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Case-Control Matching with SPSS:

A Tool to Reduce Selection Bias in Common IR Studies

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Overview of Presentation

- Research question
- Matching
- SPSS case-control matching
- Example from CSUSB
- Q-and-A

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Research Question

- How can IR offices assess the impact of student services programs when students are not randomly selected/assigned to participate?

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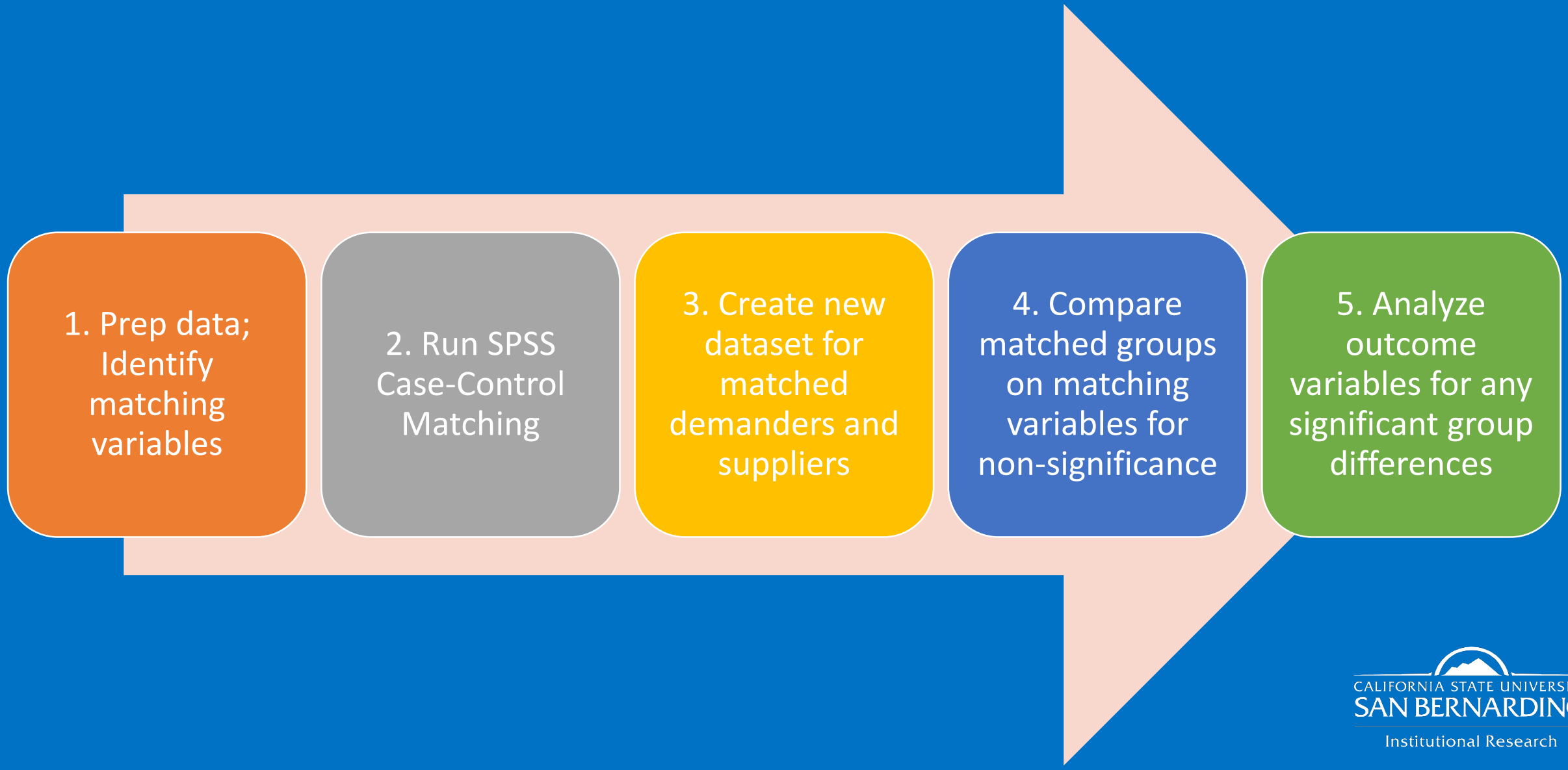
Theory/Rationale for Matching

