Analysis Report

This report is structured as follows.

Contents

<u>**Sample Characterization**</u>

The table below presents demographic information on the surveyed individuals, distributed by age, gender, and social status.

Variable	Response	Frequency	Percentage
Age Group	18-25 years old	43	39.815
Age Group	26-40 years old	41	37.963
Age Group	41-59 years old	24	22.222
Gender	Female	52	48.148
Gender	Male	56	51.852
Social Status	Employee	42	38.889
Social Status	Freelancer	24	22.222
Social Status	Student	33	30.556
Social Status	Unemployed	9	8.333

Regarding the age group, participants were predominantly young adults, with nearly 78% of the respondents falling between the ages of 18 and 40 years old. Specifically, the 18-25 years old category was the most represented age group, accounting for almost 40% (39.815%) of the total respondents. The 26-40 years old group was the second most common, representing approximately 38% (37.963%) of the participants. The 41-59 years old group constituted the smallest age group, comprising just over 22% (22.222%) of the survey population.

In terms of gender distribution, the sample was fairly balanced, with a slight predominance of males. Males represented about 52% (51.852%) of the respondents, while females accounted for around 48% (48.148%).

When considering social status, employees made up the largest group, comprising approximately 39% (38.889%) of the respondents. Students were the second most common category, representing slightly over 30% (30.556%) of the total. Freelancers constituted about 22% (22.222%) of the sample, and the unemployed were the least represented group, making up approximately 8% (8.333%) of the respondents.

In summary, this dataset is largely comprised of young adults, with a nearly equal representation of males and females, and a predominant social status of being employed or a student.

Descriptive Results and Reliability Analysis

The table in this section presents the mean scores, standard deviations, and Cronbach's alpha values for the survey scales and their corresponding items. Cronbach's alpha is a measure of internal consistency, essentially telling us how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A high value of alpha (close to 1) indicates that the items measure the same underlying (or latent) construct, leading to the interpretation that the scale has high internal consistency.

The average scores for the Perceived Humor questions range from 3.657 to 3.741, indicating that respondents' perceived humor levels are moderately high on average. The standard deviation values are relatively high (between 2.655 and 2.766), which suggests there is substantial variability in the responses - some participants found the content much more humorous than others. This makes sense since there were two different experimental conditions with different levels of humor. The average score for the Perceived Humor scale overall is 3.688, which reconfirms a moderately high level of humor perception among respondents. The Cronbach's Alpha for this scale is 0.996, which is extremely high and suggests excellent internal consistency of this scale.

Brand Loyalty, with a high average score of around 5.071 and a Cronbach's alpha of 0.953, reveals that respondents generally exhibit a strong loyalty to brands and that the survey items for this scale consistently measure this construct.

Purchase Intention also shows high values, with a mean score of 5.074. The reliability of this scale, as indicated by a Cronbach's alpha of 0.906, is also commendable.

The Need for Humor scale stands out with the highest average score among all the scales (5.264), suggesting that humor plays a significant role in the respondents' decision-making process. The high Cronbach's alpha (0.901) for this scale adds to its robustness.

The Consumer Skepticism About Ads scale indicates a moderate level of skepticism among respondents with an average score of 3.919. Despite the comparatively lower mean score, the scale's reliability is exceptionally high (Cronbach's alpha of 0.937), implying that the items effectively capture the construct of skepticism towards ads.

The high Cronbach's alpha values across all scales underscore the reliability of the survey instruments used in this study. This indicates the analysis may proceed safely.

