

San Jose State University
School of Social Work
ScWk 242
Spring 2008

Lab Exercise #4B: Multiple Linear Regression

ANSWER KEY

Research Scenario 1b: Regression

You are a program manager in a large public child welfare agency located in an urban county. The programs you manage employ a total of 40 social workers who provide a variety of case management services to children and families involved in the child welfare system. As a program manager you are particularly interested in reducing employee turnover by preventing employee stress and burnout.

You suspect that number of clients on caseload is related to employee stress levels. You ask your employees (N=40), to complete an employee stress survey that measures employee stress levels on a continuous scale with 0 = No stress, and 30 = High stress. The survey also asks employees to indicate the types of stress-reducing activities they regularly engage in, including such things as exercise. In addition the survey also contains demographic questions including race/ethnicity, age and gender.

Given the significant relationship that was found between caseload and employee stress level, you would like to learn more about the strategies that employees use to effectively cope with stress, including the role of exercise in reducing stress level. In order to help isolate the effect of exercise on employee stress level, you would like to statistically control for the potential confounding factors of number of clients on caseload, race/ethnicity, age, and gender.

1) Identify the **independent and control variables** and their **levels of measurement**

1. Number of clients on caseload (continuous, or ratio)
2. Number of hours exercise per week (continuous, or ratio)
3. African American (dummy, dichotomous, categorical, or nominal)
4. Latino (dummy, dichotomous, categorical, or nominal)
5. Asian/Pacific Islander (dummy, dichotomous, categorical, or nominal)
6. Age (continuous, or interval)
7. Female gender (dummy, dichotomous, categorical, or nominal), Male is baseline.

2) Identify the **dependent variable** and the **level of measurement**

Employee stress level (continuous, ratio)

3) State the **null hypothesis for the overall model** and for **each independent or control variable**

1. Overall model: There is no relationship between employee stress level and the independent variables.
2. There is no relationship between exercise and employee stress, controlling for age, gender, ethnicity and number of clients on caseload.

***Note: even though ethnicity is now defined as several dummy variables, you can summarize “controlling for ethnicity” in the hypotheses, unless your research question was specifically addressing one ethnic group.

4) State the **alternative hypothesis for the overall model** and for **each independent or control variable**

1. Overall model: the Independent variables will predict employee stress.
2. The number of hours of exercise will predict lower stress levels, controlling for age, gender, ethnicity, and the number of clients on caseloads. OR, There is a negative relationship between exercise and stress level, controlling for the independent variables.

5) Identify **appropriate statistical test and alpha level**

Multiple regression. Alpha = .05

6) Present **table of results (SPSS output)****Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.882 ^a	.777	.729	2.010

a. Predictors: (Constant), Gender: Female compared to male , Latino, Number of hours of exercise per week, Age, API , African-Am, Number of clients on caseload

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	451.119	7	64.446	15.952	.000 ^a
	Residual	129.281	32	4.040		
	Total	580.400	39			

a. Predictors: (Constant), Gender: Female compared to male , Latino, Number of hours of exercise per week, Age, API , African-Am, Number of clients on caseload

b. Dependent Variable: Employee stress level

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.456	2.872		2.248	.032
	Number of clients on caseload	.254	.049	.575	5.225	.000
	Number of hours of exercise per week	-.358	.111	-.350	-3.234	.003
	African-Am	.496	.841	.062	.590	.560
	Latino	.152	.923	.017	.165	.870
	API	1.278	1.055	.120	1.212	.235
	Age	.038	.032	.110	1.202	.238
	Gender: Female compared to male	.385	.652	.050	.590	.559

a. Dependent Variable: Employee stress level

7) Describe **results** and **decision to accept or reject the null hypothesis (use APA)**

When reporting multiple regression results, report

- 1) Significance of the overall model
- 2) Significance of independent or control variables

From the multivariate regression analysis, the overall regression model was significant (the model is a good fit), adjusted R -square = .729, $F(7,32) = 15.95$, $p < .001$. We can reject the Null Hypothesis and conclude that there is a significant relationship between the independent variables as a group and employee stress.

Exercise had the hypothesized negative relationship to stress ($\beta = -.350$, $p = .032$)—the more exercise, the less stress, controlling for all other variables.

Number of clients on caseload was also related to stress ($\beta = 0.575$, $p < .001$). The higher the caseload, the more stress, controlling for all other variables.

Ethnicity, Age and Gender were not significantly related to stress level.

***Note: how would you interpret one of the dummy variables? Take API as an example. The Beta is 0.120. This is interpreted as “Compared to Whites, Asian/Pacific Islanders experience more stress (.12 of a stress scale unit more), controlling for all other variables.” However, since the Beta is not significant, this would normally not be reported unless it was the primary research question. Compare this to interpreting the Beta coefficient of a continuous variable like caseload: “For every additional person added to a caseload, stress increases more than half a unit of the stress scale, controlling for other variables ($\beta = 0.575$, $p < .001$).”

8. Provide a **discussion of these results**. Include:

- Statistical significance
- Direction of the relationships
- Meaning and implications of results
- Limitations/future studies

Findings showed that as hypothesized higher levels of exercise are related to increased life employee satisfaction, controlling for age, gender, ethnicity, and the size of caseloads. In addition, the size of caseloads is negatively related to employee satisfaction. It would be important for social service agencies to monitor caseload size, as well as to encourage regular exercise as a strategy to minimize job-related stress. A limitation of this study is that there may be other factors not accounted for in the model that affect employee life satisfaction (such as factors related to their lives outside of work, and length of tenure in their jobs). The sample was chosen from one employment setting, so results do not necessarily reflect other settings nor can the results be generalized to larger groups of people. Also, while the overall sample size is sufficient to test the

relationship between exercise levels and satisfaction, the subgroup sample frequencies of ethnicity are small and should be tested with larger samples. Nevertheless, the relationship between exercise, caseload size, and employee satisfaction seem to be important factors worth further study. Further studies replicated in several other work sites would provide tests of these relationships.