Images Lecture 8B
Poli 101 UCSC

Lazarsfeld's Three Criteria in Assessing Causation (supplemented by K&W #4)

	Surveys	Experiments
1. Association	measures of association	measures of assoc/sig
2. Direction of influence	must be inferred	product of control
3. Elimination of rival expl's	statistical control	<u>random assignment</u>
4. Id plausible causal mech	statistical control	stat/exper control

Ordinary Multiple Regression

```
Regression variables = DepVar IndVar1 IndVar2 IndVar3 …
   /statistics coeff r tol
   /descriptive = n
   /dependent = DepVar
   /method = enter.
```

Hierarchical Multiple Regression

```
Regression variables = DepVar IndVar1 IndVar2 IndVar3 …
   /statistics coeff r tol
   /descriptive = n
   /dependent = DepVar
   /method = enter IndVar1
   /method = enter IndVar1 IndVar2
   /method = enter IndVar1 IndVar2 IndVar3.
```

Elaboration Paradigm
(things that can happen in control tables)

Common Terms

1.replication
2a explanation
2b interpretation
3. specification
4. suppression
5. distortion

Elaboration Paradigm
(things that can happen in control tables)

Elaboration Terms	**Psych Terms**	**Common Terms**
1. replication		
2a explanation	spurious	confounding
2b interpretation	mediation	intervening
3 specification	moderation	interaction
4 suppression		
5 distortion		

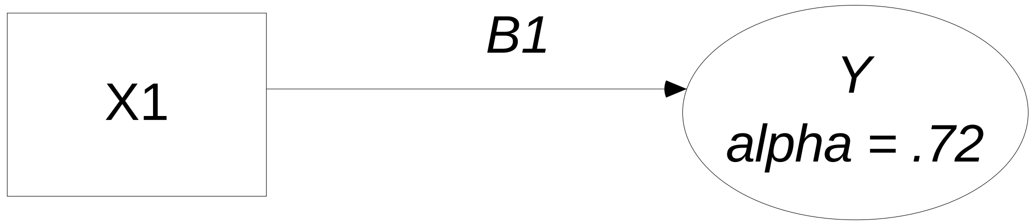
Elaboration Paradigm
(things that can happen in regression)

Elaboration Terms	**What we see**
1. replication	same results as original IV-DV relationship
2a explanation	control reduces or eliminates original IV-DV relationship
2b interpretation	control reduces or eliminates original IV-DV relationship
3 specification	an interaction term predicts the DV
4 suppression	control increases or reveals an IV-DV relationship
5 distortion	entering control results in complex pattern

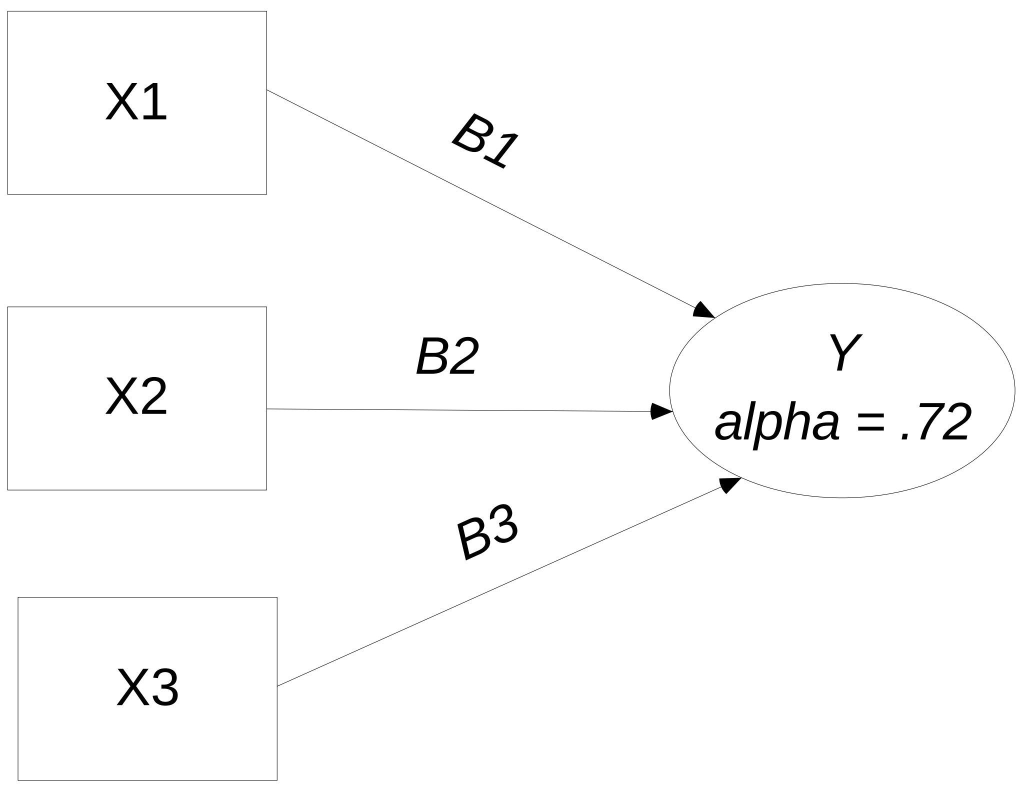
Summary Notes on Statistical Elaboration
J. Fletcher

