# EDU. 7211 Educational Research and Data Analysis II

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## **Introductory Concepts**

#### Descriptive Statistics

■ These are statistical measures that describe the general characteristics of a population and/sample of that population, (I.e.) *college majors and SAT scores, and GPA*.

#### Inferential Statistics

• Are the tools that are selected to make comparisons from the results based on a sample to a population. (*I.e.*) based on the above if the students with higher SAT or GPA take on more challenging majors, (Pre-Med, Physics).

# COMPUTING AND UNDERSTANDING AVERAGES

#### Average

■ Is the value that represents an entire group of scores

#### Measure of Central Tendency

 Another term for an average which includes the following three measures used to calculate average from different perspectives

#### Mean

■ The sum of the values of the group, divided by the number of values in the group.( I.e.) If I wanted to find the mean of my students grade on a test I would add the total number of overall scores from each test and divided by the number of students who took the test

#### Median

■ The Median is the middle score when all results are ranked from one extreme to the other. Basically it's the 50% midpoint of all grades occurring. (I.e.) *The Median of the following test scores would be 80% - 90, 85, 80, 75, 70* 

#### Mode

- The mode is the most commonly occurring value that is represented from a group of values.
  - (I.e.) Of the following scores the mode is 85- 90, 85, 80, 85, 95, 75, 85

# MEASUREMENT OF CENTRAL TENDENCYChap 2 Data set 1

#### **Statistics**

#### **PREJUDIC**

N	Valid	20
	Missing	0
Mean		84.70
Median		87.00
Mode		87

## **Variability**

■ Variability is a descriptive tool that reflects how scores differ from one another. The following are types of variability:

#### Range-

■ Finding the difference between the highest and lowest score in a numerical distribution. (I.e.) *The range for today's weather could be 58-41 degrees* 

#### **Standard Deviation-**

■ Is the average amount of variability in a set of scores. (I.e.) The standard deviation of most I.Q. tests is 15 based on a bell shape distribution.

#### Variance

■ Is the standard deviation squared. I.e. *The variance of most I.Q. tests would be 225, (15 x 15).* 

## VARIABILITY CH 3- Data set 1

#### **Statistics**

#### **REACTION**

N	Valid	30
	Missing	O
Std. Deviation		.7025
Variance		.4936
Range		2.60

## FREQUENCY DISTRIBUTIONS

#### Histogram-

- A visual representation of the frequency distribution represented by bars.
  - Average value- The average of two or more frequency distributions.
  - Variability- The amount of dispersion in a frequency distribution.
  - Skewness- The visual effect of a distribution of scores. They can be described as + or skewed depending on where the distribution occurs.
  - Kurtosis- The appearance of a distribution when compared to a bell-shaped distribution. (I.e.) platykurtic- is a relatively flat distribution and leptokurtic is a relatively pointed or peaked distribution.

# FREQUENCY DISRIBUTION CHARTS

#### Bar-

■ A column chart where categories are organized vertically and values are shown horizontally.

#### Line-

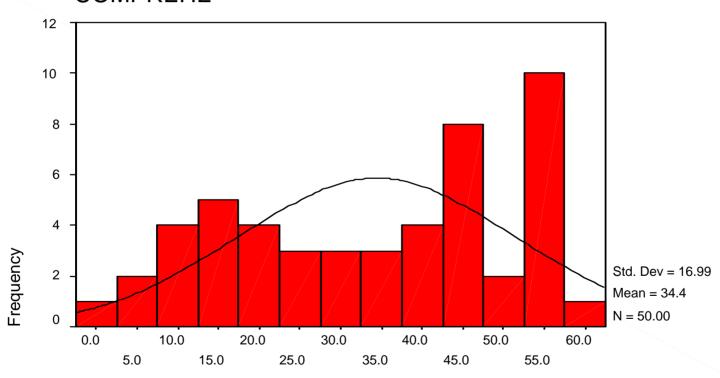
■ Is generally used to show a trend of data at equal intervals.

#### Pie-

■ Used to reveal the proportion of an item that makes up a series of data points.

