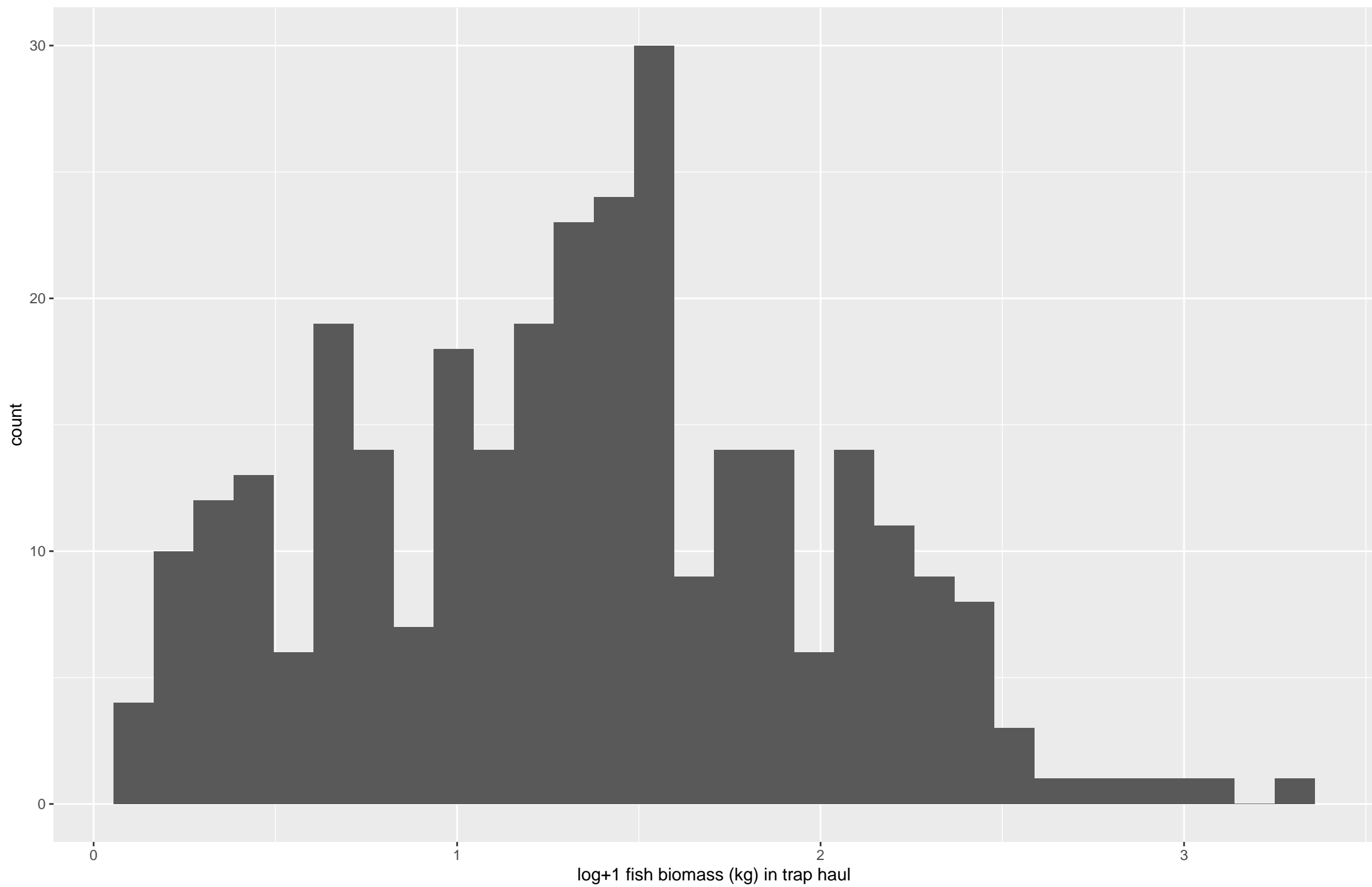
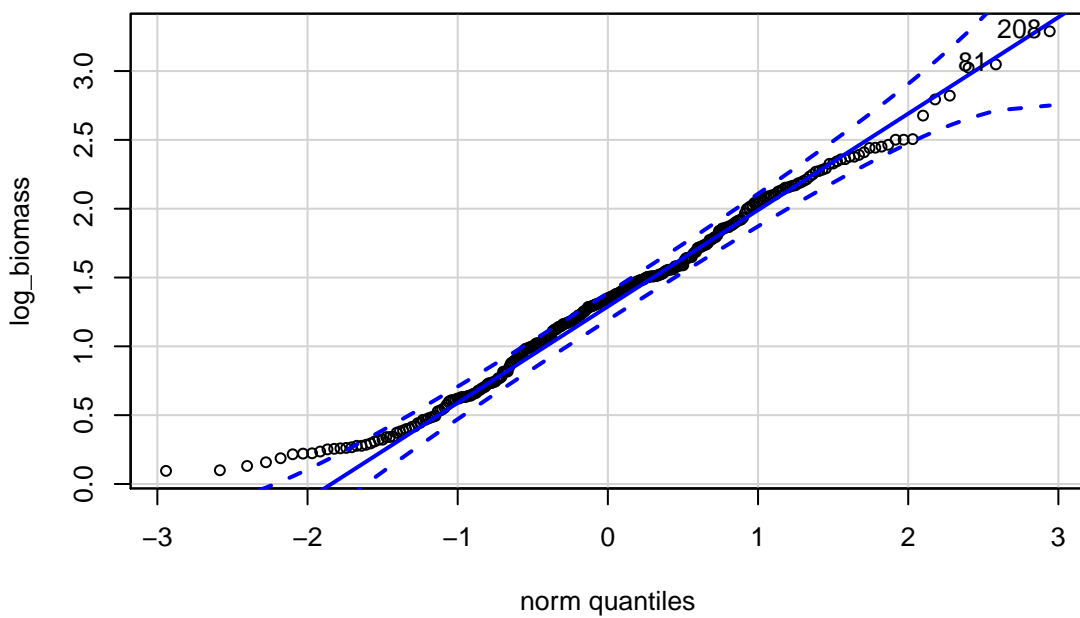