Scale	Variable	Mean	SD	Alpha
Perceived Humor	Q2_1	3.657	2.655	
Perceived Humor	Q2_2	3.667	2.672	
Perceived Humor	Q2_3	3.741	2.766	
Perceived Humor	Perceived_Humor_Avg	3.688	2.687	0.996
Brand Loyalty	Q3_1	4.648	1.053	
Brand Loyalty	Q3_2	4.583	1.239	
Brand Loyalty	Q3_3	4.880	1.083	
Brand Loyalty	Q3_4	5.315	0.983	
Brand Loyalty	Q3_5	5.509	0.942	
Brand Loyalty	Q3_6	5.491	1.046	
Brand Loyalty	Brand_Loyalty_Avg	5.071	0.955	0.953
Purchase Intention	Q4_1	4.648	0.930	
Purchase Intention	Q4_2	4.796	1.002	
Purchase Intention	Q4_3	5.778	1.017	
Purchase Intention	Purchase_Intention_Avg	5.074	0.903	0.906
Need for Humor	Q5_1	4.639	1.164	
Need for Humor	Q5_2	5.167	1.046	
Need for Humor	Q5_3	4.889	0.950	
Need for Humor	Q5_4	5.843	1.095	
Need for Humor	Q5_5	5.843	1.069	
Need for Humor	Q5_6	5.204	0.818	
Need for Humor	Need_for_Humor_Avg	5.264	0.842	0.901
Consumer Skepticism About Ads	Q6_1	3.537	1.027	
Consumer Skepticism About Ads	Q6_2	4.361	0.932	
Consumer Skepticism About Ads	Q6_3	4.361	0.912	
Consumer Skepticism About Ads	Q6_4	3.519	0.891	
Consumer Skepticism About Ads	Q6_5	4.028	0.814	
Consumer Skepticism About Ads	Q6_6	3.509	0.826	
Consumer Skepticism About Ads	Q6_7	3.852	0.771	
Consumer Skepticism About Ads	Q6_8	3.972	0.859	
Consumer Skepticism About Ads	Q6_9	4.130	0.810	
Consumer Skepticism About Ads	Consumer_Skepticism_Avg	3.919	0.714	0.937

Normality Assessment

This section provides an assessment of the distribution of the scales under study. The metrics presented in the table below are skewness, kurtosis, and the p-value from the Shapiro-Wilk test.

Scale	Skewness	Kurtosis	Shapiro.Wilk.p.value
Perceived Humor	0.029	1.049	1.85E-13
Brand Loyalty	-0.075	2.108	1.15E-02
Purchase Intention	-0.268	2.091	4.90E-04
Need for Humor	-1.064	4.384	2.78E-06
Consumer Skepticism About Ads	-0.410	3.509	2.05E-04

Skewness is a measure of the symmetry in a distribution. A symmetrical data set will have a skewness of 0. Here, the Perceived Humor scale shows the closest to zero skewness 0.029), suggesting it is the most symmetrical among the four scales. The Need for Humor scale has a negative skewness of -1.064, indicating a distribution that leans towards higher scores.

Kurtosis is a measure of the "tailedness" of the distribution. A normal distribution has a kurtosis of 3. Here, the Need for Humor scale exhibits the highest kurtosis (4.384), indicating a more peaked distribution with thicker tails, which means it has more extreme values (outliers) than a normal distribution. The Brand Loyalty, Perceived Humor and Purchase Intention scales are more platykurtic with kurtosis less than 3, indicating a distribution with lighter tails and less extreme values.

The Shapiro-Wilk test is used to test the null hypothesis that a sample came from a normally distributed population. A small p-value (usually less than 0.05) rejects the null hypothesis of normality. In this case, all scales except Brand Loyalty ($p = 0.011$) have p-values less than 0.001, indicating a departure from normality. The Brand Loyalty scale, with a p-value slightly over 0.01, also indicates a deviation from a normal distribution, though to a lesser extent than the other scales.

In summary, none of the scales precisely follow a normal distribution, which is common in real-world data. Need for Humor shows the greatest deviation with its negative skewness and high kurtosis, indicating a higher concentration of high values and more outliers. On the other hand, the Brand Loyalty scale is the most symmetrical and least deviated from normal distribution among the four. The ANOVA method, however, has been shown to be a robust method to deviations from normality, indicating the analysis may proceed. Regression-based methods do not require normality from the variables, but rather from the regression residuals. These will be assessed later on the report.

The figures below provide a visualization of the scales' distributions using boxplots and histograms.

