Final Exam PS 306, Fall 2003

1a. Pierroutsakos and DeLoache (2003) were interested in the development of pictorial competence in children. They use the term pictorial competence to "encompass the many factors that are involved in perceiving, interpreting, understanding, and using pictures (DeLoache, Pierroutsakos, & Uttal, 2003, p. 115)."These researchers observe infants as they explore pictures of familiar objects. Unlike adults, infants are not content to look at the pictures, but will typically attempt to manipulate the pictured object.

In the data depicted below, 9-month-old infants were shown photographs and line drawings of familiar objects. The photographs and line drawings were either in black-and-white or in color. The dependent variable is the number of manual behaviors the infant exhibits toward the picture. Complete the following source table, which depicts results consistent with those of Pierroustsakos and DeLoache, and then analyze the results as completely as you can. Make an effort to interpret the results, as you would in a Discussion section. [10 pts]

ANOVA Table for Manual Behav

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Pict Type	1	48.400	48.400	75.757	<.0001	75.757	1.000
Color	1	36.100	36.100	56.504	<.0001	56.504	1.000
Pict Type * Color	1	.100	.100	.157	.6947	.157	.067
Residual	36	23.000	.639				

Means Table for Manual Behav
Effect: Pict Type

	Count	Mean	Std. Dev.	Std. Err.
Drawing	20	1.800	1.196	.268
Photo	20	4.000	1.298	.290

Means Table for Manual Behav
Effect: Color

	Count	Mean	Std. Dev.	Std. Err.
B&W	20	1.950	1.276	.285
Color	20	3.850	1.461	.327

To complete the source table, one needs to remember that the MS_{Error} (Residual) is the average of the variances for the conditions. Given that StatView prints out the standard deviations, your first step would be to square the standard deviations to get the variances, then average the variances. With the four variances of .323, .901, .666, and .666, the MS_{Error} would be .639. However, you'd know the majority of the source table without knowing the MS_{Error}. The main effects are going to be important, because the interaction is not significant.

These infants were more likely to try to pick up the colored objects (*M* = 3.85) than the black-and-white objects (*M* = 1.95). They were also more likely to try to pick up the objects depicted in photographs (*M* = 4.00) than objects depicted in drawings (*M* = 1.80). [No post hoc test needed, with only two levels of each main effect.]

These results are interesting. Looking at the four cell means, there is no interaction because the differences (e.g., 1.8 for the impact of color on drawings and 2.0 for the impact of color on photos) were too similar. Thus, the infants do reach for the more realistic depictions more often, but though they prefer photos to drawings and colored depictions to black-and-white depictions, there is no particular advantage to color photos, nor a particular disadvantage to black-and-white drawings.

1b. DeLoache and her colleagues find that 9-month-old children will often attempt to grab objects pictured on paper or on television screens. Adults, however, rarely attempt to grab the beer can pictured in a magazine or television advertisement. DeLoache, et al. were not interested in the factors that contribute to adults attempting to manipulate such objects. However, they *were* interested in the time course of development of the "awareness" that the child cannot manipulate the pictured object. To that end, DeLoache, Pierroutsakos, Uttal, Rosengren and Gottlieb (1998) studied 9-month-olds, 15-month-olds, and 19-month-olds. They were interested in the way the children interacted with the pictured objects across the three different ages. They looked at two different types of manual behaviors directed at the pictures (manual investigation vs. pointing). Below are partially completed source tables for analyses of these two dependent variables. Complete the source tables and then tell me what story these two data sets tell.

ANOVA Table for Manual Invest

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Age	2	195.300	97.650	100.199	<.0001	200.398	1.000
Residual	57	55.550	.975				

Means Table for Manual Invest
Effect: Age

	Count	Mean	Std. Dev.	Std. Err.
09 month	20	4.850	1.226	.274
15 month	20	2.000	1.076	.241
19 month	20	.500	.513	.115

Again, you need to remember that MS_{Error} (Residual) is the average of the variances of the conditions. With HSD = .75, we can see a decreasing attempt to manipulate the depicted object. The 9-mo-old infants attempted to manipulate the objects significantly more often than the 15-mo-old infants and the 19-mo-old infants. The 15-mo-old infants attempted to manipulate the objects more often than the 19-mo-old infants.

ANOVA Table for Pointing

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Age	2	221.433	110.717	128.400	<.0001	256.800	1.000
Residual	57	49.150	.862				

Means Table for Pointing
Effect: Age

	Count	Mean	Std. Dev.	Std. Err.
09 month	20	.300	.470	.105
15 month	20	2.000	.973	.218
19 month	20	4.950	1.191	.266

With HSD = .71, you can conclude that as the children age, they become increasingly likely to point at the depicted object. That is, 19-mo-old children pointed significantly more often than 15-mo-old and 9-mo-old children. Furthermore, 15-mo-old children pointed significantly more often than 9-mo-old children.

Taken together, these results show maturation. As children age, they are increasingly less likely to attempt to manipulate a depicted object and more likely to simply point at the object. It's almost as if the older children recognize that the depicted object isn't really there, so they make no attempt to manipulate the object, but it's still sufficiently interesting for them to point at the object.

