

Survey Methods & Design in Psychology

Lecture 12 (2007)

Review

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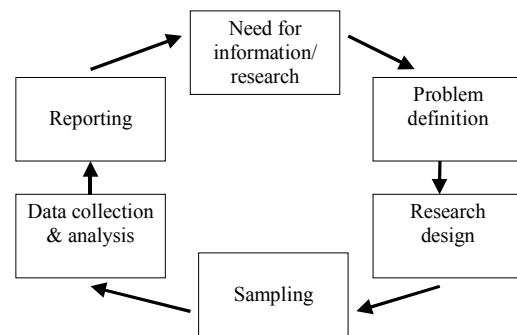
Aims & Outcomes

- Data entry and analysis in SPSS
 - Correlations
 - Factor analysis
 - Qualitative
 - Reliability
 - MLR
 - Advanced ANOVA

Overview

- Review
 - Research process
 - Survey design
 - MLR, ANOVA, Power
 - What type of analysis?
- Lab report
- Final exam
- Evaluation & feedback

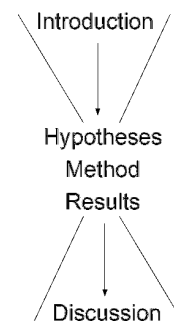
The Research Process



Aims & Outcomes

- Knowledge and skills for conducting ethical, well-designed, survey-based research in psychology.
- Theory and practice of survey-based research:
 - How to ask a research question
 - Survey design
 - Sampling
 - Interpreting and communicating results.

Funnel Model

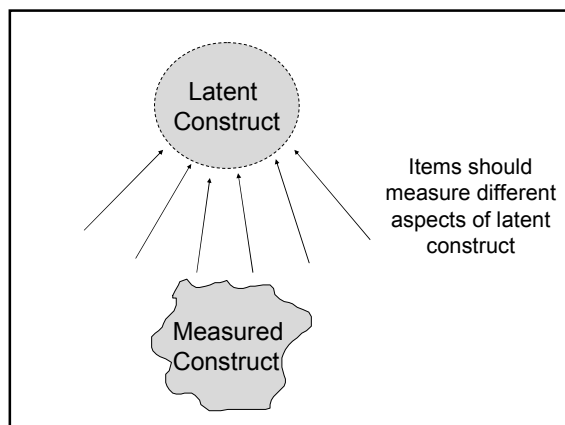


Survey Design

- Fuzzy concepts
- Reliability & validity
- Question types & response formats
- Levels of measurement
- Sampling
- Modes of administration
- → *Method and Discussion*

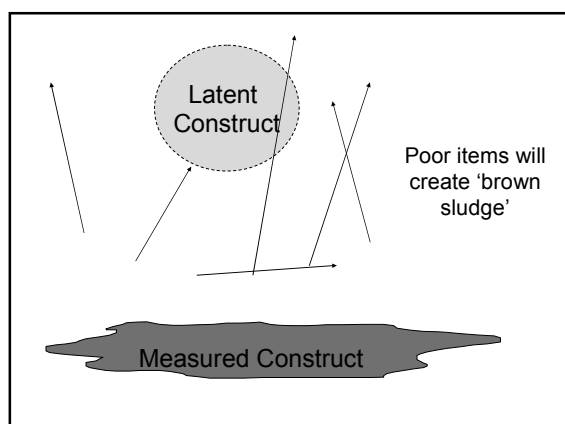
Describing Data

- Data screening
- Frequencies & %s
- 4 moments of a normal distribution
 - Central tendency
 - Dispersion
 - Skewness
 - Kurtosis



Visual Displays of Data

- Visual displays of data aid interpretation of differences or relationships.
- Univariate
 - e.g., histogram, bar graph, error-bar graph
- Bivariate
 - e.g., scatterplot, clustered bar graph
- Multivariate
 - e.g., venn diagrams, multiple line graph, 3-d scatterplot



Factor Analysis

- Purpose
 - Data reduction
 - Developing reliable & valid measures of fuzzy constructs
- Assumptions
- Extraction (PC vs. PAF)
- Rotation method (Varimax vs. Oblimin)
- Number of factors
 - Kaiser's criterion
 - Scree plot
 - Theoretical structure

Factor Analysis

- Refining items and factors
 - Primary loading over $> .5?$
 - Cross-loadings $< .3?$
 - Sufficient items per factor
 - Face validity
- Correlations between factors
- Compare models across groups
 - % variance explained
 - No. of factors
 - Item loadings

What Type of Test?

