Exploration of subsets

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```
table(ds1$country, ds1$incorp)
```

```
##
##       none
##   CH   45
##   DK   87
##   FR   11
##   IE   49
##   NL  218
##   UK  109
```

```
dim(ds1)
```

```
## [1] 519 161
```

Main calibration set:

```
table(ds2$country, ds2$app.mthd)
```

```
##
##       bsth bc ts os
##   CH    12 27  5  1
##   DK    53  9  0 17
##   FR     2  4  1  0
##   IE    18  8 23  0
##   NL     3 69 22 66
##   UK    63  0 46  0
```

```
dim(ds2)
```

```
## [1] 449 161
```

```
dim(d2)
```

```
## [1] 5514  204
```

For closed slot:

```
table(ds2cs$country, ds2cs$app.mthd)
```

```
##
##       cs
##   DK  4
##   NL  4
```

```
table(ds2cs$country, ds2cs$meas.tech2)
```

```
##
```

```
##       micro met cps
##   DK         0   4
##   NL         4   0
```

```r
dim(ds2cs)
```

```
## [1]   8 161
```

```r
dim(d2cs)
```

```
## [1]  56 201
```

For incorporation effects:

```r
table(ds4$country, ds4$app.mthd:ds4$incorp)
```

```
##
##      bsth:none bsth:shallow bsth:deep bc:none bc:shallow bc:deep
##   DK         4            8         0       0          0       0
##   FR         2            2         0       4          4       0
##   NL         0            0         0      16         25       3
```

```r
dim(ds4)
```

```
## [1]  68 161
```

For all calibration data.

```r
dscal <- unique(rbind(ds2, ds2cs, ds4))
table(dscal$meas.tech2)
```

```
##
## micro met       cps   chamber
##       503        14         2
```

```r
table(dscal$country, dscal$meas.tech2)
```

```
##
##       micro met cps chamber
##   CH         45   0       0
##   DK         79  14       2
##   FR         13   0       0
##   IE         49   0       0
##   NL        208   0       0
##   UK        109   0       0
```

```r
table(dscal$inst, dscal$meas.tech2)
```

```
##
##       micro met cps chamber
##   104        28   0       0
##   106        86   0       0
##   202       109   0       0
##   204        17   0       0
##   205        34   0       0
##   207        45   0       0
##   208        13   0       0
##   210         3   0       0
##   211         0  14       2
##   212        49   0       0
##   214       119   0       0
```

```r
dim(dscal)
```

```
## [1] 519 161
```

Look at interval duration info.

```r
names(d2)
```

```
##   [1] "inst"              "eid"
##   [3] "pid"               "pmid"
##   [5] "oid"               "database"
##   [7] "proj"              "exper"
##   [9] "exper2"            "institute"
##  [11] "country"           "file"
##  [13] "row.in.file"       "pub.id"
##  [15] "pub.info"          "lat"
##  [17] "long"              "topo"
##  [19] "field"             "plot"
##  [21] "plot.area"         "treat"
##  [23] "rep"               "rep2"
##  [25] "interval"          "t.start"
##  [27] "t.end"             "t.start.orig"
##  [29] "t.end.orig"        "dt"
##  [31] "dt.calc"           "dt.diff"
##  [33] "ct"                "mt"
##  [35] "cta"               "meas.tech"
##  [37] "meas.tech2"        "meas.tech.orig"
##  [39] "bg.dl"             "bg.val"
##  [41] "bg.unit"           "j.NH3"
##  [43] "j.rel"             "e.int"
##  [45] "e.cum"             "e.rel"
##  [47] "clay"              "silt"
##  [49] "sand"              "oc"
##  [51] "soil.type"         "soil.type2"
##  [53] "soil.water"        "soil.moist"
##  [55] "soil.ph"           "soil.dens"
##  [57] "crop.res"          "till"
##  [59] "air.temp"          "air.temp.z"
##  [61] "soil.temp"         "soil.temp.z"
##  [63] "rad"               "wind"
##  [65] "wind.z"            "wind.2m"
##  [67] "wind.loc"          "rain"
##  [69] "rain.rate"         "rain.cum"
##  [71] "rh"                "far.loc"
##  [73] "man.source"        "man.source.orig"
##  [75] "man.bed"           "man.con"
##  [77] "man.trt1"          "man.trt2"
##  [79] "man.stor"          "man.dm"
##  [81] "man.tkn"           "man.tan"
##  [83] "acid"              "man.tic"
##  [85] "man.ua"            "man.ph"
##  [87] "man.freeNH3"       "man.eq.gasNH3"
##  [89] "date.start"        "app.start"
##  [91] "app.start.orig"    "app.mthd"
##  [93] "app.mthd2"         "app.mthd.orig"
```

