HOMEWORK 4

Main Research Question: How do pick-up lines and a person’s scent influence relationship initiation?

RQ1: Is there any evidence to suggest that the cute-direct pick-up approach will lead to more relationship receptivity than the direct-direct approach?

1. What is your dependent variable?  
   Answer – Receptivity

Justification – Because it is the variable we are interested in measuring/testing. It values changes as a result of manipulation of the independent variable

1. What is(are) your independent variable(s)?  
   Answer - Pick up (with two levels: 1-“cute-direct approach”, 2- “direct-direct” approach)  
   Justification – it is the variable that is assumed to affect the values of the dependent variable for this research
2. Are the scores in each cell independent?   
   Yes – The value in each cell is gotten from responses by different individuals
3. Are there any significant outliers?  
   Answer - there are no significant outliers  
   Justification – The boxplot diagram that was plotted showed no outlier above or below the maximum and minimum value of the boxplot whiskers.
4. How is your dependent variable distributed in each cell?  
   The distribution of Receptivity under cute-direct approach is not normal. The Shapiro- wilk test has a p-value of 0.0008552.  
   The distribution of Receptivity under direct-direct approach is normal. The Shapiro-wilk test has a p-value of 0.8714
5. Do you need to perform any transformations?  
   Answer - No.   
   Justification – subsequent tests carried out with the transformed dataset may not be meaningful because the value of the transformed dataset does not relate to the actual value of our observations. Furthermore there are other test to be used for the analysis
6. Is there homogeneity or heterogeneity of variance?  
   Answer - There is homogeneity of variance for the dependent variable across the two levels of independent variable.  
   Justification – the p-value of the levene test is 0.2806. Indicating evidence in favour of the null hypothesis that there is equality of variance.
7. What is the mean score of receptivity in the experimental condition?  
   3.863
8. What is the mean score of receptivity in the control condition?  
   3.654
9. What is your answer to RQ1? Report on the findings (no less than 150 words). Don’t forget to mention the assumptions.

A Mann-whitney U test was conducted to determine whether the cute-direct pick-up approach will lead to more relationship receptivity than the direct-direct approach. The following assumptions were considered for the selection of the Mann-Whitney U Test

1. The dependent variable must be measured at the ordinal or continuous level.
2. The independent variable should consist of two categorical , independent groups
3. There should be independence of observations
4. The test should be used when at least one of the two groups for comparison does not have a normal distribution.

Analysis of our data showed that all the above assumptions were met. The null hypothesis for the test is “ there is no difference in the distribution of the scores of the two groups”. The p-value for the test is 0.017 indicating that there is a strong evidence that one group have larger scores than the other. Additionally, given that the mean of the experimental group(cute-direct approach) is larger than the control group, there is a significant statistical evidence to suggest that cute-direct pick-up approach will lead to more relationship receptivity than the direct-direct approach.  
  
  
  
RQ2: Is there any evidence to suggest that the presence of androstadienone spray will lead to more relationship receptivity than no spray?

1. What is your dependent variable?  
   Answer - Receptivity  
   Justification - Because it is the variable we are interested in measuring/testing. It values changes as a result of manipulation of the independent variable
2. What is(are) your independent variable(s)?  
   Answer - Scent  
   Justification – it is the variable that is assumed to affect the values of the dependent variable for this research
3. Are the scores in each cell independent?   
   Yes – The value in each cell is gotten from responses by different individuals
4. Are there any significant outliers?   
   Answer – No  
   Justification – There are two outliers but their z-score values is not greater than 3.3 nor less than -3.3
5. How is your dependent variable distributed in each cell?  
   Answer – The distribution of the dependent variable for the experimental group is not normal with a p-value of 0.03645.  
     