Boxplot of Average Scale Values
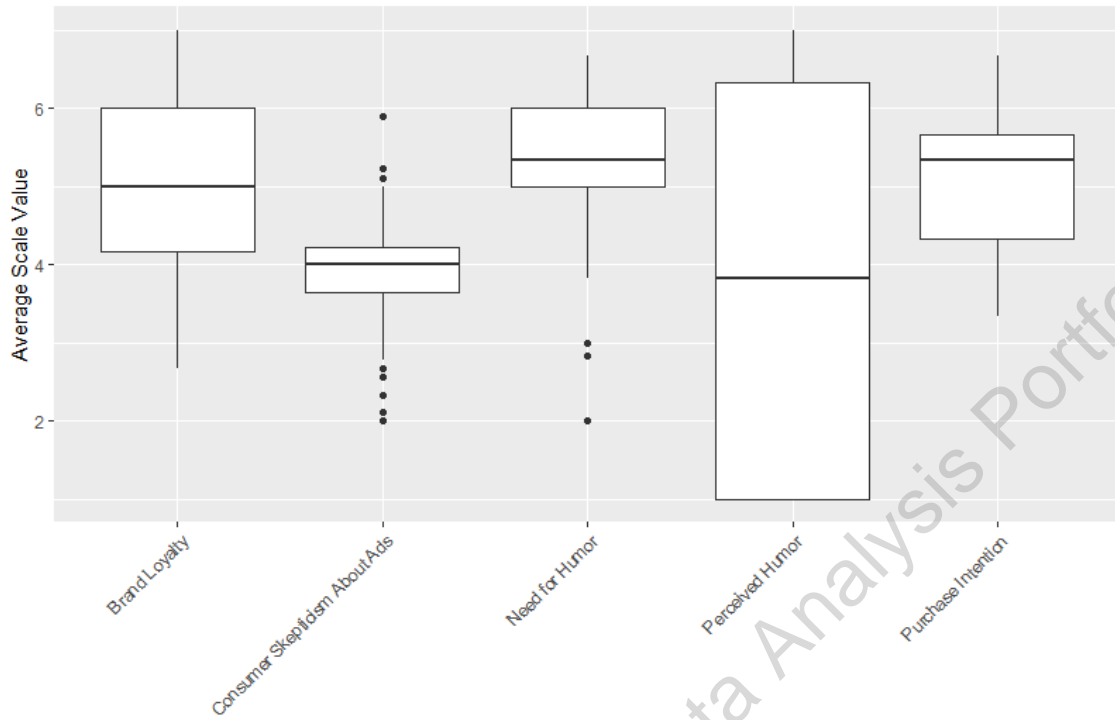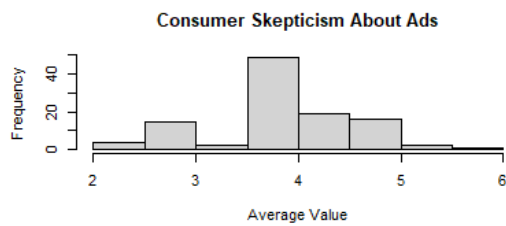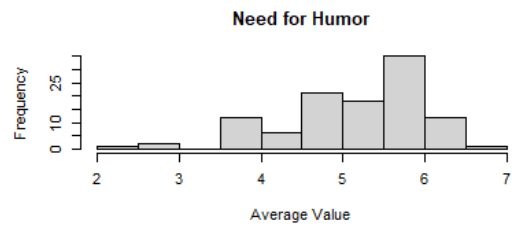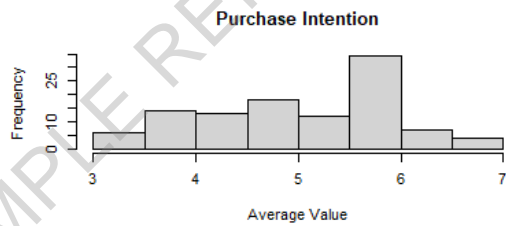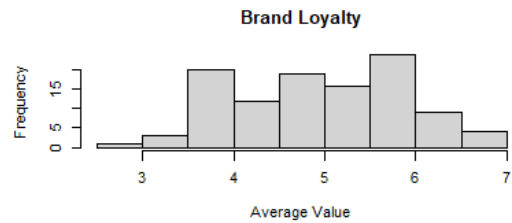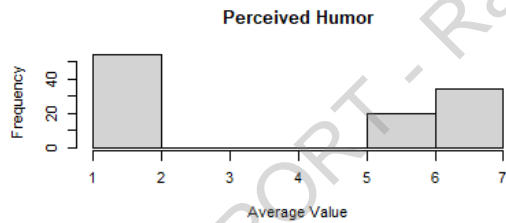
Comparison between Humorous versus Non Humorous Conditions

The following table presents a comparison between two groups: those exposed to 'Humor' and those exposed to 'No Humor'. Four different constructs are considered: 'Brand Loyalty', 'Purchase Intention', 'Need for Humor', and 'Consumer Skepticism'. The mean (average) and standard deviation (SD, a measure of variability) are reported for each construct within each group.