```
##   [95] "app.rate"              "tan.app"
##   [97] "incorp"                "incorp.orig"
##   [99] "time.incorp"           "man.area"
## [101] "dist.inj"               "furrow.z"
## [103] "furrow.w"               "crop"
## [105] "crop.orig"              "crop.z"
## [107] "crop.area"              "lai"
## [109] "notes"                  "flag"
## [111] "missingair.temp"        "missingwind"
## [113] "er"                     "lwind"
## [115] "lapp.rate"              "lman.tan"
## [117] "man.source.cat"         "man.source.conc"
## [119] "man.source.mink"        "man.source.mix"
## [121] "man.source.none"        "man.source.other"
## [123] "man.source.pig"         "man.source.poultry"
## [125] "man.source.sludge"      "app.mthd.bc"
## [127] "app.mthd.bss"           "app.mthd.bsth"
## [129] "app.mthd.cs"            "app.mthd.os"
## [131] "app.mthd.pi"            "app.mthd.ts"
## [133] "app.mthd2.band"         "app.mthd2.bc"
## [135] "app.mthd2.cs"           "app.mthd2.os"
## [137] "soil.type.clay"         "soil.type.clay.loam"
## [139] "soil.type.loam"         "soil.type.loamy.sand"
## [141] "soil.type.organic"      "soil.type.sand"
## [143] "soil.type.sandy loam"   "soil.type.sandy.clay.loam"
## [145] "soil.type.sandy.loam"   "soil.type.silt loam"
## [147] "soil.type.silt.loam"    "soil.type.silty clay loam"
## [149] "soil.type.silty.clay"   "soil.type.silty.clay.loam"
## [151] "soil.type2.clay"        "soil.type2.loam"
## [153] "soil.type2.organic"     "soil.type2.sand"
## [155] "crop.bare soil"         "crop.cereal"
## [157] "crop.grass"             "crop.maize"
## [159] "crop.other"             "crop.stubble"
## [161] "crop.any"               "incorp.deep"
## [163] "incorp.none"            "incorp.shallow"
## [165] "crop.app.mthd.bc"       "crop.app.mthd.bsth"
## [167] "crop.app.mthd.ts"       "grass.hght"
## [169] "cereal.hght"            "bsth.grass.hght"
## [171] "bsth.cereal.hght"       "ts.grass.hght"
## [173] "ts.cereal.hght"         "bc.grass.hght"
## [175] "bc.cereal.hght"         "app.rate.os"
## [177] "app.rate.cs"            "app.rate.ni"
## [179] "country.UK"             "country.NO"
## [181] "country.IT"             "country.DK"
## [183] "country.NL"             "country.CH"
## [185] "country.SE"             "country.CA"
## [187] "country.DE"             "country.FR"
## [189] "country.IE"             "country.US"
## [191] "rain.cum.tot"           "exper.code"
## [193] "ct.168"                 "ct.72"
## [195] "ct.48"                  "ct.24"
## [197] "ct.0"                   "ct.max.200"
## [199] "ct.max"                 "pmid.d2"
## [201] "weightp"                "weightc"
```
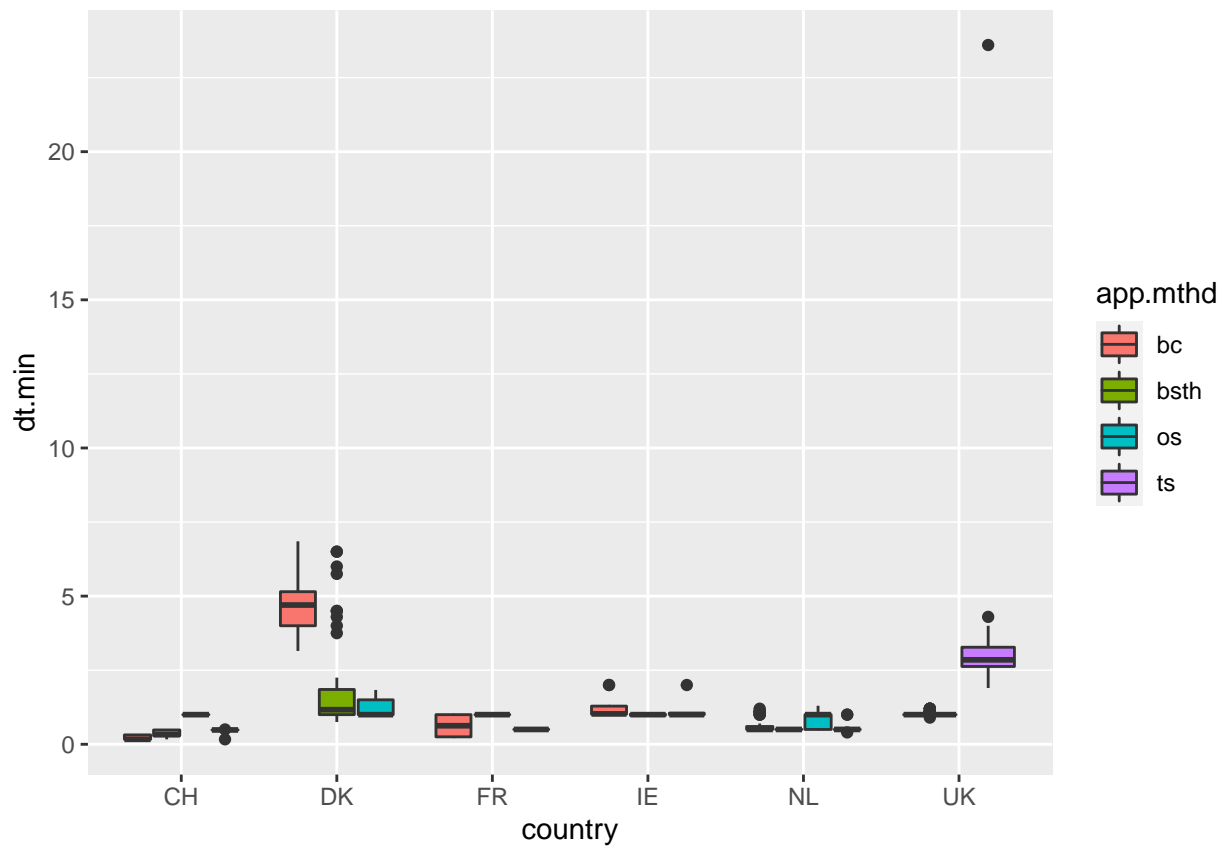
```
## [203] "weightca"                    "weightcas"
```

