



Why They Come, Why They Leave: An Examination of Social Factors Impacting Women Engineer's Career Decisions & Satisfaction

Cassidy Ortman, B.S. Mechanical Engineering
Collaborating Faculty: Dr. Steven Seiler; Dr. Beth Powell

Table 1: Multivariate Linear Regression Analysis of the Impact of Selected Independent Variables on the Level of Career Satisfaction among Women Engineers (N=262)

	Model 1	Model 2
Work, Subtle Sex Discrimination	--	-.130*** (.03)
College, Subtle Sex Discrimination	-.05** (.02)	-.01 (.02)
Self-Esteem	.34** (.11)	.30** (.10)
Work/Social Life Balance	.33 (.18)	.29 (.17)
Ability to Meet Expectations	-.22 (.14)	-.11 (.13)
Stress	-.43*** (.12)	-.35** (.12)
Stayed at Work Late	.16 (.14)	.13 (.14)
Brought Work Home	-.04 (.13)	.03 (.12)
Hours Worked per Week	-.06 (.10)	-.03 (.10)
Company Size	-.02 (.04)	-.01 (.04)
% of Colleagues Women	.06 (.03)	.03 (.03)
Nonwhite	-.23 (.20)	-.31 (.19)
Marital Status	.17 (.15)	.16 (.14)
# of Children	.01 (.05)	.01 (.05)
Age	.01 (.01)	.01 (.01)
Income	.06 (.03)	.06* (.03)
Constant	1.52* (.69)	2.21***
F-Ratio	4.62***	6.33***
Adjusted r ²	.214	.299

Note: Standard error in parentheses.
* p<.05; ** p<.01; ***p<.001

Background & Research Questions

Engineering is historically known to be a predominately male environment. However, many women have tried to combat this notion and the stereotypes that may follow the cultural norms. Furthermore, females have a substantially high attrition rate in engineering fields, and many factors can influence this. Therefore, the purpose of the study was to explore factors that lead to career satisfaction and also factors that influence women to change to non-engineering careers.

Research Questions:

- Does gender impact female engineers' experiences within the field? If so, how and to what extent?
- To what extent do female engineers experience gender-based treatment within the work place?
- To what extent does awareness of gender differences affect female engineers' career decisions?
- What factors contribute to female engineers' career satisfaction and the likelihood of seeking a career outside of the engineering field?

Research Design

Both qualitative and quantitative data for this study were collected via face-to-face interviews (N=15) and an online survey (N=262). The participants in the face-to-face interviews were women who are currently employed in engineering fields in northern Alabama, and the survey participants were women who graduated with engineering degrees from a mid-sized technical university in the Southeast. Only the quantitative findings are presented here.

College & Work Experience:

- **College Experience:**
- Felt a level playing field—76.8%
- Had faculty support—89.4%
- Need to prove themselves—69.8%
- Encountered sexist jokes from classmates—54.7%
- Felt out of place—45%
- Target of sexist comments—38.8%
- Encountered sexist jokes from faculty—29%
- Target of unwelcome sexual advances—21.2%

"you're just a young girl you don't seem to be worthy"

"you can't dress up as much and be seen as just as competent"

"it was hard to get people to listen to what we had to say, they were kind of having their own conversation"

- **Workplace Experience:**
- Satisfied with their job—86.8%
- Satisfied with treatment from male co-workers—85.3%
- Received same opportunities for advancement as their co-workers—67.7%
- Considered leaving engineering—52.6%
- Overall women are treated worse than their male counterparts—36.3%
- Excluded from informal work events—39.8%
- Men talk differently to them—48.3%
- Men don't listen to them as much as to other men—33.3%
- Held to different standards—40.8%
- Had to prove themselves—60.7%
- Experienced sexual harassment—39.3%
- Heard sexist comments—79.6%
- Target of sexist comments—58.2%
- Judged on their physical appearance—51.7%
- Received inappropriate comments about appearance—49.3%
- Dressed more masculine—34.3%
- Acted more masculine to fit in at work—28.4%

"I don't really want you to walk up and massage my shoulders. That's a little too close for me."

Factors Related to Career Satisfaction

According to the multivariate linear regression analysis in Model 1, Table 1, **self-esteem is positively related to career satisfaction, and work-related stress and the sense of gender discrimination in college are negatively related to career satisfaction.** However, in Table 1, Model 2, not only is the sense of gender discrimination in the workplace negatively related to career satisfaction, adding it to the model explained away the impact of a sense of gender discrimination during college and decreased the impact of self-esteem as well as stress on career satisfaction. Interesting, adding it to the model resulted in **income becoming positively related to career satisfaction.**

There were no statistically significant relationships between the level of career satisfaction and organizational factors (i.e., number of hours worked per week, the size of the company, and the percentage of women co-workers in immediate department), structural factors (i.e., race, age, relationship status, and number of children), and work-social life balance (i.e., ability to balance work and social/family life, feeling of being able to meet expectations of family and friends, staying at work late, and taking work home).