Statistic	No Humor	Humor
Perceived_Humor_Mean	1.031	6.346
Perceived_Humor_SD	0.149	0.399
Brand_Loyalty_Mean	4.361	5.781
Brand_Loyalty_SD	0.670	0.606
Purchase_Intention_Mean	4.469	5.679
Purchase_Intention_SD	0.778	0.542
Need_for_Humor_Mean	5.071	5.457
Need_for_Humor_SD	0.913	0.723
Consumer_Skepticism_Mean	3.965	3.872
Consumer_Skepticism_SD	0.723	0.708

Perceived Humor: The group exposed to humor shows a significantly higher average perceived humor score (mean = 6.346) compared to the group not exposed to humor (mean = 1.031). This suggests that the humor condition in the experiment was successful at increasing the perception of humor. The standard deviations indicate that there is more variability in perceived humor scores in the humor group (SD = 0.399) compared to the no humor group (SD = 0.149). This greater variability in the humor group might be due to individual differences in humor appreciation or comprehension within this group.

Brand Loyalty: The group exposed to humor shows a higher average brand loyalty (mean=5.781) compared to the group not exposed to humor (mean=4.361). The standard deviations indicate that there is less variability in the brand loyalty scores in the humor group (SD=0.606) than in the no humor group (SD=0.670).

Purchase Intention: Similar to brand loyalty, the mean purchase intention is higher in the humor group (mean=5.679) than in the no humor group (mean=4.469). The variability of purchase intention scores is also lower in the humor group (SD=0.542) compared to the no humor group (SD=0.778).

Need for Humor: The humor group shows a slightly higher average need for humor (mean=5.457) compared to the no humor group (mean=5.071). The humor group also has less variability in their need for humor scores (SD=0.723) compared to the no humor group (SD=0.913).

Consumer Skepticism: Interestingly, consumer skepticism is slightly lower in the humor group (mean=3.872) compared to the no humor group (mean=3.965). The standard deviations are quite similar, indicating a similar level of variability in consumer skepticism scores in both groups (SD=0.723 for no humor group, SD=0.708 for humor group).

In summary, these results suggest that exposure to humor may be associated with higher brand loyalty, higher purchase intention, and a higher need for humor, and possibly lower consumer skepticism. However, without information on statistical significance, we can't make definitive conclusions about the differences between these groups.

To have deeper conclusions for Brand Loyalty and Purchase Intention, ANOVA was conducted in both cases. The following table shows results for Brand Loyalty.

term	df	sumsq	meansq	statistic	p.value
GROUP_HUMOR	1	54.424	54.424	133.544	1.761E-20
Residuals	106	43.199	0.408		

The p-value is significantly less than 0.05 (p = 1.761E-20), indicating that there is a significant difference in brand loyalty between the humor and no humor groups. The F statistic is 133.544, and with a degrees of freedom (df) of 1 for the group and 106 for residuals, it further confirms the significant impact of humor on brand loyalty. The sum of squares (sumsq) between groups is 54.424, which is much larger than the within-group sum of squares (43.199), suggesting that the difference between the groups is larger than the variability within the groups.

