

Ollscoil na hÉireann, Gaillimh

NATIONAL UNIVERSITY OF IRELAND, GALWAY

Second Arts, Second Semester Examination, 2003/2004

Psychology

PS405 Advanced Research Methods in Psychology

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Time allowed: Two hours

*Candidates are required to answer two questions from section A
and one question from section B*

Section A – Statistics (Answer two questions from this section)

1. A two-way unrelated ANOVA was conducted to examine the effects of gender (male/female) and age (18-29yrs/30-44yrs/45+ yrs.) on optimism scores. Selected SPSS results are presented below.

Descriptive Statistics

Dependent Variable: total optimism

| sex | age 3 groups | Mean | Std. Deviation | N |
|---------|--------------|-------|----------------|-----|
| MALES | 18-29 | 21.38 | 4.330 | 60 |
| | 30-44 | 22.38 | 3.549 | 68 |
| | 45+ | 22.23 | 4.090 | 56 |
| | Total | 22.01 | 3.985 | 184 |
| FEMALES | 18-29 | 21.34 | 4.722 | 87 |
| | 30-44 | 21.88 | 4.578 | 85 |
| | 45+ | 23.47 | 4.704 | 79 |
| | Total | 22.20 | 4.734 | 251 |
| Total | 18-29 | 21.36 | 4.551 | 147 |
| | 30-44 | 22.10 | 4.147 | 153 |
| | 45+ | 22.96 | 4.485 | 135 |
| | Total | 22.12 | 4.429 | 435 |

Levene's Test of Equality of Error Variances

Dependent Variable: total optimism

| F | df1 | df2 | Sig. |
|-------|-----|-----|------|
| 1.083 | 5 | 429 | .369 |

Tests of Between-Subjects Effects

Dependent Variable: total optimism

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-----------------|-------------------------|-----|-------------|-----------|------|---------------------|
| Corrected Model | 238.647 ^a | 5 | 47.729 | 2.475 | .032 | .028 |
| Intercept | 206790.069 | 1 | 206790.069 | 10721.408 | .000 | .962 |
| GENDER | 5.717 | 1 | 5.717 | .296 | .586 | .001 |
| AGE | 150.863 | 2 | 75.431 | 3.911 | .021 | .018 |
| GENDER * AGE | 55.709 | 2 | 27.855 | 1.444 | .237 | .007 |
| Error | 8274.374 | 429 | 19.288 | | | |
| Total | 221303.000 | 435 | | | | |
| Corrected Total | 8513.021 | 434 | | | | |

a. R Squared = .028 (Adjusted R Squared = .017)

Multiple Comparisons

Dependent Variable: total optimism

Scheffe

| (I) age 3 groups | (J) age 3 groups | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|------------------|------------------|-----------------------|------------|------|-------------------------|-------------|
| | | | | | Lower Bound | Upper Bound |
| 18-29 | 30-44 | -.74 | .507 | .342 | -1.99 | .50 |
| | 45+ | -1.60* | .524 | .010 | -2.88 | -.31 |
| 30-44 | 18-29 | .74 | .507 | .342 | -.50 | 1.99 |
| | 45+ | -.85 | .519 | .261 | -2.12 | .42 |
| 45+ | 18-29 | 1.60* | .524 | .010 | .31 | 2.88 |
| | 30-44 | .85 | .519 | .261 | -.42 | 2.12 |

*. The mean difference is significant at the .05 level.

Write up the results of this two-way unrelated ANOVA in a style consistent with that recommended by the American Psychological Association (APA), including a properly formatted descriptive statistics table and an interaction graph illustrating the relationship between gender, age and optimism scores.

(100%)

2. A mixed ANOVA was conducted to examine the effects of an intervention designed to increase third level students' confidence with statistics. The experimental group received four weeks of confidence building training. The control group received no confidence building training. Both groups completed a Confidence in Coping with Statistics Questionnaire before the intervention (Time 1), after the intervention (Time 2) and at three month follow-up (Time 3). Higher scores on the questionnaire indicated higher levels of confidence. The SPSS output of the results is presented below.

