

Lecture 11

Segment 3

Moderation Example 2

Example

- DV = salary
- IVs
 - # of publications
 - Department
 - Psychology
 - Sociology
 - History

Moderation Example 2

- Center continuous predictor
- Dummy code categorical predictor
- Create moderation terms
- Run sequential regression in 2 steps
 - Step 1: Main effects
 - Step 2: Moderation effect

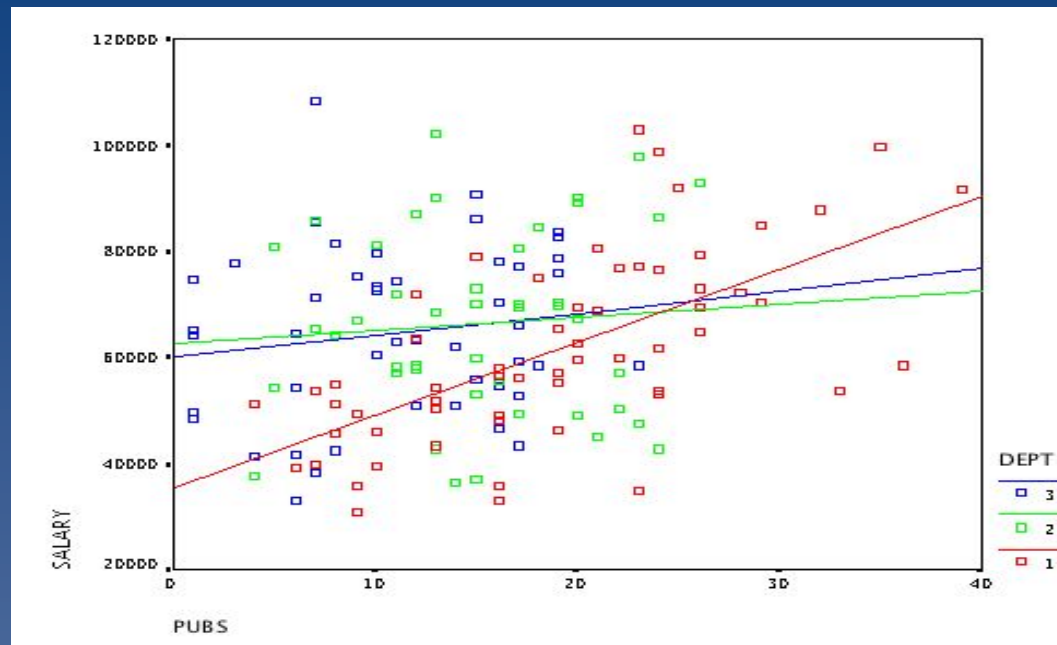
Example

- Center publications
- Create dummy codes for department
 - Regular dummy coding with Psych as the reference group
- Create moderation terms
- Run sequential regression

DEPT		PUBS	SALARY
Psychology	Mean	18.983	61,718.5327
	N	60	60
	Std. Deviation	8.0811	17,589.31294
Sociology	Mean	15.227	66,523.7720
	N	44	44
	Std. Deviation	5.6067	17,530.14462
History	Mean	11.174	64,937.3416
	N	46	46
	Std. Deviation	5.9603	16,001.40284
Total	Mean	15.487	64,115.1710
	N	150	150
	Std. Deviation	7.5064	17,110.14759

Salary as a function of publications and department

Salary



Publications

Regression model: Before moderation

- $\hat{Y} = B_0 + B_1(\text{PUBS.C}) + B_2(\text{C1}) + B_3(\text{C2})$

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	58,482.406	2167.838		26.977	.000
	PUBS.C	925.577	193.424	.406	4.785	.000
	History(C1)	10,447.030	3472.340	.282	3.009	.003
	Sociology(C2)	8281.763	3248.812	.221	2.549	.012

Interpretation of results

- The estimated salary for a Psychologist with 15.5 pubs is **58,482**
- The average return per publication across all three departments is **926**
- When taking into account publications, Historians earn **10,447** more than Psychologists
- When taking into account publication rate, Sociologists earn **8,282** more than Psychologists

Regression model: Moderation

- $\hat{Y} = B_0 + B_1(\text{PUBS.C}) + B_2(\text{C1}) + B_3(\text{C2}) + B_4(\text{C1} * \text{PUBS.C}) + B_5(\text{C2} * \text{PUBS.C})$

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
2	(Constant)	56,918.347	2207.376		25.786	.000
	PUBS.C	1,372.920	252.472	.602	5.438	.000
	History(C1)	9,795.738	3615.187	.265	2.710	.008
	Sociology(C2)	9,672.411	3235.203	.258	2.990	.003
	History(PRODUCT)	-960.978	466.235	-.215	-2.061	.041
	Sociology(PRODUCT)	-1,115.009	495.413	-.196	-2.251	.026

