1. Three groups of participants were measured for their life satisfaction (young, middle, and old aged) to determine if life satisfaction increases over the life span. Using *p* < .05, what are the group differences in life satisfaction? Include the six steps of hypothesis testing and a measure of effect size. Use a post hoc test to analyze where group differences can be found, and list your final explanation in plain English. Include your R script and output in this file.

|  |  |  |
| --- | --- | --- |
| Young Adult | Middle Adult | Older Adult |
| 4  2  3  4  2 | 7  5  7  5  6 | 10  7  9  8  11 |
| 7  4  3  6  5 | 8  10  7  7  8 | 10  9  12  11  13 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Step 1  Normal yes N = 30  Homogeneity = yes SD s are roughly equal  DV is scale = yes  Random selection – no, random assignment – no | | | | |
| Step 2  R: young =/ middle =/ old  N: young = middle = old | | | | |
| Step 3  Descriptives  > summary(ques1)  Young.Adult Middle.Adult Older.Adult  Min. :2.00 Min. : 5.00 Min. : 7  1st Qu.:3.00 1st Qu.: 6.25 1st Qu.: 9  Median :4.00 Median : 7.00 Median :10  Mean :4.00 Mean : 7.00 Mean :10  3rd Qu.:4.75 3rd Qu.: 7.75 3rd Qu.:11  Max. :7.00 Max. :10.00 Max. :13  ANOVA output  $ANOVA  Effect DFn DFd F p p<.05 ges  2 variable 2 27 32.83784 5.879942e-08 \* 0.7086614  $`Levene's Test for Homogeneity of Variance`  DFn DFd SSn SSd F p p<.05  1 2 27 0.8 30 0.36 0.7009746  $aov  Call:  aov(formula = formula(aov\_formula), data = data)  Terms:  variable Residuals  Sum of Squares 180 74  Deg. of Freedom 2 27  Residual standard error: 1.655518  Estimated effects may be unbalanced  May also do a source table | | | | |
| Step 4  F critical = 3.35 | | | | |
| Step 5  F found = 32.84 | | | | |
| Step 6  Reject the null | | | | |
| Effect size  R2 = .71 | | | | |
| Group 1 | Group 2 | P-value | Comparison | Reject |
| Young  M = 4 | Middle  M = 7 | .001 | <.05 | Yes, reject  Young < middle |
| Young  M = 4 | Older  M = 10 | <.001 | <.05 | Yes, reject  Young < older |
| Middle  M = 7 | Older  M = 10 | .001 | <.05 | Yes, reject  Middle < older |

Explain what happened in the study in a couple of short sentences with no statistical terms:

Young adults have a lower life happiness than middle who are less than older adults. Old adults are the happiest.

1. Your instructor recently installed Endnote reference management software on her computer to be able to import citations for research articles. If her normal level of frustration with formatting APA style articles is 6.3 on a 1-7 point scale, is the new level of frustration lower with this software? Use *p* < .01 for your significance level. Frustration levels were recorded for ten articles after installing the software. Include the six steps of hypothesis testing and a measure of effect size.

|  |
| --- |
| 3.00 |
| 4.00 |
| 2.00 |
| 3.00 |
| 4.00 |
| 6.00 |
| 4.00 |
| 2.00 |
| 4.00 |
| 7.00 |

|  |
| --- |
| Step 1  DV is scale – yes, interval  Random selection – yes  Normal: not N< 30 |
| Step 2  R: endnote < old no software  N: endnote > = old no software  (DV: frustration) |
| Step 3  M = 3.9  SD = 1.60  SE = .50  N = 10  Um = 6.3 |
| Step 4  Df = 9  T critical = -2.82 |
| Step 5  T found = -4.76  One Sample t-test  data: ques2$frustration  t = -4.7579, df = 9, p-value = 0.0005164  alternative hypothesis: true mean is less than 6.3  99 percent confidence interval:  -Inf 5.323203  sample estimates:  mean of x  3.9 |
| Step 6  Reject the null |
| Effect size  -1.50 |

1. Participants were randomly assigned to one of two groups: biofeedback (a technique that measures bodily functions and gives you information about them in order to help train you to control them) or special diet to determine which would help control blood pressure better. Using *p* < .05, which system has a better blood pressure (smaller numbers are better)? List the assumptions and six steps to hypothesis testing.

|  |  |
| --- | --- |
| ***Biofeedback*** | ***Diet*** |
| 88 | 119 |
| 114 | 113 |
| 98 | 98 |
| 108 | 105 |
| 98 | 130 |
| 116 | 96 |
| 103 | 89 |
| 125 | 88 |
| 126 | 129 |
| 121 | 121 |

|  |
| --- |
| Step 1  Normal: no N < 30  DV scale – yes, ratio  Random selection – not, random assignment – yes, could  Homogeneity – roughly equal |
| Step 2  R: biofeedback =/ diet  N: biofeedback = diet |
| Step 3   |  |  |  | | --- | --- | --- | |  | Bio | Diet | | M | 109.70 | 108.80 | | SD | 12.82 | 15.80 | | N | 10 | 10 | | Spooled | 14.39 | | | Sdifference | 6.43 | | |
| Step 4  Df total – 18  T critical + and – 2.10 |
| Step 5  Two Sample t-test  data: ques3$Biofeedback and ques3$Diet  t = 0.13988, df = 18, p-value = 0.8903  alternative hypothesis: true difference in means is not equal to 0  95 percent confidence interval:  -12.61738 14.41738  sample estimates:  mean of x mean of y  109.7 108.8 |
| Step 6  Fail to reject the null |

1. A sports psychologist was interested in testing the effect of a simple relaxation technique on college basketball players’ free throw shooting accuracy. Each player was asked to shoot 20 consecutive free throws and the number of successful attempts was recorded. The players were then trained to use a simple 5 second relaxation technique while preparing to shoot a free throw. The players then returned to the court and shot 20 consecutive free throws again. Using *p* < .01, did the relaxation technique improve their free throw numbers? List the six steps of hypothesis testing and the confidence interval of the mean difference. The resulting data are given below:

|  |  |
| --- | --- |
| Pre-Test | Post-Test |
| 12 | 13 |
| 15 | 15 |
| 9 | 11 |
| 16 | 15 |
| 12 | 15 |
| 15 | 18 |
| 17 | 17 |
| 10 | 12 |
| 12 | 13 |
| 14 | 17 |

|  |
| --- |
| Step 1  DV is scale – yes  Normal – don’t know N < 30  Random selection – no, random assignment – no |
| Step 2  R: Post – Pre > 0 (no change)  N: Post – Pre < = 0 (no change) |
| Step 3  Mdifference = 1.40  SD = 1.43  SE = .45  N = 10 |
| Step 4  P < .01  Df = 9  T critical 2.82 |
| Step 5  Paired t-test  data: ques4$Post.Test and ques4$Pre.Test  t = 3.0963, df = 9, p-value = 0.0064  alternative hypothesis: true difference in means is greater than 0  99 percent confidence interval:  0.1242718 Inf  sample estimates:  mean of the differences  1.4 |
| Step 6  Reject the null! |
| Confidence interval  99%CI[-0.07 - 2.87]  99 percent confidence interval:  -0.06943047 2.86943047 |