R journal examples

Smoking cessation example

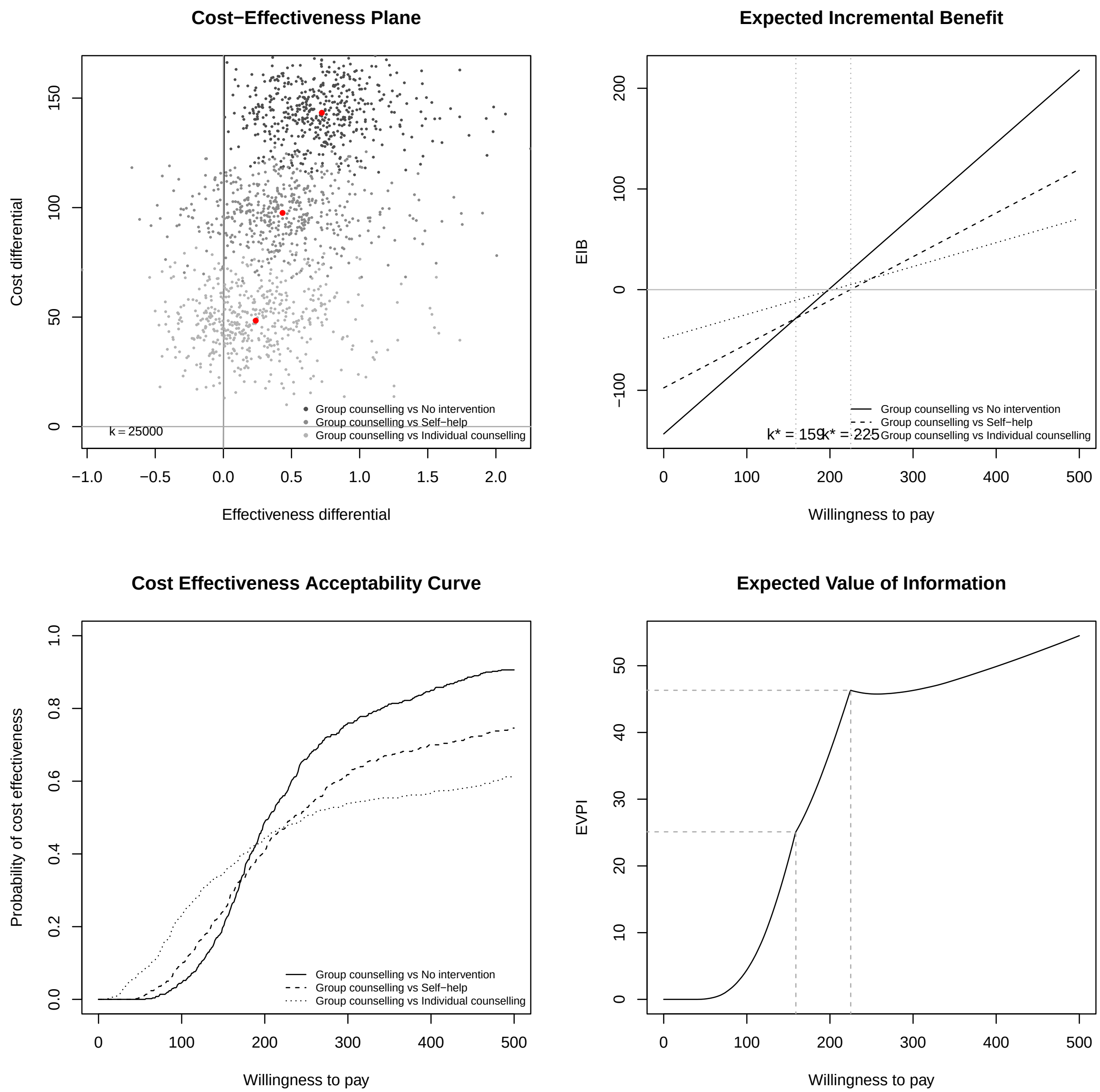
```
data(Smoking, package = "BCEA")

treats <- c("No intervention", "Self-help", "Individual counselling", "Group counselling")
bcea_smoke <- bcea(e, c, ref = 4, interventions = treats, Kmax = 500)
```

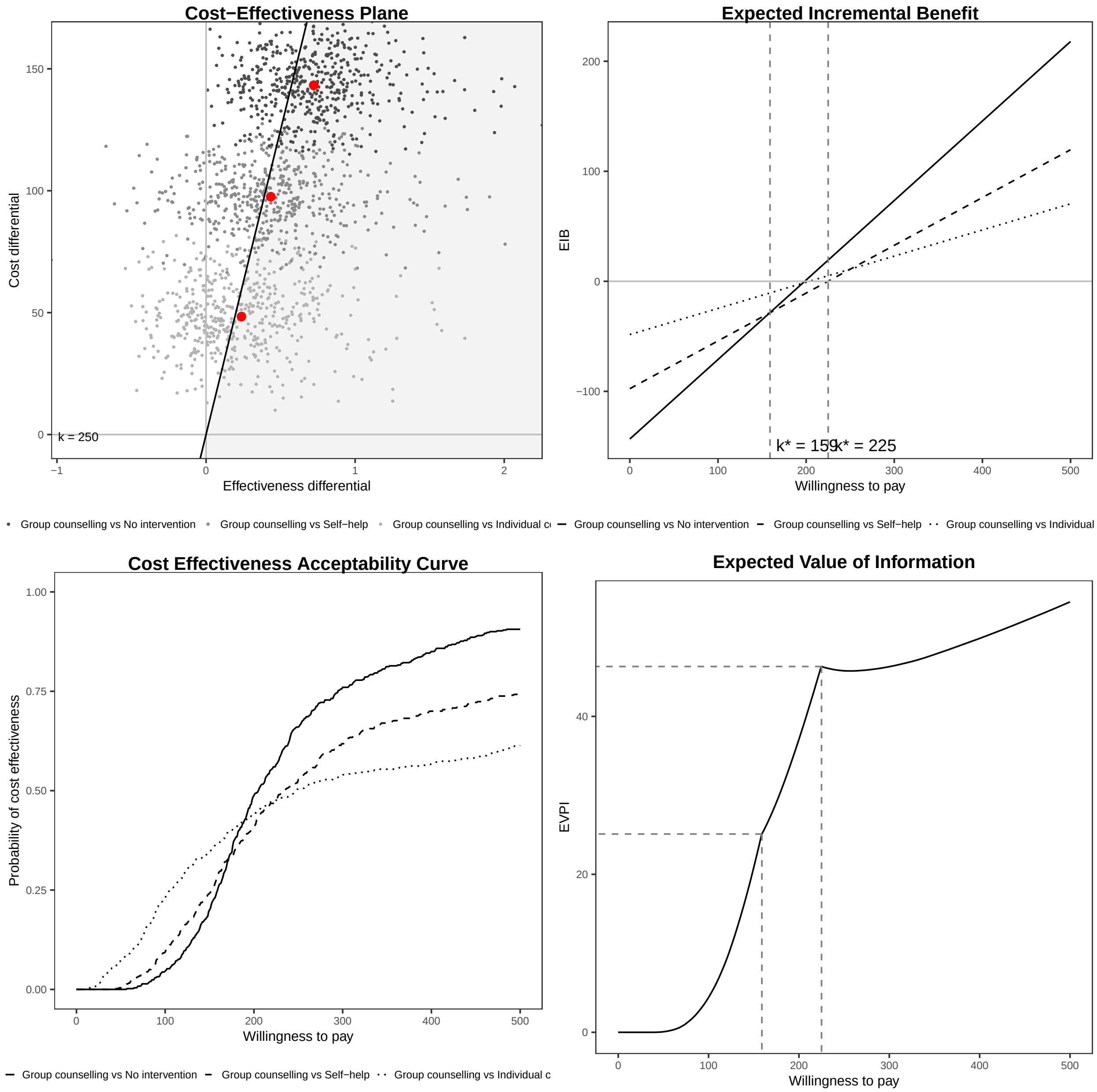
grid of plots

```
library(ggplot2)

plot(bcea_smoke)
```