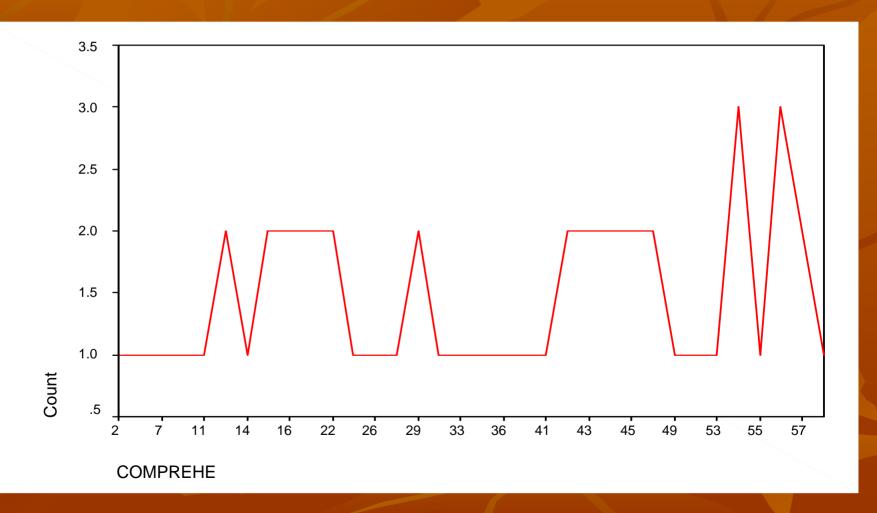
# HISTOGRAM WITH NORMAL CURVE DISTRIBUTION CHAP4. DATA SET 1

#### **COMPREHE**

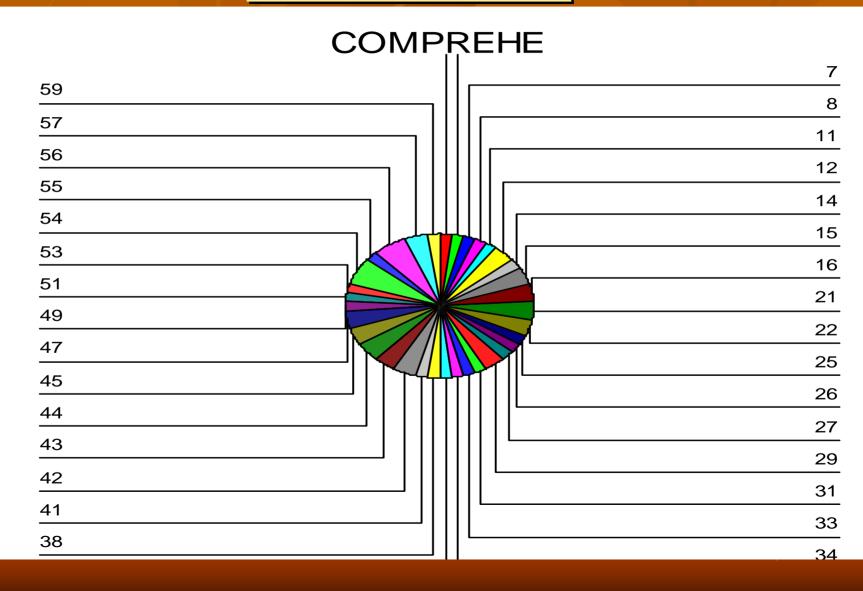


**COMPREHE** 

## LINE GRAPH



## PIE CHART



#### RESEARCH STUDYARTICLE #1

• Gloeckler, Lawrence C. (1999) The post school status of former special education students in the big five cities: presented to members of the board of regents Committee on Vocation and Educational services for Individuals with Disabilities.

- This article is a research article that provides information on how transition policies are being implemented in five major New York cities, (Buffalo, New York City, Rochester, Syracuse and Yonkers).
- Researcher looked at 1,037 former special education students one year after graduation

# FINDINGS based on number of students measured

- 62% of former special education students were either working or attending postsecondary education.
- 9% were attending day training or day treatment.
- 38% were working in paid competitive jobs in the community.
- 53% were working part time
- 57% were earning more than minimum wage.
- 83% live with their families

## **DISCUSSION**

- Although more than ½ of post Special Education students are working one year after graduation, more than ½ only work part time and slightly more than ½ were earning more than minimum wage indicating that more intervention is needed in follow-up of post graduate Special Education students.
- In addition, over 80% of graduates still lived at home indicating the need for training in independent living and necessary adaptive level skills.

## VISUAL REPRESENTATIONS

■ The researcher used numerous Bar Graphs to compare Special Education students against regular education students and their post graduate activities. By doing so it provided an easy visual representation to see the difference in how the two groups compare and contrast.



