. However, recommendation letter strength came a lot closer with an sr^2= 0.17. Another aspect observed in terms of variance, is that an applicant's level of extroversion seemingly had no singular effect at all, sr^2= 0.00.

Correlations between Application Variables



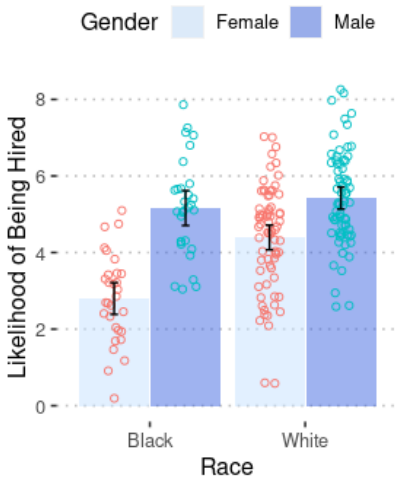
The previous graph provides a visual depiction of how the different factors correlate with each other and which factors work as the strongest predictors. Variables with darker colors play a bigger role in the likelihood of getting a job. As seen, confid_pre (applicant self-rated confidence before interview) has a darker line than those surrounding it. As well, rec (strength of recommendation letter) and rskill (proficiency in r) are darker in contrast. You can also observe a shared variance between variables within the graph. For example, confid_pre, extro (extroversion of the applicant), and confid_post (applicant self-rated confidence after interview) are all

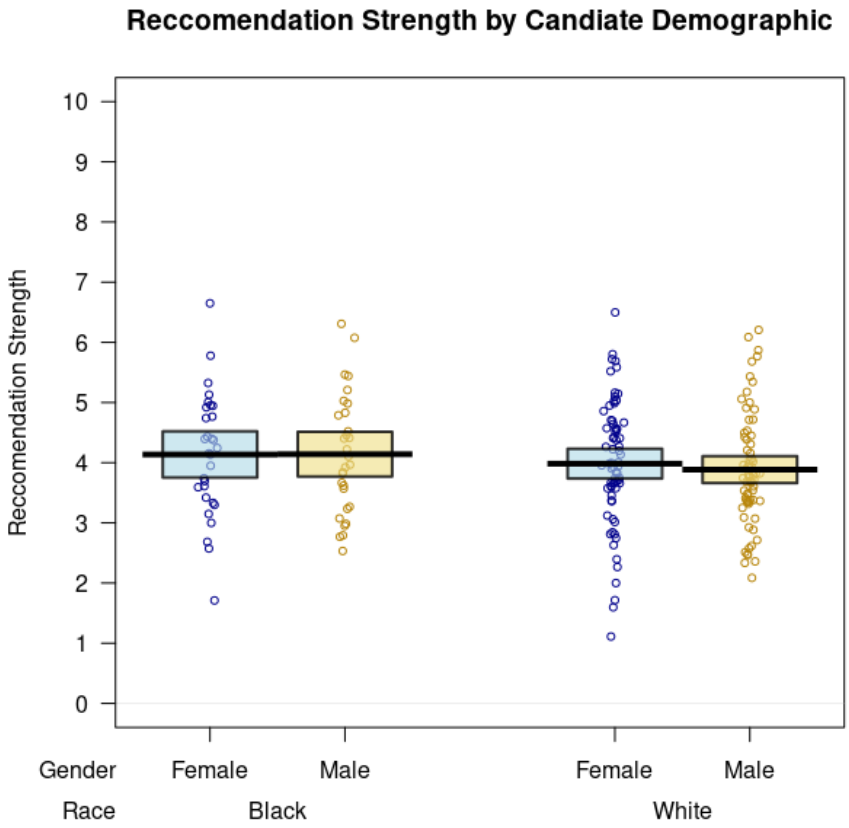
grouped together closely on the graph. We see the relevancy of this back in Table 1 where it is observed for these variables to all have shared variance as predictors.

Overall, the factors that provide the most strength to an applicant and their likelihood of getting a job are their confidence before their interview, the strength of their letter of recommendation, and their proficiency in R. If a candidate is proficient in these three categories, they are likely to be hired.

Issues in Hiring

In order to establish any discrimination present in hiring, we split applicants into three groups according to their likelihood of being hired: High (greater than 60%), Middle (30-60%), and Low (less than 30%). When looking at the demographics of each group it is concerning to note that black women are absent from the group of applicants with the highest likelihood of being hired while making up the largest demographic in the group with the lowest likelihood. Furthermore, the interacting effect of gender and race is seen in the overrepresentation of white males in the group with the highest likelihood of being hired.





The demographic breakdowns of each category of hiring likelihood implicate an influence of the applicant's race and gender. This issue is further supported when looking at the strength of recommendations for applicants. Despite black applicants having a stronger level of recommendations compared to white applicants, they were still less likely to be hired. Furthermore, the interaction of race and gender disproportionately impacts black female applicants as they have one of the strongest letters of recommendation which should indicate a higher probability of being hired, yet they consistently are hired less than all other applicants.

Conclusion

Overall, we were able to successfully complete the client's requests: both breaking down their hiring process as well as searching for discrimination within it. When looking at applicants, confidence before their meeting is a big factor in how likely they are to get a job. However, the strength of their letter of recommendation as well as their proficiency in R plays an important factor as well. In terms of discrimination, we found evidence that both gender and race played a significant role in the likelihood of receiving a job. Namely, black females were characteristically less likely to receive jobs than any other demographic. Similarly, white men were often characterized as the most likely to receive jobs compared to the other demographics.