```r
d2i <- as.data.frame(summarise(group_by(d2, inst, country, man.source, app.mthd, pmid), dt.mx = max(dt[
                               dt.mean = mean(dt[ct <= 24]), dt.med = median(dt[ct <= 24])))
```

```
## `summarise()` has grouped output by 'inst', 'country', 'man.source', 'app.mthd'. You can override us
```

```r
ggplot(d2i, aes(country, dt.mean, fill = app.mthd)) +
  geom_boxplot()
```
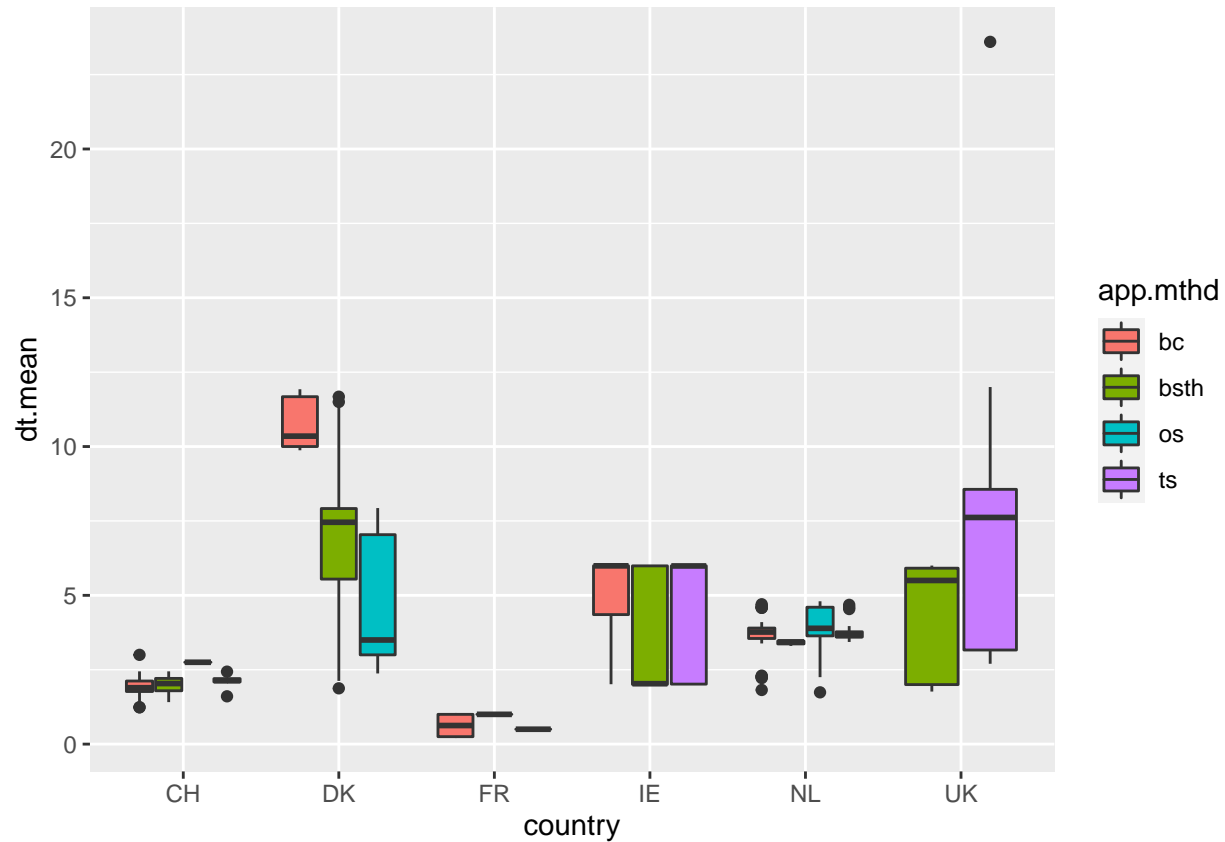


