

18. The following data were obtained from an independent-measures research study comparing three treatment conditions. Use an ANOVA with  $\alpha = .05$  to determine whether there are any significant mean differences among the treatments.

Treatment			
I	II	III	
2	5	7	$N = 14$
5	2	3	$G = 42$
0	1	6	$\Sigma X^2 = 182$
1	2	4	
2			
2			
$T = 12$ $T = 10$ $T = 20$			
$SS = 14$ $SS = 9$ $SS = 10$			

19. The following values summarize the results from an independent-measures study comparing two treatment conditions.
- Use an independent-measures  $t$  test with  $\alpha = .05$  to determine whether there is a significant mean difference between the two treatments.
  - Use an ANOVA with  $\alpha = .05$  to determine whether there is a significant mean difference between the two treatments.

Treatment		
I	II	
$n = 8$	$n = 4$	
$M = 4$	$M = 10$	$N = 12$
$T = 32$	$T = 40$	$G = 72$
$SS = 45$	$SS = 15$	$\Sigma X^2 = 588$

20. The following data represent the results from an independent-measures study comparing two treatment conditions.
- Use an independent-measures  $t$  test with  $\alpha = .05$  to determine whether there is a significant mean difference between the two treatments.
  - Use an ANOVA with  $\alpha = .05$  to determine whether there is a significant mean difference between the two treatments.

Treatment		
I	II	
8	2	$N = 10$
7	3	$G = 50$
6	3	$\Sigma X^2 = 306$
5	5	
9	2	
$M = 7$ $M = 3$		
$T = 35$ $T = 15$		
$SS = 10$ $SS = 6$		

21. One possible explanation for why some birds migrate and others maintain year round residency in a single location is intelligence. Specifically, birds with small brains, relative to their body size, are simply not smart enough to find food during the winter and must migrate to warmer climates where food is easily available (Sol, Lefebvre, & Rodriguez-Teijeiro, 2005). Birds with bigger brains, on the other hand, are more creative and can find food even when the weather turns harsh. Following are hypothetical data similar to the actual research results. The numbers represent relative brain size for the individual birds in each sample.

Non-Migrating	Short-Distance Migrants	Long-Distance Migrants	
18	6	4	$N = 18$
13	11	9	$G = 180$
19	7	5	$\Sigma X^2 = 2150$
12	9	6	
16	8	5	
12	13	7	
$M = 15$	$M = 9$	$M = 6$	
$T = 90$	$T = 54$	$T = 36$	
$SS = 48$	$SS = 34$	$SS = 16$	

- Use an ANOVA with  $\alpha = .05$  to determine whether there are any significant mean differences among the three groups of birds.
- Compute  $\eta^2$ , the percentage of variance explained by the group differences, for these data.

- c. Write a sentence demonstrating how a research report would present the results of the hypothesis test and the measure of effect size.
- d. Use the Tukey HSD posttest to determine which groups are significantly different.
22. There is some research indicating that college students who use Facebook while studying tend to have lower grades than non-users (Kirschner & Karpinski, 2010). A representative study surveys students to determine the amount of Facebook use during the time they are studying or doing homework. Based on the amount of time spent on Facebook, students are classified into three groups and their grade point averages are recorded. The following data show the typical pattern of results.

Facebook Use While Studying		
Non-User	Rarely Use	Regularly Use
3.70	3.51	3.02
3.45	3.42	2.84
2.98	3.81	3.42
3.94	3.15	3.10
3.82	3.64	2.74
3.68	3.20	3.22
3.90	2.95	2.58
4.00	3.55	3.07
3.75	3.92	3.31
3.88	3.45	2.80

- a. Use an ANOVA with  $\alpha = .05$  to determine whether there are significant mean differences among the three groups.
- b. Compute  $\eta^2$  to measure the size of the effect.
- c. Write a sentence demonstrating how the result from the hypothesis test and the measure of effect size would appear in a research report.

23. New research suggests that watching television, especially medical shows such as *Grey's Anatomy* and *House* can result in more concern about personal health (Ye, 2010). Surveys administered to college students measure television viewing habits and health concerns such as fear of developing the diseases and disorders seen on television. For the following data, students are classified into three categories based on their television viewing patterns and health concerns are measured on a 10-point scale with 0 indicating "none."

Television Viewing		
Little or None	Moderate	Substantial
4	5	5
2	7	7
5	3	6
1	4	6
3	8	8
7	6	9
4	2	6
4	7	4
8	3	6
2	5	8

- a. Use an ANOVA with  $\alpha = .05$  to determine whether there are significant mean differences among the three groups.
- b. Compute  $\eta^2$  to measure the size of the effect.
- c. Use Tukey's HSD test with  $\alpha = .05$  to determine which groups are significantly different.



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