

# **FINAL EXAM (form 2)**

## **PSYCHOLOGY 3000-090**

### **U-ONLINE**

**Thursday, August 2, 2000 — Friday, August 4, 2000**

Tracey Smith and Melissa Hawkins

DATE: \_\_\_\_\_

STUDENT NAME: \_\_\_\_\_

U OF U ID. #: \_\_\_\_\_

SIGNATURE \_\_\_\_\_

**TIME LIMIT: 2 HOURS**

START TIME: \_\_\_\_\_ END TIME: \_\_\_\_\_

PROCTOR SIGNATURE: \_\_\_\_\_

**THE FOLLOWING CONDITIONS APPLY:**

**Check all that apply:**

**Calculators O.K.**

**Open Book (any book)**

**Dictionaries O.K.**

**Notes O.K.**

**Other: Homework and  
Assignments**

**Write exam answers on:**

**Blue Book or Sheets of Paper**

**Scantron**

**Exam**

**PLEASE show all your work so we have the option of giving you partial credit for your work. Please circle your final answers. Make a copy of your calculations and answers so you will be able to check your answers when they are posted on the class web site after the testing period is over.**

**PROBLEM 1**

A psychologist is interested in the effect of temperature on problem solving ability. She believes people will make fewer mistakes when the temperature is lower. She obtains a sample of nine college students and randomly assigns them to one of three groups. All groups are given a standardized problem solving task, and the psychologist records the number of errors. The “80 degree” group completes the problems solving task in a room that is 80 degrees. The “70 degree” group completes the problem solving task in a room that is 70 degrees. The “60 degree” group completes the task in a room that is 60 degrees. The data are as follows:

80 degrees	70 degrees	60 degrees
5	6	0
4	4	1
6	2	2

The data in the table are the number of errors made for the nine students included in the sample. Higher scores mean more errors.

- 1A. (5 points) State the scientific hypothesis and the PCH (plausible competing hypothesis) of chance.
- 1B. (5 points) Name the test statistic you will use to decide between the statistical hypotheses.
- 1C. (2 points) Translate the scientific hypothesis and the PCH of chance into statistical hypotheses – that is state  $H_0$  and  $H_1$ .
- 1D. (2 points) Does the issue of one versus two tailed statistical hypotheses apply to this test? (One word, “yes” or “no” is sufficient.)
- 1E. (2 points) What is the alpha level (level of significance or  $p$ -value) that you will use?
- 1F. (4 points) Calculate the degrees of freedom (df) you will use for your critical value (or values).
- 1G. (2 points) Look up the critical value (or values) in your table. Write the value(s) down.
- 1H. (5 points) Draw a line representing the range of your test statistic. What is the value predicted by  $H_0$ ? Draw it on the line. Also draw in the critical value (or values) on the line. Label the “Reject  $H_0$ ” region or (regions). Label the “Do Not Reject  $H_0$ ” region.

**Now for the data:**

- 1I. (5 points) Find the means of the three groups and graph them.
- 1J. (2 points) Does the pattern of data favor the scientific hypothesis? Why or why not?
- 1K. (10 points) Now calculate the value of your test statistic from the data. Take this calculated value of your test statistic and put it on the number line made in (1H.) Does it fall in a rejection region(s)?
- 1L. (3 points) Do you reject  $H_0$  or not?
- 1M. (3 points) Verbally summarize the issue of statistical conclusion validity (PCH of chance) in this case. That is, do you think this study has statistical conclusion validity or not?

**PROBLEM 2**

1. The Pollyanna effect is a basic phenomenon observed by cognitive psychologists. Simply stated, the Pollyanna effect says that pleasant information is processed more efficiently and recalled better than unpleasant information. To demonstrate this phenomenon, a researcher prepares two sets of words. One set consists of 20 pleasant words (e.g. clown, sunshine, smile) and the other set consists of 20 unpleasant words (e.g. flood, disease, dirt). A sample of  $n=10$  subjects is obtained. Subjects are randomly assigned to the conditions with five subjects in the pleasant word condition and five subjects in the unpleasant word condition. Subjects are read their respective lists and then asked to recall as many words as possible thirty minutes later. The number of words recalled are recorded in the table below.

Pleasant Words	Unpleasant Words
12	8
10	9
16	5
8	12
14	9

- 2A. (5 points) State the scientific hypothesis and the PCH (plausible competing hypothesis) of chance.
- 2B. (2 points) Is the scientific hypothesis directional or non-directional? Why?
- 2C. (5 points) Name the test statistic you will use to decide between the statistical hypotheses.
- 2D. (2 points) Translate the scientific hypothesis and the PCH of chance into statistical hypotheses – that is state  $H_0$  and  $H_1$ .

2E. (2 points) What is the alpha level (level of significance or  $p$ -value) that you will use?

2F. (2 points) In your own words what does this *alpha level* mean?

2G. (2 points) Calculate your df (degrees of freedom).

2H. (2 points) Is  $H_1$  one- or two- tailed? Why?

2I. (2 points) Look up the critical value (or values) in your table. Write the value(s) down.

2J. (6 points) Draw a line representing the range of your test statistic. What is the value predicted by  $H_0$ ? Draw it on the line. Also draw in the critical value (or values) on the line. Label the "Reject  $H_0$ " region or (regions). Label the "Do Not Reject  $H_0$ " region.

