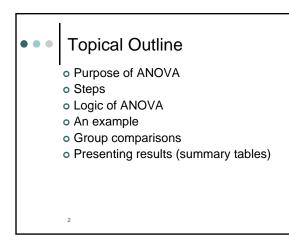
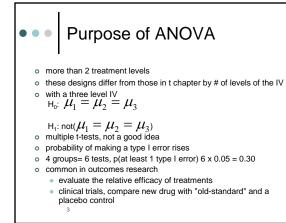
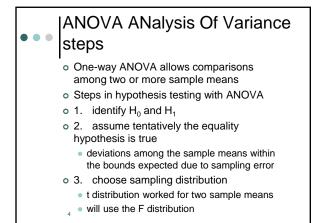
Applied Statistics for the Behavioral Sciences

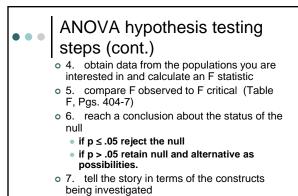
Chapter 11: One-Way Analysis of Variance (ANOVA)

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o same process we followed with t test

ANOVA logic / DF

- variance in a set of observations can be partitioned into within groups and between groups variance
- F statistic ratio of between groups variance and within groups variance
- if no differences between group means, between and within groups variance will be about the same, resulting in an f ratio of around one
- F statistic has two degrees of freedom
- o first is the between groups df which = k(ngroups)-1
- second is the within groups df which = n k(ngroups)

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• • • ANOVA example

- exercise program example
- enter data into SPSS

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- write paragraph summarizing findings
- hired by a large corporation to implement a "wellness program."
- encouraging good dietary habits and exercise will decrease sick days, productivity will increase and have reduced health insurance benefit costs due to lower utilization of medical services
- best way to present the program, in terms of scheduling?

ANOVA example (cont.)

- you have the freedom to schedule it at any time you wish, and attendance will be mandatory for all employees, so you want to find out which type of presentation people will prefer
- more satisfied with the program = receptive and attentive to the information presented
- group of 30 employees randomly assigned to one of the three conditions
- at the conclusion of the program (identical for all 3 groups) assess satisfaction with the program

• • • The data											
	Condition	Satisfaction	Cond.	Satis.	Cond.	Satis.					
	days	5	nights	5	Saturday	5					
	days	5	nights	4	Saturday	5					
	days	5	nights	4	Saturday	5					
	days	5	nights	3	Saturday	4					
	days	4	nights	3	Saturday	4					
	days	4	nights	2	Saturday	4					
	days	4	nights	2	Saturday	3					
	days	4	nights	2	Saturday	3					
	days	3	nights	1	Saturday	3					
	days	2	nights	0	Saturday	2					
	9										



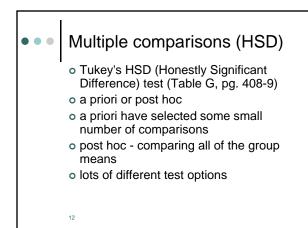
• • • Components of F statistic

- two different estimates of the pop.variance (σ^2)
- o the numerator of the F statistic represents a reasonable estimate of σ^2 only when null is true
- o when the null is not true, estimate is too large
- If this variance, as estimated by the variance of the means is large relative to the average of the variances we reject the null hypothesis that there is no difference between treatment means
- o expected value of F is 1.00 if null is true

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Conclusions from ANOVA
we can conclude that the three schedules do not result in equal satisfaction
unsure about specifically where these significant differences lie
probably a safe bet that the days mean is higher than the nights mean
is days significantly higher than Saturday?
is Saturday significantly higher than nights?



ANOVA summary table										
Source	SS	df	MS - Mean Square	F	p (sig.)					
Condition (Between Groups)	12.60	2	6.30	4.373	.023					
Error (Within Groups)	38.90	27	1.441							
Total	51.50	29								
Total N = total df+1		30								
N of groups = condition df+1		3								
13										