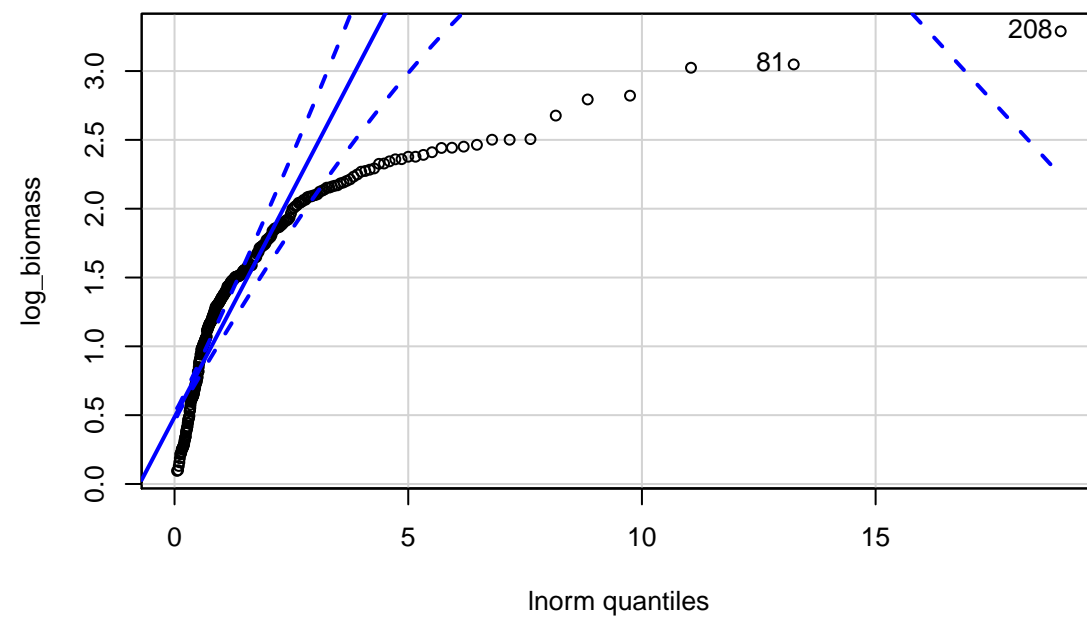
Histogram of log+1 fish biomass (kg)



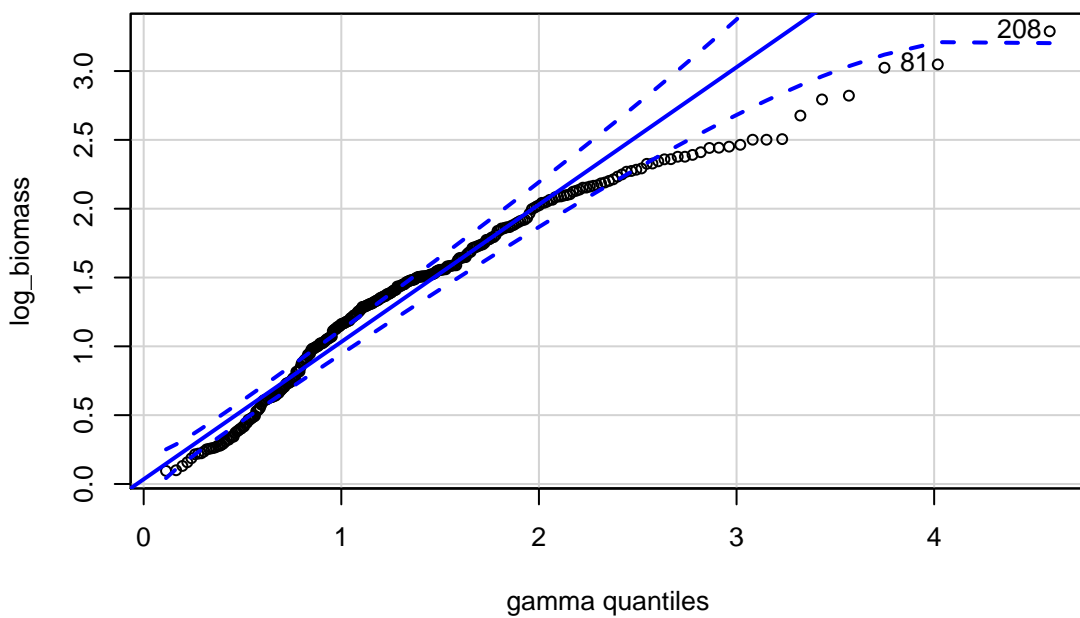
Normal distribution



Log-normal distribution



Gamma distribution



```
Global model call: lmer(formula = log_biomass ~ design + log_days_since_last_haul +
  location_exposure + Exp_or_Cont + Exp_or_Cont * log_days_since_last_haul +
  (1 | TrapID) + (1 | Date_YMD), data = trap_haul_no_zero,
  REML = FALSE, na.action = "na.fail")
```