```r
ggplot(d2i, aes(country, dt.min, fill = app.mthd)) +
  geom_boxplot()
```

```
ggplot(d2, aes(ct, dt, colour = country, group = pmid)) +
  xlim(0, 10) +
  ylim(0, 7) +
  geom_point() +
  geom_line(alpha = 0.2)
```

Warning: Removed 3733 rows containing missing values (geom_point).

Warning: Removed 3733 row(s) containing missing values (geom_path).
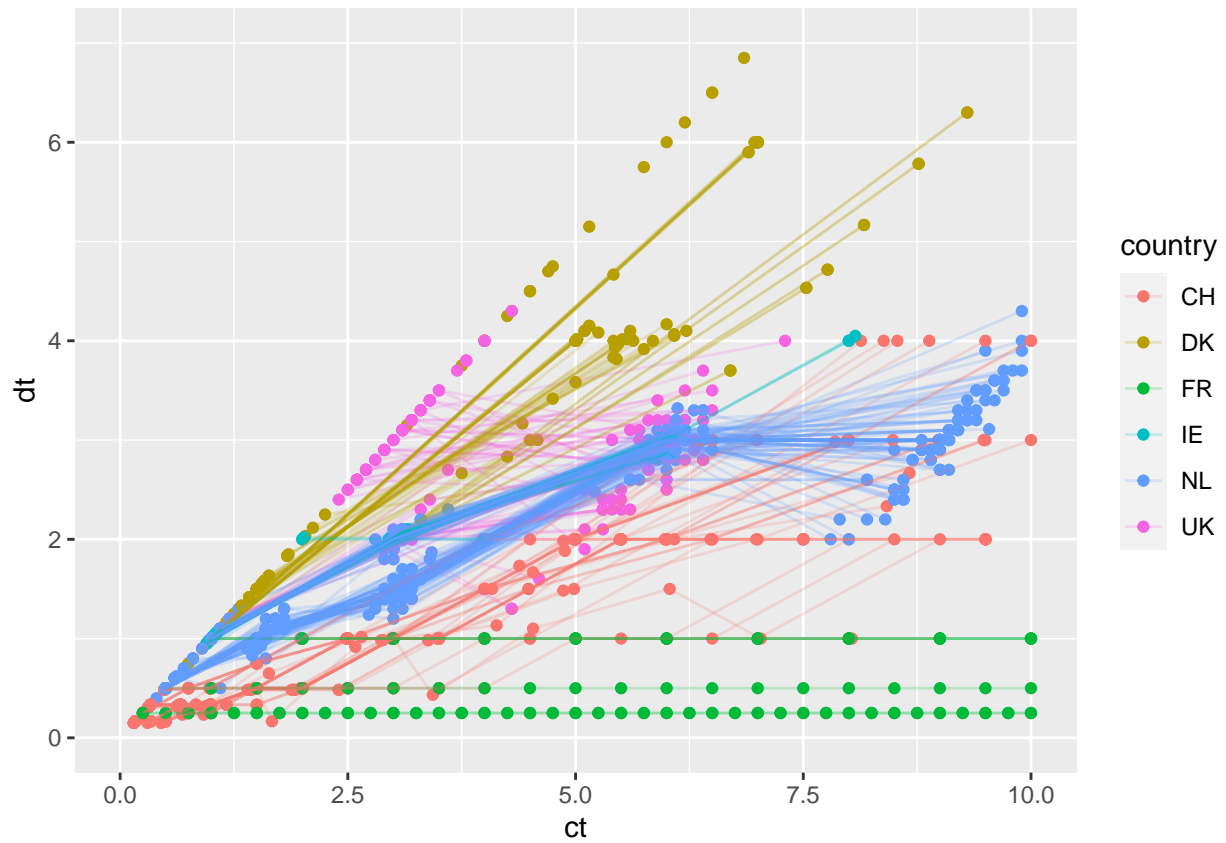
Application methods–closed slot