- Randomized experiments as the "gold standard"
  - Shadish, Cook, & Campell (2002)
- Case-control Matching as a quasi-experimental design
  - Matching on confounding variables to account for pre-existing differences
  - Reducing selection bias
  - Improving internal validity

SPSS Case-Control Matching: Overview

- Point-and-Click with v. 22
  - Or via syntax with Python Essentials in older versions (v. 18-21)
- “Fuzzy” Matching on matching variables
  - Researcher-defined tolerance levels/Fuzz Factor
  - Random match from eligible suppliers
- Iterative Process
- One SPSS file:
  - Demanders and Suppliers, coded 1 and 0, respectively
  - Unique ID variable for each case
  - Matching variables and outcome variables

SPSS Case-Control Matching: Step-by-Step



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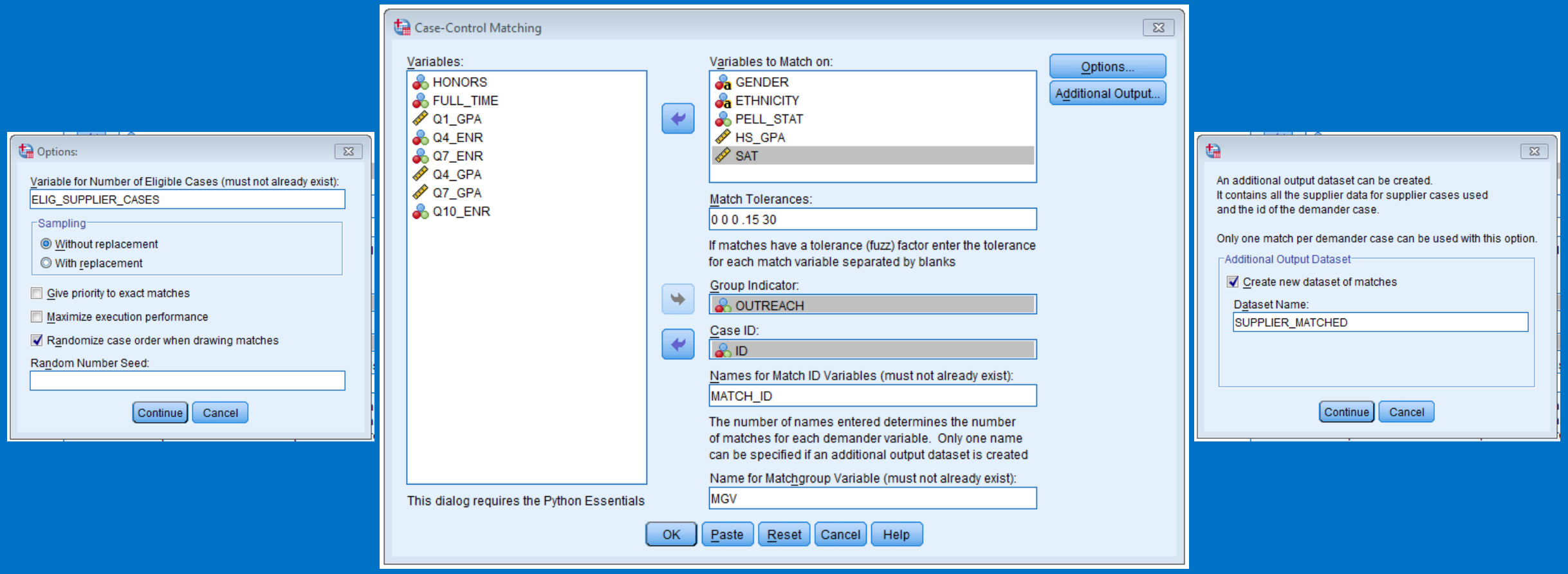
SPSS Case-Control Matching: Demonstration



