beetle.homework

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Question 1

What is the impact of having a larger body, is it different for males and females?

Males and females both show an impact of body size. In the case of females body size is positively correlated with offspring number (Figure 1). Likewise, larger males have more mating attempts (Figure 2).

Question 2

What are the best predictors for number of mating attempts and the number of grandchildren that a male will produce?

Hornsize is the best predictor of mating attempts (Figure 3). The number of grandchildren that a male has is not strongly correlated with any available variables but the highest R squared is found with bodysize (Figure 4).

First we read in our data

```
dat.m <- read.csv("gnatocerus.male.csv")
dat.f <- read.csv("gnatocerus.female.csv")
```

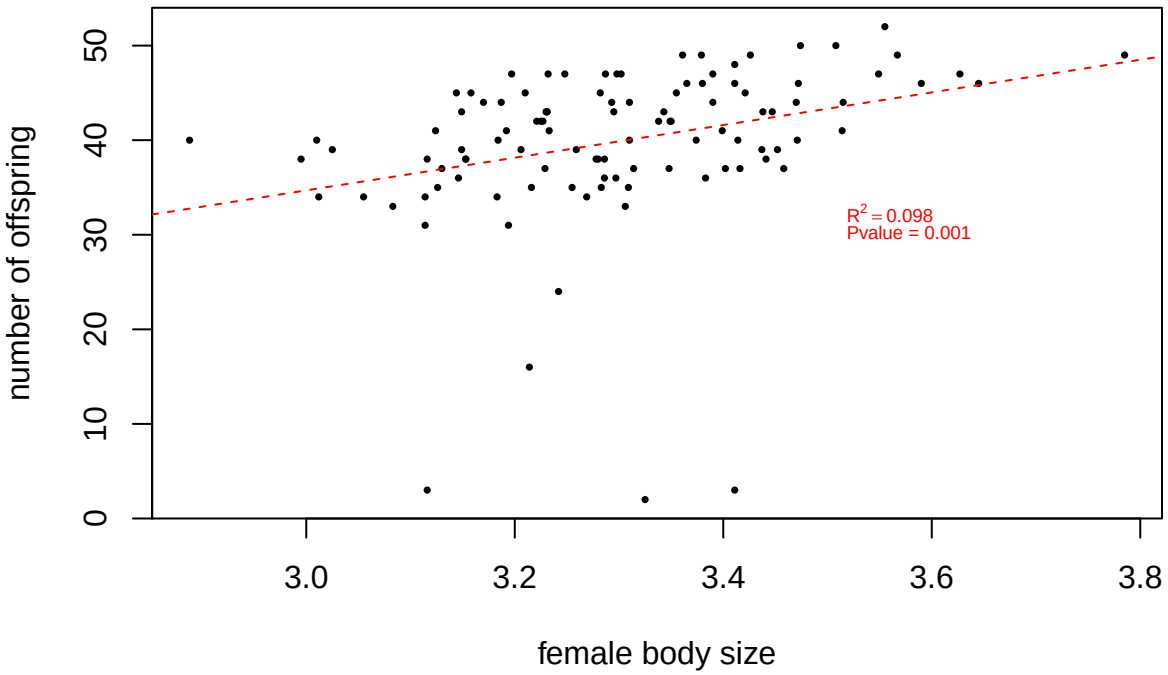

Figure 1: Female body size and offspring number in *Gnathocerus cornutus*. The impact of female body size on the number offspring produced. The red dashed line represents the regression of offspring number on body size.

Now lets make a figure showing the impact of body size on female reproductive success.

```
plot(dat.f$offspring ~ dat.f$body,
     xlab = "female body size",
     ylab = "number of offspring",
     pch = 16, cex = .5)
fit.f <- lm(dat.f$offspring ~ dat.f$body)
abline(fit.f, col="red", lty=2)
rsquared <- round(summary(fit.f)$r.squared, digits=3)
pval <-round(summary(fit.f)$coefficients[2, 4], digits = 3)
rsquared <- bquote(R^2 == .(rsquared))
text(x = 3.5, y = 32, cex = .6, rsquared, col = "red", pos = 4)
text(x = 3.5, y = 30, cex = .6, col = "red", paste("Pvalue =", pval), pos = 4)
```