```r
ggplot(ds1, aes(app.mthd, e.rel.final, fill = country)) +
  geom_boxplot() +
  facet_wrap(~ man.source)
```
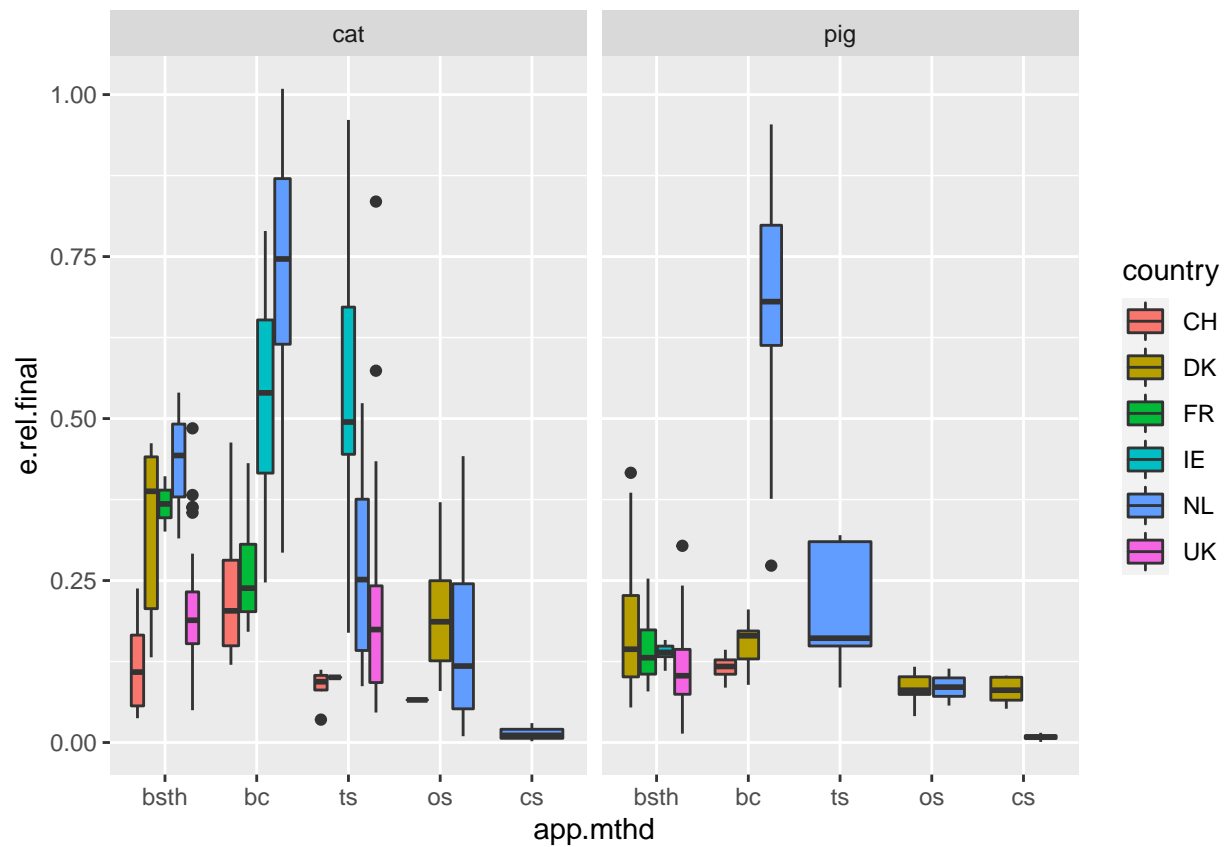
```
ggplot(subset(ds1, app.mthd == 'cs'), aes(country, e.rel.final, fill = country)) +
  geom_boxplot() +
  facet_wrap(~ man.source)
```
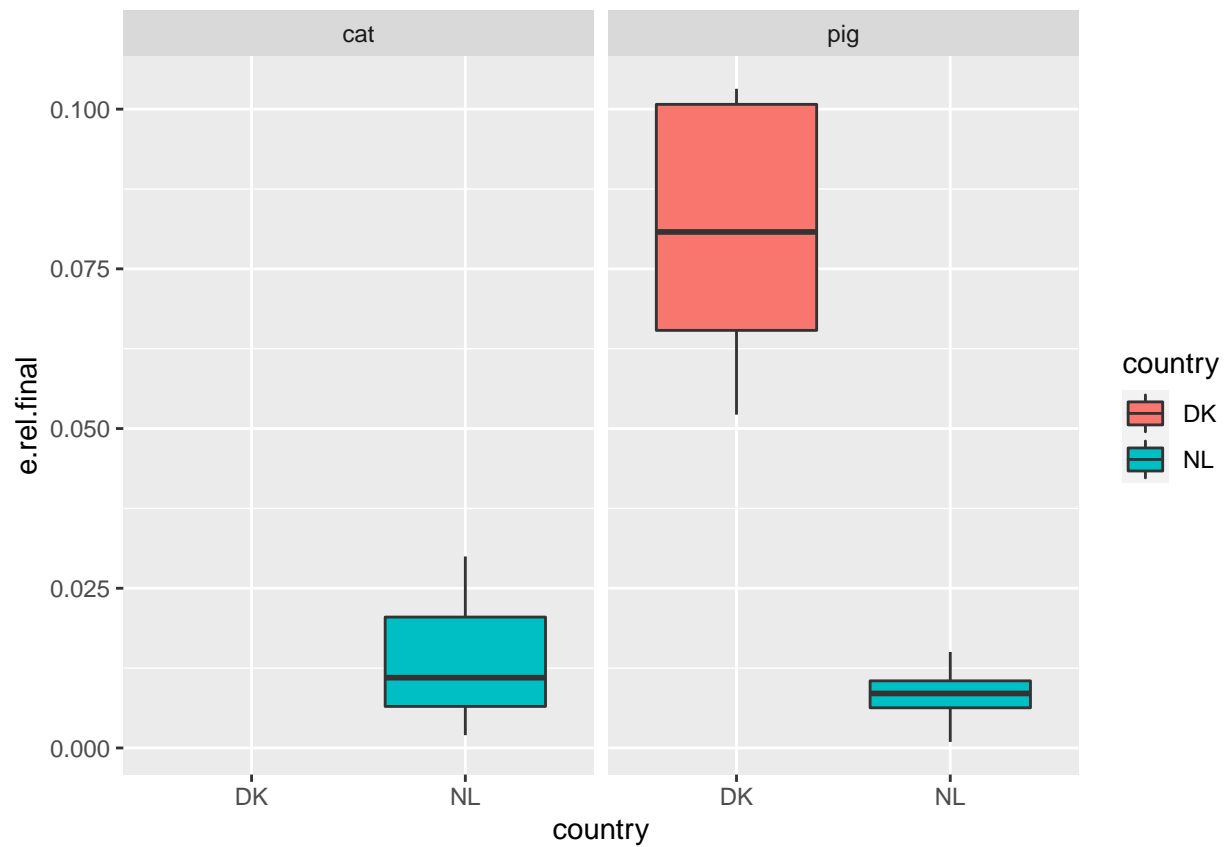
```