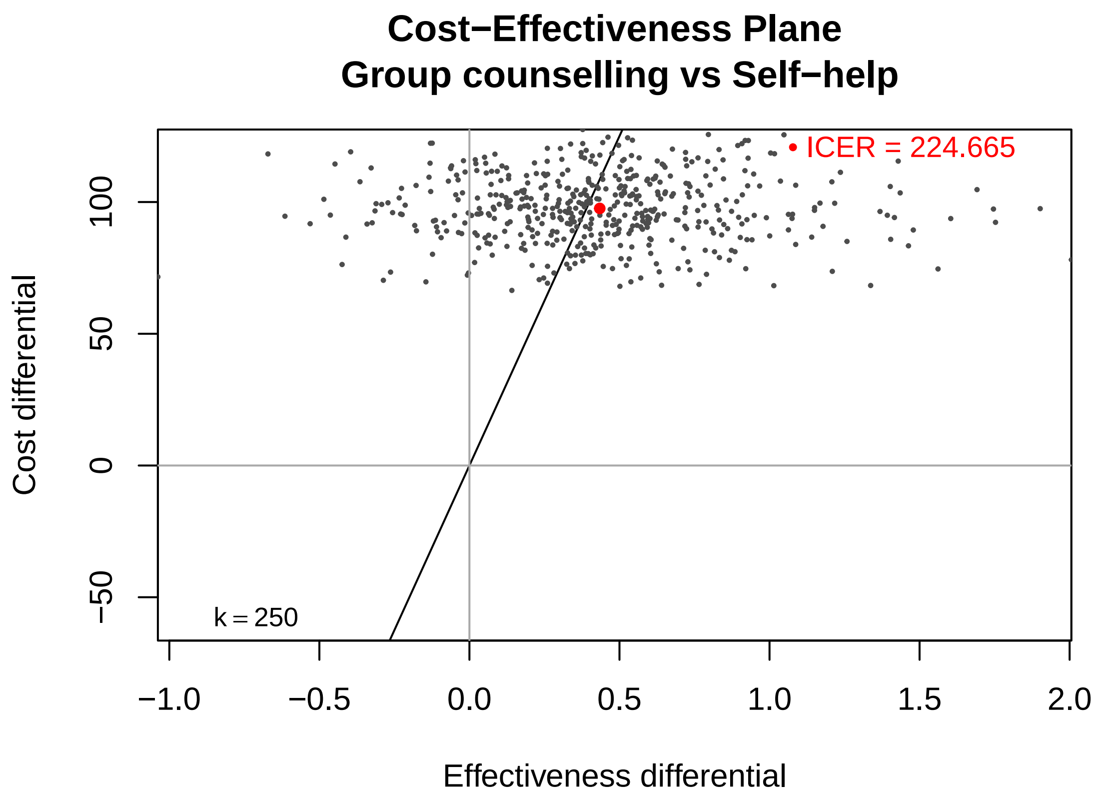



```
plot(bcea_smoke, graph = "ggplot2", wtp = 250, pos = TRUE, size = rel(2), ICER.size = 2)
```



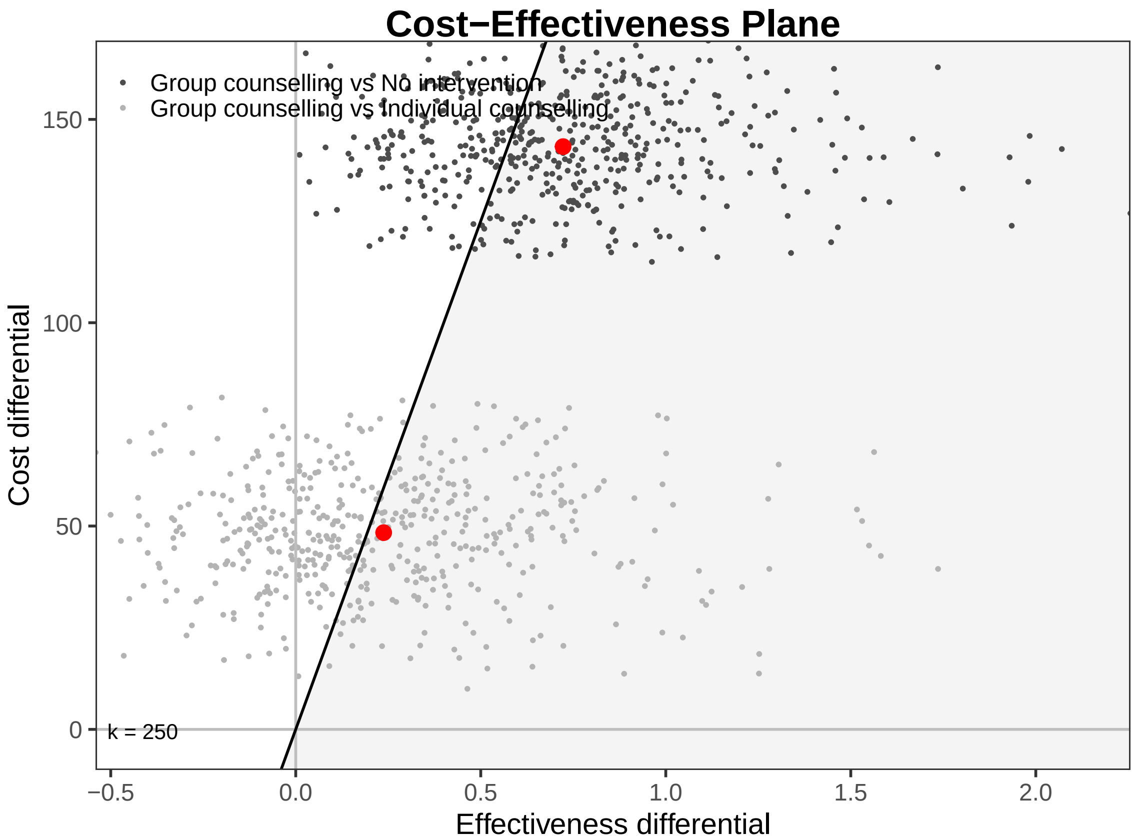
individual plots cost-effectiveness plane

```
ceplane.plot(bcea_smoke, comparison = 2, wtp = 250)
```



