First of all, the dust data are loaded:

```r
> library(catdata)
> data(dust)
> attach(dust)
```

First, the subsample of non-smokers is considered. A main effect logit model yields the following results:

```r
> dustlogitnon1=glm(bronch ~ dust+years, family=binomial, data=dust[(dust$smoke==0),])
> summary(dustlogitnon1)
```

Call:

```r
glm(formula = bronch ~ dust + years, family = binomial, data = dust[(dust$smoke == 0),])
```

Deviance Residuals:

```
  Min       1Q   Median       3Q      Max
-1.0980  -0.6097  -0.4826  -0.3744   2.3608
```

Coefficients:

```
            Estimate Std. Error z value Pr(>|z|)
(Intercept) -3.157042   0.441537  -7.150 8.67e-13 ***
dust         0.005321   0.056392   0.094  0.925
years        0.053162   0.013159   4.040  5.34e-05 ***
```

---

Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 282.45  on 324  degrees of freedom
Residual deviance: 264.83  on 322  degrees of freedom
AIC: 270.83

Number of Fisher Scoring iterations: 5

The same model as above is used without observation 1245 which can be regarded as an outlier:
> dustlogitnon2 <- glm(bronch ~ dust+years, family=binomial, 
+ data=dust[(dust$smoke==0)&(dust$dust<10),])
> summary(dustlogitnon2)

Call:
glm(formula = bronch ~ dust + years, family = binomial, data = dust[(dust$smoke ==
0) & (dust$dust < 10), ])

Deviance Residuals:
Min 1Q Median 3Q Max
-1.1117 -0.6149 -0.4802 -0.3730 2.3607

Coefficients:
Estimate Std. Error z value Pr(>|z|)
(Intercept) -3.16577 0.44190 -7.164 7.84e-13 ***
dust 0.01200 0.05802 0.207 0.836
years 0.05293 0.01315 4.026 5.67e-05 ***
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 282.10 on 323 degrees of freedom
Residual deviance: 264.46 on 321 degrees of freedom
AIC: 270.46

Number of Fisher Scoring iterations: 5

The following calculations are based on the complete dataset. Therefore, main effect logit models are fitted for all observations and without observation 1246, respectively:

> dustlogit1 <- glm(bronch ~ dust+years+smoke, family=binomial, data=dust)
> summary(dustlogit1)

Call:
glm(formula = bronch ~ dust + years + smoke, family = binomial, data = dust)

Deviance Residuals:
Min 1Q Median 3Q Max
-1.3675 -0.7798 -0.5906 -0.3813 2.3022

Coefficients:
Estimate Std. Error z value Pr(>|z|)
(Intercept) -3.047872 0.248570 -12.262 < 2e-16 ***
dust 0.091888 0.023243 3.953 7.71e-05 ***
years 0.040155 0.006206 6.470 9.78e-11 ***
smoke 0.676844 0.174380 3.881 0.000104 ***
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1356.3 on 1244 degrees of freedom
Residual deviance: 1276.3 on 1241 degrees of freedom
AIC: 1284.3

Number of Fisher Scoring iterations: 4

> dustlogit2 <- glm(bronch ~ dust+years+smoke, family=binomial,
+                  data=dust[(dust$dust<20),])
> summary(dustlogit2)

Call:
glm(formula = bronch ~ dust + years + smoke, family = binomial,
    data = dust[(dust$dust < 20), ])  

Deviance Residuals:
            Min       1Q   Median       3Q      Max
-1.2998  -0.7799  -0.5875  -0.3795   2.3043

Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept) -3.06196   0.24915  -12.290  < 2e-16 ***
daust   0.09918   0.02391    4.149   3.34e-05 ***
years   0.03979   0.00621    6.404    1.51e-10 ***
smoke   0.68160   0.17453    3.905    9.40e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1356.8 on 1245 degrees of freedom
Residual deviance: 1278.3 on 1242 degrees of freedom
AIC: 1286.3

Number of Fisher Scoring iterations: 4