## CORRELATIONS

#### Correlation of coefficients

■ A numerical index that reflects the linear relationship between two variables (I.e.) *education* and future earning potential.

#### Pearson product-moment

■ A type of correlation of coefficient that looks at variables that are continuous in nature, (*I.e.*) height, weight, income.

#### **Direct Correlation**

- Also known as a Positive Correlation where variables change in the same direction, (I.e. Ht/Wt)
   Indirect Correlation
- Also known as a Negative Correlation where variables change in the opposite direction, (I.e.) Unemployment and income

#### **Scatterplot**

Also know as a scattergram it is a plot of each set of scores on separate axes,( *I.e.*) how it appears on a graph

#### Rule of thumb

Generally a term used to making reference of the data by looking at the coefficient correlation and using the information based on a visual interpretation (I.e.) what general trend is the data showing.

## Chap.5 Data Set 2

#### Correlations

		CORRECT	ATTITUDE
CORRECT	Pears on Correlation	1.000	.596
	Sig. (2-tailed)		.069
	N	10	10
ATTITUDE	Pears on Correlation	.596	1.000
	Sig. (2-tailed)	.069	
	N	10	10

## RELIABILITY AND VALIDITY

#### <u>Independent Variable</u> –

■ The research variable that is manipulated by the experimenter (I.e.) *Applying a new method to increase reading scores for 3<sup>rd</sup>. grade students.* 

#### Dependent Variable

The results that occur from an experimental design. (I.e.) The  $3^{rd}$ . grade reading scores that are reported after completion of the program

## TYPES OF MEASUREMENT

#### Nominal-

• A characteristic that applies to one type of classification (*I.e.*) Sex, ethnicity, political affiliation

#### Ordinal-

 Refers to the order or list of items being measured (i.e.) ranking test grades from highest to lowest in numerical order

#### Interval-

 A scale of measurement that describes specific equal distances between points from acquired data

#### Ratio-

• Characterized by the presence of an absolute zero on a scale (I.e.) In a case of observed verbal responses of a student, a case where there is no response or "o" times

## RELIABILITY

 A determination of the value of a measure being utilized. Generally means "consistency" of results as well as the format and application of technique being used.

## TYPES of RELIABILITY

#### Test-Retest-

• A factor that reveals little if any variable change in results over time (I.e.) *I.Q. test scores of an individual from the same test instrument usually remain consistent over years.* 

#### Parallel Forms-

• Using two alternate tests that measure the same factors and comparing for "likeness" in results (I.e.) A teacher that has two or more types of the same exam to guard for cheating.

#### Internal Consistency-

■ When all the items of a particular measure all pertain to the same factor (*I.e.*) All the items on the math test were geared for the same grade level tested

#### Interrater-

■ The effect, if any between those evaluating or administering the test measure (I.e.) *teacher A was more liberal in his scoring criteria than teacher B* 

## **VALIDITY**

In general terms it is to determine if a test measures what it's designed to measure, (I.e.) the ability to fix a broken down car is a valid test for a car mechanic but not necessarily a sign of intelligence as some theorize I.Q. tests are.

## TYPES of VALIDITY

#### Content-

■ Does the test apply to the information needed to answer correctly, (*I.e.*) the history test does not include biology questions.

#### Criterion-

■ Does the test predict or reflect a specific factor, (*I.e.*) the view that SAT scores predict academic ability as well as future scholastic success.

#### Construct-

■ Does the test measure some underlying issue or factor, (I.e.) students in cohorts have a higher program retention than traditional programs.

### THE RESEARCH HYPOTHESIS

#### Hypothesis-

Generally means an educated guess of the problem statement that you intend to explore in the following research.

#### Null Hypothesis-

• When no relationship is expected to be found to exist between the variables in question. (I.e.) There will be no difference between the average I.Q's of left vs. right handed people. (Creativity maybe but not intelligence.)

#### Research Hypothesis

• A statement suggesting when a relationship between two variables is expected, (I.e.) The average I.Q's of graduate college students is different than the I.Q.'s of high school dropouts.

#### Non- Directional Research Hypothesis

■ When a difference between two groups is expected but the direction of the difference is not stated.