2. Hmmm. There's an article with the intriguing title, "Why people fail to recognize their own incompetence" by Dunning, Johnson, Ehrlinger, and Kruger (2003). According to Confucius, "real knowledge is to know the extent of one's ignorance." So, how well do you think that you'll do on this exam? Dunning, et al. (2003) asked students who were leaving an exam to judge how well they'd done on the exam. It turned out that students who performed the worst on the exam actually overestimated their performance and students who did the best on the exam were fairly accurate in their self-assessment (with a slight underestimation among the students with the best performance).

In one study, Kruger and Dunning (1999) gave additional information to some students, and that information had an impact on their judgments. Let's imagine a set of results that are consistent with their report. The dependent variable is the percent overestimation of a person's performance on an exam. So a score of zero is an accurate judgment. A positive score indicates overestimation and a negative score is an underestimation of one's performance. The students were divided into four groups based on their actual performance (Bottom Quartile, Second Quartile, Third Quartile, and Top Quartile). In addition, half of the students in each quartile were given a mini-lecture about the material after completing the exam (Add Info), but before making their judgments. The other half of each quartile was not given any additional information (No Info). Complete the source table below and interpret the results of this study as completely as you can. [20 pts]

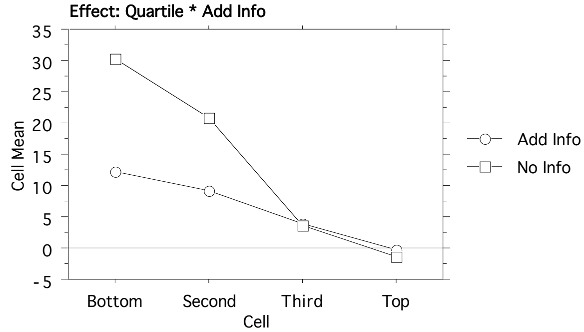
ANOVA Table for Estimate

	DF	Sum of Squares	Mean Square	F-Value	P-Value	Lambda	Power
Quartile	3	6184.650	2061.550	417.177	<.0001	1251.531	1.000
Add Info	1	1008.200	1008.200	204.020	<.0001	204.020	1.000
Quartile * Add Info	3	1308.100	436.033	88.236	<.0001	264.708	1.000
Residual	72	355.800	4.942				

Means Table for Estimate
Effect: Quartile * Add Info

	Count	Mean	Std. Dev.	Std. Err.
Bottom, Add Info	10	12.300	3.164	1.001
Bottom, No Info	10	30.400	4.300	1.360
Second, Add Info	10	9.300	1.418	.448
Second, No Info	10	20.900	2.079	.657
Third, Add Info	10	4.000	1.155	.365
Third, No Info	10	3.700	1.337	.423
Top, Add Info	10	-.300	.823	.260
Top, No Info	10	-1.300	.949	.300

Interaction Line Plot for Estimate
Effect: Quartile * Add Info



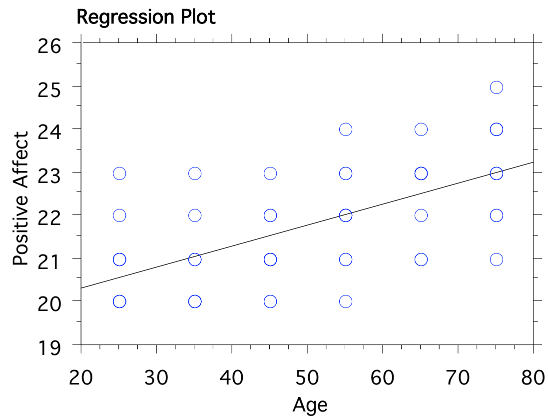
$$HSD = 4.4\sqrt{\frac{4.94}{10}} = 3.1$$

People who did worse on the exam (Bottom and Second Quartile) overestimated their performance much more if not given additional information about the material (*Ms* = 30.4 and 20.9, respectively) than if given additional information (*Ms* = 12.3 and 9.3, respectively). However, people who did better on the exam (Third and Top Quartile) were much more accurate in their estimates of their performance, regardless of whether they were given additional information (*Ms* = 4.0 and –0.3, respectively) or not (*Ms* = 3.7 and –1.3, respectively).