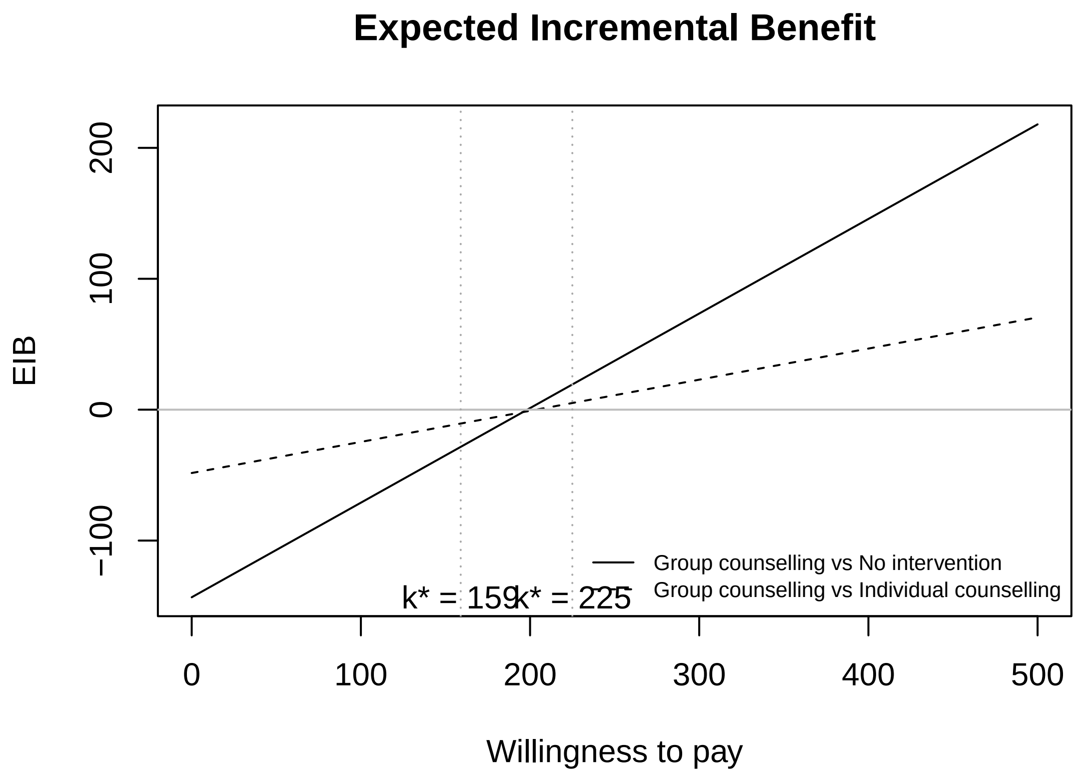

```
setComparisons(bcea_smoke) <- c(1,3)

ceplane.plot(bcea_smoke, wtp = 250, graph = "ggplot2")
```