- Statistical Decision Tree
 - Establish the hypothesis
 - Identify levels of measurement
 - Differences or relationships
 - No. of IVs and DVs
- See [website homepage](#) for:
 - Statistical decision tree
 - Selecting statistics

Reliabilities & Composite Scores

- Internal reliability (Cronbach's α)
- Composite scores
 - Unit-weighting
 - Regression-weighting
- Reversing a scale e.g.,
IM = mean(item1,item2,item3)
EM = mean (item4,item5,item6)
M = IM + (8 – EM)

1 2 3 4 5 6 7
7 6 5 4 3 2 1

Measures of Association

- Correlation: strength & direction of bivariate linear relationships
- Non-parametric correlations for each LOM
- Building block for understanding FA & MLR regression
- Scatterplots – watch out for:
 - Outliers
 - Non-linearity
- Caution with causal interpretation

Qualitative

- Do I need a hypothesis?
- Multiple Response Analysis with SPSS

Multiple Linear Regression

- Linear regression

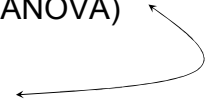
$$Y = ax + b$$

- Proportion of variance in a DV explained by one or more IVs
 - R
 - R²
 - Adjusted R²

Multiple Linear Regression

- Assumptions:
 - LOM
 - Continuous DV
 - Dichotomous or continuous IVs
 - Normality, linearity & homoscedasticity.
 - Multicollinearity
 - MVOs
- Methods
 - Standard / Direct
 - Hierarchical
 - Stepwise, Forward, Backward

Types of ANOVA

- 1-way ANOVA
 - 1-way repeated measures ANOVA
 - 2-way factorial ANOVA
 - Mixed design ANOVA (Split-plot ANOVA)
 - ANCOVA
 - MANOVA
- 

Multiple Linear Regression

- Overall hypothesis: (Null) That the IVs do not explain variance in the DV (i.e., that R is 0)
- One hypothesis per predictor: (Null) (i.e., that t for each predictor is 0)
- Also consider:
 - Direction
 - Which predictors are more important?
 - Where IVs are correlated, interpret zero-order vs. partial correlations.
- Can use Venn or path diagrams to depict relationships between variables

ANOVA

- Assumptions
 - Cell size > 20 (Ideal)
 - Normally distributed DVs
 - Homogeneity of Variance (b/w subjects)
 - Sphericity (w/in subjects)
- Post-hoc and follow-up tests (see discussion group)
- Calculating eta-squared and Cohen's d

ANOVA

- Extension of t-test
- ANOVA is like MLR in that:
 - One continuous DV (although ANOVA can handle multiple DVs)
 - One or more IVs
- ANOVA differ from MLR in that:
 - Interactions are automatically tested
 - IVs must be categorical
 - Significant results may indicate need for followup or post-hoc tests

Power, Effect Sizes, Significance Testing

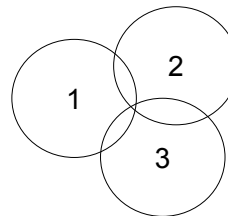
- Power and effect sizes have been neglected topics
- Calculate the power of studies (prospectively & retrospectively)
- Report ESs and CIs to complement inferential statistics
- Research ethics and publication bias (low power; favouritism of sig. findings)

Lab Report - Tips

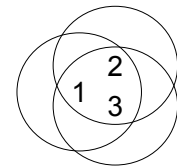
- Check Marking criteria
- Use model articles & write-ups
- Demonstrate capability and independent thinking
- Include appendices only where relevant and referred in the text. Appendices may not be consulted by a reader, so if its important/relevant make sure its covered in the text.

Lab Report - Results

- Data screening
- LOM
- Caution in use of overall scores



Overall Score not valid



Overall Score valid

Lab Report - Introduction

- Tell a story; set up a question(s)
- No room for waffle – cut to the chase
- Develop clear hypotheses
 - One per test of significance

Lab Report - Results

- Conceptualisation, e.g.,
- Hierarchical MLR
 - DV = Campus Satisfaction
 - Step 1
 - IV1 = Gender (M / F)
 - Step 2
 - IV1 = IM (Continuous)
 - IV2 = EM (Continuous)
- 2 x (3) Mixed ANOVA
 - B/W subjects IV: Enrolment Status (FT / PT)
 - W/in subjects DV: Satisfaction (Education and Teaching / Social / Campus)