The graph below shows the difference on the means of Brand Loyalty between both groups.
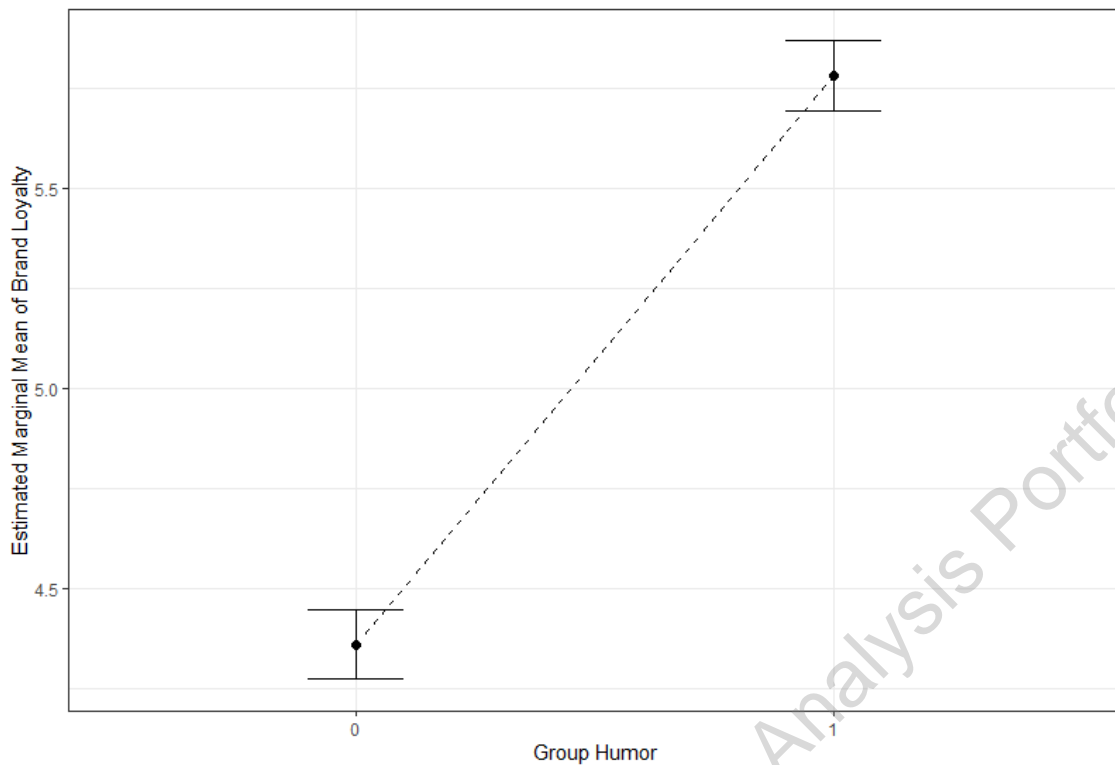
Similarly for Purchase Intention (table below), the p-value is significantly less than 0.05 (p = 1.4298E-15), showing a significant difference in purchase intention between the humor and no humor groups. The F statistic is 87.897 with df of 1 for the group and 106 for residuals, indicating a significant effect of humor on purchase intention. The sum of squares between groups is 39.523, which is smaller than that for brand loyalty but still larger than the within-group sum of squares (47.663), again suggesting that the impact of humor is significant.

term	df	sumsq	meansq	statistic	p.value
GROUP_HUMOR	1	39.523	39.523	87.897	1.4298E-15
Residuals	106	47.663	0.450		

The graph below shows the difference on the means of Purchase Intention between both groups.
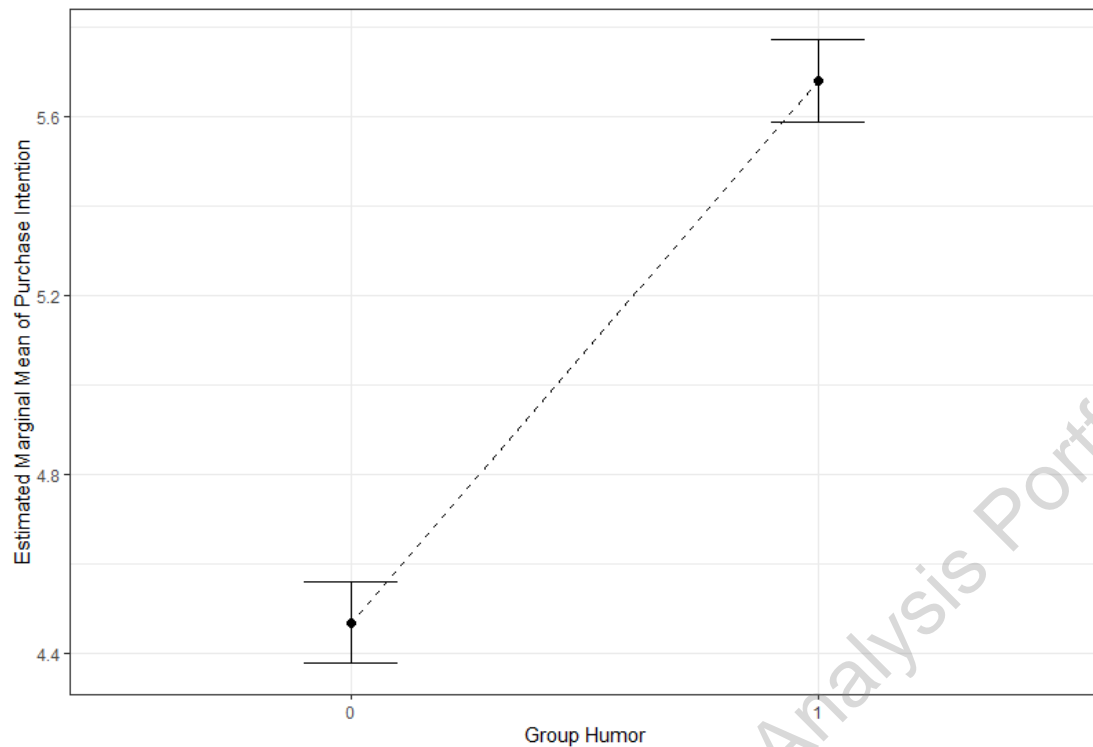
Regression Models