Model selection table

	(Int)	dsg	Exp_or_Cont	lct_exp	log_dys_snc_lst_hal	Exp_or_Cont:log_dys_snc_lst_hal	df	logLik	AICc	delta	weight
9	0.5791						5	-273.856	557.9	0.00	0.202
13	0.6096			+			6	-272.893	558.1	0.16	0.187
10	0.4430	+					6	-273.164	558.6	0.70	0.143
14	0.5414	+		+			7	-272.806	560.0	2.07	0.072
11	0.5777			+			6	-273.856	560.0	2.08	0.071
15	0.6089			+	+		7	-272.893	560.2	2.25	0.066
27	0.4081			+			+ 7	-273.025	560.4	2.51	0.058
31	0.4385			+	+		+ 8	-272.049	560.6	2.67	0.053
12	0.4432	+		+			7	-273.164	560.7	2.79	0.050
28	0.2708	+		+			+ 8	-272.318	561.1	3.21	0.041
16	0.5414	+		+	+		8	-272.806	562.1	4.18	0.025
32	0.3689	+		+	+		+ 9	-271.957	562.5	4.61	0.020
1	1.2930						4	-278.982	566.1	8.19	0.003
5	1.3240				+		5	-278.041	566.3	8.37	0.003
2	1.2430	+					5	-278.804	567.8	9.90	0.001
3	1.2910			+			5	-278.982	568.2	10.25	0.001
6	1.3550	+			+		6	-278.008	568.3	10.39	0.001
7	1.3230			+	+		6	-278.041	568.4	10.45	0.001
4	1.2420	+		+			6	-278.804	569.9	11.98	0.001
8	1.3540	+		+	+		7	-278.008	570.4	12.48	0.000

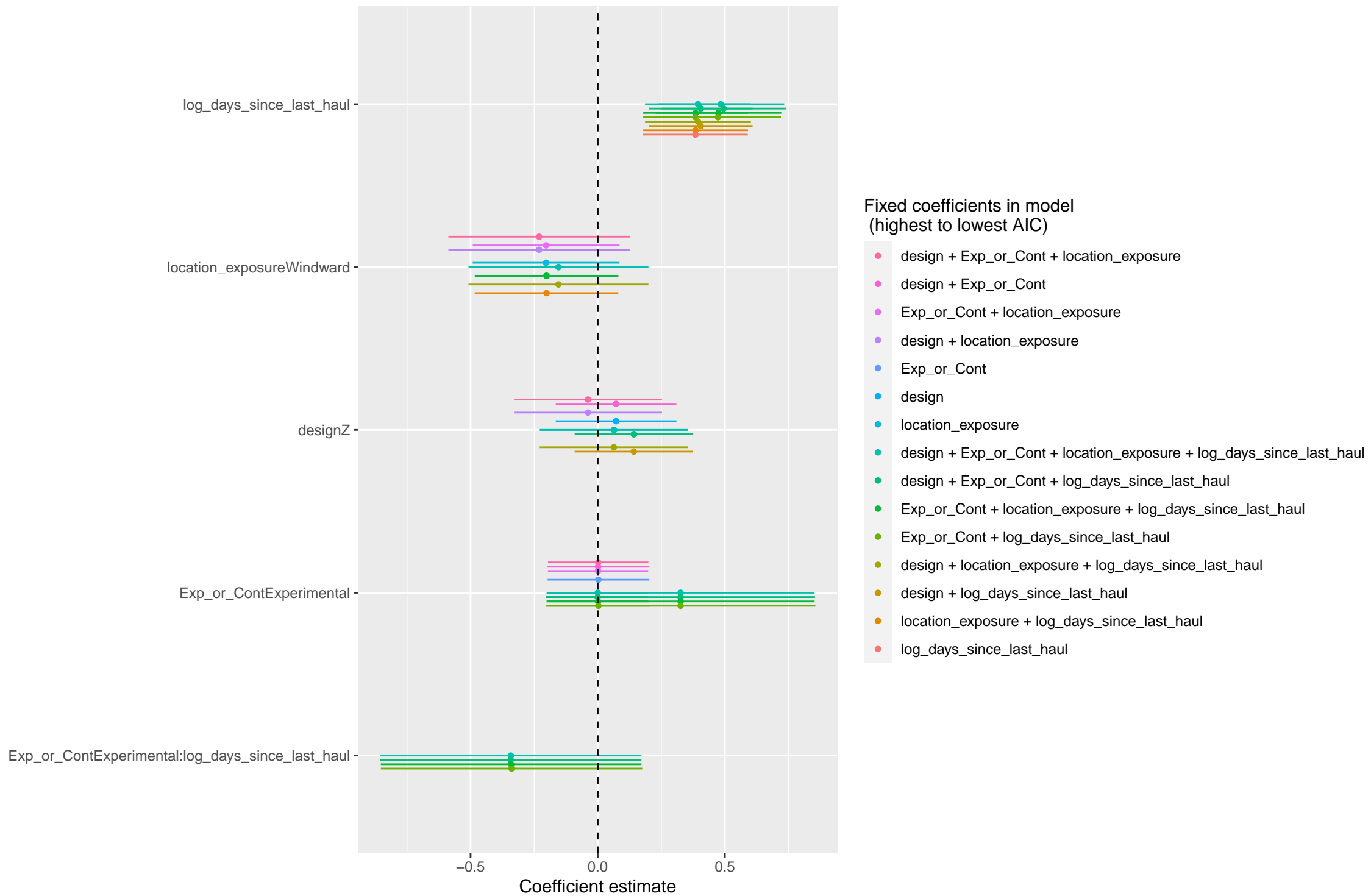
Models ranked by AICc(x)

Random terms (all models):

...1 | TrapID..., ...1 | Date_YMD...

