

Lecture 5: Parsimony, Operationism, Essentialism

Friday, September 15, 2023

Your Teaching Fellows:

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Lectures: MWF 12:00 PM – 1:00 PM (003); 1:00 PM – 2:00 PM (004); 2:00 PM – 3:00 PM (010)
Office hours: Tuesdays 2:00 PM – 4:00 PM

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Principle of Parsimony (Occam's Razor)

- Parsimony: simpler theories are preferred to more complex theories that can explain the same phenomenon (i.e. same set of data)
- Simpler has two meanings:
 - Requires fewer conceptual relationships/ assumptions
 - Requires fewer adjustments to established relationships in science
- Implications for falsifiability

Example

Explanation A

Violence in video
games



Aggressive behaviour
by children

Explanation B

Violence in video
games



Children are
desensitised to
violence



Aggressive
behaviour by
children

Which explanation is more parsimonious? A or B?

A, because fewer links in causal chain

Which explanation is more falsifiable? A or B?

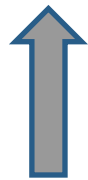
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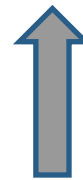
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Parsimony and Falsifiability

Note to 004: Audio cuts here in recording. Watch the 003 recording instead.



Parsimony



Falsifiability

- Fewer conceptual relationships (assumptions) = less data required to counter a theory
- Fewer adjustments to established relationships in science = less data required to test adjustments
- We are evaluating the *whole theory*

An example study...

Video game violence and aggression

Theory

- Human behaviour is a function of exposure to environmental stimuli

Hypothesis

- Playing violent video games leads people to become more aggressive

Conceptual variable 1

- Playing violent video games

Conceptual variable 2

- Aggression

Essentialism and operationism

Conceptual variable = Aggression



Essentialism

- There is an unchanging, underlying essence of an entity that can be defined
- Sense of fixedness
- Focus is on the *meaning* of words



Operationism

- Operational Definitions
 - Observable indicator of each variable, used for the purposes of this particular study
 - Enable reliable measurement or manipulation of each variable in your hypothesis
 - *How would you operationally define “aggression”?*
- Might not be right or perfect, but a place to start

An example study...

■ Video game violence and aggression

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Conceptual
variable 1

- Playing violent video games

Conceptual
variable 2

- Aggression

Video game violence & Aggression

- Target hypothesis:
 - Playing violent video games leads people to become more aggressive
- Study's hypothesis:
 - Playing violent video games is associated with greater aggression