ggplot(subset(d1, app.mthd %in% c('os', 'cs') & country != 'CH'), aes(ct, er, colour = app.mthd, group =
  geom_line() +
  facet_grid(country ~ man.source)
```
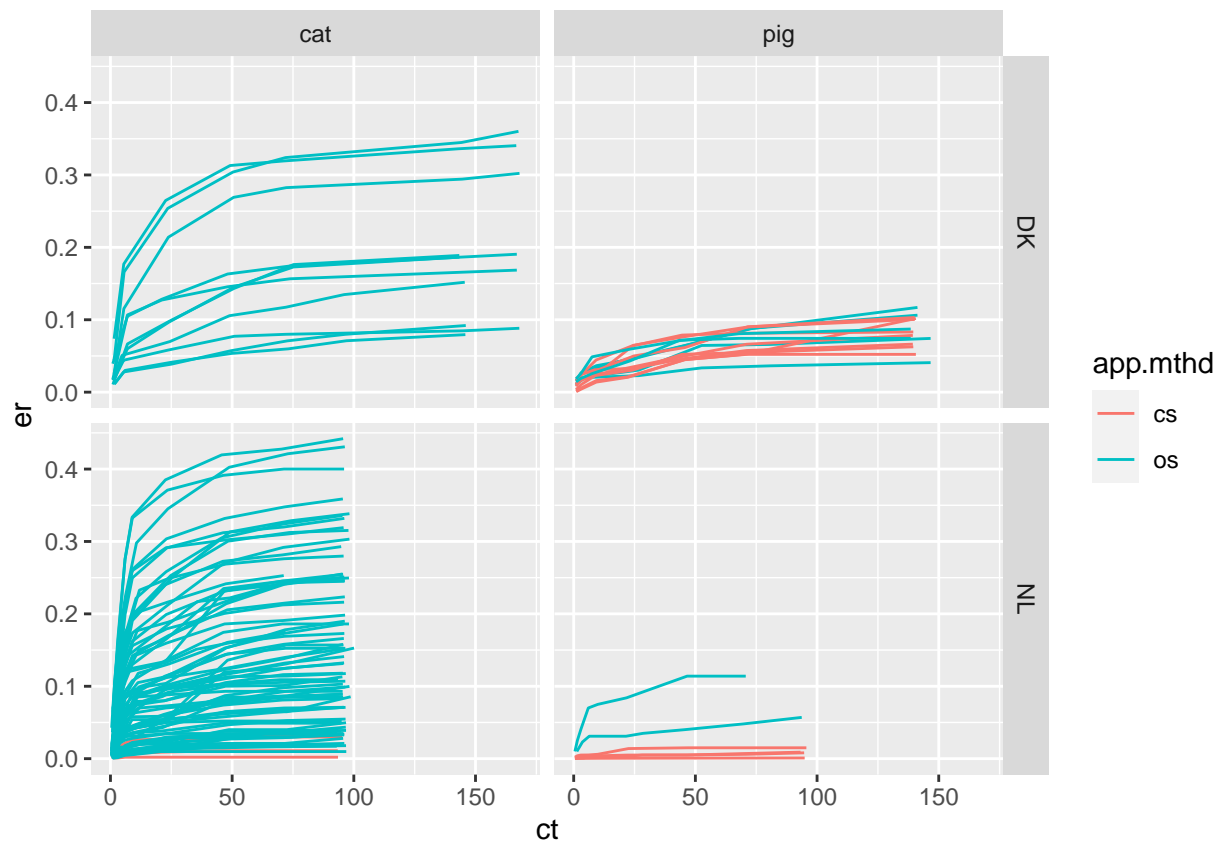
```
ggplot(xx <- subset(ds1, app.mthd == 'cs'), aes(interaction(country, exper, man.source), e.rel.final, co
  geom_point() +
  theme(axis.text.x = element_text(angle = 90))
```

