

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

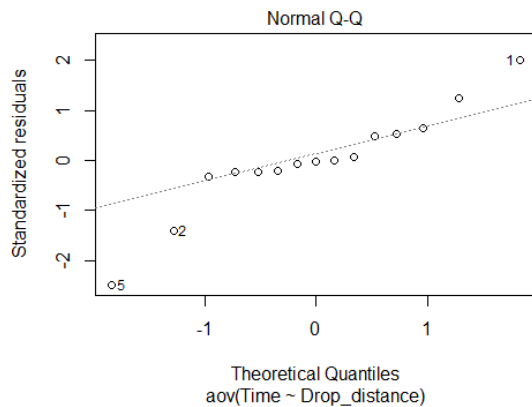
Output: Time for 50% coverage (Time)

	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

QUANTITY OF INTERACTIONS BY ROBOT

One-way ANOVA

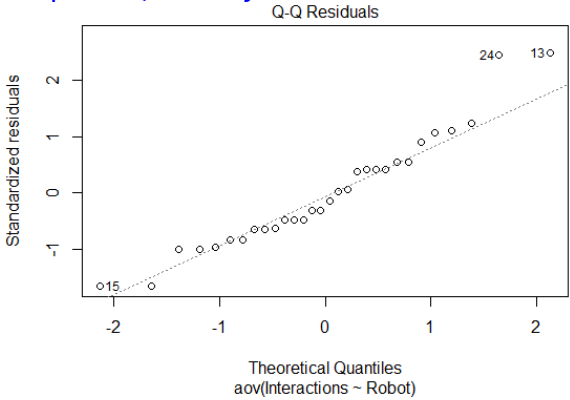
Input: Robot

Output: Quantity of interactions

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Robot	2	32.07	16.033	1.712	0.2
Residuals	27	252.90	9.367		

Assumption for ANOVA test: Normality

Output: Quantity of interactions



Assumption for ANOVA test: Homogeneity of variances

Levene's Test

Input: Robot

Output: Quantity of interactions

Levene's Test for Homogeneity of Variance (center = median)

	Df	F value	Pr(>F)
group	2	0.597	0.5576
	27		