aflevering

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R Markdown

```r
load("DWBdata.Rdata")
fit1 <- lmer(DWB100 ~ WkDay + z2sleep + (z2sleep|NameID), data = DWBdata)
fixef(fit1)
```

```
## (Intercept)      WkDay2      WkDay3      WkDay4      WkDay5      WkDay6
##  56.7802389  -0.2664728  -0.9063820  -1.5689017  -1.5536840   2.9100872
##      WkDay7     z2sleep
##   2.7232162   7.2078672
```

```r
# t distribution with 3 degrees of freedom

fit2 <- lmer(DWB100 ~ WkDay + z2sleep + (1|NameID), data = DWBdata)
M <- 2e3
X <- fit2 %>% model.matrix()
Z <- fit2 %>% getME(name="Z")
beta <- fixef(fit2)
tau <- (VarCorr(fit2) %>% as.data.frame())$sdcor[1]
sigma <- (VarCorr(fit2) %>% as.data.frame())$sdcor[2]
resMat <- matrix(NA,M,3)
for (i in 1:M) {
B <- rt(27, 3)*tau/(sqrt(3/(3-2)))
eps <- rnorm(nrow(DWBdata), 0, sigma)
y <- X %*% beta + Z %*% B + eps
simdata <- DWBdata
simdata$y <- as.numeric(y)
lmm <- lmer(y ~ WkDay + z2sleep + (1|NameID), data = simdata)
resMat[i,1] <- fixef(lmm)[8]
resMat[i,2:3] <- confint(lmm,method="Wald")[10,]
}
resData <- data.frame(resMat)
names(resData) <- c("est","lower","upper")
```

```r
resData %>% summarise(bias = mean(est)-beta["z2sleep"])
```

```
##          bias
## 1 0.0006217784
```

```r
resData %>% mutate(cover = (beta[8] > lower)*(beta[8] < upper)) %>% summarise(coverage = mean(cover))
```

```
##   coverage
## 1    0.949
```

```r
ggplot() +
geom_histogram(resData, mapping = aes(x = est, y = ..density..), color = "white", bins = 30) +
geom_vline(xintercept = beta[8], color = "red", linetype = "dashed") +
```

```
geom_vline(xintercept = mean(resData$est), color = "blue", linetype = "dashed")
```

```
## Warning: The dot-dot notation (`..density..`) was deprecated in ggplot2 3.4.0.
## i Please use `after_stat(density)` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```
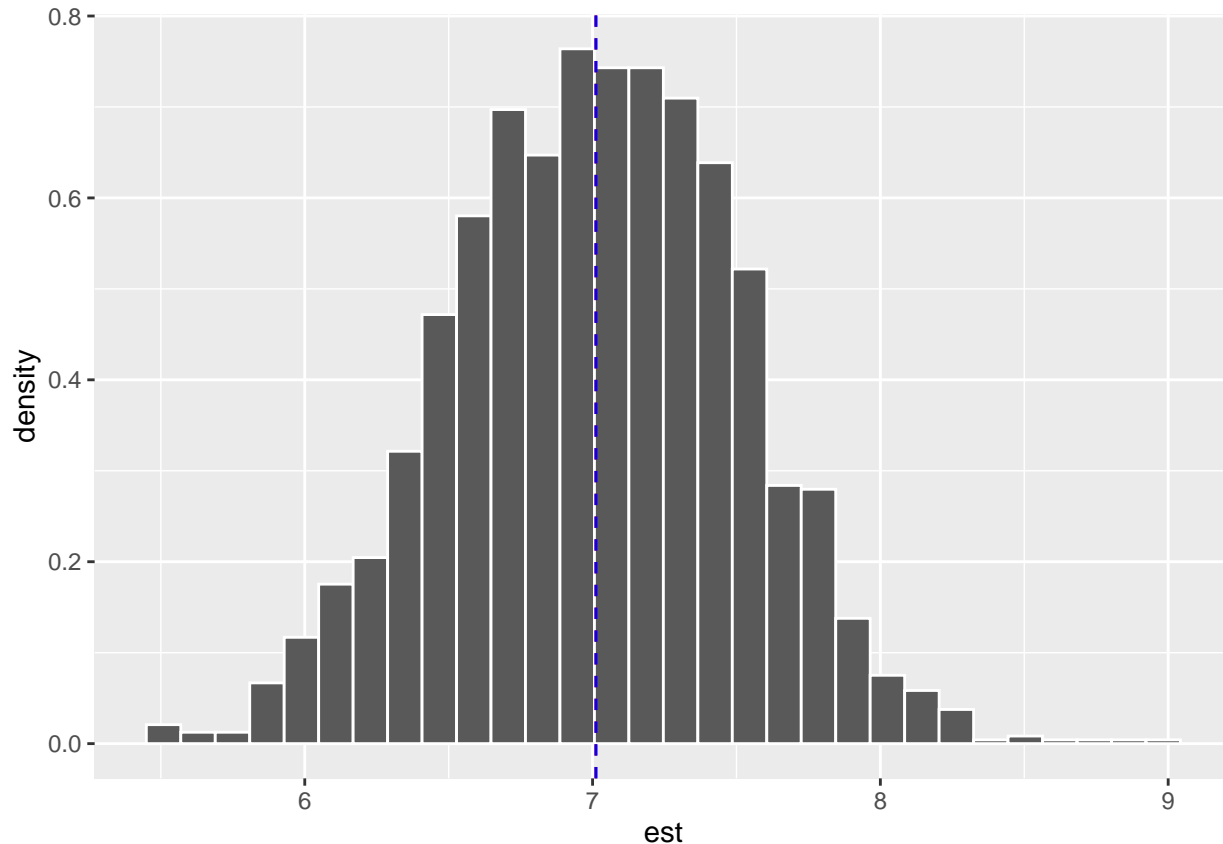


```
# Exponential
```

```
fit2 <- lmer(DWB100 ~ WkDay + z2sleep + (1|NameID), data = DWBdata)
M <- 2e3
X <- fit2 %>% model.matrix()
Z <- fit2 %>% getME(name="Z")
beta <- fixef(fit2)
tau <- (VarCorr(fit2) %>% as.data.frame())$sdcor[1]
sigma <- (VarCorr(fit2) %>% as.data.frame())$sdcor[2]
resMat <- matrix(NA,M,3)
for (i in 1:M) {
B <- (rexp(27)-1)*tau
eps <- rnorm(nrow(DWBdata), 0, sigma)
y <- X %*% beta + Z %*% B + eps
simdata <- DWBdata
simdata$y <- as.numeric(y)
lmm <- lmer(y ~ WkDay + z2sleep + (1|NameID), data = simdata)
resMat[i,1] <- fixef(lmm)[8]
resMat[i,2:3] <- confint(lmm,method="Wald")[10,]
```

```
}
resData <- data.frame(resMat)
names(resData) <- c("est","lower","upper")

resData %>% summarise(bias = mean(est)-beta["z2sleep"])

##        bias
## 1 0.0140701

resData %>% mutate(cover = (beta[8] > lower)*(beta[8] < upper)) %>% summarise(coverage = mean(cover))

##   coverage
## 1    0.949

ggplot() +
geom_histogram(resData, mapping = aes(x = est, y = ..density..), color = "white", bins = 30) +
geom_vline(xintercept = beta[8], color = "red", linetype = "dashed") +
geom_vline(xintercept = mean(resData$est), color = "blue", linetype = "dashed")
```