Lab Report - Method

- Efficient and well-organised (like a recipe)
- A naïve reader must be able to replicate the study
- Balance between informative, relevant details and efficiency (i.e., avoid getting bogged down in extraneous detail)
- Relevant details will help to set up critical discussion

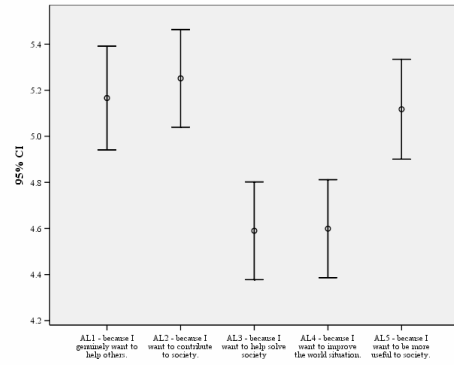
Lab Report - Discussion

- Draw out conclusions with regard to the RQ and hypotheses, in light of the results.
- Point out the strengths and limitations of the study. (Seek balance between criticism and findings)
- Make useful, specific, practical recommendations with regard to theory, research, and practice e.g.,
- Consider future directions for instrument development and related research.

Lab Report - Submission

- Email the convener **one** electronic attachment containing:
 - Coversheet
 - Lab report (with Appendices)

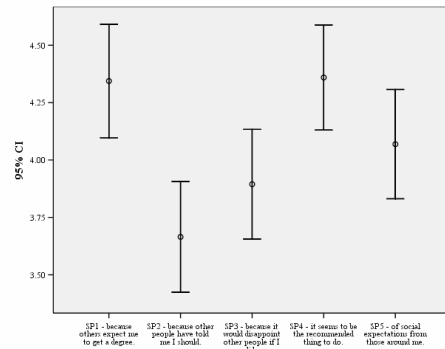
Altruism – Error-Bar



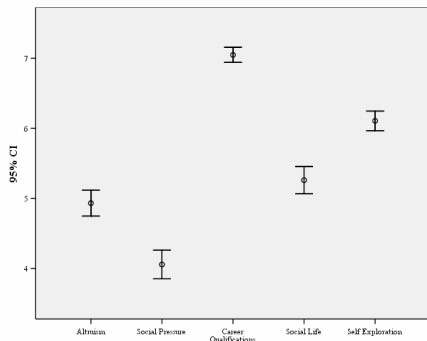
Final Exam

- 120 multiple-choice questions
- 120 minutes (Mid-semester was 60 questions in 90 minutes)
- 50 – MLR; 50 – ANOVA; 20 - Power
- Practice exam questions come from the same test bank