Name of Effect	Crosstab Results	Symbolic Representation	Regression Results
Replication	Same results in control tables as in original table without controls	Irrespective of Z X←→Y	X predicts Y with and without Z being in equation
Explanation	All control tables show weaker relationship than original table	Z X← /→Y	Entering Z into equation reduces or eliminates X's influence on Y
Interpretation (mediation)	All control tables show weaker relationship than original table	X→Z→Y	Entering Z into equation reduces or eliminates X's influence on Y
Specification (moderation)	Only one (or some) of control tables show relationship from original table	If Z = 1 X←→Y If Z ≠ 1 X←/→Y Or, preferably X Z → XZ → Y	An interaction term of the form X*Z predicts Y
Suppression	Control tables reveal a relationship that was not evident in original table without controls	Without control for Z: X←/→Y With control for Z X←→Y	Entering Z into equation allows X to predict Y
Distortion	Control tables show complex pattern of results		Entering Z into equation produces a complex pattern

```
regression variables = DepVar IndVar1 IndVar2 IndVar3
   /statistics coeff r tol
   /descriptive = n
   /dependent = DepVar
   /method = Enter IndVar1
   /method = Enter IndVar1 IndVar2
   / method = Enter IndVar1 IndVar2 IndVar3.
```



X1
B1
Y
alpha = .72



X1
B1
X2
B2
Y
alpha = .72
B3
X3

```
regression variables=RawMJ3 democrat5 female
  /statistics anova coeff r tol
  /descriptives = n
  /dependent = RawMJ3
  /method = enter democrat5
 /method = enter democrat5 female.
```

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standard Coefficients Beta	Sig.	Tol
1	(Constant)	1.108	.072		.000	
	Democrat5	.734	.111	.209	.000	1.000
2	(Constant)	1.277	.076		.000	
	Democrat5	.808	.110	.230	.000	.987
	female	-.429	.072	-.186	.000	.987

2 x .111 = .222

.734 + .222 = .956

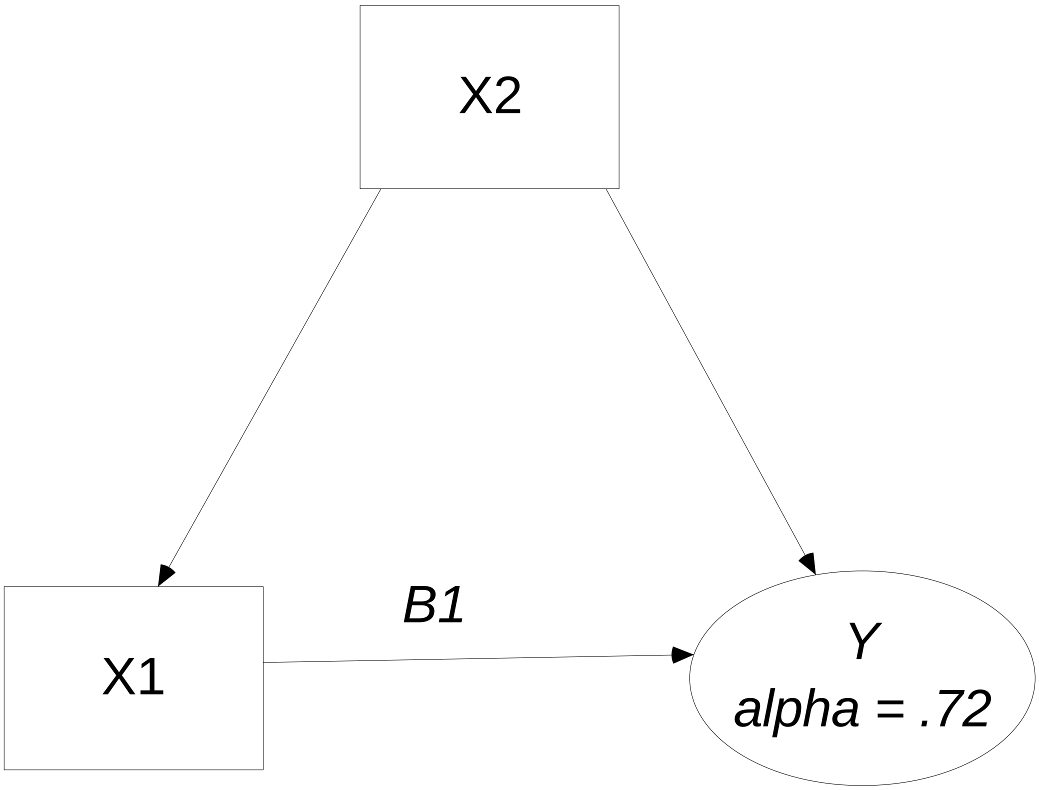
The b value didn't change by this much. Therefore, we have replication.

