Figure 8 Statistical Analysis

ROBOT INTERACTIONS

Logistic Binary Regression
Input: Drop distance and Speed
Output: Robot Interactions (for “Repelled”)

```
Deviance Residuals:
     Min        1Q    Median        3Q       Max
-0.40643  -0.34289  -0.12842  -0.00005   3.09909

Coefficients:
                   Estimate Std. Error z value Pr(>|z|)
(Intercept)        -20.35132 1703.49171  -0.012    0.990
Drop_distance20mm   15.90942 1703.49189   0.009    0.993
Drop_distance40mm   17.89905 1703.49164   0.011    0.992
Speed120mm/s        -0.07615    1.03636  -0.073    0.941
Speed160mm/s        -0.35202    0.89519  -0.393    0.694

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 74.871  on 320  degrees of freedom
Residual deviance: 62.837  on 316  degrees of freedom
AIC: 72.837

Number of Fisher Scoring iterations: 19
```

Chi-Square Test
Input: Drop distance
Output: Robot Interactions

```
        Pearson's Chi-squared test
X-squared = 11.028, df = 2, p-value = 0.004029
```

Chi-Square Test
Input: Speed
Output: Robot Interactions

```
        Pearson's Chi-squared test
X-squared = 0.24843, df = 2, p-value = 0.8832
```

Table of Output count by Drop distance

	Repelled	Crossed
1mm	108	0
20mm	105	1
40mm	100	7

Table of Output proportion by Drop distance

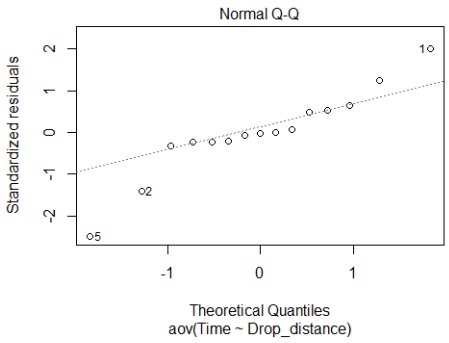
	Repelled	Crossed
1mm	1.000000000	0.000000000
20mm	0.990566038	0.009433962
40mm	0.934579439	0.065420561

TIME FOR 50% COVERAGE

One-way ANOVA
Input: Drop distance
Output: Time for 50% coverage (Time)

```
              Df Sum Sq Mean Sq F value Pr(>F)
Drop_distance  2 447913  223957   5.621 0.0189 *
Residuals     12 478134   39844
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Assumption for ANOVA test: Normality
Output: Time for 50% coverage (Time)



Assumption for ANOVA test: Homogeneity of variances
Levene's Test
Input: Drop distance
Output: Time for 50% coverage (Time)

```
Levene's Test for Homogeneity of Variance (center = median)
      Df F value Pr(>F)
group  2  4.6993 0.0311 *
      12
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Welch's ANOVA test

```
        One-way analysis of means (not assuming equal variances)

data:  Time and Drop_distance
F = 2.786, num df = 2.0000, denom df = 7.1754, p-value = 0.1272
```