

Psy 207: Psychological Statistics

Exam 3 Form A

Circle in your **Name** (Surname First) **and Student Number** (at Identification Number; start at left and leave no spaces) **on the Answer Sheet**. Circle in the **1** for **Form A** under "Grade or Education." Write your recitation time on the top of the Answer Sheet. **Also write your name and circle your recitation time on this booklet**. This booklet and the Answer sheet are to be turned in. There is one best answer per question. If you don't know the answer, it is better to guess than to leave it blank, as your grade is based on the total number correct.

1. Suppose that a researcher is interested in the effects of different doses of caffeine on the amount of time that it takes subjects to solve a puzzle. The independent or treatment variable is: A) each subject; B) the researcher; C) caffeine dosage; D) time to solve the puzzle; E) Shape of the cup.
2. Suppose that a researcher is interested in the effects of different doses of caffeine on the amount of time that it takes subjects to solve a puzzle. The dependent variable is: A) each subject; B) the researcher; C) caffeine dosage; D) time to solve the puzzle; E) Shape of the cup.
3. Suppose that s_1^2 is the variance of a sample of size 10 that was drawn from a population whose mean is μ and whose variance is σ^2 . Further suppose that s_2^2 is the variance of a sample of size 20 that was drawn from the same population. Which is the best estimate of the population variance? A) s_1^2 ; B) s_2^2 ; C) the pooled variance based on both s_1^2 and s_2^2 ; D) Each of these are equally as good
4. Suppose you run an experiment with 30 subjects. Then you run an identical experiment with 300 subjects. Which is true? A) t is more likely to be larger in the 300-subject experiment. B) t is more likely to be smaller in the 300-subject experiment. C) d is more likely to be larger in the 300-subject experiment. D) d is more likely to be larger in the 300-subject experiment. E) both t and d are more likely to be larger in the 300-subject experiment.
5. If one sample has 20 subjects, another sample has 10 subjects, and we pool variances, how many degrees of freedom does this pooled variance have? A) 32 B) 28 C) 29 D) 19 E) 30

*****use for the following 7 questions*****

A therapist uses behavior therapy to reduce smoking behavior. Studies in other clinics have shown that this therapy does in fact reduce smoking. To evaluate the program in her clinic, she selects five subjects and asks them count the number of cigarettes they smoke per day. She then administers the smoking-reduction program, and then has them again count the number of cigarettes per day. The data are shown below. She wanted to analyze them with $\alpha < .05$, one tailed test.

Subject	Before	After
1	24	20
2	21	21
3	28	20
4	24	24
5	30	22

6. The null hypothesis H_0 can be stated as A) $\mu_1 = 25.4$ B) $\mu_2 \geq 25.4$ C) $\mu_D \neq 0$; D) $\mu_1 \geq \mu_2$; E) $\mu_1 < 25.4 < \mu_2$.

7. t in this problem has ___ degrees of freedom. A) 10; B) 4; C) 8; D) 5; E) 9.
 8. The critical value for t in this problem is: A) 2.132; B) 2.571; C) 1.833; D) 2.228; E) 2.306.
 9. The numerator of the t test in this problem is? A) 7; B) 8; C) 24; D) 4; E) 5.
 10. The computed SS_D used in solving for t is: A) 130; B) 32; C) 64; D) 28
E) 12.5
 11. The t computed from the data for this experiment was A) 2.543; B) 2.236;
C) 1.772; D) 1.595; E) 1.971
 12. We could conclude from this experiment A) The Behavior therapy had no effect on smoking
B) There were too few participants to come to any statistical conclusions C) The Behavior therapy
successfully reduced smoking D) There was not enough evidence to reject H_0 that the Behavior
therapy has no effect
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13. If a dependent-sample t test and an independent-sample t test are performed on the same data, which
of the following statements is true? A) The dependent-sample t value is always smaller than the
independent-sample t value B) the dependent-sample t value is always larger than the
independent-sample t value C) the dependent-sample t value is sometimes smaller and sometimes
larger than the independent-sample t value D) the dependent-sample t value is always equal to
the independent-sample t value
 14. Power is defined as: A) the probability of making a Type 1 error B) The probability of making
a Type 2 error C) The probability of making a correct decision D) the probability of
correctly rejecting H_1 E). the probability of correctly rejecting H_0
 15. Other things being equal, if the raw effect size was increased, we would expect power to A)
increase B) decrease C) remain unchanged D) increase or decrease (impossible to tell)
 16. Other things being equal, if we decreased α from .05 to .01, we would expect power to A) increase
B) decrease C) remain unchanged D) increase or decrease (impossible to tell)
 17. What is a Type I error? A) When the null hypothesis is incorrectly accepted
B) When the null hypothesis is correctly accepted C) When the null hypothesis is correctly
rejected D) When the null hypothesis is incorrectly rejected
 18. If we conduct an analysis of variance with three samples and the null hypothesis is true, what is the
probability of making a Type I error? A) the chosen level of significance (α) B) three times
the chosen level of significance (3α) C) α D) $1-\alpha$ E) not enough information to
answer.
 19. If the null hypothesis of the analysis of variance is true, then: A) MS_B would be expected to be
about the same magnitude as MS_W B) MS_B would be expected to be exactly equal to MS_W
C) MS_B would be expected to be substantially larger than MS_W D) MS_B would be expected to be
substantially smaller than MS_W
 20. Chapter 15's repeated-measures ANOVA is to Chapter 14's ANOVA as
A) independent-sample t test is to dependent-sample t test B) post hoc is to a priori
C) dependent-sample t test is to independent-sample t test D) a priori is to post hoc
 21. For a data set with four rows, two columns, and five observations per cell, how many degrees of
freedom are there for the interaction? A) 10 B) 2 C) 8 D) 4 E) 3
 22. For a data set with four rows, two columns, and five observations per cell, how many degrees of
freedom are there within cells? A) 24 B) 32 C) 36 D) 39 E) 40

