

Extraneous Variable Problems in Research Designs

<p>Note that in the table:</p> <p>X indicates a treatment, O indicates an observation;</p> <p>– indicates a definite weakness, + Indicates that the factor is controlled, ? indicates a possible source of concern, and a blank indicates the factor is not relevant;</p> <p>[P] indicates Pre-Experimental Design [Q] indicates Quasi-Experimental Design [E] indicates Experimental Design</p> <p>R indicates Random Assignment BR indicates Blocking then Random Assignment MR indicates Matching then Random Assignment Y indicates Yoking R/MR indicates one or the other form of assignment</p>	Sources of Invalidity											
	Internal						External					
	Contemporary History\Environ.	Maturation	Participant Attrition	Testing	Instrumentation	Statistical Regression	Selection (and its interactions)	Sequence/Order	Interaction of Testing & X	Interaction of Selection & X	Reactive Arrangements	Multiple X Interference
Pre-Experimental Design Example												
◆ One-Group Posttest-Only Design X O	[P]	-					+			?	?	
Within-Participants/Groups Designs												
1. One-Group Pretest-Posttest Design O X O	[Q/P]	-	-	-	-	-	+		-	?	?	
2. Time-Series Design O O O ... X O O O ...	[Q]	-	+	-	+	+	+		-	?	?	
3. Equivalent Time-Sample Design X ₁ O X ₀₍₂₎ O X ₁ O X ₀₍₂₎ O ...	[E/Q]	+	+	+	+	+	+		-	?	?	-
4. Counterbalanced Designs (example) X ₁ O X ₂ O X ₂ O X ₁ O and for a 2 nd group X ₂ O X ₁ O X ₁ O X ₂ O	[E]	+	+	+	+	+	+	?	?	?	?	-
Between-Participants, Independent (Randomized), Two-Group Designs												
1. Nonequivalent Posttest-Only Control-Group Design [P/Q] X O ----- O	[P/Q]	+	?	-				-			-	?
2. Nonequivalent Pretest-Posttest Control-Group Design [Q] O X O ----- O O	[Q]	+	?	?			?	?	-	?	?	
3. Multiple Time-Series Design O O O ... X O O O ... ----- O O O ... O O O ...	[Q]	+	+	?	+	+	+	?	-	?	?	

				Sources of Invalidity												
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				Contemporary History\Environ.	Maturation	Participant Attrition	Testing	Instrumentation	Statistical Regression	Selection (and its interactions)	Sequence/Order	Interaction of Testing & X	Interaction of Selection & X	Reactive Arrangements	Multiple X Interference	
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4. Posttest-Only Control Group Design [E]				+	+	+	+	+	+	+	+			?	?	
R X O																
R O																
5. Pretest-Posttest Control Group Design [E]				+	+	?	+	+	+	+		-	?	?		
R O X O																
R O O																
6. Randomized-Blocks Design [E]				+	+	+	+	+	+	+			?	?		
BR X O																
BR O																
Between-Participants, Related/Matched/Correlated, Two-Group Designs																
1. Match by Correlated-Criterion Design [E]				+	+	?	+	+	+	+		?	?	?		
MR X O																
MR O																
2. Pretest-Match-Posttest Design [E]				+	+	?	+	+	+	+		-	?	?		
MR O X O																
MR O O																
3. Yoked Control Group Design [E]				+	+	+	+	+	+	+		?	?	?		
Y(R/MR) X(X') O																
Y(R/MR) (X') O																
Multiple Treatment Designs																
1. Multilevel Designs [E]				+	+	?	+	+	+	+		?	?	?	?	
R/MR? O? X ₁ O																
R/MR? O? X ₂ O																
R/MR? O? X ₃₍₀₎ O																
etc.?																
2. Factorial (Multifactor) Designs [E] (Schematic would be a Matrix)				+	+	?	+	+	+	+	?	?	?	?	?	