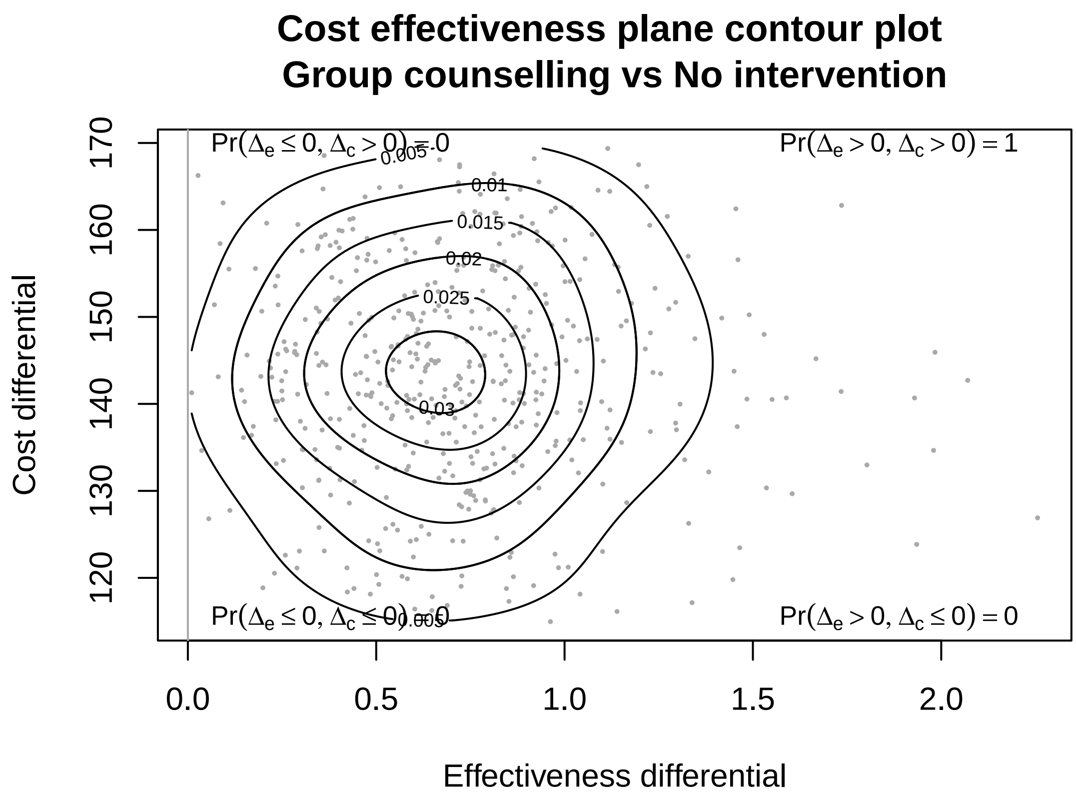


other plots

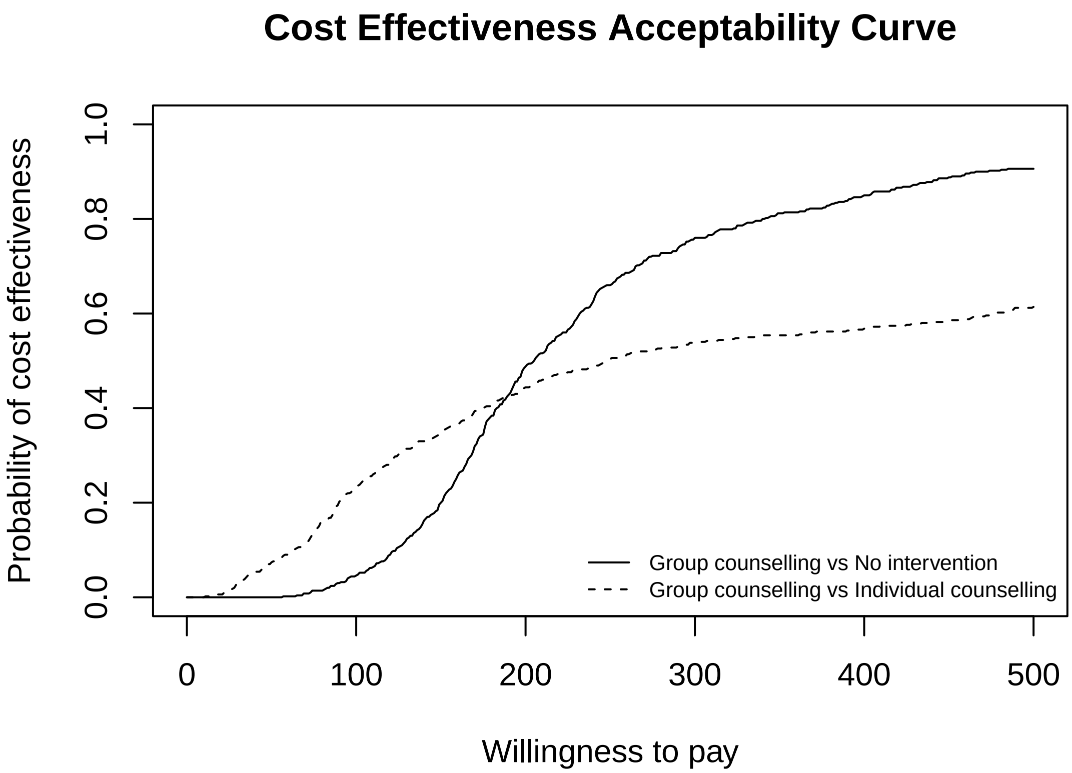
```
eib.plot(bcea_smoke)
```



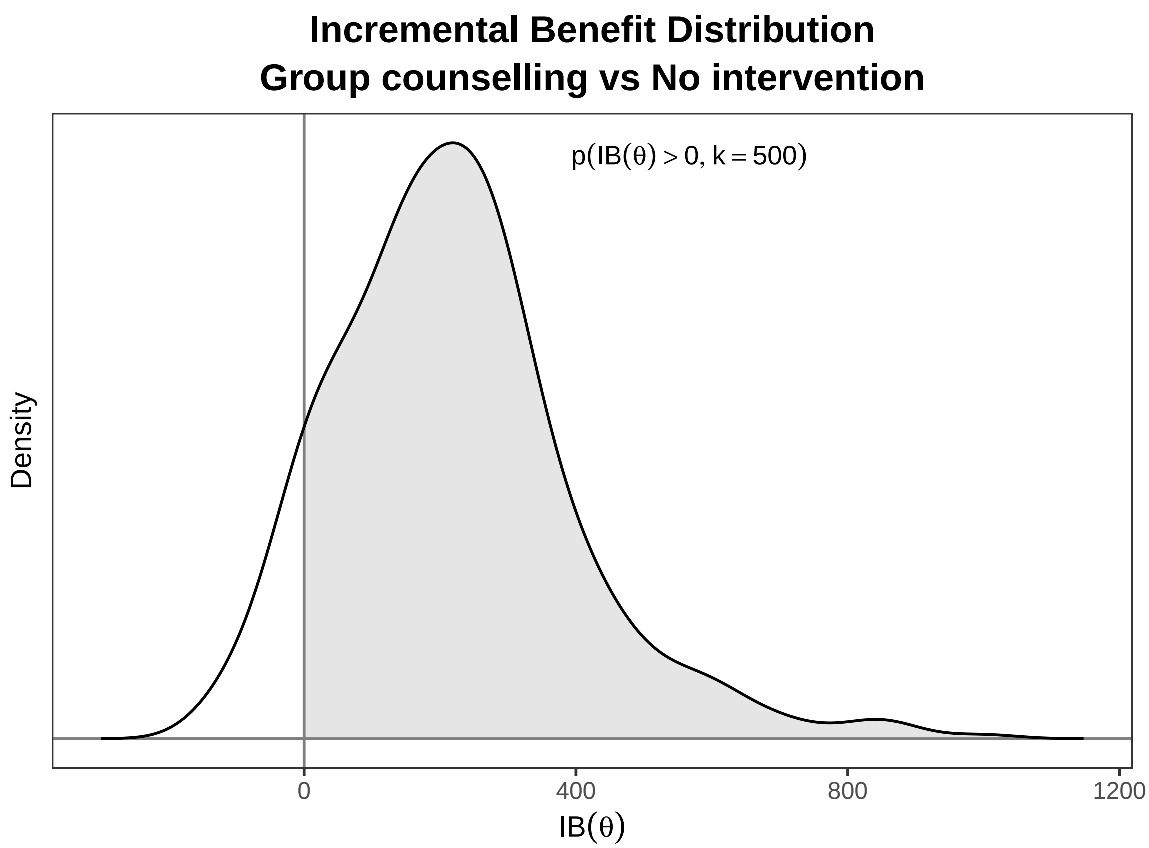

```
contour(bcea_smoke)
```



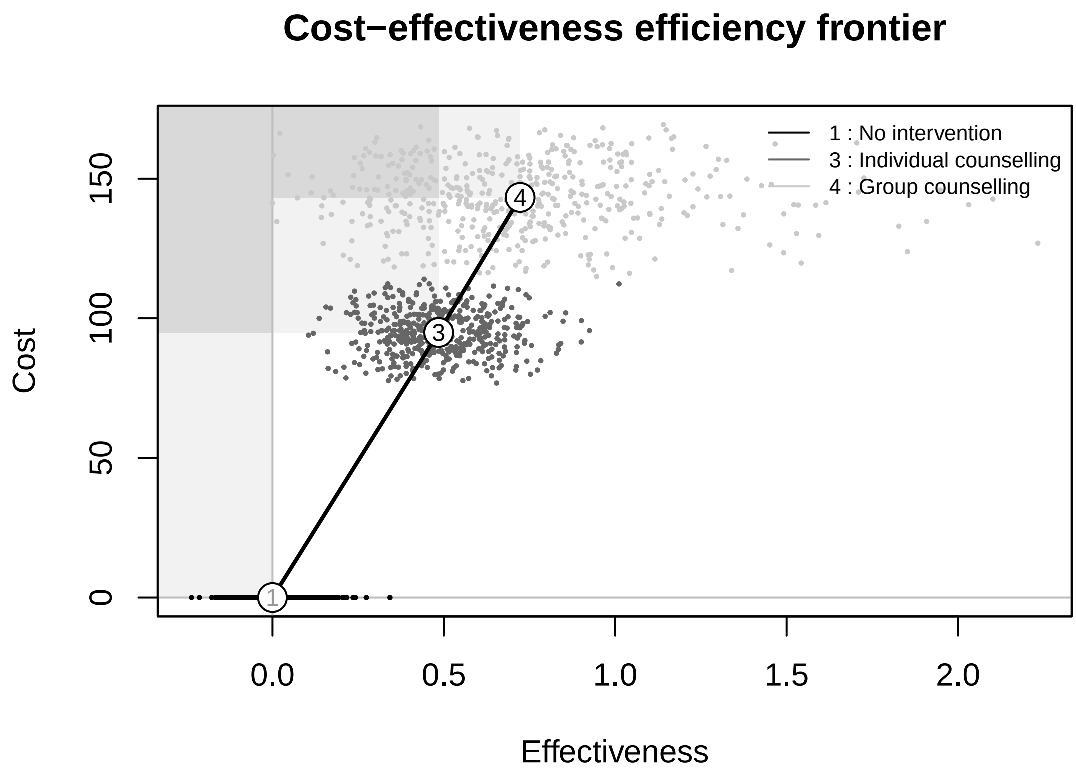

```
ceac.plot(bcea_smoke)
```




```
ib.plot(bcea_smoke)
#> NB: k (wtp) is defined in the interval [0 - 500]
```