23. For a data set with four rows, two columns, and five observations per cell, at $\alpha < .05$ what is the critical value of F needed for a significant row effect? A) 3.10 B) 3.35 C) 4.18
D) 2.90 E) 2.68

*****Use for the following 4 questions*****

In a study on the effectiveness of a set of chemicals designed to inhibit tumor growth Dr Hsu compared four groups of eight mice each that were injected with different drugs. The groups were simply coded D1, D2, D3, and D4. The overall $F = 4.5$, and $MS_{within} = 0.291$ for these data. The mean tumor size in mm after a week were D1 = 3.5, D2 = 2.7, D3 = 3.2, D4 = 4.1.

24. In the above analysis, what is the df for MS within? A) 29 B) 3 C) 28 D) 7 E) 31.
25. In the above analysis, what is the critical value of F for $\alpha = .05$? A) 3.32; B) 2.33; C) 4.61
D) 2.69; E) 2.95.
26. If a Tukey HSD test were run, what is the critical value for the difference between means?
A) 0.788; B) 0.645; C) 0.426; D) 1.032; E) 0.354
27. If you ran a Newman-Keuls test, what is the Q to check whether the D1 drug is significantly different from the D2 drug? A) 3.84 B) 3.98 C) 4.10 D) 3.51 E) 3.26

*****Use for the following 4 questions*****

In a study of the relation between heredity and environment the experimenter, Dr Hsu bred mice selected to be bright, dull, or mixed (a hybrid between the two). She raised 5 mice of each kind in a very restricted environment and 5 in an open environment, and then studied the number of trials each of these mice took to learn a maze. The data incompletely analyzed follows: Each cell contains

$\sum X$, $\sum X^2$, $\frac{(\sum X)^2}{n}$, \bar{X} respectively, computed for its experimental condition. She wanted to see whether the animals raised in different environments could reduce the performance differences due to heredity. She also had to show, of course, that the breeding differences made a difference in her learning task. She used $\alpha < .05$ in her analysis.

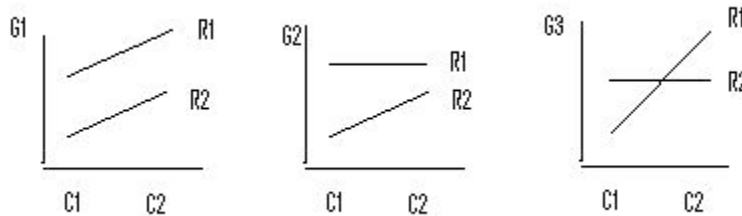
	Bright	Dull	Mixed(hybrid)	
Open Environment	12 40 28.8 2.4	36 276 259.2 7.2	24 126 115.2 4.8	$\sum_C \sum_R \frac{(\sum X)^2}{n} = 1240.4$
Restricted Environment	37 303 273.8 7.4	39 331 304.2 7.8	36 278 259.2 7.2	$\sum_{Rows} \frac{(\sum X)^2}{kn} = 1181.87$
	$\sum_{columns} \frac{(\sum X)^2}{jn} = 1162.6$			$\sum X^2 = 1354$ $\frac{(\sum X)^2}{N} = 1128.53$

	SS	df	MS	F	F _{CV}
Rows (Env)	53.333	1			
Columns (Hered)	34.067				
R x C					3.40
Within	113.6		4.733		
Total	225.467	29			

28. The Sum of squares (SS) for the R x C interaction is: A) 24.467 B) 31.567 C) 91.333
D) 18.267 E) 12.767
29. The F for Columns (Heredity) is: A) 4.28; B) 5.14 C) 3.60 D) 3.91 E) 7.91
30. The F for RxC interaction is: A) 6.64 B) 2.58 C) 4.44 D) 3.83 E) 5.27
31. From this experiment we could conclude A) Heredity has an effect on maze learning performance but there is no evidence that environment does. B) Environment has an effect on maze learning performance but there is no evidence that heredity does. C) Heredity and environment both significantly affect maze learning but the two variables interact. D) Heredity and environment both significantly affect maze learning and the data suggest that the effects are additive.

*****Use for the following 3 questions*****

The following graphs represent the results of plotting results from factorial designs. The lines represent row values and the abscissa represents column values. The ordinate represents the dependent variables. Assume that all differences that look different are significantly different.



32. In which graphs is there likely to be a significant row effect? A) only G1; B) G1 and G2, not G3; C) G1, G2, and G3; D) only G3. E) only G2.
33. In which graphs is there likely to be a significant column effect? A) only G1; B) G1 and G2, not G3; C) G1, G2, and G3; D) only G3. E) G2 and G3, not G1.
34. In which graphs is there likely to be a significant interaction? A) only G2; B) G1 and G2, not G3; C) G1, G2, and G3; D) only G3. E) G2 and G3, not G1.

KEY: CDCAB DBADC BCCEA BDAAC EBDCE ADACB DBCE