Example: EOP Matching

Cohorts	Matched Variables	EOP	Non-EOP
2008-2011	EFC	268.70	289.37
	HSGPA	3.00	3.01
	FG Status		
	No College	65%	65%
	College	28%	28%
	Unknown	7%	7%
	Gender		
	Male	31%	31%
	Female	69%	69%
	Ethnicity		
	Asian	4%	4%
	African American	13%	12%
	Hispanic	76%	78%
	White	3%	3%
	Other	4%	3%
	Comparison Variables	EOP	Non-EOP
	SAT	826.38	*865.38
	ACT	16.72	*17.85
	ELM	36.65	*39.70
	EPT	138.58	*140.50

*Sig. differences at the p<.05 level.

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Example: EOP Retention Rates

Table 1. Retention Comparison EOP vs. Non-Matched Students					
Cohort	Group	Count	2nd Year Retention	3rd Year retention	4th Year Retention
	EOP	250	87%*	72%	66%
Fall 2008	All Non-EOP	1718	82%	67%	61%
	EOP	243	89%	79%*	72%
Fall 2009	All Non-EOP	1774	84%	72%	66%
	EOP	249	91%	85%*	-
Fall 2010	All Non-EOP	1524	88%	78%	-
	EOP	243	91%	-	-
Fall 2011	All Non-EOP	1888	87%		
	EOP	985	89%*	78%*	69%*
Total	All Non-EOP	6904	85%	72%	64%

Table 2. Retention Comparison EOP vs. Matched Students					
Cohort	Group	Count	2nd Year Retention	3rd Year retention	4th Year Retention
	EOP	250	87%	72%	66%
Fall 2008	Matched Non-EOP	250	81%	66%	61%
	EOP	243	89%*	79%	72%
Fall 2009	Matched Non-EOP	243	82%	72%	66%
	EOP	249	91%*	85%	-
Fall 2010	Matched Non-EOP	249	87%	78%	-
	EOP	243	91%	-	-
Fall 2011	Matched Non-EOP	243	86%		
	EOP	985	89%*	78%*	69%*
Total	Matched Non-EOP	985	84%	72%	62%

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Example: EOP GPA Comparisons

Table 3. First-Term GPA Comparison
EOP vs. Non-Matched Students

Cohort	Group	First-Term GPA
	EOP	2.74
Fall 2008	All Non-EOP	2.72
	EOP	2.70
Fall 2009	All Non-EOP	2.78
	EOP	2.87
Fall 2010	All Non-EOP	2.91
	EOP	2.89
Fall 2011	All Non-EOP	2.91
	EOP	2.80
Total	All Non-EOP	2.80

Table 4. First-Term GPA Comparison
EOP vs. Matched Students

Cohort	Group	First-Term GPA
	EOP	2.74*
Fall 2008	Matched Non-EOP	2.44
	EOP	2.70
Fall 2009	Matched Non-EOP	2.53
	EOP	2.87
Fall 2010	Matched Non-EOP	2.73
	EOP	2.89*
Fall 2011	Matched Non-EOP	2.48
	EOP	2.80*
Total	Matched Non-EOP	2.55

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Campus Impact

- EOP Director:

"For many years, our student population was being compared with other students that did not have comparable characteristics. We did not feel that the available data accurately provided a true comparison, nor the added value of our program and services provided for the population that we serve. *With the introduction of the Case Control Matching technique, our department is now able to measure and compare students with similar attributes. This allows us to truly assess the significant impact our services and interventions have on the students that participate in our program*."

Conclusion

- Case-control matching is a useful tool to *reduce* selection bias when analyzing the effectiveness of student services programs
- Deciding on matching variables and tolerance levels is *crucial*
- Check the matched groups for similarities before analyzing outcomes
- IR studies can have broad impact for campus stakeholders

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Thank You!

- Questions?
- Contact us!
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