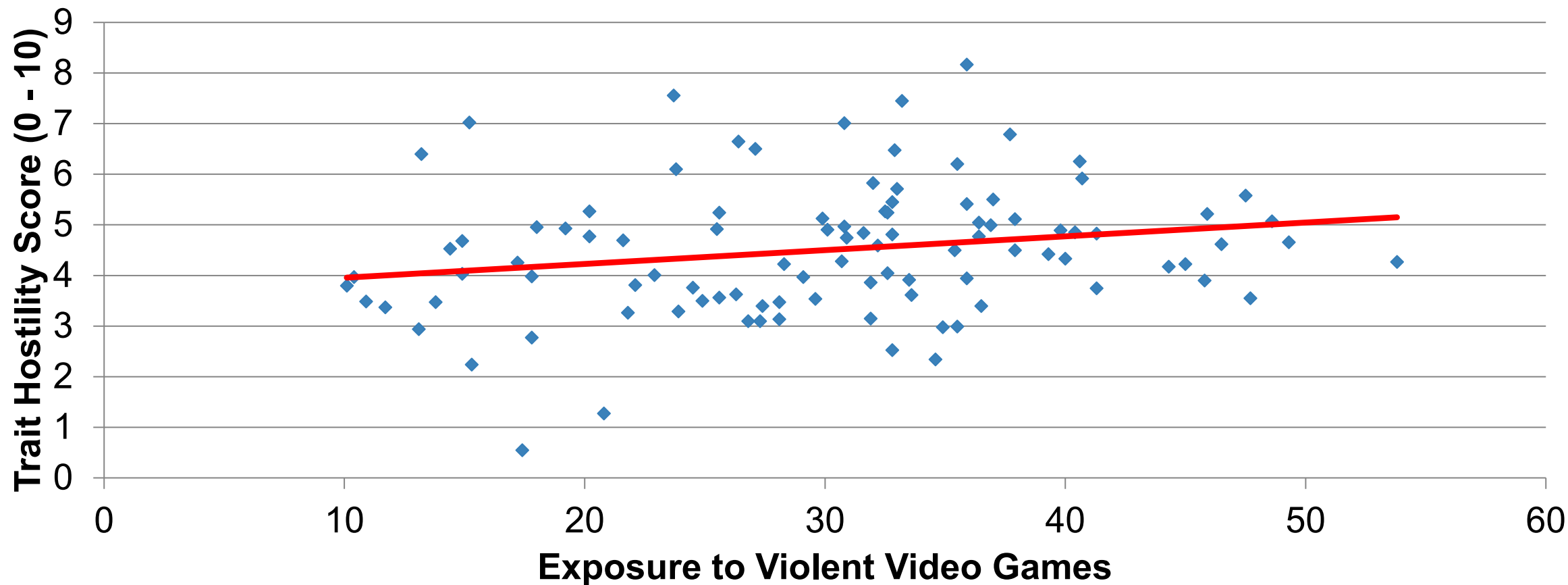


Video game violence & Aggression

- Operational definitions for this study:
 - Playing (exposure to) violent video games
 - Frequency of playing favourite games x Rating of a game's violence
 - Aggression
 - Self-reported hostility
 - Scores on the Cook & Medley Hostility Scale
- Prediction:
 - As one plays more violent games, the scores on the Cook & Medley Hostility Scale increase

Video game violence & Aggression

- Method:
 - 607 8th and 9th grade students



Video game violence & Aggression

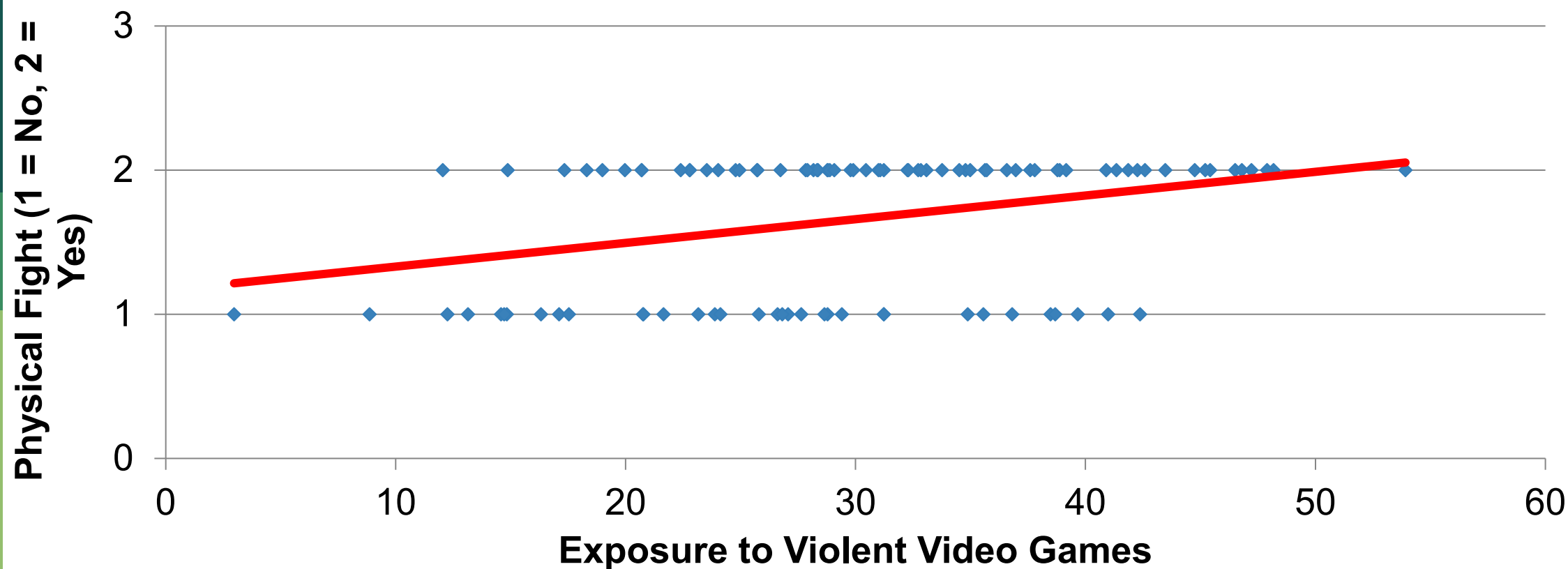
- Conclusion:
 - These findings suggest that children may be affected by violent video games
 - The results support our hypothesis that playing the violent game would result in more aggression than would playing the nonviolent game

You are a reviewer! Right now, what do you think?