   The distribution of the dependent variable for the control group is also not normal with a p-value of 0.03629
6. Do you need to perform any transformations?  
   Answer – No  
   Justification - subsequent tests carried out with the transformed dataset may not be meaningful because the value of the transformed dataset does not relate to the actual value of our observations. Furthermore there are tests that can be used to carry out the analysis without transformation of the data
7. Is there homogeneity or heterogeneity of variance?  
   Answer – There is heterogeneity of variance  
   Justification – p-value for the levene test is 0.0004493 indicating strong evidence that there is no equality of variance
8. What is the mean score of receptivity in the experimental condition?  
   3.857
9. What is the mean score of receptivity in the control condition?  
   3.699
10. What is your answer to RQ2? Report on the findings (no less than 150 words). Don’t forget to mention the assumptions.

A Mann-whitney U test was conducted to determine whether the presence of androstadienone spray will lead to more relationship receptivity than no spray. The following assumptions were considered for the selection of the Mann-Whitney U Test

1. The dependent variable must be measured at the ordinal or continuous level.
2. The independent variable should consist of two categorical , independent groups
3. There should be independence of observations
4. The test should be used when at least one of the two groups for comparison does not have a normal distribution.

Analysis of our data showed that all the above assumptions were met. The null hypothesis for the test is “ there is no difference in the distribution of the scores of the two groups”. The p-value for the test is 0.068 indicating that there is no evidence that one group have larger scores than the other. There is no significant statistical evidence to suggest the presence of androstadienone spray will lead to more relationship receptivity than no spray.

RQ3: Is there any evidence to suggest that the impact of the androstadienone spray on attractiveness effect will be enhanced by the pick-up approach?

1. What is your dependent variable?  
   Answer – Receptivity  
   Justification – it is the variable we are interested in measuring/testing. Value changes relative to fluctuations in the independent variables
2. What is(are) your independent variable(s)?  
   Answer - PickUp and Scent  
   Justification – we are seeking to check if fluctuations and the interaction in the values of these two variables affect the value of the dependent variable
3. Are the scores in each cell independent?   
   Yes  
   Justification – All observations were responses from different individuals
4. Are there any significant outliers?  
   No  
   Justification – the diagram of box plot for the four different groups showed no outliers
5. How is your dependent variable distributed in each cell?  
   the distribution in group 1-(cute-direct approach and spray) is: not normal(p-value is 0.01147)  
   the distribution in group 2-(cute-direct approach and no-spray) is: normal(p-value is 0.06159)  
     
     
   the distribution in group 3-(direct-direct approach and spray) is: normal(p-value is 0.1198)  
     
   the distribution in group 4-(direct-direct approach and no spray) is: normal(p-value is 0.4355)
6. Do you need to perform any transformations?  
   No  
   There is no strong violation of normality. The only group that is not normal has a p-value above 0.01.
7. Is there homogeneity or heterogeneity of variance?  
     
   Answer – There is heterogeneity of variance  
     
   This is because the p-value for the levene test is 0.001164. Also, the ratio of the largest group variance to the smallest group variance is 2.75

N.B. If group sample sizes are equal or approximately equal and large, there is normality and the ratio of the largest group variance to the smallest group variance is less than 3, the two-way ANOVA is somewhat robust to heterogeneity of variance in these circumstances (Jaccard, 1998).

Reminder: Standard deviation is square root of variance (SD= √Variance).

1. Is there any interaction between the two factors?   
    Yes   
    the p-value for the 2-way ANOVA for the interaction between variables Pickup and Scent is 0.00289. This indicates a strong evidence for interaction between the two variables
2. What is your answer to RQ3? Report on the findings (no less than 200 words). Don’t forget to mention the assumptions. You can use eta2 .

Yes. There is evidence to suggest that the impact of the androstadienone spray on attractiveness effect will be enhanced by the pick-up approach.

