JAT Workshop NATA Annual Meeting and Clinical Symposia

Analysis of Likert-type Data

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Review of Data Types

Nominal – categorically discrete data



• Ordinal – categories with a natural ordering, intervals

between each response may not be equal

Q.1 Please rate your satisfaction with our Portable Hole:

	Very unsatisfied	Unsatisfied	Niether Unsatisfied satisfied nor dissatisfied		Very satisfied	
Reliability	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
Size	\bigcirc	\circ	\circ	\bigcirc	\bigcirc	
Ease of use	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
Portability	\bigcirc	\circ	\circ	\bigcirc	\bigcirc	
Overall	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	

Nominal – categorically discrete data





Special Case



 Ordinal Interval – natural ordering and intervals between responses are equal

Q.1 Please rate your satisfaction with our Portable Hole:

	Very unsatisfied	Unsatisfied	Niether nsatisfied satisfied nor dissatisfied		Very satisfied		
Reliability	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		
Size	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		
Ease of use	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		
Portability	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		
Overall	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		

 Interval – integer data which is ordered and distance between responses equal



 Ratio – interval data with a natural 0 point, points along the scale make sense as ratios



Data Type Summary

Provides:	Nominal	Ordinal	Interval	Ratio
"Counts," aka "Frequency of Distribution"	~	~	~	~
Mode, Median		~	~	~
The "order" of values is known		~	~	~
Can quantify the difference between each value			~	~
Can add or subtract values			~	~
Can multiple and divide values				r
Has "true zero"				~

Likert Scales vs. Likerttype Items

- Likert items are single items that may have different types of structure (ordinal, interval, etc.)
- Likert scale is a sum of a number of Likert items

On average, how bad has your pain been											
	No Pain									P ba c	ain as ad as it an be
In the morning over the past 2 days?	0	1	2	3	4	5	6	7	8	9	10
In the <u>afternoon</u> over the past 2 days?	0	1	2	3	4	5	6	7	8	9	10
In the evening over the past 2 days?	0	1	2	3	4	5	6	7	8	9	10
With activity over the past 2 days?	0	1	2	3	4	5	6	7	8	9	10

4-item Pain Scale Sum each of 4 ratings, 0 – 40 possible score Reliable * Valid * Responsive

Are these items Ordinal or Interval?

- Order to them?
- Mode, median, mean?
- Frequency distribution?
- Quantify the difference between each value?
- Can add or subtract values?

Parametric vs. Non-Parametric

 Many feel strongly nominal and ordinal data should be treated and analyzed with non-parametric tests.

Mistakes I've Seen

- Mean of gender
- Make their own scale up



- No scale development process described
- No reliability/validity data
- Don't examine the structure of their data (e.g., normality)





Response Preference

Anchor effect



• Number preference



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original research

Student-Retention and Career-Placement Rates Between Bachelor's and Master's Degree Professional Athletic Training Programs

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- Decent description of survey development
 - content and construct validity
 - no reliability
- Retention and career placement rates (percentages) by bachelor/master level
 - Independent t-tests (equal-variance not assumed values b/c violated homogeneity of variance)
- Lacking some depth of info in methods
 - Graph retention and career placement rates?
 - Assumed (?) interval data but would categorization (ordinal) match the data structure better

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original research

High School Athletes' Parents' Perceptions and Knowledge of the Skills and Job Requirements of the Certified Athletic Trainer

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- "Adapted" the Parents Perceptions and Knowledge of Certified Athletic Trainers (PPCAT) from Role Delineation Study
 - Established content and face validity with 12 ATs and 10 parents
 - Extent of modifications?
- Parent experience with AT 3 groups (Nominal or Ordinal?)
 - Own injuries as well as their child's 33%
 - Either their own or child's 46%
 - No experience 21%
- 1-way ANOVA composite perception and knowledge scores
 - Test for normality? Graph?
 - "Confirmed" parametric results with Kruskal-Wallis test (rationale = small n?)

Take Home Points

- Get to know your data don't skip the basics
 - Frequencies, graphs, cross-tabs etc.
 - Make sense? Do you have women with prostrate cancer?
 - Best data structure interval data may be better analyzed as ordinal
- <u>Detailed</u> description of methods and rationale for data analysis decisions
 - Survey/instrument development process
 - Test for normality results should you use parametric or non-parametric tests?
 - For the sake of space, the data analysis section often gets cut
- Ordinal data can be treated as interval (parametric) but the rationale must be clearly stated

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