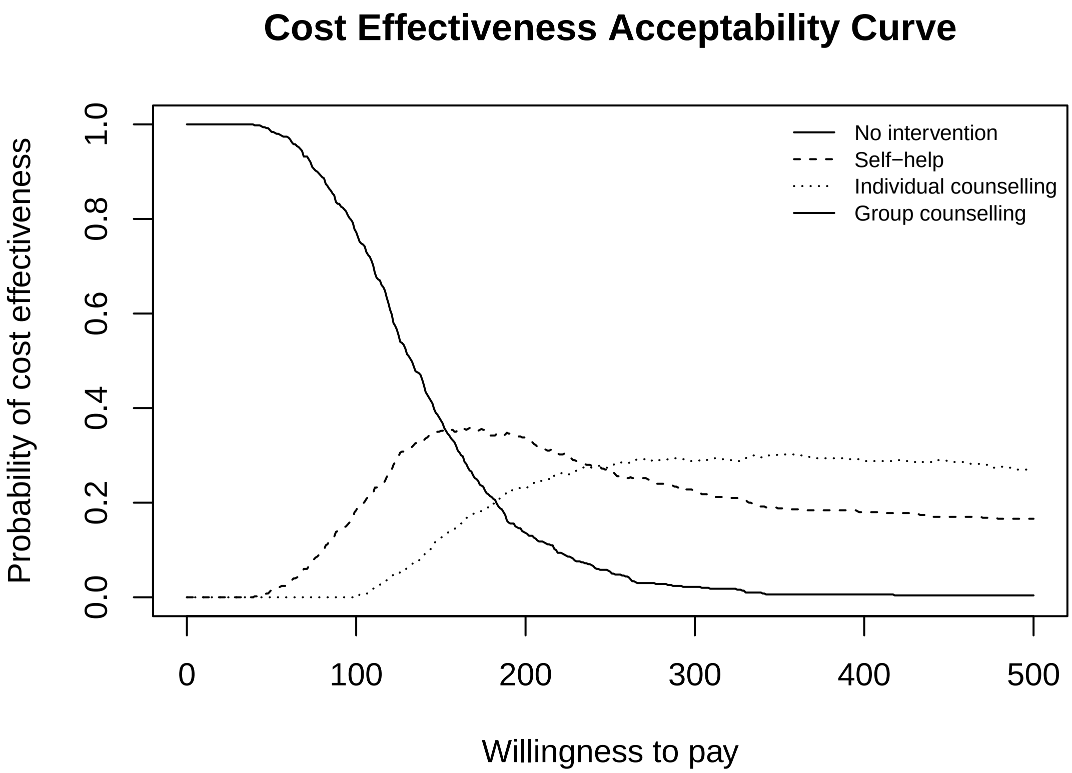

```
ceef.plot(bcea_smoke)
#>
#> Cost-effectiveness efficiency frontier summary
#>
#> Interventions on the efficiency frontier:
#>                         Effectiveness   Costs Increase slope Increase angle
#> Self-help                     0.48486  94.919         195.77         1.5657
#> Individual counselling        0.72252 143.301         203.57         1.5659
#>
#> Interventions not on the efficiency frontier:
#>                  Effectiveness Costs     Dominance type
#> No intervention              0     0 Extended dominance
```



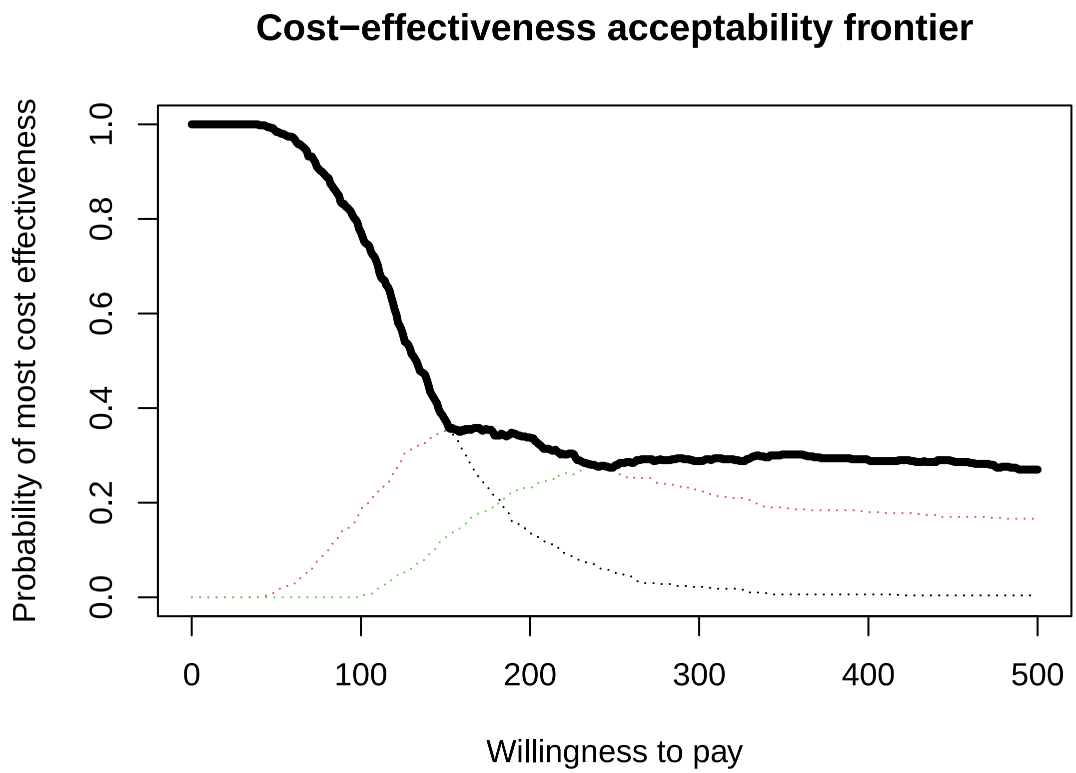
multiple simultaneous comparisons

```
bcea_smoke <- multi.ce(bcea_smoke)

ceac.plot(bcea_smoke, pos = "topright")
```