A two-way ANOVA was conducted to examine the effects of Pickup and Scent on the degree of receptivity. To do this, the data was partitioned into 4 groups: group 1(cute-direct approach and spray), group 2(cute-direct approach and no spray) , group 3(direct-direct approach and spray) , group 4(direct-direct approach and no-spray). Residual Analysis was performed to test for the assumptions of the two-way ANOVA. Outliers were assessed by inspection of a box plot, normality was assessed using Shapiro-wilk’s test for each cell of the design and homogeneity of variances was assessed by Levene’s test. There were no outliers, there was no strong violation of normality with three groups having greater than 0.05 significance level and 1 group having a significance level less than 0.05 but greater than 0.01. There was heterogeneity of variance (p-value =0.0012), however a-two way ANOVA was still used given that the ratio of the group with the largest variance(0.318) and that of the group with the smallest variance(0.1156) is less than 3(2.75) and all sample sizes are large(greater than 30).

There was a statistically significant interaction between PickUp and Scent variables F(1,190) = 9.13 , p-value = 0.00289 eta-squared = 0.05. A Games Howell post hoc test was then performed due to heterogeneity of variance to understand the pair wise comparison of the different groups. There was a significant mean difference between the cute direct –presence of spray group and cute-direct-absence of spray group with mean difference value 0.348, 95% CI [0.124, 0.572], p-value = 0.000563. There was also a significant mean difference between the cute-direct –presence of spray group and direct-direct-presence of spray group with mean difference value 0.427, 95% CI [0.133, 0.721], p-value = 0.001. There was no significance in the mean difference of other group comparisons.

1. Answer the main research question by taking the above findings into account (no less than 200 words). Don’t forget to mention the assumptions.

A Mann-whitney U test was conducted to determine the main effect of pickup line on the degree of receptivity. The following assumptions were considered for the selection of the Mann-Whitney U Test

1. The dependent variable must be measured at the ordinal or continuous level.
2. The independent variable should consist of two categorical , independent groups
3. There should be independence of observations
4. The test should be used when at least one of the two groups for comparison does not have a normal distribution.

Analysis of our data showed that all the above assumptions were met. The null hypothesis for the test is “ there is no difference in the distribution of the scores of the two groups”. The p-value for the test is 0.017 indicating that there is a strong evidence that one group have larger scores than the other. Given that the mean of the experimental group(cute-direct approach) is larger than the control group. There is a significant statistical evidence to suggest that cute-direct pick-up approach will lead to more relationship receptivity than the direct-direct approach.  
  
  
A second test was also carried out to assess the impact of presence of androstadienone spray on the degree of receptivity. The following assumptions were considered for the selection of the Mann-Whitney U Test

1. The dependent variable must be measured at the ordinal or continuous level.
2. The independent variable should consist of two categorical , independent groups
3. There should be independence of observations
4. The test should be used when at least one of the two groups for comparison does not have a normal distribution.

Analysis of our data showed that all the above assumptions were met. The null hypothesis for the test is “ there is no difference in the distribution of the scores of the two groups”. The p-value for the test is 0.068 indicating that there is no evidence that one group have larger scores than the other. Hence the conclusion that there is no significant statistical evidence to suggest the use of androstadienone spray will lead to more relationship receptivity than not using the spray.

And a third test, two-way ANOVA was conducted to examine the effects of Pickup and Scent on the degree of receptivity. Residual Analysis was performed to test for the assumptions of the two-way ANOVA. Outliers were assessed by inspection of a boxplot, normality was assessed using Shapiro-wilk’s test for each cell of the design and homogeneity of variances was assessed by Levene’s test. There were no outliers, there was no strong violation of normality with three groups having p-values greater than 0.05 and 1 group having a significance level less than 0.05 but greater than 0.01. There was heterogeneity of variance (p-value =0.0012), however a-two way ANOVA was still used given that the ratio of the group with the largest variance(0.318) and that of the group with the smallest variance(0.1156) is less than 3(2.75) and the size of each group is large(n>30 in all cases).

The findings of the analysis showed that there was an interaction between the two variables with a p-value of 0.00089 albeit with a low effect size of 0.05.

From these analyses, it can be seen that there was evidence to suggest that the use of cute-direct pickup approach positively influence relationship initiation compared to the direct-direct approach. Furthermore, while there is no evidence to suggest that the use of spray by itself can influence relationship initiation, the use of the cute-direct approach can be positively impacted by the use of spray to enhance attractiveness and relationship initiation.