The analysis proceeds to the test of regression models, aimed at evaluating the effect of the humorous condition on Brand Loyalty and Purchase Intention, while also evaluating if these effects depend on Need for Humour and Customer Skepticism. The results of the first assessment (for brand Loyalty) are presented in the next page. The following three hierarchical models were tested:

Model 1 considers the impact of 'Humor' (condition) on 'Brand Loyalty'. The coefficient for Humor is significant at the 0.01 level (1.420, $p < 0.01$), which suggests that humor has a positive impact on brand loyalty. The model explains 55.7% of the variance in Brand Loyalty ($R^2 = 0.557$) and the adjusted R^2 is 0.553, which takes into account the number of predictors in the model. The F statistic, which is a measure of how well the model fits the data, is highly significant (F = 133.544, df = 1; 106, $p < 0.01$).

Model 2 extends Model 1 by adding 'Need for Humor' and 'Consumer Skepticism' as predictors. Neither of these new variables is significant, suggesting they do not contribute to predicting Brand Loyalty once we control for the effect of Humor. The variance explained by this model is similar to Model 1 ($R^2 = 0.559$) and the adjusted R^2 is 0.546. The F statistic is still highly significant (F = 43.929, df = 3; 104, $p < 0.01$).

Model 3 extends Model 2 by adding interaction terms for Humor x Need for Humor and Humor x Consumer Skepticism. However, these interaction terms are not significant, suggesting that the effect of humor on brand loyalty does not depend on a person's need for humor or skepticism about ads. The R² is the same as Model 2 (0.559) and the adjusted R² drops slightly to 0.538. The F statistic remains highly significant (F = 25.883, df = 5; 102, p < 0.01).

Overall, these results suggest that while Humor is a significant predictor of Brand Loyalty, neither Need for Humor nor Consumer Skepticism nor their interaction with Humor significantly improve the prediction of Brand Loyalty.

Regression Results

```
===============================================================================================
                                           Dependent variable: Brand Loyalty
                            -------------------------------------------------------------------
                                Model 1              Model 2                  Model 3
                                  (1)                  (2)                      (3)
-----------------------------------------------------------------------------------------------
Humor (Condition)           1.420*** (0.123)     1.432*** (0.127)          1.218 (1.092)
Need for Humor                                   -0.039 (0.076)            -0.055 (0.098)
Consumer Skepticism                              -0.025 (0.087)            -0.025 (0.123)
Humor x Need for Humor                                                      0.042 (0.157)
Humor x Consumer Skepticism                                               -0.002 (0.176)
Constant                    4.361*** (0.087)     4.656*** (0.527)          4.736*** (0.712)
-----------------------------------------------------------------------------------------------
Observations                      108                  108                      108
R2                               0.557                0.559                    0.559
Adjusted R2                      0.553                0.546                    0.538
Residual Std. Error         0.638 (df = 106)     0.643 (df = 104)          0.650 (df = 102)
F Statistic                 133.544*** (df = 1; 106) 43.929*** (df = 3; 104) 25.883*** (df = 5; 102)
===============================================================================================
Note:                                                        *p<0.1; **p<0.05; ***p<0.01
```

Lastly, the effects on Purchase Intention were evaluated with three models.

Model 1 only includes the 'Humor' variable as a predictor. Humor is a significant predictor of Purchase Intention, with a coefficient of 1.210, significant at the 0.01 level. This model explains 45.3% of the variation in Purchase Intention ($R^2 = 0.453$), with an adjusted R^2 (which takes into account the number of predictors in the model) of 0.448. The F statistic is highly significant ($F = 87.897$, df = 1; 106, $p < 0.01$), indicating that the model significantly predicts Purchase Intention.

Model 2 adds two new predictors to the model: 'Need for Humor' and 'Consumer Skepticism'. Both of these predictors are not significant, indicating they do not contribute significantly to predicting Purchase Intention when controlling for Humor. The model's R^2 slightly improves to 0.465, with an adjusted R^2 of 0.449. The F statistic remains highly significant ($F = 30.107$, df = 3; 104, $p < 0.01$).