Interpretation of results

- The estimated salary for a Psychologist with 15.5 pubs is **56,918** (taking into account the rate of return for Psychologists)
- The average return per pub for Psychology is **1,373**
- The difference in salary between Psychology and History is **9,796** (for a person with 15.5 pubs, taking into account rate of return)

Interpretation of results

- The difference in salary between Psychology and Sociology is **9,672** (for a person with 15.5 pubs, taking into account rate of return)
- The difference in the pubs by salary slope between Psychology and History is **-961**
- The difference in the pubs by salary slope between Psychology and Sociology is **-1,115**

Further questions

- Is the History slope significant?
- Is the Sociology slope significant?
- Is the difference in slope between History and Sociology significant?
 - Re-code to make a different reference group and re-run the analysis

Further questions

- Test of simple slopes
 - Don't enter the main effect of publications
 - Create moderation terms that represent the slope for each group
 - See next slide for example

Simple slopes coding

Case	Dept	Pubs	Pubs.c	SS1	SS2	SS3
1	Psy	17	-2	-2	0	0
2	Soc	21	6	0	6	0
3	His	19	8	0	0	8
...						

Note:

Pubs_c = Publications, centered

SS1 = $G1 \times \text{Pubs_c}$, SS2 = $G2 \times \text{Pubs_c}$, SS3 = $G3 \times \text{Pubs_c}$

G1 = Group 1 (Psy), G2 = Group 2 (Soc), G3 = Group 3 (Hist)

Simple slopes: Regression terms

- Enter DV (salary)
- Enter IVs
 - Main effect of department
 - C1, C2
 - Three moderation terms
 - SS1, SS2, SS3

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	56,918.347	2207.376		25.786	.000
	History (C1)	9,795.738	3615.187	.265	2.710	.008
	Sociology (C2)	9,672.411	3235.203	.258	2.990	.003
	Psychology (SS1)	1,372.920	252.472	.431	5.438	.000
	History (SS2)	411.942	391.960	.092	1.051	.295
	Sociology (SS3)	257.911	426.253	.045	.605	.546

Interpretation of results

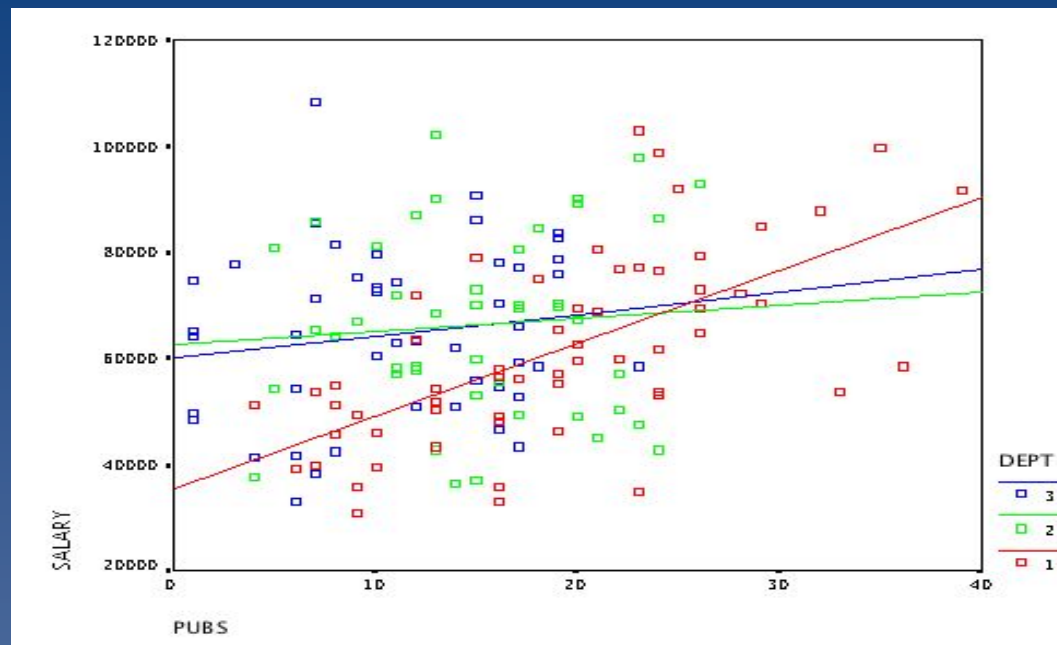
- The B' s for the moderation terms are the simple slopes
 - Psychology is significant
 - History is not significant
 - Sociology is not significant

Interpretation of results

- Department moderates the relationship between publications and salary

Salary as a function of publications and department

Salary



Publications

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