ID# ___________________________ Exam1 PS 306, Spring 2010

The Skidmore Honor Code is in effect for this exam, as always. You'll be asked to write out the Honor Code statement at the end of the exam. Read each question carefully and answer it completely. Pay careful attention to the point value of each question, thinking of a point as a minute. That is, if you answer a 10-point question in about 10 minutes, you'll complete the exam in a timely fashion. I'm also presuming that after taking PS 217, you all remember that the standard deviation (s) is simply the square root of the variance (s^2). Good luck!

1. Suppose that you were interested in estimating the variance of a population. What statistic would you compute? What would you do if you had four independent samples from a population? What term in an independent groups ANOVA source table represents an analogous situation? [5 pts]

2. An independent groups design and a repeated measures design are both important tools in the psychologist's experimental arsenal. Distinguish between the two designs in terms of setting up experiments, power, situations in which one design or the other might be inappropriate, etc. [10 pts]

3. Recently Simone Schnall and her colleagues published a paper in *Psychological Science*:

Schnall, S., Roper, J., & Fessler, D. M. T. (2010). Elevation leads to altruistic behavior.

From their abstract:
Feelings of elevation, elicited by witnessing another person perform a good deed, have been hypothesized to motivate a desire to help others. However, despite growing interest in the determinants of prosocial behavior, there is only limited evidence that elevation leads to increases in altruistic behavior…Feelings of elevation, but not feelings of amusement or happiness, predicted the amount of helping. Together, these results provide evidence that witnessing another person's altruistic behavior elicits elevation, a discrete emotion that, in turn, leads to tangible increases in altruism.

From their Procedure section:
Participants were informed that they were taking part in a 1-hr experiment on episodic memory in which they would watch a film clip, write about it, and complete a 30-min computer task. Tested individually, participants were randomly assigned to watch the elevation film clip from the Oprah Winfrey Show (elevation condition), the control film clip (the first 7 min of "The Open Ocean," David Attenborough's (1984) nature documentary describing a journey through the deepest part of the ocean), or a clip from a British comedy ("Fawlty Towers") intended to induce mirth (mirth condition).
The experimenter then feigned three unsuccessful attempts to open the computer file that ostensibly needed to be completed by the participant. She then told the participant that, because it was impossible to complete the next part of the study, the participant was free to leave, but would still receive the full hour's worth of course credit. Following the procedure outlined in Bartlett and DeSteno (2006), when the participant got up to leave, the experimenter asked, apparently as an afterthought, whether she would be willing to complete another questionnaire, ostensibly from another study for which the experimenter needed to establish norms. The experimenter noted that the questionnaire was, unfortunately, rather boring, emphasizing that the participant was under no obligation, and was free to stop whenever she wanted, but that completing any number of the items would greatly assist the experimenter. If the participant agreed to help, she was seated at a desk, reminded that she was free to stop whenever she wished, and given 85 elementary math problems. The participant's work on the problems was secretly timed (the dependent variable in the experiment, time spent on the task). The participant was then probed for suspicions regarding the purpose of the study and debriefed.

The results from the study were analyzed as illustrated in the incomplete source table below. First, complete the source table below.

Descriptives

Time

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Elevation	11	40.6364	17.06032	5.14388	29.1751	52.0976	18.00	63.00
Control	11	19.9091	8.36008	2.52066	14.2927	25.5255	10.00	32.00
Mirth	11	23.7273	14.06479	4.24069	14.2784	33.1761	8.00	48.00
Total	33	28.0909	16.07087	2.79758	22.3924	33.7894	8.00	63.00

Test of Homogeneity of Variances

Time

Levene Statistic	df1	df2	Sig.
4.915	2	30	.014

ANOVA

Time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2677.1				.003
Within Groups	5587.6				
Total	8264.73				

Next, analyze and interpret the results as completely as you can. [15 pts]

4. Distinguish between internal and external validity. Using evidence from your readings this semester (especially Mook), which type of validity would you argue is more important (i.e., less serious to violate). [10 pts]

5. Another recent article in *Psychological Science* comes from Saul Miller and Jon Maner:

Miller, S. L., & Maner, J. K. (2010) Scent of a woman: Men's testosterone responses to olfactory ovulation cues.