model	sigma	logLik	AIC	BIC	deviance	df.residual
log_days_since_last_haul	0.54	-273.86	557.71	576.35	547.71	302
location_exposure + log_days_since_last_haul	0.54	-272.89	557.79	580.15	545.79	301
design + log_days_since_last_haul	0.55	-273.16	558.33	580.69	546.33	301
design + location_exposure + log_days_since_last_haul	0.54	-272.81	559.61	585.70	545.61	300
Exp_or_Cont + log_days_since_last_haul	0.54	-273.86	559.71	582.07	547.71	301
Exp_or_Cont + location_exposure + log_days_since_last_haul	0.54	-272.89	559.79	585.87	545.79	300
Exp_or_Cont + log_days_since_last_haul	0.54	-273.03	560.05	586.14	546.05	300
Exp_or_Cont + location_exposure + log_days_since_last_haul	0.54	-272.05	560.10	589.91	544.10	299
design + Exp_or_Cont + log_days_since_last_haul	0.55	-273.16	560.33	586.42	546.33	300
design + Exp_or_Cont + log_days_since_last_haul	0.54	-272.32	560.64	590.45	544.64	299
design + Exp_or_Cont + location_exposure + log_days_since_last_haul	0.54	-272.81	561.61	591.43	545.61	299
design + Exp_or_Cont + location_exposure + log_days_since_last_haul	0.54	-271.96	561.91	595.46	543.91	298
none	0.54	-278.98	565.96	580.87	557.96	303
location_exposure	0.54	-278.04	566.08	584.72	556.08	302
design	0.54	-278.80	567.61	586.24	557.61	302
Exp_or_Cont	0.54	-278.98	567.96	586.60	557.96	302
design + location_exposure	0.54	-278.01	568.02	590.38	556.02	301
Exp_or_Cont + location_exposure	0.54	-278.04	568.08	590.44	556.08	301
design + Exp_or_Cont	0.54	-278.80	569.61	591.97	557.61	301
design + Exp_or_Cont + location_exposure	0.54	-278.01	570.02	596.10	556.02	300

Predicting log+1 fish biomass (kg) in trap haul



Backward reduced random-effect table:

	Eliminated	npar	logLik	AIC	LRT	Df	Pr(>Chisq)	
<none>		9	-271.96	561.91				
(1 TrapID)	0	8	-280.77	577.54	17.626	1	2.689e-05	***
(1 Date_YMD)	0	8	-278.32	572.64	12.724	1	0.000361	***

Signif. codes:	0	...	***	...	0.001	...	**	...
					0.01	...	*	...
						0.05	0.1
								...
								1

Backward reduced fixed-effect table:
Degrees of freedom method: Satterthwaite

	Eliminated	Sum Sq	Mean Sq	NumDF	DenDF	F value	Pr(>F)
design	1	0.0561	0.0561	1	79.785	0.1906	0.663571
log_days_since_last_haul:Exp_or_Cont	2	0.4982	0.4982	1	288.595	1.6950	0.193980
Exp_or_Cont	3	0.0000	0.0000	1	34.813	0.0002	0.990271
location_exposure	4	0.5756	0.5756	1	90.986	1.9476	0.166240
log_days_since_last_haul	0	3.9617	3.9617	1	23.238	13.3568	0.001304 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1							

Model found:
log_biomass ~ log_days_since_last_haul + (1 | TrapID) + (1 |
Date_YMD)

Optimal model found using 'step' function which performs backward elimination of fixed-effect terms