Descriptive Statistics

| | GROUP | Mean | Std. Deviation | N |
|------------------|--------------|-------|----------------|----|
| confidence time1 | control | 20.80 | 8.317 | 15 |
| | experimental | 20.60 | 7.239 | 15 |
| | Total | 20.70 | 7.662 | 30 |
| confidence time2 | control | 20.00 | 4.660 | 15 |
| | experimental | 23.73 | 5.970 | 15 |
| | Total | 21.87 | 5.594 | 30 |
| confidence time3 | control | 21.80 | 3.005 | 15 |
| | experimental | 26.00 | 5.782 | 15 |
| | Total | 23.90 | 5.006 | 30 |

Multivariate Tests^b

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial Eta Squared |
|--------------|--------------------|-------|--------------------|---------------|----------|------|---------------------|
| TIME | Pillai's Trace | .319 | 6.334 ^a | 2.000 | 27.000 | .006 | .319 |
| | Wilks' Lambda | .681 | 6.334 ^a | 2.000 | 27.000 | .006 | .319 |
| | Hotelling's Trace | .469 | 6.334 ^a | 2.000 | 27.000 | .006 | .319 |
| | Roy's Largest Root | .469 | 6.334 ^a | 2.000 | 27.000 | .006 | .319 |
| TIME * GROUP | Pillai's Trace | .106 | 1.595 ^a | 2.000 | 27.000 | .221 | .106 |
| | Wilks' Lambda | .894 | 1.595 ^a | 2.000 | 27.000 | .221 | .106 |
| | Hotelling's Trace | .118 | 1.595 ^a | 2.000 | 27.000 | .221 | .106 |
| | Roy's Largest Root | .118 | 1.595 ^a | 2.000 | 27.000 | .221 | .106 |

a. Exact statistic

b.

Design: Intercept+GROUP
Within Subjects Design: TIME

Mauchly's Test of Sphericity

Measure: MEASURE_1

| Within Subjects Effect | Mauchly's W | Approx. Chi-Square | df | Sig. | Epsilon | | |
|------------------------|-------------|--------------------|----|------|--------------------|-------------|-------------|
| | | | | | Greenhouse-Geisser | Huynh-Feldt | Lower-bound |
| TIME | .607 | 13.469 | 2 | .001 | .718 | .773 | .500 |

Tests of Within-Subjects Effects

Measure: MEASURE_1

| Source | | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|--------------|--------------------|-------------------------|--------|-------------|-------|------|---------------------|
| TIME | Sphericity Assumed | 157.356 | 2 | 78.678 | 4.743 | .013 | .145 |
| | Greenhouse-Geisser | 157.356 | 1.436 | 109.580 | 4.743 | .023 | .145 |
| | Huynh-Feldt | 157.356 | 1.546 | 101.753 | 4.743 | .021 | .145 |
| | Lower-bound | 157.356 | 1.000 | 157.356 | 4.743 | .038 | .145 |
| TIME * GROUP | Sphericity Assumed | 87.622 | 2 | 43.811 | 2.641 | .080 | .086 |
| | Greenhouse-Geisser | 87.622 | 1.436 | 61.019 | 2.641 | .099 | .086 |
| | Huynh-Feldt | 87.622 | 1.546 | 56.661 | 2.641 | .095 | .086 |
| | Lower-bound | 87.622 | 1.000 | 87.622 | 2.641 | .115 | .086 |
| Error(TIME) | Sphericity Assumed | 929.022 | 56 | 16.590 | | | |
| | Greenhouse-Geisser | 929.022 | 40.208 | 23.106 | | | |
| | Huynh-Feldt | 929.022 | 43.300 | 21.455 | | | |
| | Lower-bound | 929.022 | 28.000 | 33.179 | | | |