3. Do you think that people get more crotchety as they get older? Mroczek (2001) was interested in assessing the relationship between affect and aging. To that end, he analyzed data from the Midlife in the United States (MIDUS) survey. Mroczek looked at both positive and negative affect, but I'll focus on positive affect here (higher scores indicate more positive affect). I've attempted to replicate the basic trend that he reported in the data analyzed below. Interpret the results of this study as completely as you can. What would be your prediction of a person's affect score if he or she was 65 years old? Ordinarily, you would be able to argue against the proposition that age "caused" the changes in affect by using a couple of arguments. One argument won't work in this case. Tell me why. Nonetheless, you should be able to articulate why you would be uncomfortable arguing that age caused the change in positive affect. [10 pts]

Regression Summary
Positive Affect vs. Age

Count	60
Num. Missing	0
R	.635
R Squared	.404
Adjusted R Squared	.393
RMS Residual	1.038



Y = 19.31 + .049 * X; R^2 = .404

ANOVA Table
Positive Affect vs. Age

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Regression	1	42.263	42.263	39.238	<.0001
Residual	58	62.470	1.077		
Total	59	104.733			

Regression Coefficients
Positive Affect vs. Age

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	19.310	.415	19.310	46.584	<.0001
Age	.049	.008	.635	6.264	<.0001

There is a positive linear relationship between age and level of positive affect, *r*(58) = +.635, p < .001. If a person were 65 years old, then you would predict a positive affect score of 22.5, using the regression equation.

One typical argument against a causal interpretation of these data won't work. It's highly unlikely that level of positive affect could cause age (the causal arrow problem), so the reason that you'd avoid a causal interpretation is due to potential third variables. One explanation might have to do with the deterioration of cognitive abilities, which might mean that younger people are better able to assess their lives and come up with a fairly negative assessment. But older people have lost the ability to accurately assess their lives, so they think that everything's rosy.

4. How many participants would you need in an experiment with a minimum n = 25? [10 pts]

A completely between (independent groups) 5x5 design	**625**
A completely repeated measures (within) 5x5 design	**50**
A completely repeated measures (within) 2x5 design	**30**
A mixed 3x5 design, with the second factor repeated measures (within)	**360 complete** **90 incomplete**
A mixed 4x4 design, with the second factor repeated measures (within)	**192 complete** **112 incomplete**

5. Imagine that you are a member of an Institutional Review Board (IRB). In reviewing research proposals involving human participants, you would apply the APA guidelines (as we discussed in class and as you read in your textbook). What are those guidelines? When reviewing a research proposal that involves deception (e.g., the West, Gunn, & Chernicky (1975) study on planning a burglary as described in your textbook), what are all the points that you would investigate before approving the study? Given the results of the Ross et al. studies, what would you conclude about the effectiveness of debriefing? [10 pts]

A good answer to this question would require a familiarity with the APA Ethical guidelines, the West et al. study from your textbook, and the Ross et al. article.

6. Remember Lab 1? We talked about the False Memory Paradigm, in which people report seeing a word (e.g., anger) if they were exposed to a number of words highly associated with that word (e.g., mad, fear). Drs. Deese and Dose were interested in investigating the role of the number of associates (as we did in our lab) on the extent to which people reported seeing the lure. They present participants with a long list of words, and interspersed within the list are two of the associates for each of 10 lures, four associated words for each of a different 10 lures, eight associates of another 10 lures, and 12 associates of a final 10 lures. During the acquisition phase, the 260 words are not blocked in any way, but are randomized throughout the list. As a result, do you think that there is any need to counterbalance?

Probably no need to counterbalance orders, as long as the placement of the words within the list was fairly random. You'd want to be sure that the first and last parts of the list were comprised of similar types of stimuli.

At test, then, Drs. Deese and Dose are interested in the number of lures (out of a possible 10) that participants reported seeing during the acquisition phase of the study for each number of associates (2, 4, 8, and 12). Complete the source table below and interpret the results of this study as completely as you can. [10 pts]

ANOVA Table for Num of Associates

	DF	Sum of S...	Mean Sq...	F-Value	P-Value	Lambda	Power
Subject	9	26.500	2.944				
Category for Num of Associates	3	193.100	64.367	109.302	<.0001	327.906	1.000
Category for Num of Associates * Subject	27	15.900	.589				

Means Table for Num of Associates
Effect: Category for Num of Associates

	Count	Mean	Std. Dev.	Std. Err.
Two Assoc	10	.200	.422	.133
Four Assoc	10	1.400	1.174	.371
Eight Assoc	10	3.400	1.075	.340
Twelve Assoc	10	6.000	1.414	.447

$$HSD = 3.87\sqrt{\frac{0.59}{10}} = 0.94$$

Thus, it appears that as the number of associates increased, so did false memories. That is, with 12 associates there were significantly more false memories (*M* = 6.0) than for eight (*M* = 3.4), four (*M* = 1.4), or two associates (*M* = 0.2). Moreover, eight associates led to more false memories than four or two associates, and four associates led to more false memories than two associates.

7. In talking about the social psychology of the experiment, we discussed experimenter effects and participant effects. Distinguish between experimenter effects and experimenter expectancy effects. What kinds of evidence support the existence of these two potential effects in an experiment? How might you minimize the impact of these effects, if you were concerned about them? What kind of participant effects should you cause you concern? [10 pts]

A good answer to this question requires familiarity with the information from the lectures and textbook on the social psychology of the experiment.

8. Carefully describe the circumstances under which you think that an undergraduate author should receive authorship credit for his or her efforts? Use the principles from Fine & Kurdek to support your position. [5 pts]

A good answer to this question requires familiarity with the Fine & Kurdek article.