**Now for the data:**

2K. (2 points) Does the pattern of data favor the scientific hypothesis?

2L. (10 points) Now calculate the value of your test statistic from the data. Take this calculated value of your test statistics and put it on the number line made in (j.) Does it fall in a rejection region(s)?

2M. (3 points) Do you reject  $H_0$  or not?

2N. (5 points) What test statistic would you choose if she had run the study in the following way? She sampled one group of subjects. She had this single group of subjects come into the lab on two successive days. On the first day they were read the pleasant words and asked to recall them thirty minutes later. On the second day they were read the unpleasant words and asked to recall them thirty minutes later.

**END OF EXAM** (written 7/00)

**t-table**

df	one-tailed	0.05	0.025	0.01	0.005	0.001
	two-tailed	0.1	0.05	0.02	0.01	0.002
1		6.314	12.706	31.821	63.657	318.310
2		2.920	4.303	6.965	9.925	22.326
3		2.353	3.182	4.541	5.841	10.213
4		2.132	2.776	3.747	4.604	7.173
5		2.015	2.571	3.365	4.032	5.893
6		1.943	2.447	3.143	3.707	5.208
7		1.895	2.365	2.998	3.499	4.785
8		1.86	2.306	2.896	3.355	4.501
9		1.833	2.262	2.821	3.250	4.297
10		1.812	2.228	2.764	3.169	4.144
11		1.796	2.201	2.718	3.106	4.025
12		1.782	2.179	2.681	3.055	3.930
13		1.771	2.160	2.650	3.012	3.852
14		1.761	2.145	2.624	2.977	3.787
15		1.753	2.131	2.602	2.947	3.733
16		1.746	2.120	2.583	2.921	3.686
17		1.74	2.110	2.567	2.898	3.646
18		1.734	2.101	2.552	2.878	3.610
19		1.729	2.093	2.539	2.861	3.579
20		1.725	2.086	2.528	2.845	3.552
21		1.721	2.080	2.518	2.831	3.527
22		1.717	2.074	2.508	2.819	3.505
23		1.714	2.069	2.500	2.807	3.485
24		1.711	2.064	2.492	2.797	3.467
25		1.708	2.060	2.485	2.787	3.450
26		1.706	2.056	2.479	2.779	3.435
27		1.703	2.052	2.473	2.771	3.421
28		1.701	2.048	2.467	2.763	3.408
29		1.699	2.045	2.462	2.756	3.396
30		1.697	2.042	2.457	2.750	3.385
40		1.684	2.021	2.423	2.704	3.307
60		1.671	2.000	2.390	2.660	3.232
120		1.658	1.980	2.358	2.617	3.160
inf		1.645	1.960	2.326	2.576	3.090

**Chi-Square Table**

df	one-tailed	0.050	0.010	0.001
	1		3.84146	6.63490
2		5.99147	9.21034	13.816
3		7.81473	11.3449	16.266
4		9.48773	13.2767	18.467
5		11.0705	15.0863	20.515
6		12.5916	16.8119	22.458
7		14.0671	18.4753	24.322
8		15.5073	20.0902	26.125
9		16.9190	21.6660	27.877
10		18.3070	23.2093	29.588
11		19.6751	24.7250	31.264
12		21.0261	26.2170	32.909
13		22.3621	27.6883	34.528
14		23.6848	29.1413	36.123
15		24.9958	30.5779	37.697
16		26.2962	31.9999	39.252
17		27.5871	33.4087	40.790
18		28.8693	34.8053	42.312
19		30.1435	36.1908	43.820
20		31.4104	37.5662	45.315
21		32.6705	38.9321	46.797
22		33.9244	40.2894	48.268
23		35.1725	41.6384	49.728
24		36.4151	42.9798	51.179
25		37.6525	44.3141	52.620
26		38.8852	45.6417	54.052
27		40.1133	46.9630	55.476
28		41.3372	48.2782	56.892
29		42.5569	49.5879	58.302
30		43.7729	50.8922	59.703
40		55.7585	63.6907	73.402
50		67.5048	76.1539	86.661
60		79.0819	88.3794	99.607
70		90.5312	100.425	112.317
80		101.879	112.329	124.839
90		113.145	124.116	137.208
100		124.342	135.807	149.449

F Table for Alpha=0.5

alpha= .05		1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	inf	
df lower	df upper																				
	1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5	241.9	243.9	245.9	248.0	249.1	250.1	251.1	252.2	253.3	254.3	254.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.37	19.38	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.85	8.81	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.82	4.77	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.15	4.10	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.73	3.68	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.44	3.39	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.23	3.18	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.07	3.02	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.95	2.90	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.85	2.80	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.77	2.71	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.70	2.65	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.64	2.59	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.59	2.54	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.55	2.49	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.51	2.46	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.45	2.39	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.42	2.37	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.40	2.34	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.37	2.32	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.36	2.30	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.32	2.27	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.31	2.25	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.28	2.22	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.27	2.21	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.18	2.12	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.10	2.04	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	2.02	1.96	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25	1.25
inf	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.94	1.88	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00	1.00