Dummy-Interaction and Conditioning

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```
load("~/計量経済学演習/R data sets for 5e/gpa3.RData")
gpa3<-data
```

Model with full interaction with female dummy (only for spring data)

```
(reg<-lm(cumgpa~female*(sat+hsperc+tothrs), data=gpa3, subset=(spring==
1)))
```

```
##
## Call:
## lm(formula = cumgpa ~ female * (sat + hsperc + tothrs), data = gpa3,
##     subset = (spring == 1))
##
## Coefficients:
##   (Intercept)         female            sat         hsperc         tot
hrs
##     1.4808117     -0.3534862      0.0010516     -0.0084516      0.0023
441
##    female:sat  female:hsperc  female:tothrs
##     0.0007506     -0.0005498     -0.0001158
```

4 monomials and 3 cross product (total 7 terms)

F-Test H0 : all coeffs with names containing “female” ==0 説

```
library(car)
```

```
## Loading required package: carData
```

```
linearHypothesis(reg, matchCoefs(reg, "female"))
```

```
## Linear hypothesis test
##
## Hypothesis:
## female = 0
## female:sat = 0
## female:hsperc = 0
## female:tothrs = 0
##
## Model 1: restricted model
## Model 2: cumgpa ~ female * (sat + hsperc + tothrs)
```

```
##
##   Res.Df    RSS Df Sum of Sq      F    Pr(>F)
## 1    362 85.515
## 2    358 78.355  4    7.1606 8.1791 2.545e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

all 0 は流石にないって(何かしらの regressor 通して男女差はある)

Estimate difference between gender

Estimate model for *males*

```
lm(cumgpa~sat+hsperc+tothrs, data=gpa3, subset=(spring==1&female==0))
```

```
##
## Call:
## lm(formula = cumgpa ~ sat + hsperc + tothrs, data = gpa3, subset = (sp
ring ==
##     1 & female == 0))
##
## Coefficients:
## (Intercept)          sat       hsperc       tothrs
##    1.480812     0.001052    -0.008452     0.002344
```

Estimate model for *females*

```
lm(cumgpa~sat+hsperc+tothrs, data=gpa3, subset=(spring==1&female==1))
```

```
##
## Call:
## lm(formula = cumgpa ~ sat + hsperc + tothrs, data = gpa3, subset = (sp
ring ==
##     1 & female == 1))
##
## Coefficients:
## (Intercept)          sat       hsperc       tothrs
##    1.127325     0.001802    -0.009001     0.002228
```

男女間で sat,hsperc,tothrs の動きによる効果は違う。