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: log_biomass ~ log_days_since_last_haul + (1 | TrapID) + (1 | Date_YMD)
Data: trap_haul_no_zero
```

AIC	BIC	logLik	deviance	df.resid
557.7	576.3	-273.9	547.7	302

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.19806	-0.73098	-0.03229	0.65968	2.82404

Random effects:

Groups	Name	Variance	Std.Dev.
TrapID	(Intercept)	0.04657	0.2158
Date_YMD	(Intercept)	0.04001	0.2000
Residual		0.29660	0.5446

Number of obs: 307, groups: TrapID, 37; Date_YMD, 23

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	0.5791	0.2067	26.4505	2.802	0.00937 **
log_days_since_last_haul	0.3165	0.0866	23.2383	3.655	0.00130 **

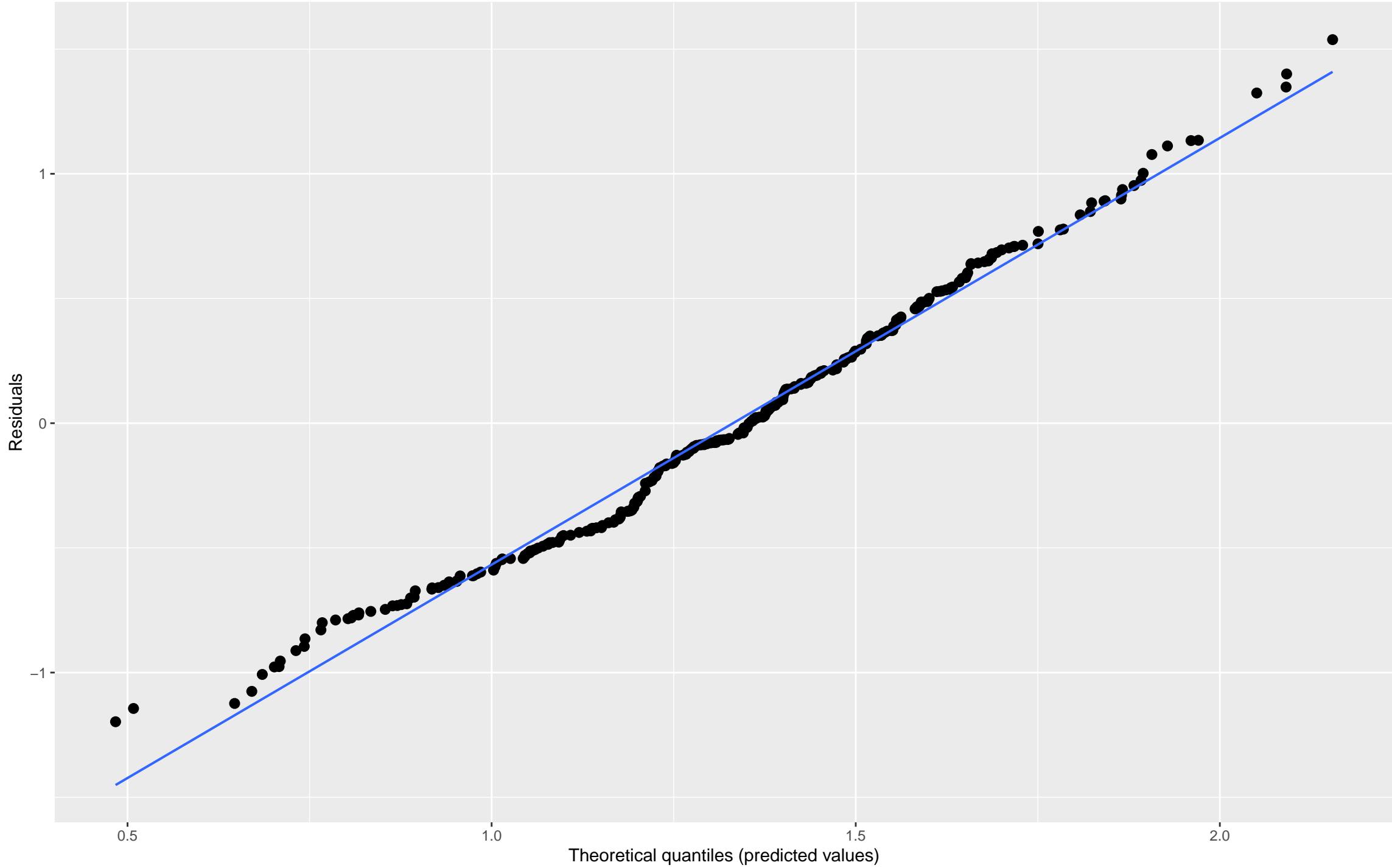
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

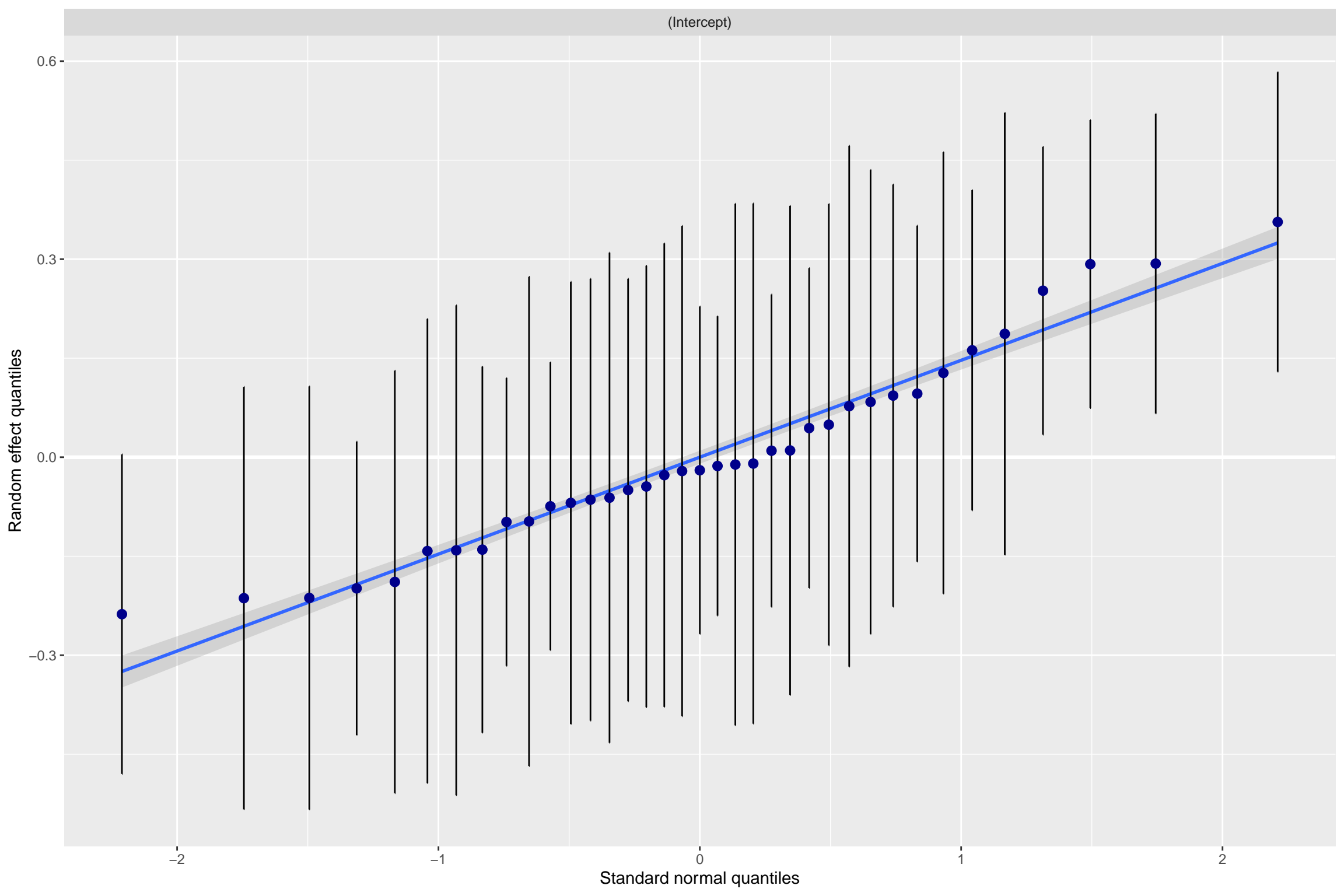
Correlation of Fixed Effects:

	(Intr)
lg_dys_sn__	-0.946

Non-normality of residuals and outliers

Dots should be plotted along the line





(Intercept)

