Statistics

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This markdown details the analysis methods used for stats computations

Analysis Description:

1) Data is formatted, characters are converted to factors
2) Summary statistics are generated and outliers identified
3) Analysis methods assume that data is normal with homogeneous variance. *Normality is assessed using the Shapiro-Wilks* test. For few groups with many data points (>20), normality of each group individually is assessed. For many groups with few data points (<20), normality of all groups together is assessed by analyzing model (Sample vs Time points) residuals. *Homoegeneity of variances is assessed by levene test.* A p- value <0.05 indicates failure of these tests. If these tests fail, the statisical analysis will still run but a warning will issue
4) Statistical analysis is performed based on user choice
    a) No stats
    b) T-Test: pairwise students T-test with bonferroni p-value adjustment
    c) One-way ANOVA: Different types of ANOVA are carried out based on the results of the levene test for homogeneity of variances ->Passed: One-way ANOVA is done. If and significant interactions were found, pairwise comparisons are done using Tukey's method ->Failed: A Welch ANOVA is performed. If significant, Games-Howell post-hoc test is performed
    d) Two-way ANOVA: A two-way ANOVA is carried out using Sample and Treatment if data passed the Levene test. Otherwise one way ANOVAS are suggested ->if significant, post hoc pairwise comparison is computed using emmeans_test with bonferroni p-value adjustment, and simple main effects are computed by one-way ANOVA on data grouped by Sample ->if not significant, pairwise comparisons are carried out using emmeans test with error based on model