8: Model Output Can Deceive!

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November 25, 2013

Ideas and issues illustrated by the graphs in this vignette

Issues are noted here that apply to all regression models, including regression models where the outcome variable is categorical. Note in particular implications, for standard forms of analysis output, of errors in explanatory variables.

1 Code for the Figures

```
fig8.1 <- function(plotit=TRUE){
tau <- (0:5)/2.5; m <- length(tau); n <- 200; SD <- 2
x0 <- rnorm(n, mean=12.5, sd=SD)  # Generate x-values
df <- data.frame(sapply(tau, function(xtau)x0+rnorm(n, sd=SD*xtau)))
  # Columns after the first are x-values with added error
df$y = 15+2.5*x0
names(df) <- c(paste("X", tau, sep=""), "y")
lab <- c(list("0"),
         lapply(tau[-1], function(x)substitute(A*s[z], list(A=x))))
form <- formula(paste("y ~ ", paste(paste("X", tau, sep=""),
                                    collapse="+")))
library(latticeExtra)
xlabel <- expression(italic(x)*' ('*italic(z)*' with error)')
striplabel <- strip.custom(strip.names=TRUE,
                           var.name="SD(added err)",
                           sep=expression(" = "),
                           factor.levels=as.expression(lab))
gph <- xyplot(form, data=df, outer=TRUE, xlab=xlabel, strip=striplabel,
              type=c("p", "r"), layout=c(3,2))
gph+layer(panel.abline(15, 2.5, lty=2))
}
```

```
fig8.2 <- function(){
  gph <- errorsINx(gpdiff=4, , timesSDx=1.25, SDyerr=2.5, n=80, plotit=FALSE)$gph
```

```
  gph
}
```

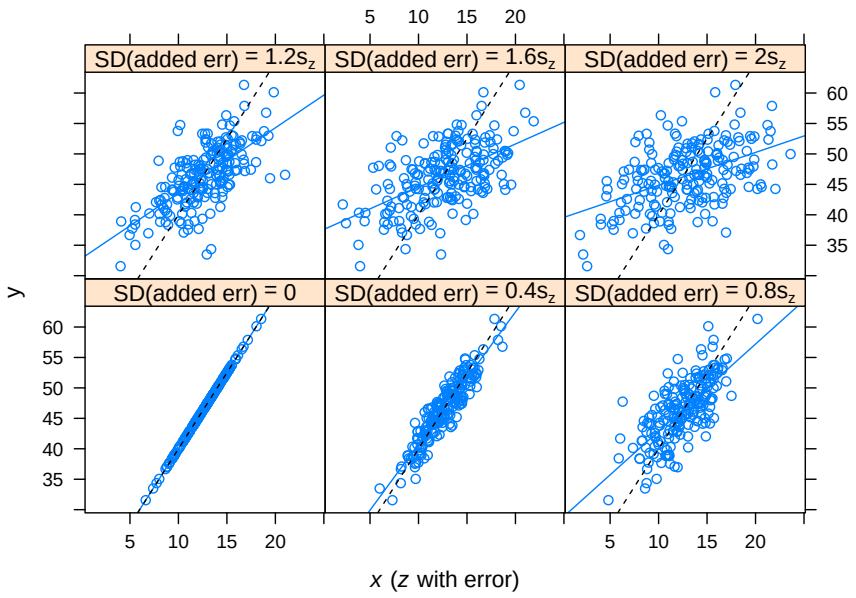
2 Show the Figures

Unless `doFigs` is found in the workspace and is `FALSE`, then subject to checks that all necessary datasets and packages are available, the figures are now shown.

```
if(!exists("doFigs")) doFigs <- TRUE
```

```
library(DAAG)
```

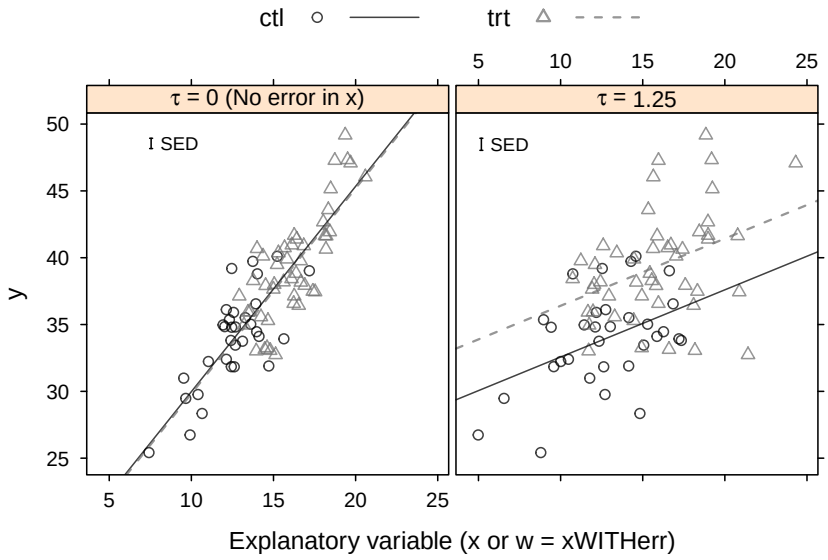
```
gph <- fig8.1()
print(gph)
```




```
set.seed(31)
gph <- fig8.2()
```

```
              Intercept:ctl Offset:trt  Slope
No error in x         14.61    -0.1483 1.5365
1.25sx                27.54     3.8331 0.5028
```

```
print(gph)
```


ctl
trt
τ = 0 (No error in x)
τ = 1.25
I SED
I SED
y
Explanatory variable (x or w = xWITHerr)