Random effect quantiles

0.6
0.3
0.0
-0.3

-2

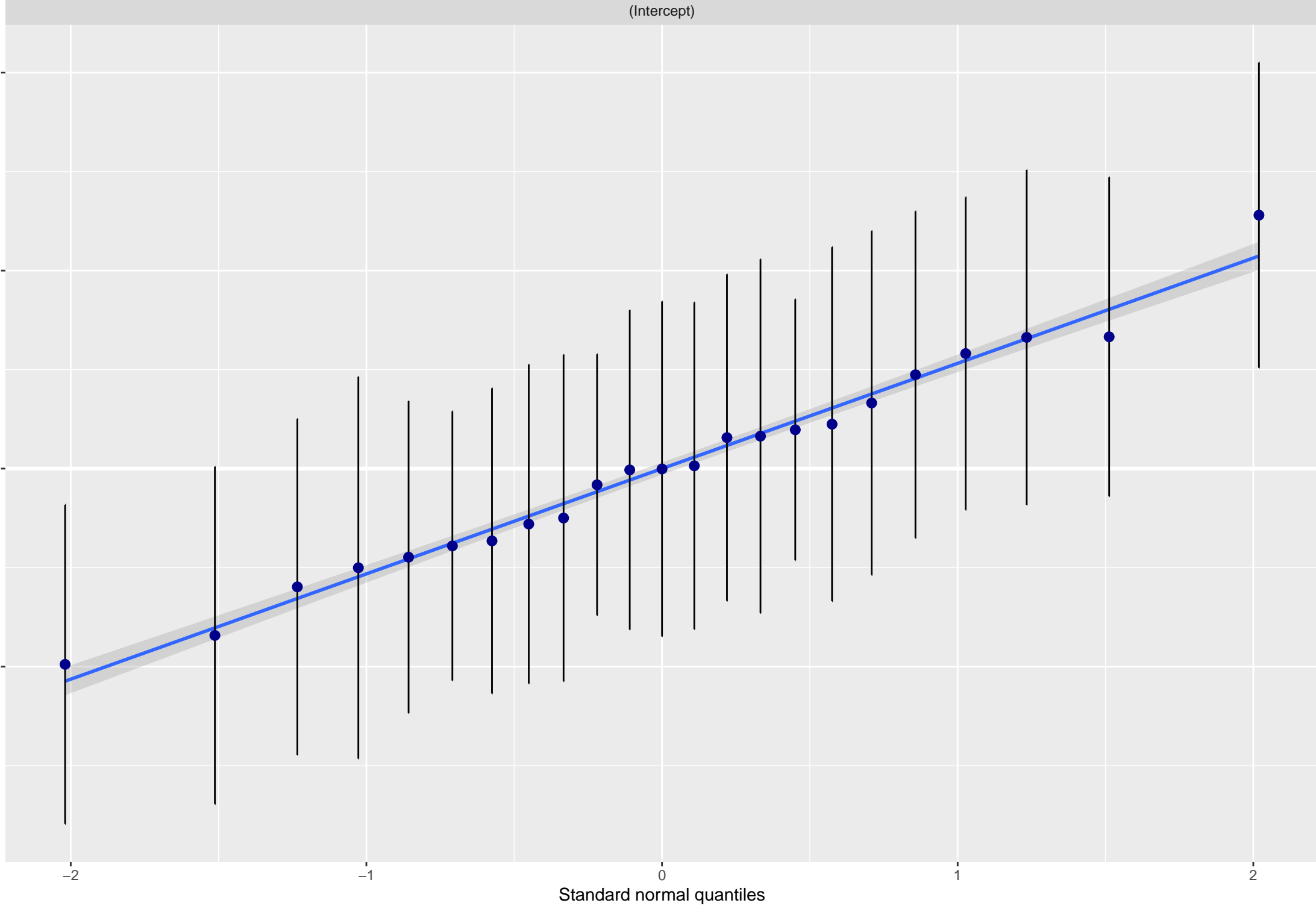
-1

0

1

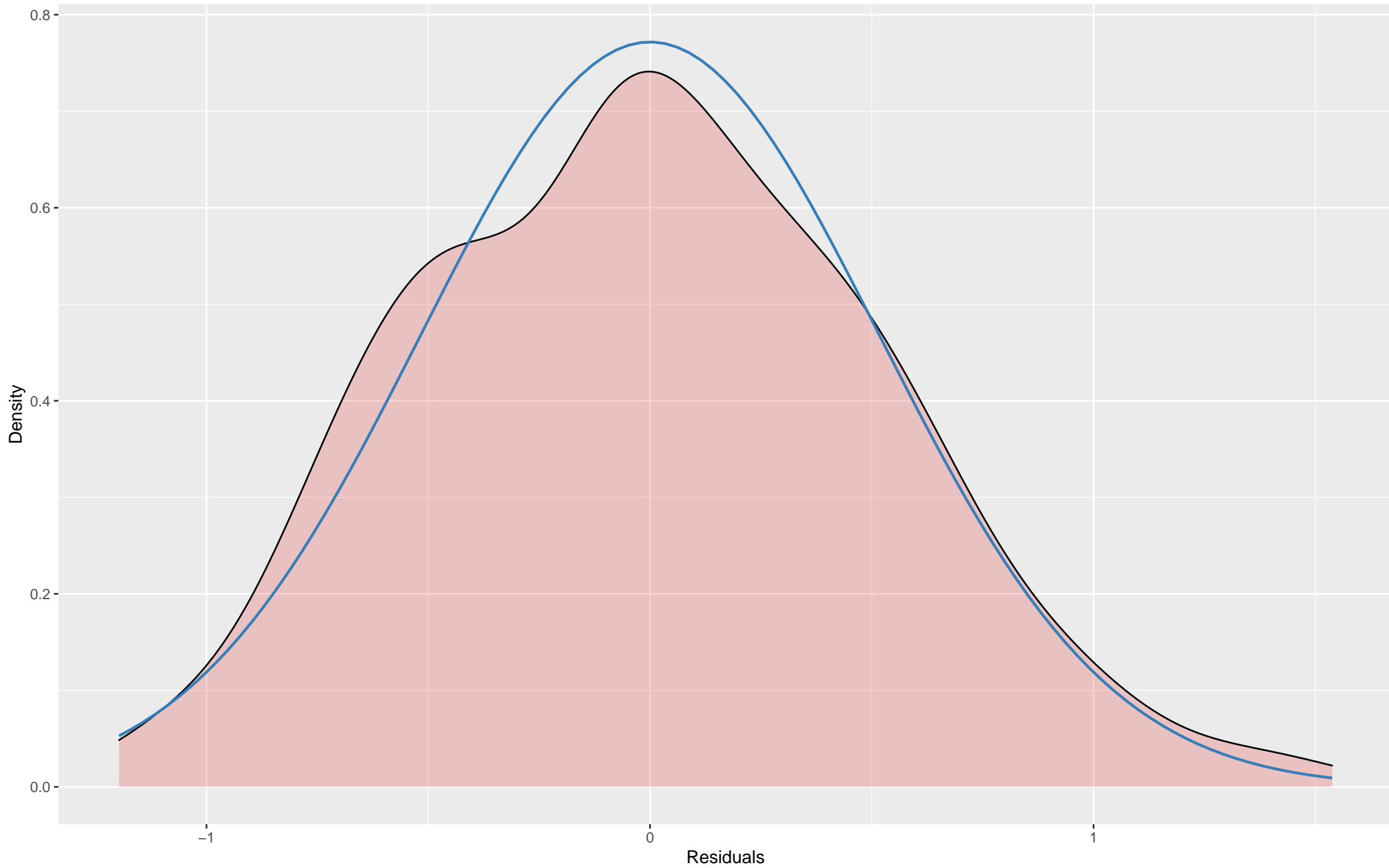
2

Standard normal quantiles



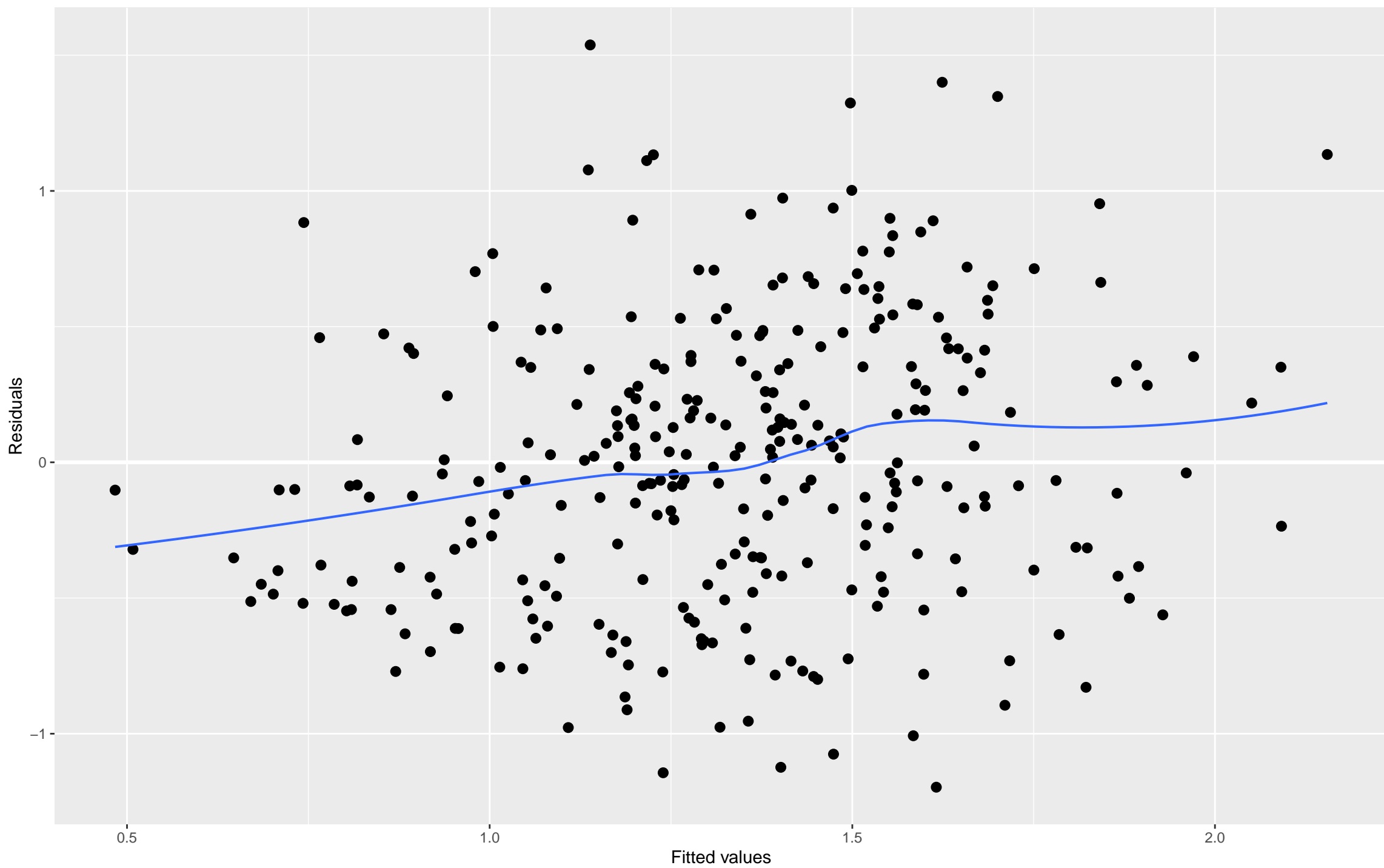
Non-normality of residuals

Distribution should look like normal curve



Homoscedasticity (constant variance of residuals)

Amount and distance of points scattered above/below line is equal or randomly spread



Model summaries for all models with delta AIC < 2