Model 3 extends Model 2 by introducing interaction terms between Humor and 'Need for Humor' as well as 'Consumer Skepticism'. Neither interaction term is significant, suggesting that the impact of Humor on Purchase Intention does not depend on the levels of 'Need for Humor' or 'Consumer Skepticism'. The R^2 improves slightly to 0.477, and the adjusted R^2 is 0.452. The F statistic remains highly significant ($F = 18.633$, df = 5; 102, $p < 0.01$).

Overall, the 'Humor' condition significantly predicts Purchase Intention across all models. However, neither the addition of 'Need for Humor' and 'Consumer Skepticism' nor their interaction with Humor result in significant improvements to the model.

Regression Results

```
================================================================================
                              Dependent variable: Purchase Intention
                    ------------------------------------------------------------
                         Model 1              Model 2              Model 3
                          (1)                  (2)                  (3)
--------------------------------------------------------------------------------
Humor (Condition)      1.210*** (0.129)    1.163*** (0.133)     -0.584 (1.124)
Need for Humor                              0.116 (0.079)        0.037 (0.101)
Consumer Skepticism                        -0.025 (0.091)       -0.114 (0.127)
Humor x Need for Humor                                           0.199 (0.162)
Humor x Consumer Skepticism                                      0.176 (0.182)
Constant               4.469*** (0.091)    3.980*** (0.548)     4.732*** (0.733)
--------------------------------------------------------------------------------
Observations              108                  108                  108
R2                        0.453                0.465                0.477
Adjusted R2               0.448                0.449                0.452
Residual Std. Error    0.671 (df = 106)     0.670 (df = 104)     0.668 (df = 102)
F Statistic       87.897*** (df = 1; 106) 30.107*** (df = 3; 104) 18.633*** (df = 5; 102)
================================================================================
Note:                                              *p<0.1; **p<0.05; ***p<0.01
```

The normality of residuals was checked for both cases with QQ-plots, which should show a diagonal pattern to demonstrate normal distribution. The first figure presents the plot for the Brand Loyalty model and normality is supported.
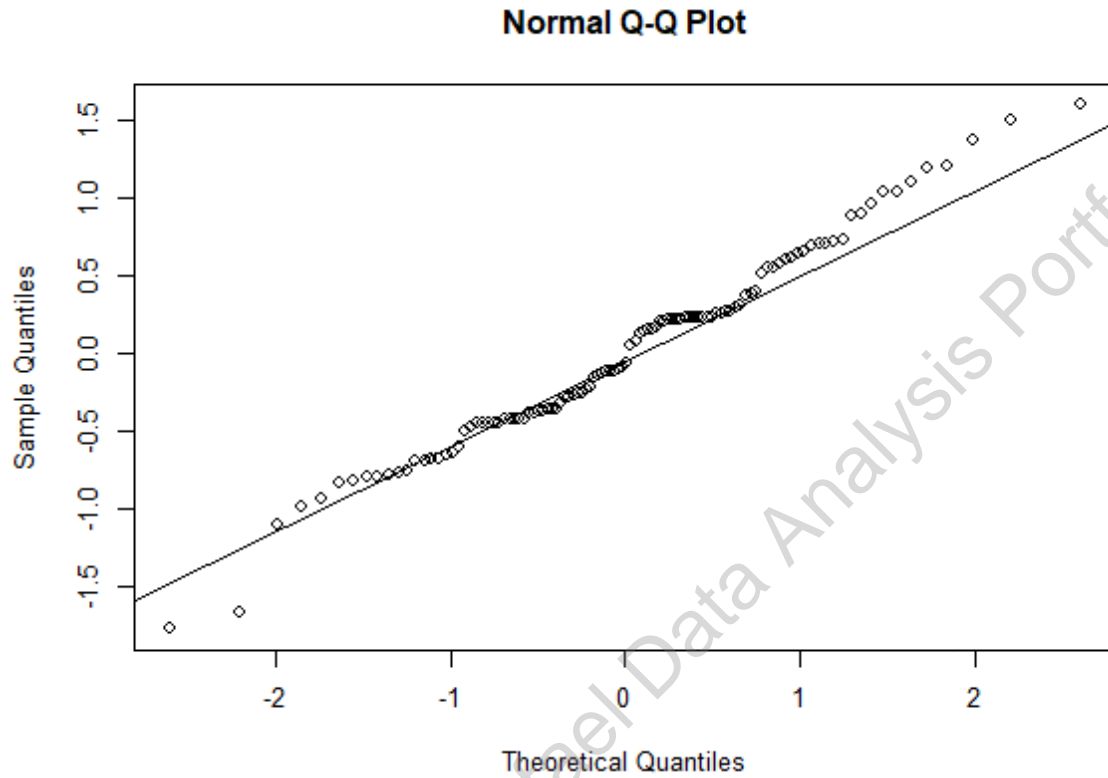
Normal Q-Q Plot

The figure below shows the plot for Purchase intention and it also suggests the presence of normality.