#### **Directional Hypothesis**

• When a difference between two groups is expected and a direction is stated, (I.e.) *The average I.Q.'s of graduate college students* **will be** *greater than the average I.Q.'s of high schools dropouts.* 

# WHAT MAKES A GOOD HYPOTHESIS

#### 1. Be stated in declarative form

Use a clear and forceful statement, (I.e.) Students who participate in transition planning are less likely to be involved in violations of the law and/or imprisonment.

- States an expected relationship between two variables, (as stated above).
- Can be related to existing literature that has previously been completed.

In the above topic research has been done in the area of transition planning however not necessarily in the exact area.

## 4. <u>Be brief and to the point</u> Keep it simple, rational and coherent.

#### 5. Be testable

Stay away from vague or un-measureable objectives, (I.e.) College graduates have "more fun" than high school dropouts.

## THE NORMAL DISTRIBUTION



## SPSS Figure 8.6

### **Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Zs core(VAR 00001)	10	-1.55703	1.19821	1.665E-16	1.0000000
VAR00001	10	33.00	76.00	57.3000	15.6066
ValidN (listwise)	10				

### RESEARCH STUDY ARTICLE #2

Wehmeyer, Michael I., Palmer, Susan B.,
 Soukup, Jane H., Garner, Nancy W. &
 Lawrence, Margaret (2007). Self Determination and Student Transition Planning
 Knowledge and Skills: Predicting
 Involvement. Exceptionality,15(1) 31-44.

This article examined the contribution of selfdetermination to transition planning knowledge and skills for students with disabilities

#### Sample Size

■ 180 students receiving special education services from 25 school districts in four states. The mean age for the sample was 17.73 years (range 14.4-21.8), Standard Deviation 1.5.

#### Measuring Device-

 Researchers used a 20-item questionnaire from a criterion reference tool to determine the impact of a self-directed transition planning program.

#### Analysis-

- A Factor Analysis was utilized to examiner the relationship between student transition planning knowledge and skills relative to self-determination.
- Researchers also reported results acquired from Descriptive Analyses, Regression Analyses, and Factor Analysis.

# **STATISTICS**

 The statistics utilized allowed for the multiple comparisons for Disability by group.
 Correlations were presented that compared the mean difference between groups at the 95% confidence interval.

### **FINDINGS**

- This study provided evidence of the importance of self-determination to the transition planning process for students with intellectual and developmental disabilities.
- The researchers also found that selfdetermination was a significant predictor of Transition Planning factors related to knowledge and skills about the individualized education process, goals and decision making.

## **CRITIQUE**

 Subjects included students classified as Mentally Retarded, Learning Disabled, or Autistic. I feel future researchers should include other disabled groups including Physical Disabilities, Visual or Auditory impaired students and those classified as Emotionally Disturbed, including A.D.H.D. students.



# ERRORS REGARDING THE NULL HYPOTHESIS

- 1. The Null Hypothesis is true and you reject the Null Hypothesis, Type I error (I.e.) thus you make the claim that there is a significant difference between the groups when there is not.
- 2. The Null Hypothesis is false and you accept the Null Hypothesis, Type II error (I.e.) thus there was a significant difference between the groups and you believe there was not

#### INFERENTIAL STATISTICS

 Are used to make conclusions about the population under study that is largely based on the sample's characteristics, (I.e.) A well represented sample of the United States population can accurate predict how the country will vote in a Presidential election, (plus or minus a numerical margin or error) as it did this past election



#### ■ <u>Effect Size-</u>

A measure of the magnitude of a particular outcome, (I.e.) in other words how different two groups are from one another

#### SPSS CHAP 10 DATA FILE SET 1

#### **Group Statistics**

	GROUP	N	Mean	Std. Deviation	Std. Error Mean	
MEMTEST	1	30	5.43	3.42	.62	
	2	30	5.53	2.06	.38	

#### Independent Samples Test

		Levene's Test fo of Varian			t-te	3					
								Std. Error 👅	95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Difference	Lower	Upper	
MEMTEST	Equal variances assumed	4.994	.029	137	58	.891	-1.00E-01	.73	-1.56	1.36	
	Equal variances not assumed			137	47.635	.892	-1.00E-01	.73	-1.57	1.37	

# T-TESTS for DEPENDENT MEANS

■ The T-Test for Dependent means involves comparing the means from each group evaluated and directs the experimenter to view the differences between the scores obtained

### PAIRED SAMPLES TEST

#### Paired Samples Test

				Paired Differences					
					95% Confidenc the Diffe				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	ď	Sig. (2-tailed)
Pair 1	PRETEST - POSTTEST	-1,20	2.45	.49	-2,21	19	-2.449	24	.022