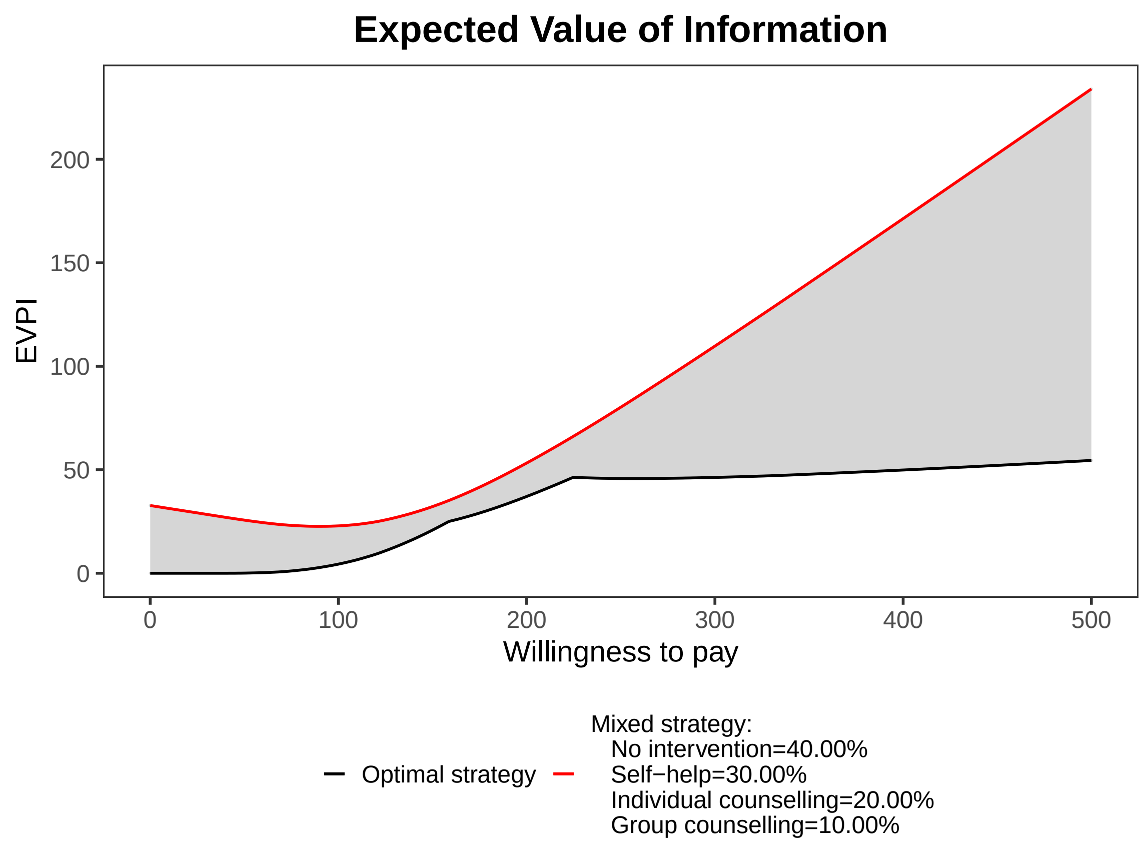



```
ceaf.plot(bcea_smoke)
```



mixed strategy

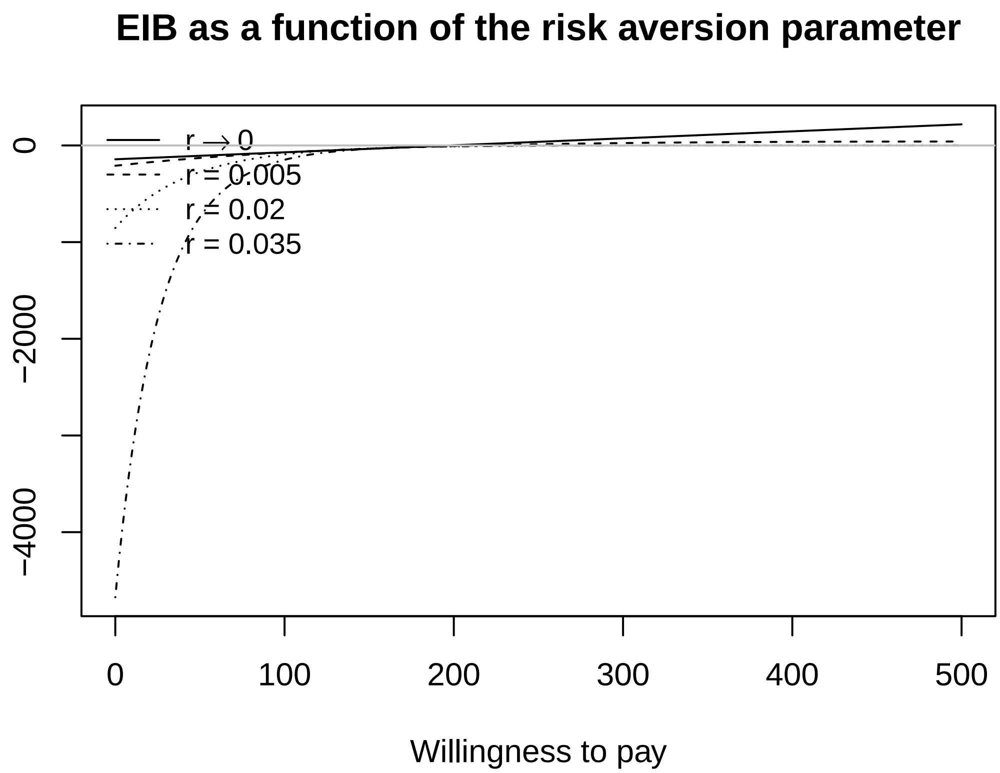
```
mixedAn(bcea_smoke) <- c(0.4, 0.3, 0.2, 0.1)
summary(bcea_smoke, wtp = 250)
#>
#> Analysis of mixed strategy for willingness to pay parameter k = 250
#>
#> Reference intervention: Group counselling (10.00% market share)
#> Comparator intervention(s): No intervention (40.00% market share)
#>                           : Individual counselling (20.00% market share)
#>
#> Loss in the expected value of information = 34.43
evi.plot(bcea_smoke, graph = "ggplot", pos = "b")
```



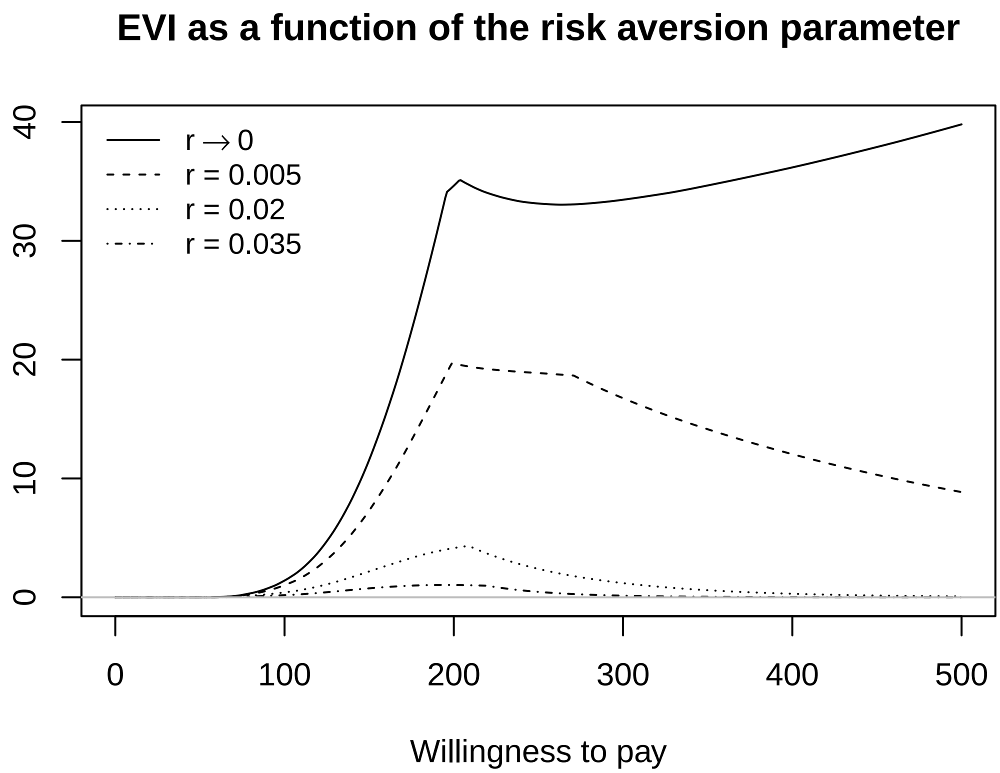
risk aversion

```
r <- c(0, 0.005, 0.020, 0.035)
CEriskav(bcea_smoke) <- r

plot(bcea_smoke)
```