Adapted from their abstract:
Adaptationist models of human mating provide a useful framework for identifying subtle, biologically based mechanisms influencing cross-gender social interaction. In line with this framework, the current studies examined the extent to which olfactory cues to female ovulation—scents of women at the peak of their reproductive fertility—influence endocrinological responses in men. Men in the current study smelled T-shirts worn by women near ovulation or far from ovulation. Men exposed to the scent of an ovulating woman subsequently displayed higher levels of testosterone than did men exposed to the scent of a nonovulating woman. Hence, olfactory cues signaling women's levels of reproductive fertility were associated with specific endocrinological responses in men—responses that have been linked to sexual behavior and the initiation of romantic courtship.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.136[a]	.019	-.007	3.26161

a. Predictors: (Constant), Days from Ovulation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.629	1	7.629	.717	.402[a]
	Residual	404.249	38	10.638		
	Total	411.878	39			

a. Predictors: (Constant), Days from Ovulation

b. Dependent Variable: Testosterone level (

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	8.504	.535		15.886	.000
	Days from Ovulation	-.092	.108	-.136	-.847	.402

a. Dependent Variable: Testosterone level (

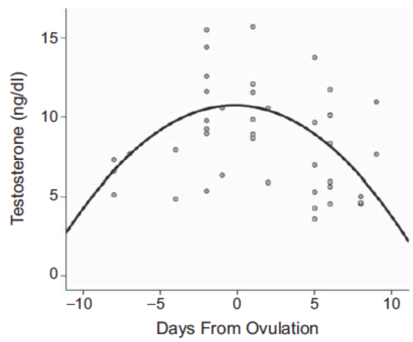

Fig. 2. Results from Study 2: postsmell testosterone levels (controlling for presmell testosterone levels) among men exposed to a woman's odor, as a function of the woman's estimated days from ovulation.

I've interpolated their data from the graph to produce the output above. The graph is from their paper (note the curve). Interpret their results as completely as you can. Given the output, how would you predict the man's testosterone level, when presented with a T-shirt from a woman who was ovulating (0 days from ovulation)? Judging from the abstract, would you describe this study as correlational? In other words, would you be comfortable making causal claims? [10 pts]

6. In the video at the beginning of the semester, two studies were described (the social psychological study on fear and affiliation and the perceptual development study on the effects of light deprivation). One of the studies would have benefited from a manipulation check and the other would not. Which one would, and why? Which one would not, and why not? Use either of these two studies to illustrate an operational definition by telling me how the researchers operationally defined one of their IV's or DV's. [5 pts]

7. In the light deprivation study from that video, we discussed the option of using a different dependent variable than depicted in the study. What was that DV, and would you agree that it would be more sensitive? Of course, greater sensitivity is another way of describing more power. First, define power and then describe general strategies for increasing the power in a study. [5 pts]

8. A repeated measures ANOVA will typically yield a higher F-ratio than an independent groups ANOVA on the same data. Under which circumstances will that *not* be true? [2 pts]

9. Dr. Jones decides to test the effectiveness of two different experimental methodology textbooks. He gets two of his colleagues to agree to use the texts and to give the same exams throughout the term. At the end of the term, he finds that there was no difference in mean performance between the two classes (Mean = 98% and 96% for Class A and Class B, respectively). He concludes that there is no difference between the two texts. Would you agree? Why or why not? [3 pts]

10. For Lab 2, we're studying the extent to which faces in a photo array (a six pack) are similar to one another. Knowing the basic description provided by an eyewitness (or eyewitnesses), police then create an array that contains the photo of their suspect, as well as five other photos that should be similar to the description (and similar to the suspect). Thus, ideally the faces in an array would be so similar that a person who was not an eyewitness should be choosing a face based on the description in a fairly random fashion. In other words, when rating the extent to which each face in the photo array matched the eyewitness description, a participant should rate each face as an equally good match to the description. With H_0: $\mu_{Face1} = \mu_{Face2} = \mu_{Face3} = \mu_{Face4} = \mu_{Face5} = \mu_{Face6}$, we're asserting that people should be rating the faces as equally good matches. In other words, if the array is unbiased, the data should be consistent, leading to a non-significant *F* ratio. Complete the analysis below (for the first photo array) and interpret the results as completely as you can. (A1F1 means Array 1 Face 1.) [15 pts]

Descriptive Statistics

	Mean	Std. Deviation	N
A1F1	3.4719	1.32365	89
A1F2	4.5955	1.39577	89
A1F3	3.9326	1.49086	89
A1F4	2.3933	1.18339	89
A1F5	5.7865	1.42599	89
A1F6	3.6854	1.29330	89

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power[a]
face	Sphericity Assumed	579.1				.000	.450	1.000
Error(face)	Sphericity Assumed	707.9						