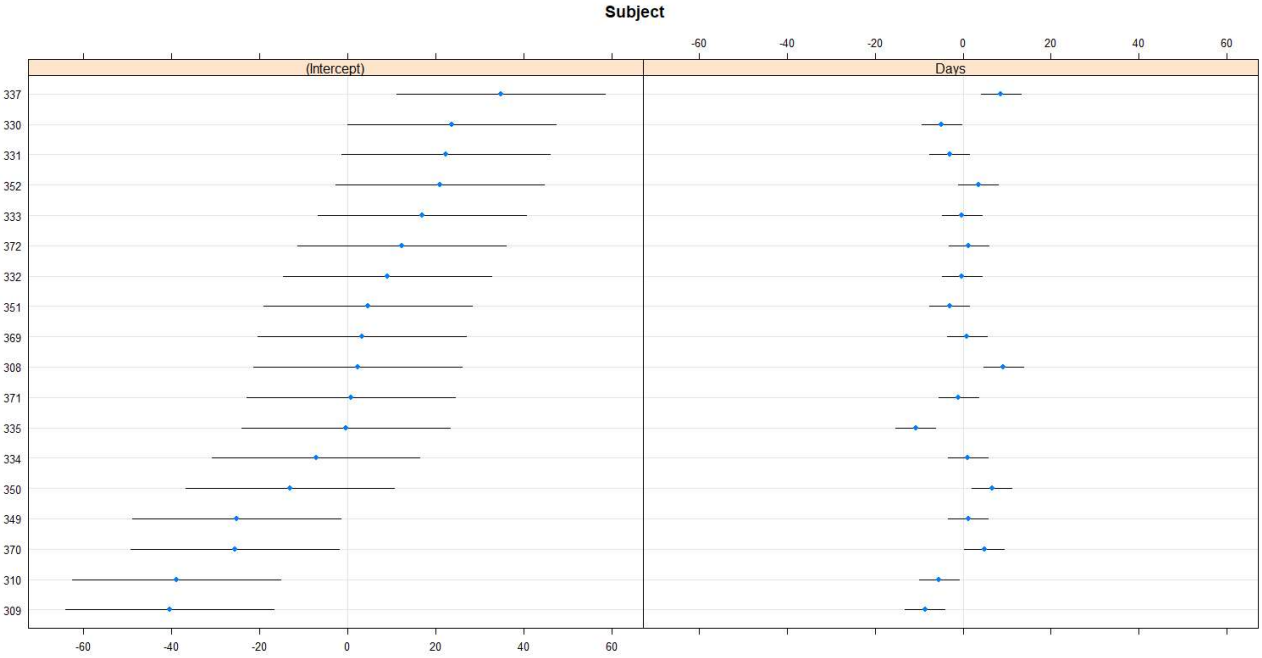
Extract the confidence intervals of lmer random effects; plotted with dotplot(ranef())

Asked 1 year, 6 months ago Modified 1 year, 6 months ago Viewed 1k times Part of R Language Collective

I´m trying to extract the confidence intervals and the intercept values that are plotted with `dotplot(ranef())` . How can I do this?

```
attach(sleepstudy)
library(lme4)
fm1 <- lmer(Reaction ~ Days + (Days | Subject), sleepstudy)
lattice::dotplot(ranef(fm1, condVar=TRUE))
```



I tried exploring the list object `fm1` but could not fiund the CI.

r plot lme4 confidence-interval

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edited Nov 2, 2021 at 6:35
jay.sf
58.1k 7 51 103

asked Nov 2, 2021 at 4:53
Luis M. García
121 1 9

2 `attach()` is unnecessary here (and considered harmful) – Ben Bolker Nov 2, 2021 at 14:30

1 Answer

Sorted by: Highest score (default)

```
rr <- ranef(fm1)  ## condVar = TRUE has been the default for a while
```

With `as.data.frame` : gives the conditional mode and SD, from which you can calculate the intervals (technically, these are not "confidence intervals" because the values of the BLUPs/conditional modes are not parameters ...)

```
dd <- as.data.frame(rr)
transform(dd, lwr = condval - 1.96*condsd, upr = condval + 1.96*condsd)
```

Or with `broom.mixed::tidy` :

```
broom.mixed::tidy(m1, effects = "ran_vals", conf.int = TRUE)
```

`broom.mixed::tidy()` uses `as.data.frame.ranef.mer()` (the method called by `as.data.frame`) internally: this function takes the rather complicated data structure described in `?lme4::ranef` and extracts the conditional modes and standard deviations in a more user-friendly format:

> If 'condVar' is 'TRUE' the '"postVar"' attribute is an array of dimension j by j by k (or a list of such arrays). The kth face of this array is a positive definite symmetric j by j matrix. If there is only one grouping factor in the model the variance-covariance matrix for the entire random effects vector, conditional on the estimates of the model parameters and on the data, will be block diagonal; this j by j matrix is the kth diagonal block. With multiple grouping factors the faces of the '"postVar"' attributes are still the diagonal blocks of this conditional variance-covariance matrix but the matrix itself is no longer block diagonal.

In this particular case, here's what you need to do to replicate the `condsd` column of `as.data.frame()`:

```
## get the 'postVar' attribute of the first (and only) RE term
aa <- attr(rr$Subject, "postVar")
## for each slice of the array, extract the diagonal;
##  transpose and drop dimensions;
##  take the square root
sqrt(c(t(apply(aa, 3, diag))))
```

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edited Nov 2, 2021 at 18:27

answered Nov 2, 2021 at 14:28

Ben Bolker

208k 25 367 451

Would you mind to elaborate briefly on what `as.data.frame.ranef.mer` does to get the conditional SD from the `attr(rr$Subject, 'postVar')` (supposedly)? – jay.sf Nov 2, 2021 at 15:02

Thanks! that is exactly what I was looking for. – Luis M. García Nov 2, 2021 at 15:16

1 @jay.sf: does that help? – Ben Bolker Nov 2, 2021 at 18:11

@BenBolker Yes thanks, great answer +1 – jay.sf Nov 3, 2021 at 5:17