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

| Source | TIME | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|--------------|-----------|-------------------------|----|-------------|-------|------|---------------------|
| TIME | Linear | 153.600 | 1 | 153.600 | 6.928 | .014 | .198 |
| | Quadratic | 3.756 | 1 | 3.756 | .341 | .564 | .012 |
| TIME * GROUP | Linear | 72.600 | 1 | 72.600 | 3.274 | .081 | .105 |
| | Quadratic | 15.022 | 1 | 15.022 | 1.365 | .253 | .046 |
| Error(TIME) | Linear | 620.800 | 28 | 22.171 | | | |
| | Quadratic | 308.222 | 28 | 11.008 | | | |

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. | Partial Eta Squared |
|-----------|-------------------------|----|-------------|---------|------|---------------------|
| Intercept | 44178.178 | 1 | 44178.178 | 569.959 | .000 | .953 |
| GROUP | 149.511 | 1 | 149.511 | 1.929 | .176 | .064 |
| Error | 2170.311 | 28 | 77.511 | | | |

Write up the results of this mixed ANOVA analysis in a style consistent with that recommended by the American Psychological Association (APA), including a properly formatted descriptive statistics table and an interaction graph illustrating the relationship between group, time and confidence scores.

(100%)

3. A hierarchical multiple regression was conducted to establish whether self-esteem and life satisfaction were good predictors of perceived stress. Age and social desirability were controlled for in the first block of the analysis. Self-esteem and life satisfaction were entered as the second block of variables. The SPSS results are presented below.

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|-------|-------------------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .238 ^a | .057 | .052 | 5.693 | .057 | 12.771 | 2 | 425 | .000 |
| 2 | .640 ^b | .410 | .404 | 4.513 | .353 | 126.581 | 2 | 423 | .000 |

a. Predictors: (Constant), AGE, total social desirability

b. Predictors: (Constant), AGE, total social desirability, total life satisfaction, total self esteem

ANOVA^c

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|--------|-------------------|
| 1 | Regression | 827.742 | 2 | 413.871 | 12.771 | .000 ^a |
| | Residual | 13773.131 | 425 | 32.407 | | |
| | Total | 14600.873 | 427 | | | |
| 2 | Regression | 5984.553 | 4 | 1496.138 | 73.450 | .000 ^b |
| | Residual | 8616.320 | 423 | 20.370 | | |
| | Total | 14600.873 | 427 | | | |

a. Predictors: (Constant), AGE, total social desirability

b. Predictors: (Constant), AGE, total social desirability, total life satisfaction, total self esteem

c. Dependent Variable: total perceived stress

Coefficients^a

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|-------|---------------------------|-----------------------------|------------|---------------------------|--------|------|-------------------------|-------|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 31.076 | .980 | | 31.703 | .000 | | |
| | total social desirability | -.599 | .140 | -.209 | -4.281 | .000 | .928 | 1.077 |
| | AGE | -3.122E-02 | .022 | -.070 | -1.442 | .150 | .928 | 1.077 |
| 2 | (Constant) | 49.528 | 1.464 | | 33.839 | .000 | | |
| | total social desirability | -.390 | .112 | -.136 | -3.490 | .001 | .915 | 1.092 |
| | AGE | -3.381E-03 | .017 | -.008 | -.195 | .845 | .913 | 1.096 |
| | total life satisfaction | -.236 | .037 | -.273 | -6.378 | .000 | .759 | 1.317 |
| | total self esteem | -.457 | .047 | -.422 | -9.717 | .000 | .741 | 1.349 |

a. Dependent Variable: total perceived stress

Write up the results of this multiple hierarchical regression in a style consistent with that recommended by the American Psychological Association (APA), using a properly formatted table to summarise your results.

(100%)

4. Write notes on three of the following topics:

- (a) The importance of power, effect size and sample size in research design
- (b) The differences and similarities between hierarchical and stepwise multiple regression
- (c) Fixed, random and mixed effects models
- (d) Types of errors in making decisions about hypotheses
- (e) Regression towards the mean

Section B – Research Methods (Answer one question from this section)

1. Critically evaluate the attached article: 'Contingency Reinforcement in the Treatment of Talking Aloud to Self'.
2. Discuss the main types of participant effects and experimenter effects that may arise in psychological research and outline how they may be controlled.
3. Compare and contrast within-subjects designs and between-subjects designs, highlighting the strengths and weaknesses of each.