Normal Q-Q Plot
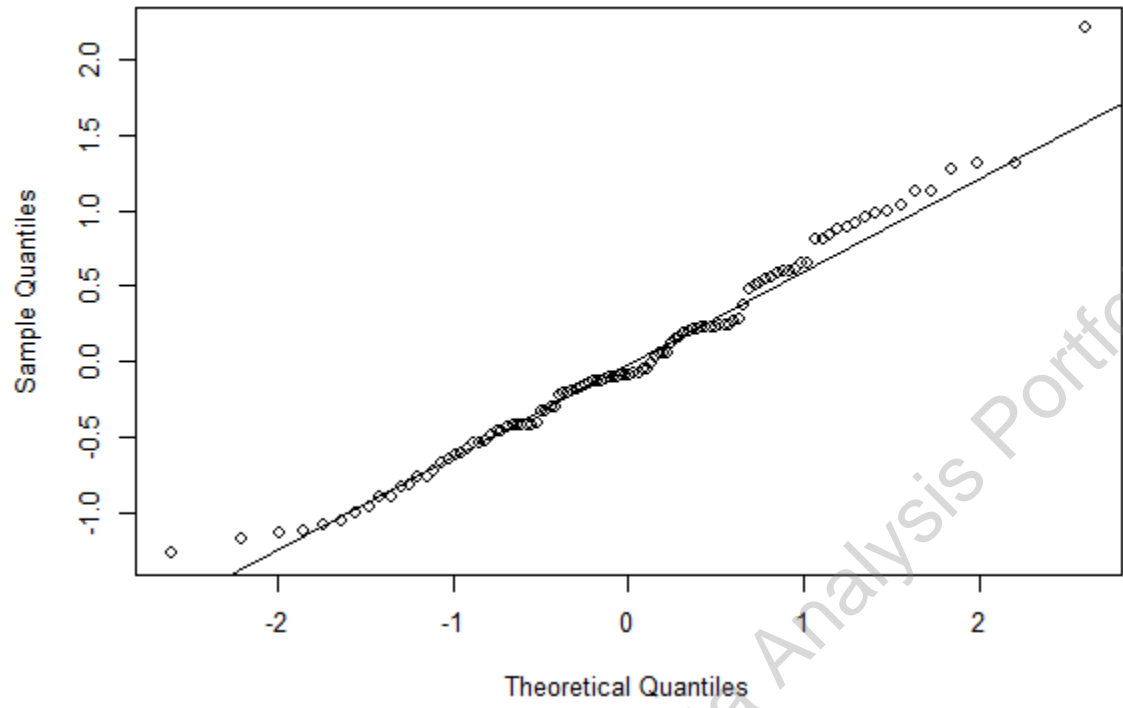
Hypotheses Testing

Hypothesis 1: Humor in CSR ads positively influences brand loyalty.

This hypothesis was confirmed both by the ANOVA and regression models. They are two different methods that lead to the same conclusion in this case. The regression-based method is more robust so I would advise you to focus on that.

Hypothesis 2: Humorous CSR advertisements positively impacts consumers' purchase

intention.

This hypothesis was also confirmed since the p-value of Humor was less than 0.05 in the regression models that used Purchase intention as dependent variable.

Hypothesis 3a: For consumers with a high need for humor (NFH), the use of humor in CSR ads significantly enhances brand loyalty and purchase intention.

This hypothesis was rejected, since need for humor does not moderate the relationship between humorous ads and brand loyalty or purchase intention as per the regression models (p >0.05 for the interaction term).

Hypothesis 3b: For less skeptical consumers, humor positively impacts purchase intention

and brand loyalty. For more skeptical individuals, humor negatively influences purchase

intention and brand loyalty.

This hypothesis was rejected, since skepticism does not moderate the relationship between humorous ads and brand loyalty or purchase intention as per the regression models (p >0.05 for the interaction term).