Family & Career Satisfaction

The multivariate linear regression analysis in Table #2 focused on women engineers who were in a relationship and had children. The sense of discrimination in the workplace, the number of children, working too much, missing children's school functions, and working alone **decrease career satisfaction.** However, level of self-esteem, income, spending time with children **increase career satisfaction.** Surprisingly, the more women agree they have very clear boundaries between work life and social/family life, **the level of career satisfaction decreases.**

Table 2: Multivariate Linear Regression Analysis of the Impact of Selected Independent Variables on the Level of Career Satisfaction among Women Engineers in Relationships with Children (N=262)

Work, Subtle Sex Discrimination	-.10*** (.03)
College, Subtle Sex Discrimination	-.01 (.02)
Self-Esteem	.25* (.12)
Work too Much	-.29* (.13)
Clear Work/Social Boundaries	-.36* (.16)
Miss Child's School Function	-.26* (.12)
Spent Quality Time w/ Partner	.29 (.11)
Spent Quality Time w/ Children	.31* (.15)
Stress	.10 (.14)
Stayed at Work Late	-.29* (.15)
Brought Work Home	-.39* (.14)
Hours Worked per Week	.02 (.10)
Company Size	.07 (.04)
% of Colleagues Women	.04 (.03)
Nonwhite	-.12 (.24)
# of Children	-.13* (.06)
Age	.00 (.01)
Income	.13*** (.03)
Constant	2.67*** (.79)
F-Ratio	6.79***
Adjusted r ²	.551

Note: Standard error in parentheses.
* p<.05; ** p<.01; ***p<.001

Factors Contributing to Leaving An Engineering Career

According to the multivariate logistic regression in Table 3, **higher self-esteem decreases the likelihood of leaving a career in engineering, whereas, subtle work discrimination, having strong self-strengths, working late, working alone, and being a woman of color increase the likelihood of leaving an engineering career.**

Table 3: Multivariate Logistic Regression Analysis of the Impact of Selected Independent Variables on the Likelihood of a Women Engineer Leaving an Engineering Career (N=262)

	B(SE)	Exp(B)	B(SE)	Exp(B)
Work, Subtle Sex Discrimination	--	--	.36** (.13)	1.43
College, Subtle Sex Discrimination	.12 (.11)	1.13	-.00 (.12)	.99
Career Satisfaction	-.78* (.33)	.46	-.63 (.35)	.534
Self-Strengths	1.70** (.64)	5.48	1.80** (.66)	6.02
Self-Esteem	-1.49** (.58)	.23	-1.50* (.61)	.22
Hours Worked per Week	-.49 (.43)	.62	-.50 (.43)	.61
Nonwhite	1.67* (.83)	5.32	1.95* (.88)	7.02
Marital Status	-.51 (.57)	.60	-.59 (.56)	.55
# of Children	.26 (.22)	1.30	.17 (.23)	1.19
Income	-.11 (.12)	.90	-.16 (.13)	.86
Age	-.03 (.03)	.97	-.02 (.03)	.98
Company Size	.24 (.18)	1.27	.23 (.18)	1.26
% of Colleagues Women	.15 (.13)	1.16	.22 (.14)	1.24
Work Alone	1.12* (.49)	3.06	1.16* (.52)	3.18
Work/Social Life Balance	-.16 (.84)	.85	-.17 (.90)	.84
Ability to Meet Expectations	1.27* (.58)	3.57	1.02 (.61)	2.77
Stress	-.20 (.53)	.82	-.39 (.56)	.68
Stayed at Work Late	1.22* (.58)	3.37	1.41* (.60)	4.09
Brought Work Home	.04 (.53)	1.04	-.03 (.55)	.97
Constant (S.E)	6.23* (3.01)		4.38 (3.16)	
Model χ^2	61.34***		69.51***	
Nagelkerke r ²	.453		.500	

*** p<.001; ** p<.01; * p<.05

Conclusions

Despite women engineers facing forms of discrimination in the workplace, they are still generally satisfied with their career. **Yet, a substantial number of women have considered leaving engineering, primarily resulting from discriminatory treatment.** The findings suggest discriminatory experiences might have normalized in women's experiences, and they find satisfaction elsewhere such as income. Interestingly, other factors commonly associated with career satisfaction (e.g. hours worked, company size, upward mobility) were not significant in women's experiences. Women engineers still face a number of challenges; however, the challenges identified here were largely cultural and relational and not as strongly related with pay gaps and lack of upward mobility.