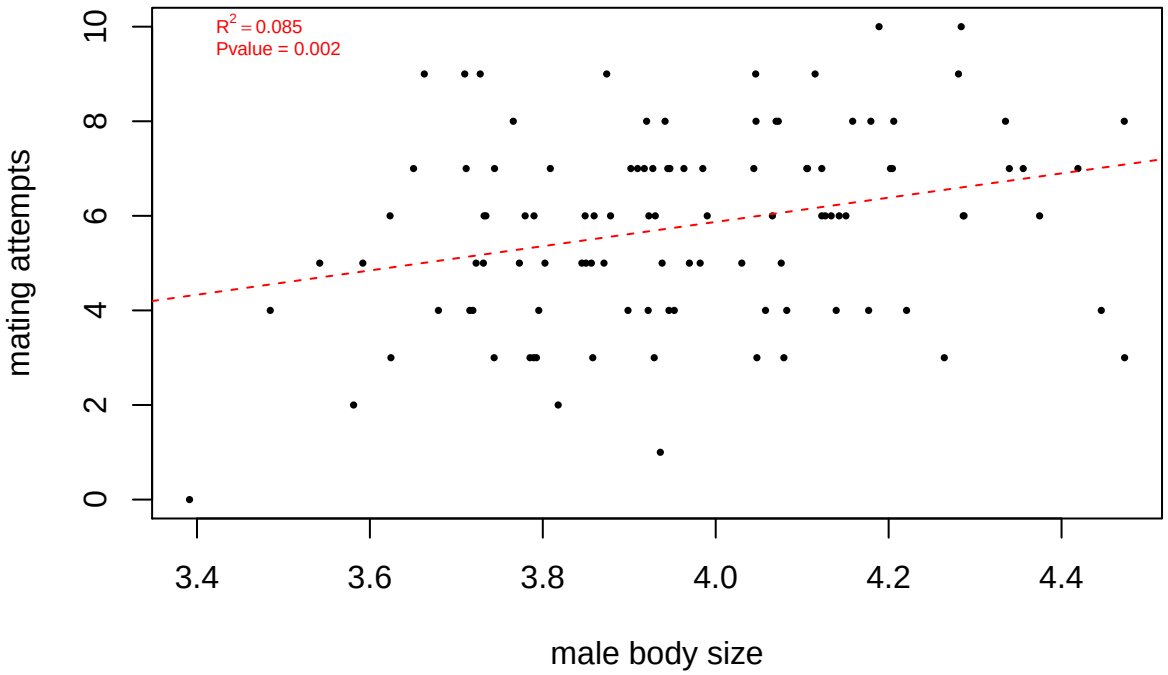

Figure 2: Male body size and mating attempts in *Gnathocerus cornutus*. The impact of male body size on mating attempts. The red dashed line represents the regression of mating attempts on body size.

Now lets make a figure showing the impact of body size on male reproductive success.

```
plot(dat.m$mating.attempts ~ dat.m$body,
     xlab = "male body size",
     ylab = "mating attempts",
     pch = 16, cex = .5)
fit.m <- lm(dat.m$mating.attempts ~ dat.m$body)
abline(fit.m, col="red", lty=2)
rsquared <- round(summary(fit.m)$r.squared, digits=3)
pval <-round(summary(fit.m)$coefficients[2, 4], digits = 3)
rsquared <- bquote(R^2 == .(rsquared))
text(x = 3.4, y = 10, cex = .6, rsquared, col = "red", pos = 4)
text(x = 3.4, y = 9.5, cex = .6, col = "red", paste("Pvalue =", pval), pos = 4)
```

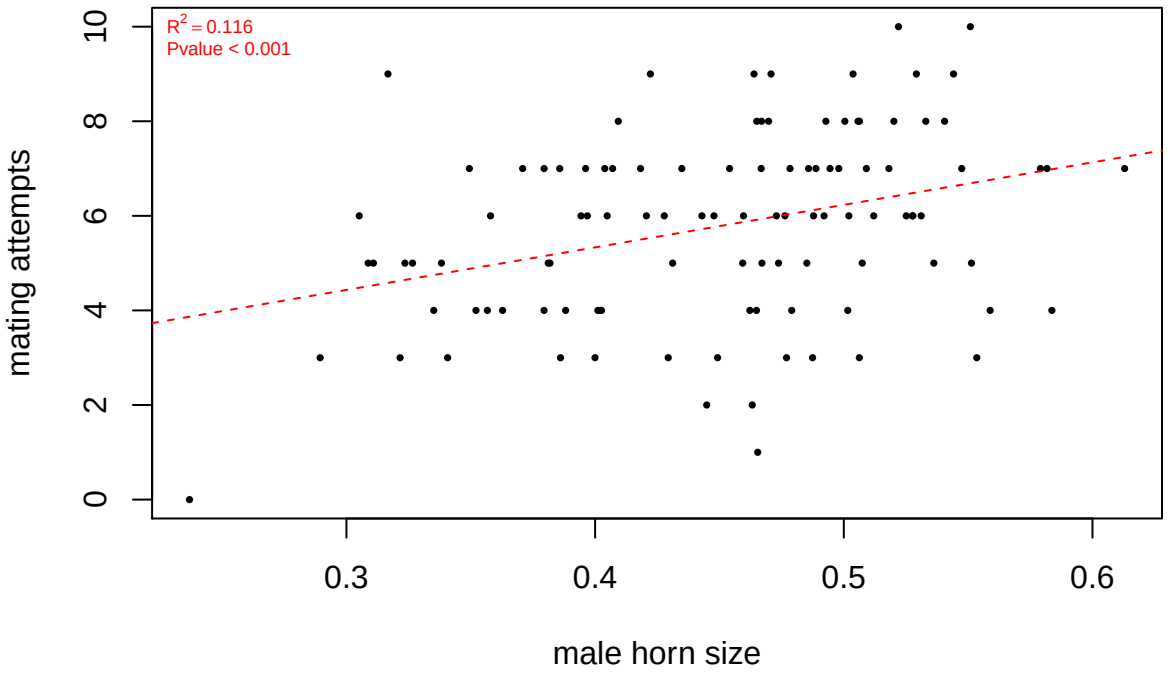

Figure 3: Horn size and mating attempts in *Gnathocerus cornutus* males. The impact of male horn size on mating attempts. The red dashed line represents the regression of mating attempts on horn size.