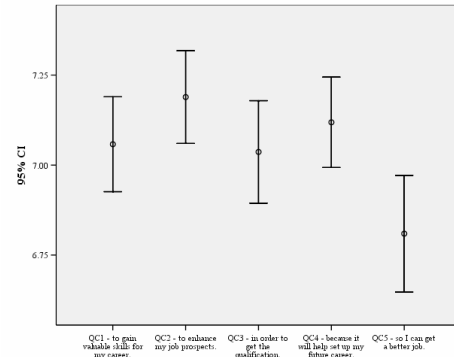
Social Pressure – Error-Bar

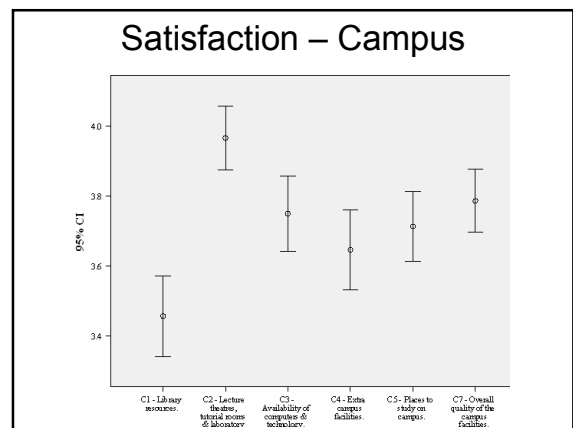
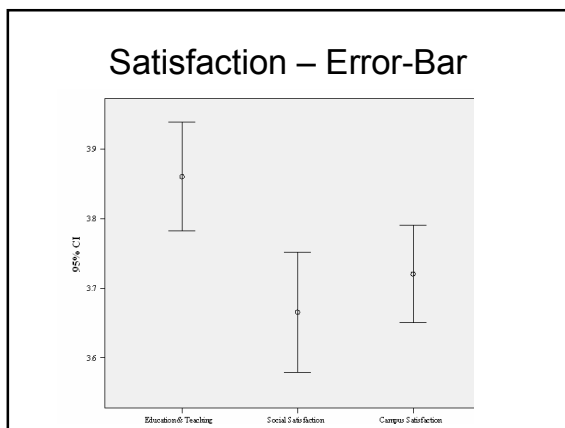
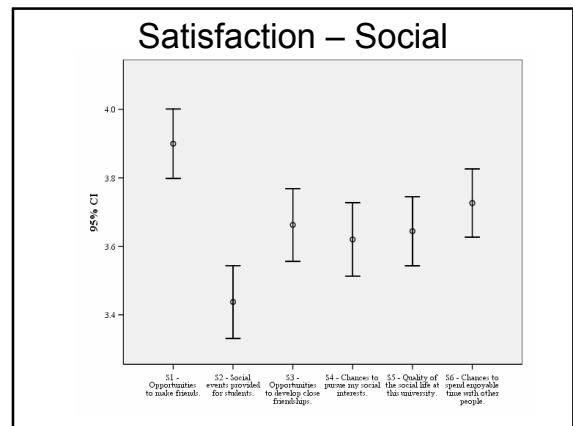
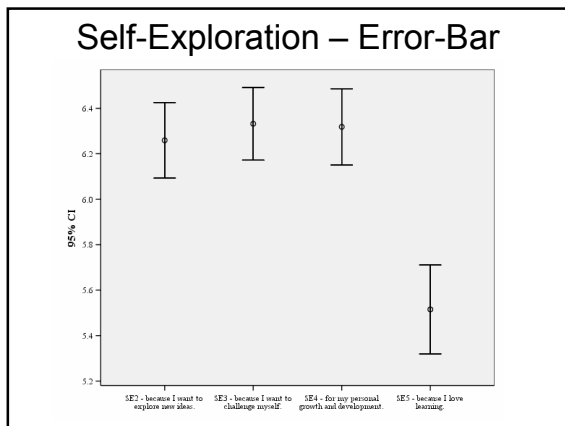
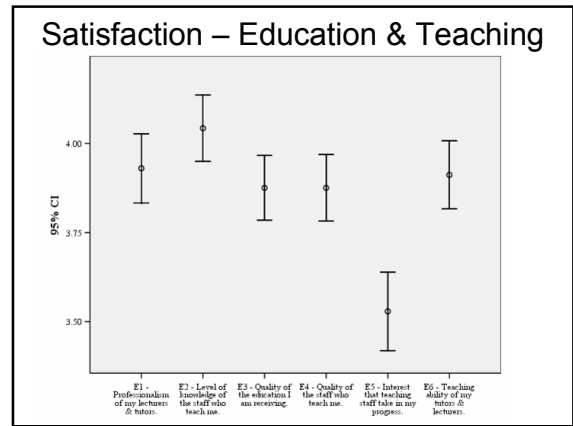
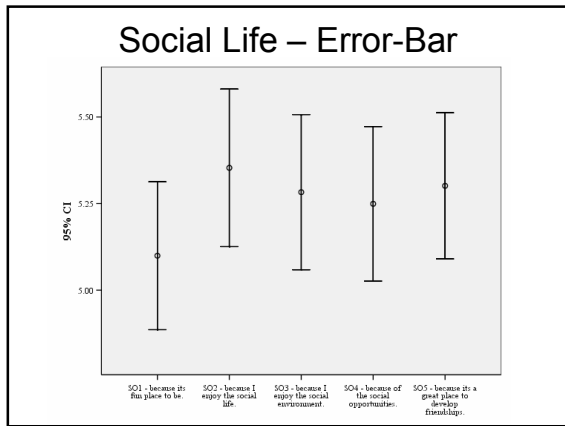


Motivation – Error-Bar



Career Qualifications – Error-Bar





Evaluation & Feedback – Issues & Topics

- Lectures
- Tutorials
- Texts
- Assessment
- Website
- Software - SPSS
- Workload

Evaluation & Feedback

Unit
Satisfaction
Survey
(OSIS)

Online
Feedback
& Evaluation
Survey

Public
Comments