EIB as a function of the risk aversion parameter
r → 0
r = 0.005
r = 0.02
r = 0.035
0
−2000
−4000
0
100
200
300
400
500
Willingness to pay



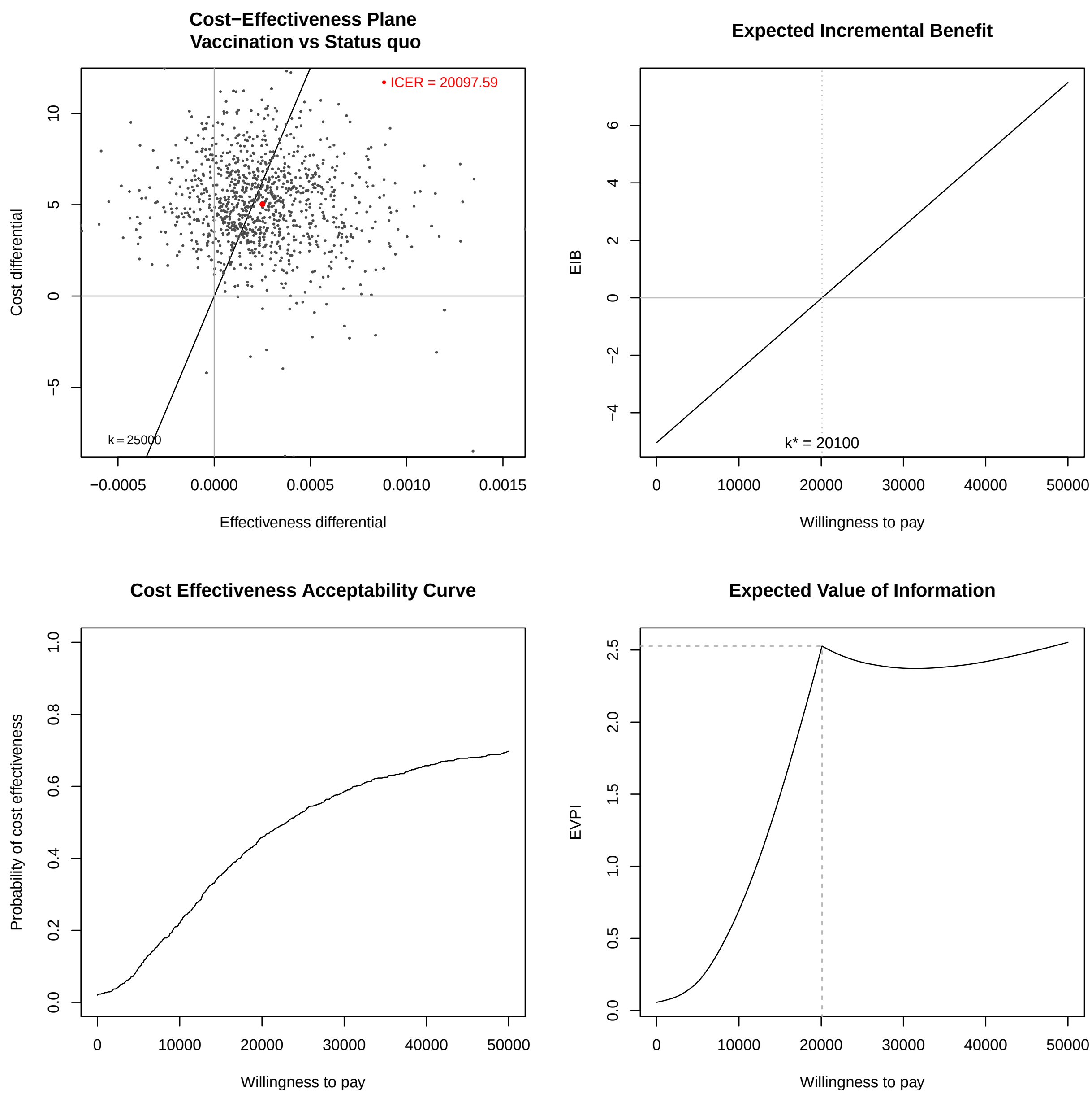
Influenza vaccine data

```
data(Vaccine)

treats <- c("Status quo", "Vaccination")
bcea_vacc <- bcea(e, c, ref = 2, interventions = treats)
```

grid of plots

```
plot(bcea_vacc)
```



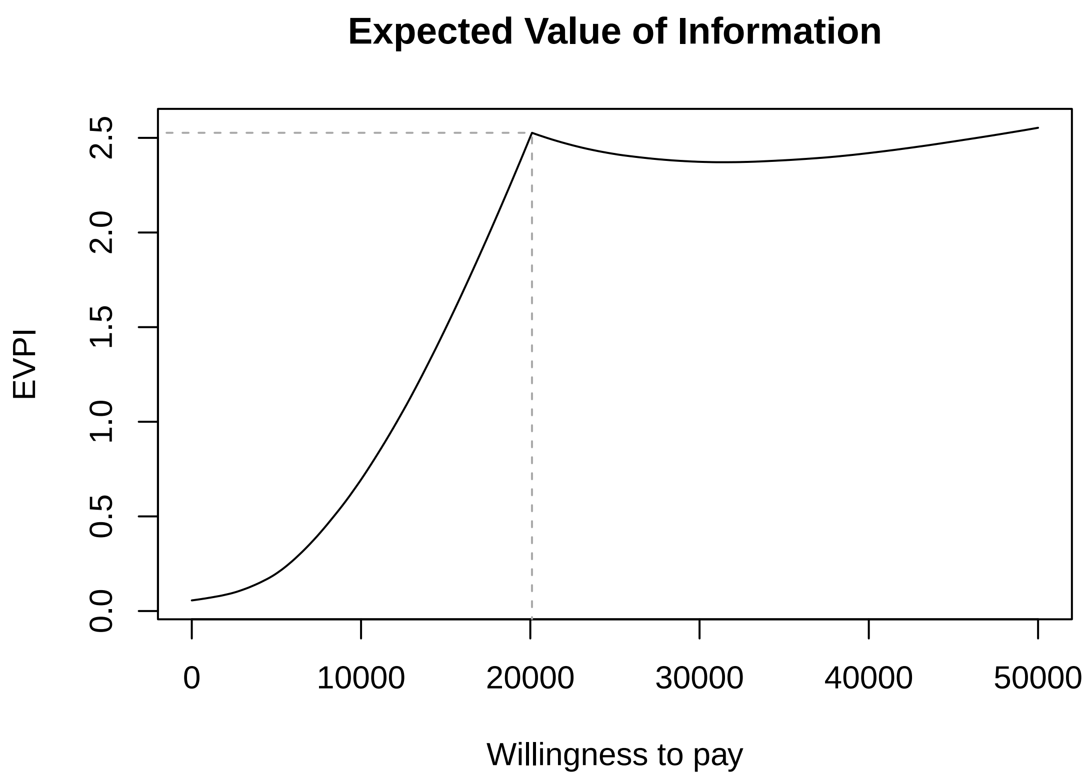
summary output

```
summary(bcea_vacc, wtp = 10000)
#>
#> Cost-effectiveness analysis summary
#>
#> Reference intervention:  Vaccination
#> Comparator intervention: Status quo
#>
#> Optimal decision: choose Status quo for k < 20100 and Vaccination for k >= 20100
#>
#>
#> Analysis for willingness to pay parameter k = 10000
#>
```

```
#>              Expected utility
#> Status quo            -36.054
#> Vaccination           -34.826
#>
#>                                EIB  CEAC  ICER
#> Vaccination vs Status quo 1.2284 0.529 20098
#>
#> Optimal intervention (max expected utility) for k = 10000: Status quo
#>
#> EVPI 3.0287
head(sim_table(bcea_vacc, wtp = 25000)$Table)
#>          U1        U2        U*      IB2_1       OL         VI
#> 1 -36.57582 -38.71760 -36.57582 -2.1417866 2.141787  -1.135907
#> 2 -27.92514 -27.67448 -27.67448  0.2506573 0.000000   7.765431
#> 3 -28.03024 -33.37394 -28.03024 -5.3436963 5.343696   7.409665
#> 4 -53.28408 -47.13734 -47.13734  6.1467384 0.000000 -11.697432
#> 5 -43.58389 -40.40469 -40.40469  3.1791976 0.000000  -4.964782
#> 6 -42.37456 -33.08547 -33.08547  9.2890987 0.000000   2.354444
```