0	0	0	0
Accept for publication	Light revise and resubmit (Small problems)	Heavy revise and resubmit (Major problems)	Reject (wtf were you thinking?)

Follow-up study

- Change operational definition of aggression
 - Self-report of hostility might not be accurate
 - Use number of actual physical fights



So...

- Theory/Broad framework
 - Playing violent video games leads one to exhibit greater aggression
- Do we have evidence of this?
- Do these data convince you of this?
- Do you see any more problems with these data?

Gentile, D. A., Lynch, P. J., Linder, J. R., & Walsh, D. A. (2004). The effects of violent video game habits on adolescent hostility, aggressive behaviors, and school performance. *Journal of Adolescence*, 27, 5-22. doi: 10.1016/j.adolescence.2003.10.002

Learning Objectives

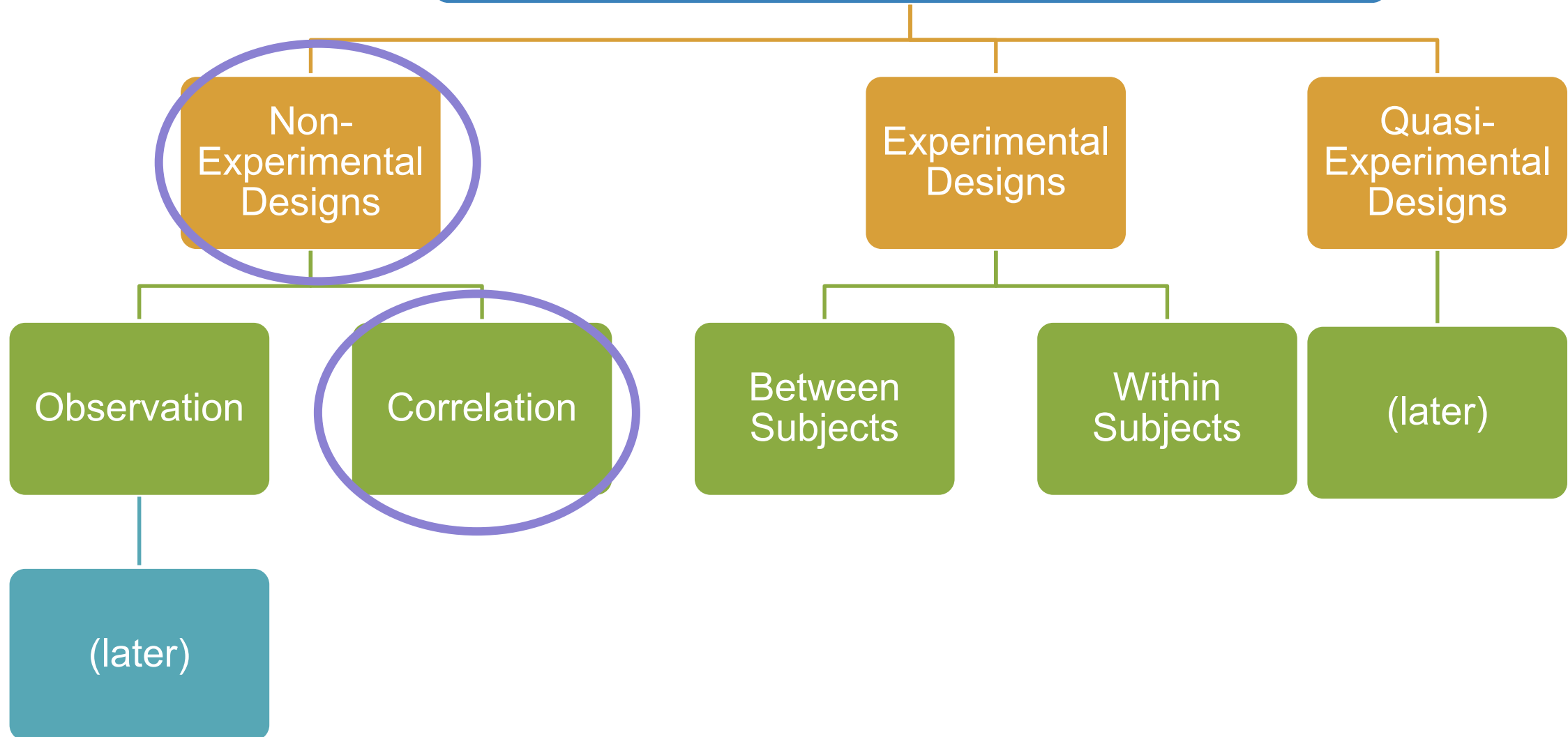
By the end of this class, you should be able to

