

# Results

## KSQ\_Duration\_Linear Mixed Models

### ANOVA Summary

Effect	df	F	p
Distance	1, 14.00	20.728692179	0.000451383
Transecto	1, 17.81	99.524954588	0.000000010
Contexto	2, 3.40	0.765439544	0.531560904
Population	2, 13.09	3.504728860	0.060390890

Warning: All random slopes involving "Population" have been removed for the random effects grouping factor 'Individual'. -- Factor 'Population' does not vary within the levels of random effects grouping factor 'Individual'.

Warning: Model fit is singular. Specified random effects parameters (random intercepts and random slopes) cannot be estimated from the available data. Carefully reduce the random effects structure, but this practice might inflate the reported p-value, and invalidates the analysis.

Note. Model terms tested with Satterthwaite method.

Note. The following variable is used as a random effects grouping factor: 'Individual'.

Note. Type III Sum of Squares

### Model summary

#### Fit statistics

Deviance	Deviance (REML)	log Lik.	df	AIC	BIC
−5223.826131674	−5171.805184302	2585.902592151	23	−5125.805184302	−4983.722320354

Note. The model was fitted using restricted maximum likelihood.

#### Sample sizes

Observations	Levels of RE grouping factors
	Individual
3560	20

## Fixed Effects Estimates

Term	Estimate	SE	df	t	p
Intercept	0.536121312	0.044016788	5.573983166	12.179927933	0.000031543
Distance	−0.000634397	0.000139340	13.997868452	−4.552877352	0.000451383
Transecto (1)	0.025083734	0.002514353	17.814195066	9.976219454	0.000000010
Contexto (1)	−0.033107472	0.026846976	3.083640786	−1.233191861	0.303170481
Contexto (2)	0.059825522	0.118871584	8.635222697	0.503278581	0.627354236
Population (1)	−0.015622434	0.028810108	18.442938185	−0.542255288	0.594134845
Population (2)	0.073135428	0.031610197	14.208817915	2.313665710	0.036147744

*Note.* The intercept corresponds to the (unweighted) grand mean; for each factor with k levels, k – 1 parameters are estimated. Consequently, the estimates cannot be directly mapped to factor levels.

# KSQ\_Max Freq\_Linear Mixed Models

## ANOVA Summary

Effect	df	F	p
Distance	1, 17.25	2.117941141	0.163542861
Transecto	1, 11.19	2.898156097	0.116270191
Contexto	2, 2	4.026838734	0.198932182
Population	2, 16.40	0.915478840	0.419835774

Warning: All random slopes involving "Population" have been removed for the random effects grouping factor 'Individual'. –  
– Factor 'Population' does not vary within the levels of random effects grouping factor 'Individual'.

*Note.* Model terms tested with Satterthwaite method.

Warning: Numerical problems with the maximum-likelihood estimate (e.g., gradients too large). This may indicate that the specified random effects parameters (random intercepts and random slopes) cannot be estimated from the available data. Consider carefully reducing the random effects structure, but be aware this may induce unknown risks of anti-conservative results (i.e., p-values might be lower than nominal).

*Note.* The following variable is used as a random effects grouping factor: 'Individual'.

*Note.* Type III Sum of Squares

## Model summary

### Fit statistics

Deviance	Deviance (REML)	log Lik.	df	AIC	BIC
55369.791204177	55304.903613277	–27652.451806638	23	55350.903613277	55492.986477225

*Note.* The model was fitted using restricted maximum likelihood.

### Sample sizes

Observations	Levels of RE grouping factors
	Individual
3560	20

## Fixed Effects Estimates

Term	Estimate	SE	df	t	p
Intercept	4535.480295431	301.777387809	4.038937299	15.029225113	0.000107145
Distance	−4.215491039	2.896618013	17.246821333	−1.455314791	0.163542861
Transecto (1)	−71.044475378	41.732021745	11.187669170	−1.702397162	0.116270191
Contexto (1)	−158.664096286	120.272135936	1.740375503	−1.319209101	0.334061365
Contexto (2)	−364.800350415	130.805599889	1.802972435	−2.788874106	0.121083642
Population (1)	12.425010589	124.192135164	17.782693486	0.100046678	0.921426556
Population (2)	−166.368827351	144.713880774	16.484501556	−1.149639734	0.266698997

*Note.* The intercept corresponds to the (unweighted) grand mean; for each factor with k levels, k – 1 parameters are estimated. Consequently, the estimates cannot be directly mapped to factor levels.