Now lets make a figure showing the best predictor of number of mating attempts.

```
plot(dat.m$mating.attempts ~ dat.m$horn,
     xlab = "male horn size",
     ylab = "mating attempts",
     pch = 16, cex = .5)
fit.m <- lm(dat.m$mating.attempts ~ dat.m$horn)
abline(fit.m, col="red", lty=2)
rsquared <- round(summary(fit.m)$r.squared, digits=3)
pval <-round(summary(fit.m)$coefficients[2, 4], digits = 3)
rsquared <- bquote(R^2 == .(rsquared))
text(x = .22, y = 10, cex = .6, rsquared, col = "red", pos = 4)
text(x = .22, y = 9.5, cex = .6, col = "red", paste("Pvalue < 0.001"), pos = 4)
```

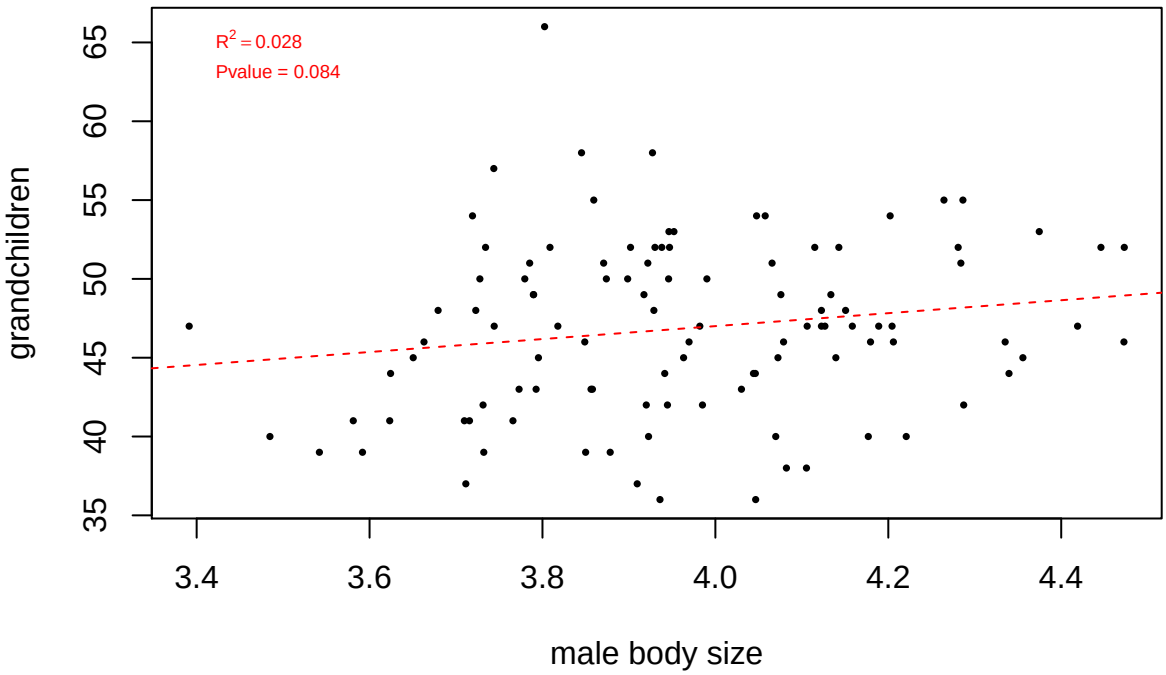

Figure 4: Body size and number of grandchildren in *Gnathocerus cornutus* males. The impact of male body size on the number of grandchildren. The red dashed line represents the regression of number of grandchildren on body size.

Now lets make a figure showing the best predictor of the number of grandchildren that a male has.

```
plot(dat.m$grandchildren ~ dat.m$body,
     xlab = "male body size",
     ylab = "grandchildren",
     pch = 16, cex = .5)
fit.m <- lm(dat.m$grandchildren ~ dat.m$body)
abline(fit.m, col="red", lty=2)
rsquared <- round(summary(fit.m)$r.squared, digits=3)
pval <-round(summary(fit.m)$coefficients[2, 4], digits = 3)
rsquared <- bquote(R^2 == .(rsquared))
text(x = 3.4, y = 65, cex = .6, rsquared, col = "red", pos = 4)
text(x = 3.4, y = 63, cex = .6, col = "red", paste("Pvalue =", pval), pos = 4)
```