- Explain what can and cannot be concluded from a correlational design
- List and describe the two ways internal validity is attained in an independent groups design
- Identify a confounding variable and explain how it threatens internal validity

Main question:



Types of Studies



Correlation Designs

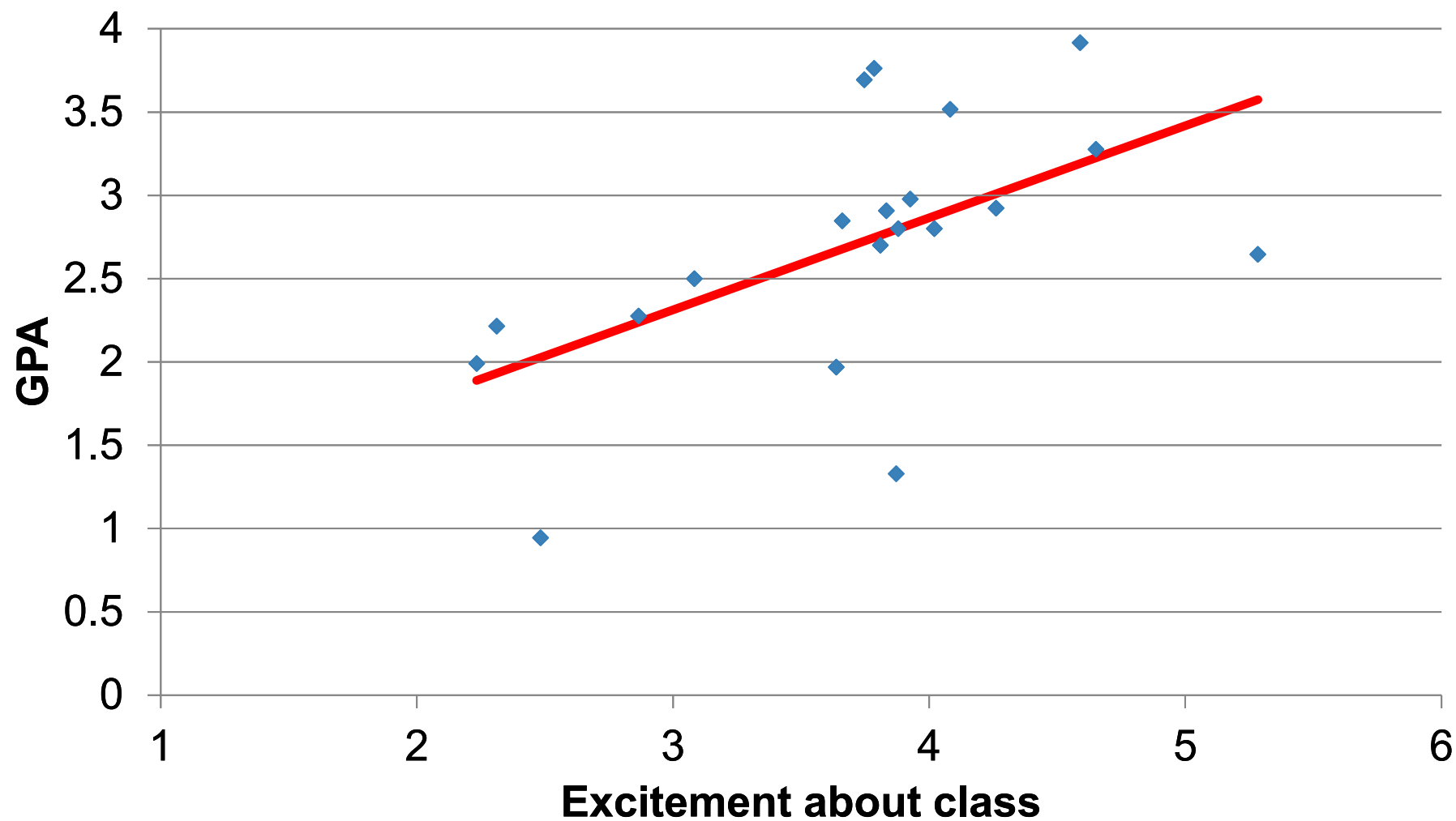
- A type of non-experiment – simply measuring variables
- Example:
 - Exposure to violent video games & aggression study