```
  #geom_jitter(height = 0)
unique(xx$notes)
```

```
## [1] NA  Incorporation (incorp/incorp.orig) not entered and was assumed to be none.
## [2]
## 15 Levels:  ... NA  Incorporation (incorp/incorp.orig) not entered and was assumed to be none.
```

```
unique(xx[, c('country', 'file')])
```

```
##      country                        file
## 479       NL                 ALFAM1.xlsx
## 1236      DK           ALFAM2_AU_v5.xlsx
## 1758      NL ALFAM2_data_NL_arable01_v3.xlsx
```

```
ggplot(xx <- subset(ds2, app.mthd == 'cs'), aes(interaction(country, exper, man.source), e.rel.final, c
  geom_point() +
  theme(axis.text.x = element_text(angle = 90))
```

e.rel.final

interaction(country, exper, man.source)

```
  #geom_jitter(height = 0)
unique(xx$notes)
```

```
## factor(0)
## 13 Levels:  ... NA  Incorporation (incorp/incorp.orig) not entered and was assumed to be none.
```

```
unique(xx[, c('country', 'file')])
```

```
## [1] country file
## <0 rows> (or 0-length row.names)
```

```
table(ds1$exper, ds1$app.mthd)
```

```
##
##              bsth bc ts os cs
##    1            1  7 10  0  0
##    10           1  0  0  0  0
##    11           0  1  0  0  0
##    12           1  0  0  0  0
##    13           0  1  0  0  0
##    14           1  0  0  0  0
##    15           0  1  0  0  0
##    16           1  0  0  0  0
##    17           0  1  0  0  0
##    18           1  0  0  0  0
##    1989-13      0  1  0  1  0
##    1989-15      0  1  0  0  0
##    1989-27      0  0  0  1  1
##    1989-28      0  1  0  1  1
```

12

```
##   1990-12                  0  1  2  1  0
##   1990-17                  0  1  0  1  0
##   1990-18                  1  1  0  0  0
##   1990-20                  0  1  2  1  0
##   1990-22                  0  1  0  1  0
##   1990-23                  0  1  2  1  0
##   1990-24                  0  3  2  1  1
##   1990-25                  0  1  0  0  0
##   1990-26                  0  1  0  1  1
##   1990-27                  1  1  0  0  0
##   1990-29                  0  1  0  0  0
##   1990-30                  0  1  0  0  0
##   1990-31                  0  1  0  0  0
##   1990-35                  0  1  0  0  0
##   1990-36                  0  1  0  1  0
##   1991-15                  0  2  2  0  0
##   1991-16                  0  2  2  0  0
##   1991-24                  1  1  1  0  0
##   1991-30                  0  1  0  0  0
##   1991-36                  0  1  0  0  0
##   1992-11                  0  1  0  0  0
##   1992-12                  0  1  0  0  0
##   1992-16                  0  1  0  3  0
##   1992-17                  0  1  2  0  0
##   1992-21                  0  1  0  0  0
##   1992-25                  0  0  0  4  0
##   1992-26                  0  1  4  0  0
##   1992-27                  0  1  2  2  0
##   1992-28                  0  1  0  0  0
##   1992-35                  0  1  0  0  0
##   1992-38                  0  1  0  2  0
##   1993-10                  0  2  0  0  0
##   1993-11                  0  2  4  0  0
##   1993-12                  0  2  0  0  0
##   1993-18                  0  0  0  4  0
##   1993-21                  0  0  0  6  0
##   1993-22                  0  0  4  0  0
##   2                        2  0  4  0  0
##   3                        2  1  8  0  0
##   4                        3  2  1  0  0
##   5                       20  1  0  0  0
##   6                        3  0  0  0  0
##   7                        0  1  0  0  0
##   8                        1  0  0  0  0
##   9                        0  1  0  0  0
##   A1                       2  1  0  0  0
##   A2                       1  1  1  0  0
##   A3                       1  1  1  0  0
##   A4                       1  1  1  1  0
##   A5                       1  1  1  0  0
##   A6                       1  1  1  0  0
##   B1990-15                 0  1  0  0  0
##   B1990-35                 0  1  0  0  1
##   B1990-37                 0  1  0  0  1
```