### SPSS Chap.11 Data set 1

#### **Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRETEST	6.32	25	1.73	.35
	POSTTEST	7.52	25	1.83	.37

#### Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRETEST & POSTTEST	25	.051	.810

### RESEARCH ARTICLE #3

 Trainer, Audrey A. (2007). Perceptions of Adolescent Girls With LD Regarding Self-Determination and Postsecondary Transition Planning Learning Disability Quarterly, 30, 31-45.  This Qualitative Research article examined the perceptions of adolescent females with Learning Disabilities regarding selfdetermination during transitioning from high school to postsecondary settings.

## METHOD

- The researcher utilized a qualitative approach analyzing comments made by adolescent women with Learning Disabilities.
- The researcher interpreted plausible meanings of the content of the interviews conducted and constructed theoretical relationships relevant to the research questions.
- The protocol utilized 13 questions that addressed knowledge, attitudes, skills and attitudes from a previously published theoretical model of self-determination.

# **PARTICIPANTS**

■ The participants were seven racially/ethically diverse adolescent girls age 16 or older and were receiving services as students with Learning Disabilities using state criteria and were eligible for free or reduced lunch programs.

### **RESULTS**

#### Key Themes:

- Participants expressed beliefs that they were selfdetermining young women based on some personal experiences.
- Participants lacked a connection between their understanding of personal strengths and needs and their goals (I.e.) One student felt she would make a good lawyer because she liked arguing with people.
- Participants were unfamiliar with the formal transition planning process (I.e.) *None were able to define the term "transition plan"*.

### **CRITIQUE**

- The lack of a graph or table grouping patterns, themes and discrepancies made it difficult to analyze the results objectively and the reader was left to the authors interpretation from the narratives the researcher evaluated.
- The small sample size and subjects profile, (7 adolescent girls classified as Learning Disabled) make it difficult to generalize conclusions not just for adolescents girls with learning problems but with all adolescents as the population was relatively small and very specific.

#### ANALYSIS OF VARIANCE

#### ANOVA-

■ A test that evaluates the difference between two or more means. The less complicated ANOVA is one that involves only one independent variable.

#### One way ANOVA-

 Utilized when the researchers are evaluating the differences between the means of *two or more* groups.

## SPSS CHAP.12 Data Set 1

#### One way

#### **Descriptives**

LANG\_SC

			95% Confidence Interval for  Mean							
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum		
5 Hours	10	76.60	11.96	3.78	68.04	85.16	56	98		
10 Hours	10	85.20	6.20	1.96	80.77	89.63	78	99		
20 Hours	10	91.60	3.41	1.08	89.16	94.04	87	96		
Total	30	84.47	9.95	1.82	80.75	88.18	56	99		

#### **ANOVA**

#### LANG\_SC

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1133.067	2	566.533	8.799	.001
Within Groups	1738.400	27	64.385		
Total	2871.467	29			

### RESEARCH ARTICLE # 4

Nelson, Betty (2005) Creating Positive
 Outcomes for Deafblind Youth and Young
 Adults: A Personal Features Planning
 Transition Model. Heldref Publications, 36,
 173-180.

#### **METHODOLOGY**

- In this article the author researched a model framework program (*The University of Alabama at Birmingham Alabama Deafblind Project*) for young people who are deafblind and incorporates transition planning
- The program described utilized a planning process of people with a first hand knowledge of the individual with disabilities to create an outline of a purpose driven, coordinated and progressive plan for a fulfilling future for the individuals

# **PARTICIPANTS**

■ The participants were 17 individuals across different disciplines, agencies, and geographic areas to develop a viable working model for deafblind students.

### RESULTS

The commonality of results found that those involved in Transition Planning included the following main factors:

#### **VISUALIZATIONS**

- The author provided visualization maps of how the process would work with the student as the focal point in the process.
- The two figures gave the reader an easy to understand model as it relates to the students needs within and outside the school community.

### **CRITIQUE**

Although qualitative in presentation, the author was able to provide visualizations as representations of the model utilized that were acquired from the perspective from those participants involved.

However, it did not include input from those who would benefit directly from the conclusions drawn, namely the *deafblind*. Thus, the authors are working under an assumption (right or wrong) that they know what's best for students with multiple disabilities.

# END OF PRESENTATION