```
$log_days_since_last_haul
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: log_biomass ~ log_days_since_last_haul + (1 | TrapID) + (1 | Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC   logLik deviance df.resid
557.7      576.3   -273.9    547.7      302

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.19806 -0.73098 -0.03229  0.65968  2.82404

Random effects:
Groups   Name              Variance Std.Dev.
TrapID   (Intercept)  0.04657   0.2158
Date_YMD (Intercept)  0.04001   0.2000
Residual                    0.29660   0.5446
Number of obs: 307, groups: TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    0.5791      0.2067 26.4505   2.802  0.00937 **
log_days_since_last_haul  0.3165      0.0866 23.2383   3.655  0.00130 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr)
lg_dys_sn_ -0.946

$'location_exposure + log_days_since_last_haul'
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: log_biomass ~ location_exposure + log_days_since_last_haul + (1 | TrapID) + (1 | Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC   logLik deviance df.resid
557.8      580.1   -272.9    545.8      301

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.20897 -0.73974 -0.01921  0.64412  2.81684

Random effects:
Groups   Name              Variance Std.Dev.
TrapID   (Intercept)  0.04385   0.2094
Date_YMD (Intercept)  0.04024   0.2006
Residual                    0.29555   0.5436
Number of obs: 307, groups: TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    0.60960      0.20745 26.99061   2.939  0.00668 **
location_exposureWindward -0.20115      0.14414 90.98576  -1.396  0.16624
log_days_since_last_haul  0.31733      0.08665 23.59684   3.662  0.00126 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr) lctn_W
lctn_xparWn -0.097
lg_dys_sn_ -0.941 -0.012

$'design + log_days_since_last_haul'
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: log_biomass ~ design + log_days_since_last_haul + (1 | TrapID) + (1 | Date_YMD)
Data: trap_haul_no_zero

      AIC      BIC   logLik deviance df.resid
558.3      580.7   -273.2    546.3      301

Scaled residuals:
    Min       1Q   Median       3Q      Max
-2.22809 -0.74814 -0.01972  0.64751  2.81760

Random effects:
Groups   Name              Variance Std.Dev.
TrapID   (Intercept)  0.04394   0.2096
Date_YMD (Intercept)  0.03694   0.1922
Residual                    0.29737   0.5453
Number of obs: 307, groups: TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    0.44301      0.23187 41.03757   1.911  0.06306 .
designZ         0.14185      0.11868 70.68139   1.195  0.23602
log_days_since_last_haul  0.33386      0.08575 24.49901   3.893  0.00067 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
      (Intr) desgnZ
designZ      -0.492
lg_dys_sn_ -0.894  0.167
```

Full model summary

```
Linear mixed model fit by maximum likelihood . t-tests use Satterthwaite's method ['lmerModLmerTest']
Formula: log_biomass ~ design + log_days_since_last_haul + location_exposure + Exp_or_Cont + Exp_or_Cont * log_days_since_last_haul + (1 |
  TrapID) + (1 | Date_YMD)
Data: trap_haul_no_zero

           AIC      BIC    logLik deviance df.resid
561.9      595.5    -272.0     543.9       298

Scaled residuals:
   Min       1Q   Median       3Q      Max
-2.06963 -0.72357  0.00813  0.63112  2.77784

Random effects:
Groups   Name              Variance Std.Dev.
TrapID   (Intercept)  0.04252    0.2062
Date_YMD (Intercept) 0.03937    0.1984
Residual                    0.29442    0.5426
Number of obs: 307, groups:  TrapID, 37; Date_YMD, 23

Fixed effects:
              Estimate Std. Error    df t value Pr(>|t|)
(Intercept)    0.36893    0.29583  86.34778   1.247 0.215723
designZ         0.06466    0.14809  79.78540   0.437 0.663571
log_days_since_last_haul
0.39921      0.10468   48.38550   3.813 0.000388 ***
location_exposureWindward
-0.15400     0.17969  101.01561  -0.857 0.393449
Exp_or_ContExperimental
0.32592     0.26891   246.39813   1.212 0.226673
log_days_since_last_haul:Exp_or_ContExperimental
-0.14077     0.10783  288.24787  -1.305 0.192768
---
Signif. codes:  0 '***'... 0.001 '**'... 0.01 '*'... 0.05 '.'... 0.1 ' '... 1

Correlation of Fixed Effects:
          (Inter) designZ lg_____ lctn_W Ex__CE
designZ      -0.535
lg_dys_sn__ -0.871  0.171
lctn_xparWn -0.377  0.604  0.094
Exp_r_CntEx -0.480  0.001  0.504  0.002
l_____E__CE 0.451 -0.011 -0.546 -0.005 -0.928
```