Correlation Coefficient

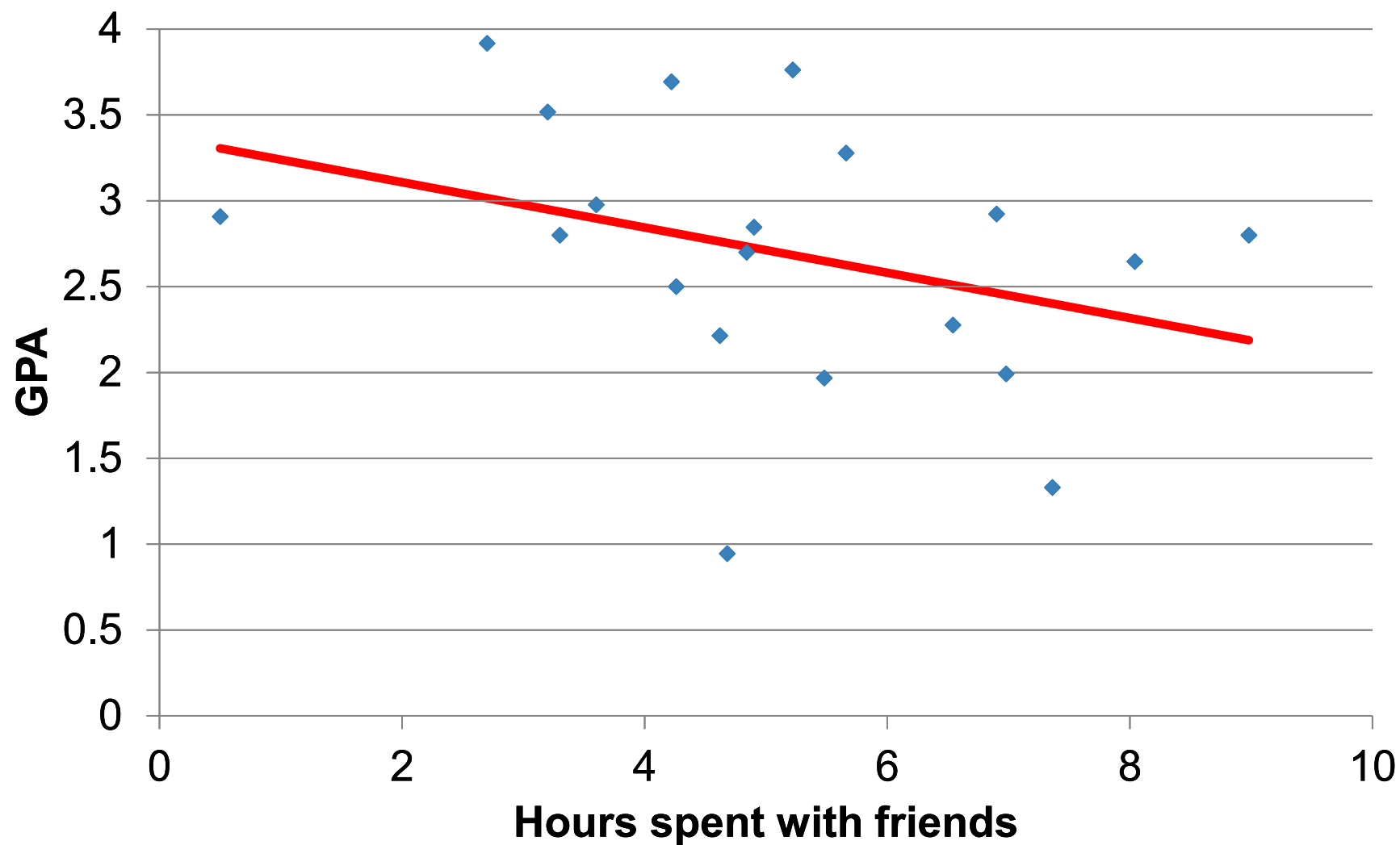
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- A statistic that indexes the degree of *linear* relationship between two variables
- Also called: Pearson product-moment correlation
- Ranges from -1 to +1