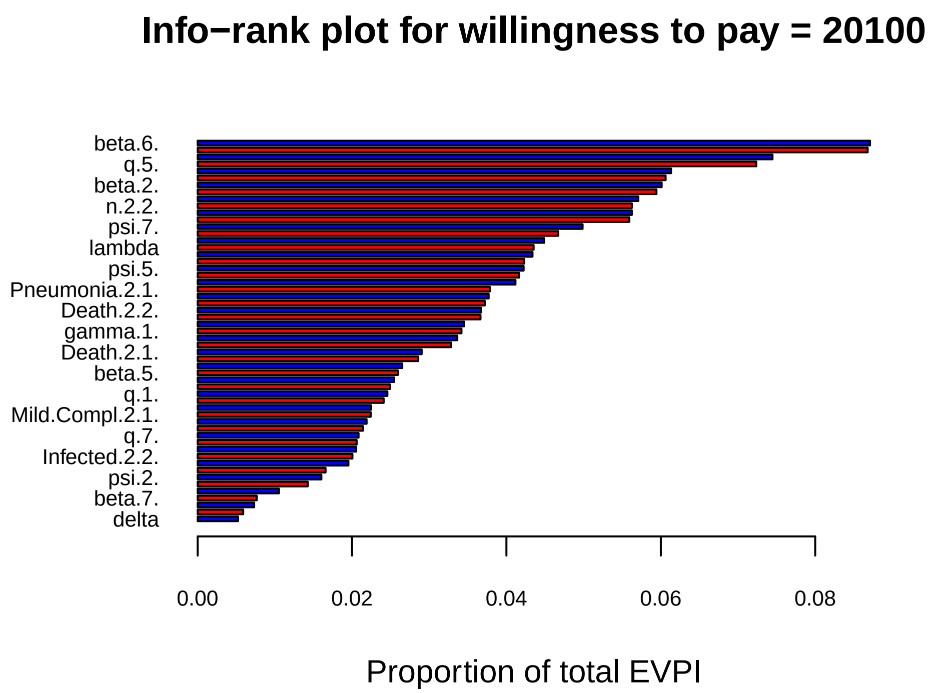
value of information

```
evi.plot(bcea_vacc)
```

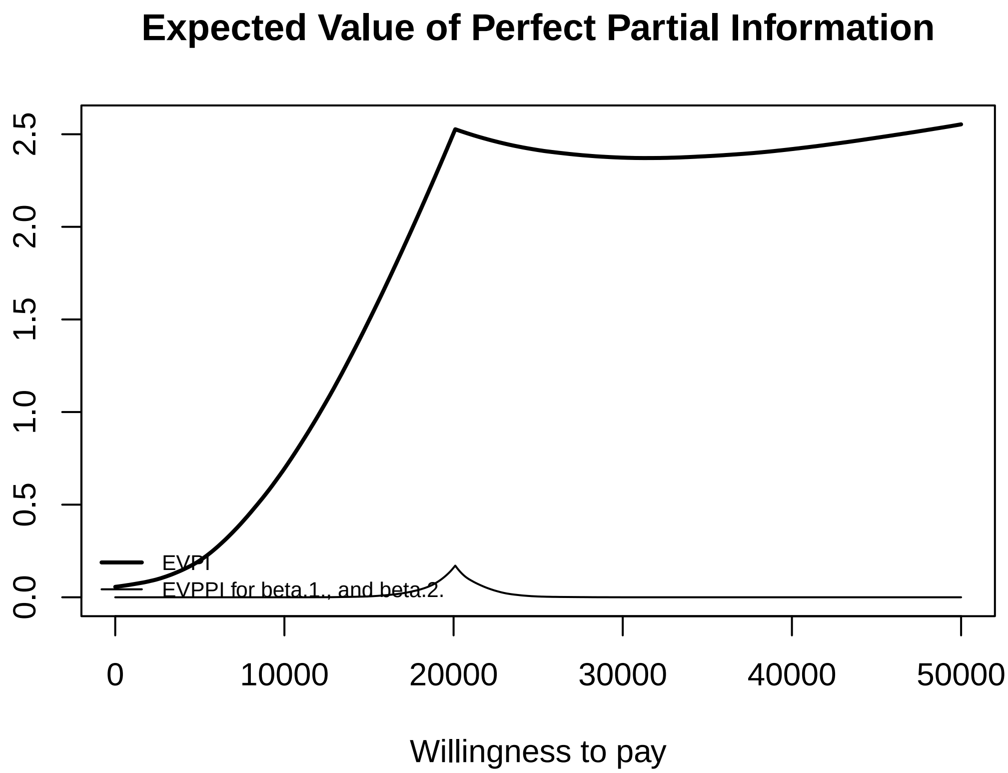



```
inp <- createInputs(vaccine, print_is_linear_comb = FALSE)
```

```
info.rank(bcea_vacc, inp)
```




```r
EVPPI <- evppi(bcea_vacc, c("beta.1.", "beta.2."), inp$mat)
#> [1] "method: GAM" "method: GAM"
#>
#> Calculating fitted values for the GAM regression
#>
#> Calculating fitted values for the GAM regression
#> Calculating EVPPI
plot(EVPPI)
```


Expected Value of Perfect Partial Information
0.0
0.5
1.0
1.5
2.0
2.5
EVPI
EVPPI for beta.1., and beta.2.
0
10000
20000
30000
40000
50000
Willingness to pay