# KSQ\_Max Power\_Linear Mixed Models

## ANOVA Summary

Effect	df	F	p
Distance	1, 13.93	2911.034248430	1.423523788e − 17
Transecto	1, 15.71	1144.900559517	4.213059714e − 16
Contexto	2, 7.29	2.836679487	0.122717598
Population	2, 14.95	4.920788623	0.022807941

Warning: All random slopes involving "Population" have been removed for the random effects grouping factor 'Individual'. -- Factor 'Population' does not vary within the levels of random effects grouping factor 'Individual'.

Note. Model terms tested with Satterthwaite method.

Warning: Numerical problems with the maximum-likelihood estimate (e.g., gradients too large). This may indicate that the specified random effects parameters (random intercepts and random slopes) cannot be estimated from the available data. Consider carefully reducing the random effects structure, but be aware this may induce unknown risks of anti-conservative results (i.e., p-values might be lower than nominal).

Note. The following variable is used as a random effects grouping factor: 'Individual'.

Note. Type III Sum of Squares

## Model summary

### Fit statistics

Deviance	Deviance (REML)	log Lik.	df	AIC	BIC
20813.122789206	20823.166959882	−10411.583479941	23	20869.166959882	21011.249823830

Note. The model was fitted using restricted maximum likelihood.

### Sample sizes

Observations	Levels of RE grouping factors
	Individual
3560	20

## Fixed Effects Estimates

Term	Estimate	SE	df	t	p
Intercept	118.694097381	0.777097630	13.051194395	152.740264258	1.292427840e – 22
Distance	–0.312001474	0.005782731	13.925633443	–53.954001227	1.423523788e – 17
Transecto (1)	8.113191646	0.239777182	15.707030653	33.836379232	4.213059714e – 16
Contexto (1)	–1.477037321	0.981648981	17.131096308	–1.504649167	0.150628031
Contexto (2)	0.569839116	0.258564693	2.773314753	2.203855095	0.122043479
Population (1)	–0.915186633	0.631781885	16.989086468	–1.448580048	0.165660575
Population (2)	2.226368155	0.722673531	14.850234316	3.080738479	0.007684211

*Note.* The intercept corresponds to the (unweighted) grand mean; for each factor with k levels, k – 1 parameters are estimated. Consequently, the estimates cannot be directly mapped to factor levels.

# KSQ\_rel.Max Time\_Linear Mixed Models

## ANOVA Summary

Effect	df	F	p
Distance	1, 21.94	97.780483879	0.0000000002
Transecto	1, 14.34	4.891292594	0.043703479
Contexto	2, 2	4.741181453	0.174180177
Population	2, 21.66	7.943326166	0.002586121

Warning: All random slopes involving "Population" have been removed for the random effects grouping factor 'Individual'. -- Factor 'Population' does not vary within the levels of random effects grouping factor 'Individual'.

Warning: Model fit is singular. Specified random effects parameters (random intercepts and random slopes) cannot be estimated from the available data. Carefully reduce the random effects structure, but this practice might inflate the reported p-value, and invalidates the analysis.

Note. Model terms tested with Satterthwaite method.

Note. The following variable is used as a random effects grouping factor: 'Individual'.

Note. Type III Sum of Squares

## Model summary

### Fit statistics

Deviance	Deviance (REML)	log Lik.	df	AIC	BIC
-1515.348416426	-1460.958542632	730.479271316	23	-1414.958542632	-1272.875678684

Note. The model was fitted using restricted maximum likelihood.

### Sample sizes

Observations	Levels of RE grouping factors
	Individual
3560	20

## Fixed Effects Estimates

Term	Estimate	SE	df	t	p
Intercept	0.276383397	0.039388000	68.140911968	7.016944238	0.000000001
Distance	0.001579099	0.000159692	21.942161273	9.888401483	0.000000002
Transecto (1)	0.017390303	0.007863128	14.338280616	2.211626685	0.043703479
Contexto (1)	0.086166391	0.028808871	10.461638180	2.990967308	0.012926068
Contexto (2)	−0.037379240	0.050061054	12.331370143	−0.746673055	0.469258383
Population (1)	0.015403556	0.015884607	22.163760218	0.969715934	0.342652242
Population (2)	0.041215612	0.017836528	21.145197538	2.310741952	0.031020162

*Note.* The intercept corresponds to the (unweighted) grand mean; for each factor with k levels, k – 1 parameters are estimated. Consequently, the estimates cannot be directly mapped to factor levels.