```
## B1990-38                     0  2  0  0  0
## B1990-39                     0  2  0  0  0
## B1991-13                     0  1  0  0  0
## B1991-14                     0  1  0  0  0
## B1991-18                     0  1  0  0  0
## B1991-36                     0  1  0  0  0
## B1991-37                     0  1  0  0  0
## B1991-38                     0  1  0  0  0
## B1992-10                     0  1  0  0  0
## B1992-14                     0  1  0  0  1
## B1992-19                     0  1  0  0  0
## B1992-20                     0  1  0  0  0
## B1992-24                     0  1  0  0  0
## B1992-37                     0  1  0  0  0
## B1992-38                     0  1  0  0  0
## B1993-15                     0  2  0  0  0
## B1998-39                     0  1  0  0  0
## B1998-40                     0  1  0  0  0
## Cracking Clays 40 Acres     36  0  0  0  0
## Cracking Clays Faringdon    27  0  0  0  0
## Cracking Clays Rowden        0  0 46  0  0
## DERVAL(44)_2011              2  0  0  0  0
## ECLAIRE-2012                 0  0  1  0  0
## F1                           0  3  0  0  0
## F2                           0  2  0  0  0
## F3                           2  0  0  0  0
## G1997-24                     0  2  0  1  0
## G1997-25                     0  1  0  1  0
## G1997-26                     0  2  0  1  0
## G1997-28                     0  1  0  1  0
## G1997-29                     0  2  0  1  0
## G1997-30                     0  1  0  1  0
## G1997-31                     0  2  0  1  0
## G1997-33                     0  1  0  1  0
## G1998-28                     0  3  0  0  0
## G1998-30                     0  4  0  0  0
## G1998-32                     0  4  0  0  0
## G1999-19                     0  0  0  5  0
## G1999-20                     0  0  0  3  0
## G1999-22                     0  0  0  2  0
## G1999-26                     0  0  0  2  0
## G1999-27                     0  0  0  5  0
## G1999-30                     0  0  0  5  0
## G1999-35                     0  0  0  2  0
## G2                           0  3  0  0  0
## G2000-11                     0  0  0  2  0
## G2000-12                     0  0  0  5  0
## G2000-19                     0  0  0  2  0
## G2000-9                      0  0  0  2  0
## G2002-10                     0  0  2  0  0
## G2002-23                     0  0  2  0  0
## G2003-10                     0  3  0  0  0
## G2003-11                     0  4  0  0  0
## G3                           0  3  0  0  0
```
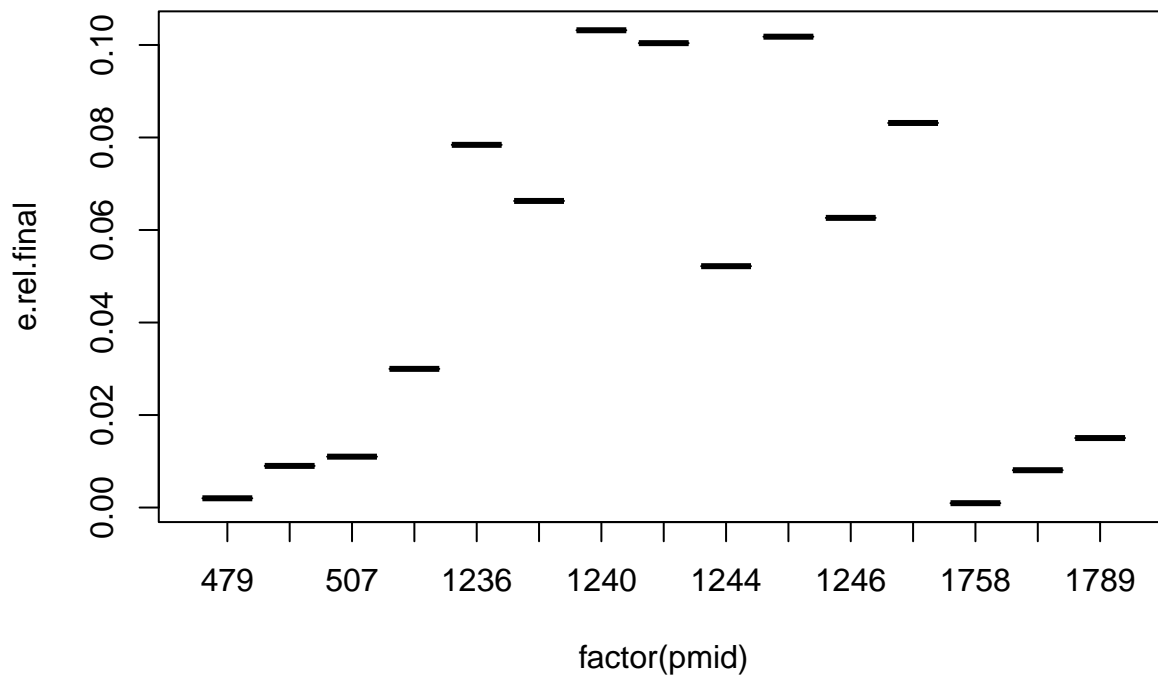
```
##    IHF_13                    0  1  0  0  0
##    IHF_6                     0  1  0  0  0
##    IHF_7                     0  1  0  0  0
##    Juni 2000                 1  0  0  4  0
##    Juni_99                   1  0  0  3  0
##    Kent_01                   5  0  0  0  0
##    Kent_2_02                 3  0  0  0  0
##    LACHAP(44)_2011           0  2  0  0  0
##    LI_1994                   0  2  0  0  0
##    R1                        0  3  0  0  0
##    SyreN                    16  0  0  6  0
##    TREV(29)_2011             4  0  0  0  0
##    TS1                       0  3  0  0  0
##    TS2                       0  1  0  0  0
##    Unter (a)                 4  0  0  2  4
##    Unter (b)                 4  0  0  2  4
##    Z1                        0  3  0  0  0
##    Z2                        3  0  0  0  0
```

```r
table(ds1$country, ds1$app.mthd)
```

```
##
##       bsth  bc  ts  os  cs
##   CH    12  27   5   1   0
##   DK    53   9   0  17   8
##   FR     6   4   1   0   0
##   IE    18   8  23   0   0
##   NL     3 100  33  75   7
##   UK    63   0  46   0   0
```

```r
plot(e.rel.final ~ factor(pmid), data = subset(ds1, app.mthd == 'cs'))
```


Problem is 1183.