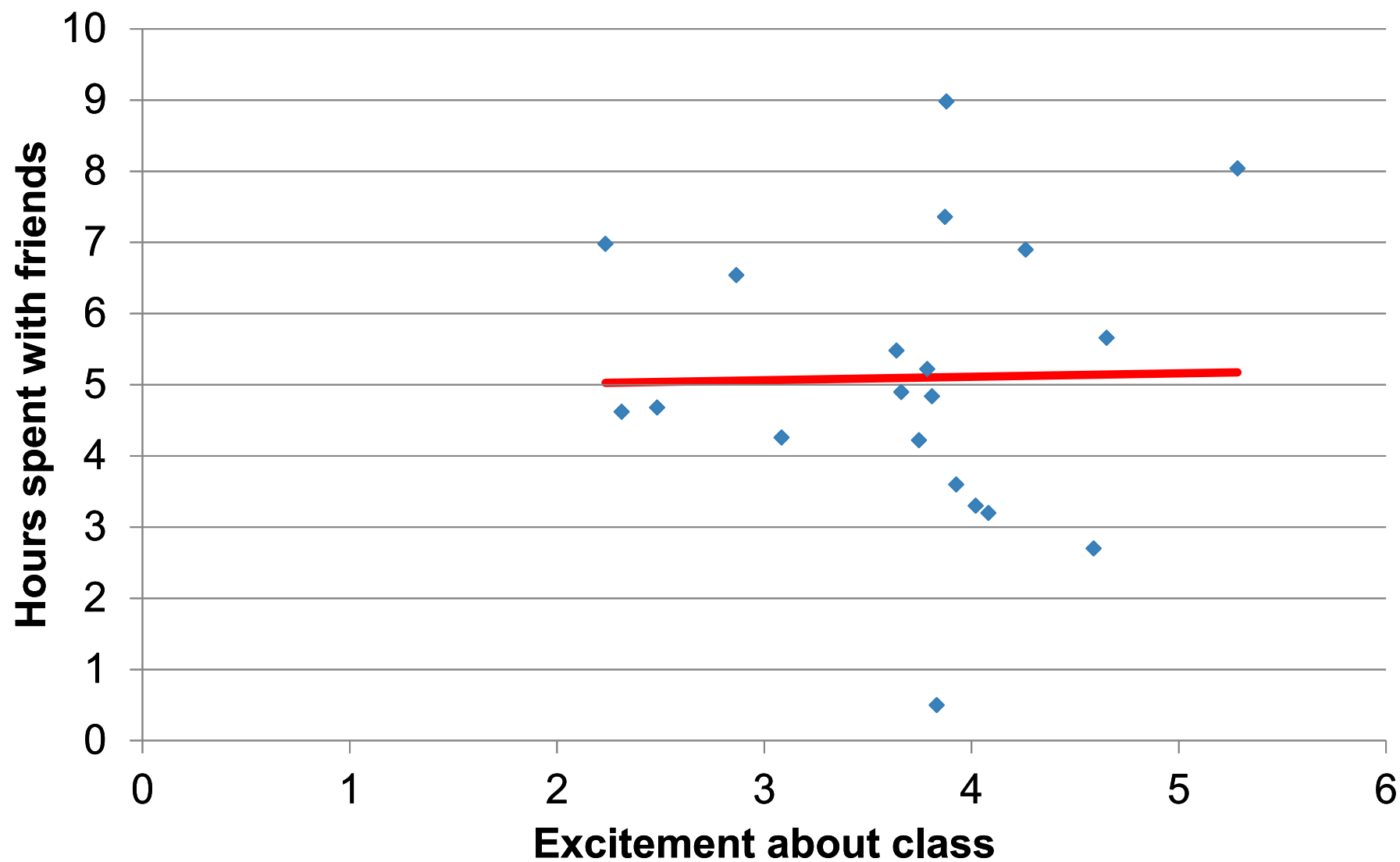
Correlational relationships



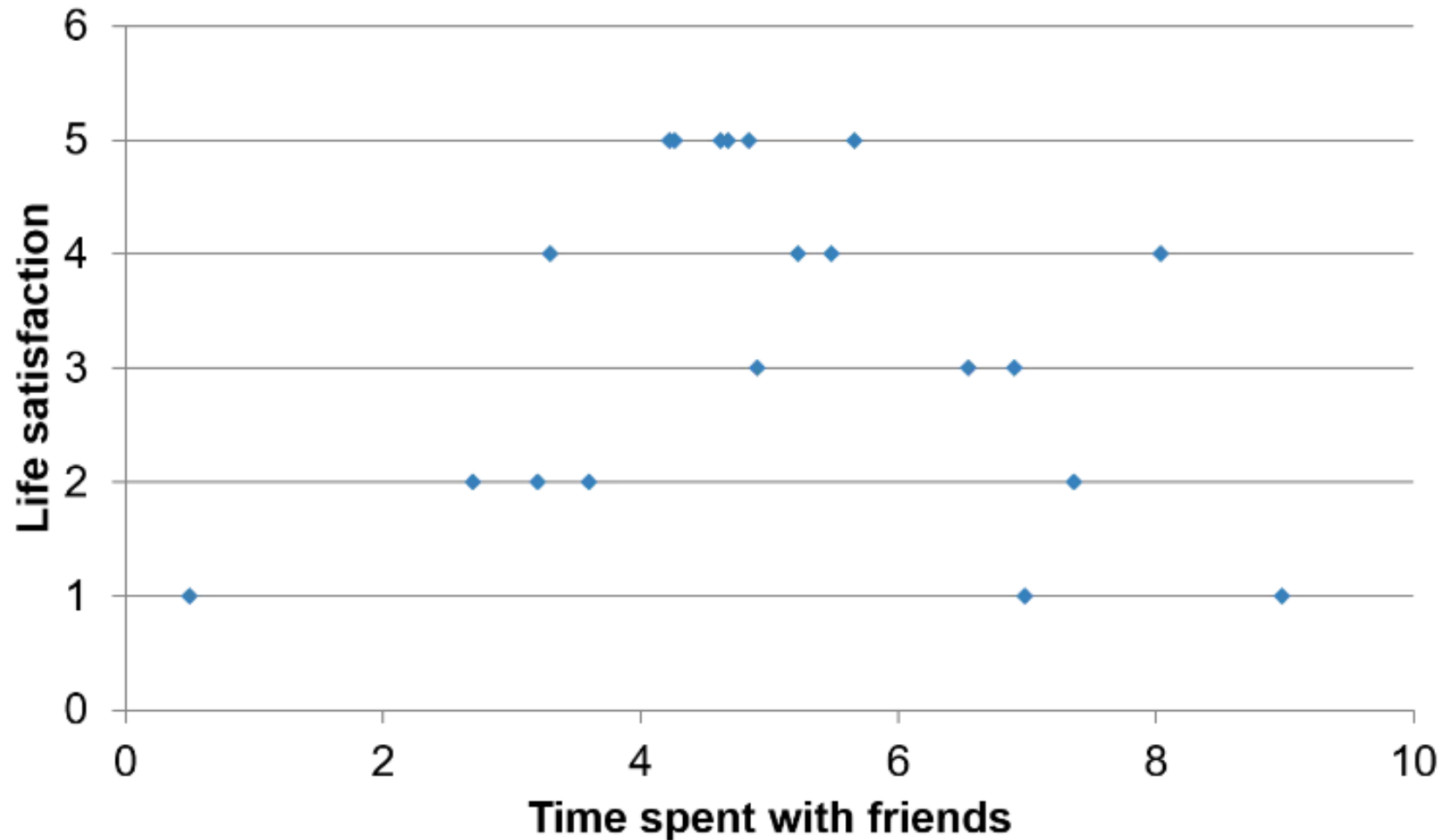
Correlational relationships



Correlational relationships



What's the correlation here?



Correlational relationships