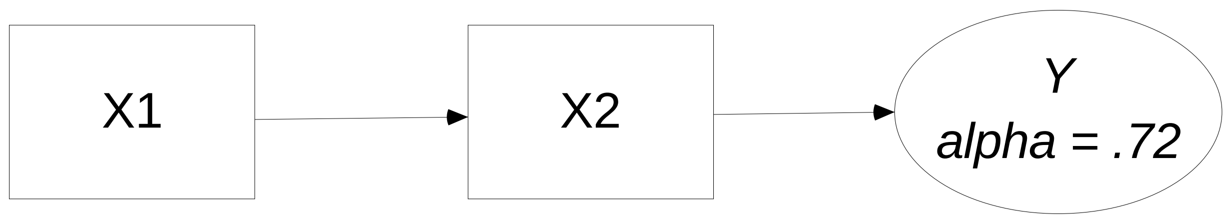
```
regression variables=RawMJ3 democrat5 interest
  /statistics anova coeff r tol
  /descriptives = n
  /dependent = RawMJ3
  /method = enter democrat5
  /method = enter democrat5 interest.
```

		B	Std. Error	Beta	sig	Tol
1	(Constant)	1.108	.072		.000	
	Democrat5	.738	.111	.210	.000	1.000
2	(Constant)	.735	.113		.000	
	Democrat5	.758	.110	.215	.000	.998
	interest	.545	.128	.133	.000	.998

```
regression variables=RawMJ3 democrat5 black hisp asian
  /statistics anova coeff r tol
  /descriptives = n
  /dependent = RawMJ3
  /method = enter democrat5
  /method = enter democrat5 black hisp asian.
```

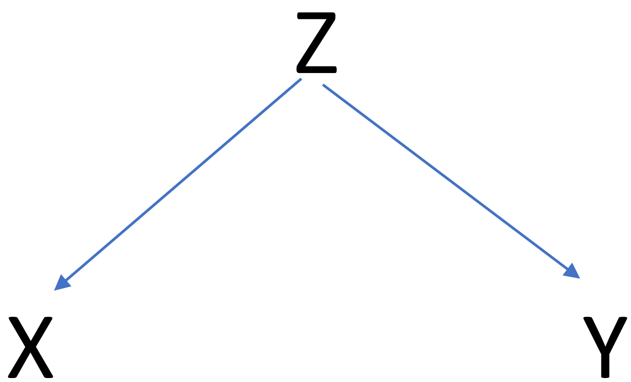
		B	Std. Error	Beta	sig	Tol
1	(Constant)	1.108	.072		.000	
	Democrat5	.734	.111	.209	.000	1.000
2	(Constant)	1.184	.073		.000	
	Democrat5	.904	.113	.257	.000	.923
	Black	-.055	.148	-.012	.709	.927
	Hisp	-.651	.091	-.233	.000	.880
	Asian	-.196	.108	-.057	.071	.938


X2
X1
B1
Y
alpha = .72

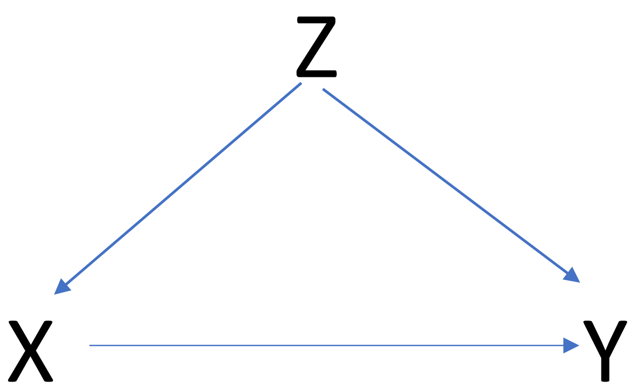

X1
X2
Y
alpha = .72

The important point for you to take away here is that the empirical results supporting explanation and interpretation are identical. In both instances the original relationship is substantially reduced or sometimes completely goes away in the control tables.

Complete Explanation



Partial Explanation



Complete Interpretation (mediation)

X → Z → Y

Partial Interpretation (mediation)

X → Z → Y

```
regression variables=RawMJ3 democrat5 liberal5
  /statistics anova coeff r tol
  /descriptives = n
  /dependent = RawMJ3
  /method = enter democrat5
  /method = enter democrat5 liberal5.
```

Model		Unstandardized Coefficients		Standard Coefficients		
		B	Std. Error	Beta	Sig.	Tol
1	(Constant)	1.108	.072		.000	
	Democrat5	.743	.111	.212	.000	1.000
2	(Constant)	.797	.077		.000	
	Democrat5	.189	.122	.054	.122	.762
	liberal5	1.214	.131	.323	.000	.762

Predicting Attitudes toward Recreational Marijuana with Party Preference (Democrat5) & Ideology (Liberal5) (Unstandardized coefficients)

	Model 1		Model 2
(Constant)	1.108		.797
democrat5	.743***		.189
liberal5			1.214***
Adj R^2	.044		.122
N =	(950)		(950)

Predicting Attitudes toward Recreational Marijuana with Party Preference (Democrat5) & Ideology (Liberal5) (Standardized coefficients)

	Model 1		Model 2
democrat5	.212***		.054
liberal5			.323***
Adj R^2	.044		.122
N =	(950)		(950)

Democrat → Liberal → MJ3

Complete Explanation

$$\begin{tikzcd} & \text{Liberal} \arrow[dl] \arrow[dr] & \\ \text{Democ} & & \text{MJ3} \end{tikzcd}$$

Perhaps the most theoretically important results using statistical control come from with cases of interpretation. This is because they can help understand the mechanism by which X→Y. As a result, statistical control using interpretation can be very important for understanding the political meaning of relationships.

Photo → Emotion → Mission

Photo → Sad/Proud → Mission

Elaboration Paradigm

Elaboration Terms	Psych Terms	Common Terms
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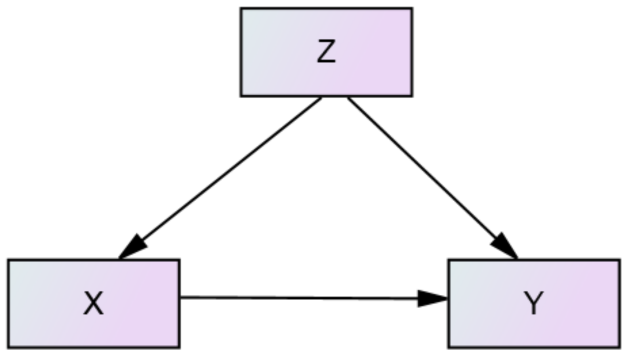
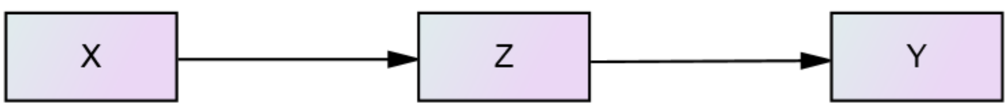
Explanation	Z ↙ ↘ X← /→Y	All control tables show weaker relationship than original table	Entering Z into equation reduces or eliminates X's influence on Y
Specification (moderation)	If Z = 1 X←→Y If Z ≠ 1 X←/→Y Or, preferably X ↘ Z → XZ → Y	Only one (or some) of control tables show relationship from original table	An interaction term of the form X*Z predicts Y
Suppression	Without control for Z: X←/→Y With control for Z X←→Y	Control tables reveal a relationship that was not evident in original table without controls	Entering Z into equation allows X to predict Y
Distortion	Another pattern of results	Control tables show complex pattern of results	Entering Z into equation produces complex pattern

.15 (.30)

Graphic display of Explanation



Graphic display of complete interpretation



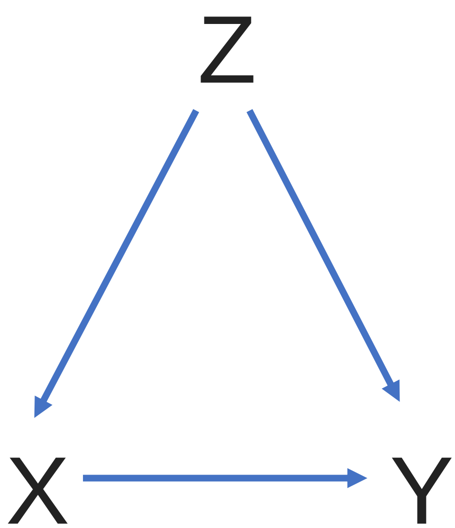
Complete Interpretation

$$X \rightarrow Z \rightarrow Y$$

Partial Interpretation

$$\begin{tikzcd} X \arrow[r] \arrow[rr, bend right] & Z \arrow[r] & Y \end{tikzcd}$$

Partial Explanation



Complete Explanation