TP 3 : analyses des données sur animaux non-marqués

Partie 1

1. Introduction

On charge le package `unmarked`.

```r
library(unmarked)
```

2. Les données

On lit les données lézard ocelés.

```r
dat <- read.csv2("dat/lezard-ocelle-oleron-2007-pa.csv")
```

On jette un coup d'oeil.

```r
head(dat)
```

```
##   site presence_R1 presence_R2 presence_R3 Abond_R1 Abond_R2 Abond_R3 temp_R1
## 1    1           1           1           1        0        2        0    21.2
## 2    2           1           1           1        1        2        5    21.7
## 3    3           0           1           1        0        3        1    22.7
## 4    4           1           1           1        0        1        2    23.5
## 5    5           1           1           1        1        2        2    24.2
## 6    6           1           1           1        1        1        3    23.9
##   temp_R2 temp_R3 vent_R1 vent_R2 vent_R3 nuage_R1 nuage_R2 nuage_R3
## 1    24.8    21.6     2.7     5.7     3.3        1        1        2
## 2    23.8    23.8     2.2     4.7     2.6        1        2        1
## 3    22.5    24.2     0.8     2.5     7.2        1        2        3
## 4    22.4    18.3     2.4     1.4     1.3        1        2        3
## 5    24.8    20.1     3.4     2.2     3.3        1        2        3
## 6    26.3    23.9     2.7     2.2     6.7        1        2        4
##   nb_terriers_lapins
## 1                  0
## 2                  5
## 3                  1
## 4                  2
## 5                  5
## 6                 10
```

Les dimensions.

```
dim(dat)
```

[1] 70 17

On crée le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3))
```

Un coup d'oeil.

```
head(lezard)
```

```
## Data frame representation of unmarkedFrame object.
##     y.1 y.2 y.3
## 1    1   1   1
## 2    1   1   1
## 3    0   1   1
## 4    1   1   1
## 5    1   1   1
## 6    1   1   1
## 7    1   1   1
## 8    0   1   1
## 9    0   0   0
## 10   1   1   1
```

Résumé des données.

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##    0    1
##   82  128
```

Et visuellement?

```
plot(lezard)
```
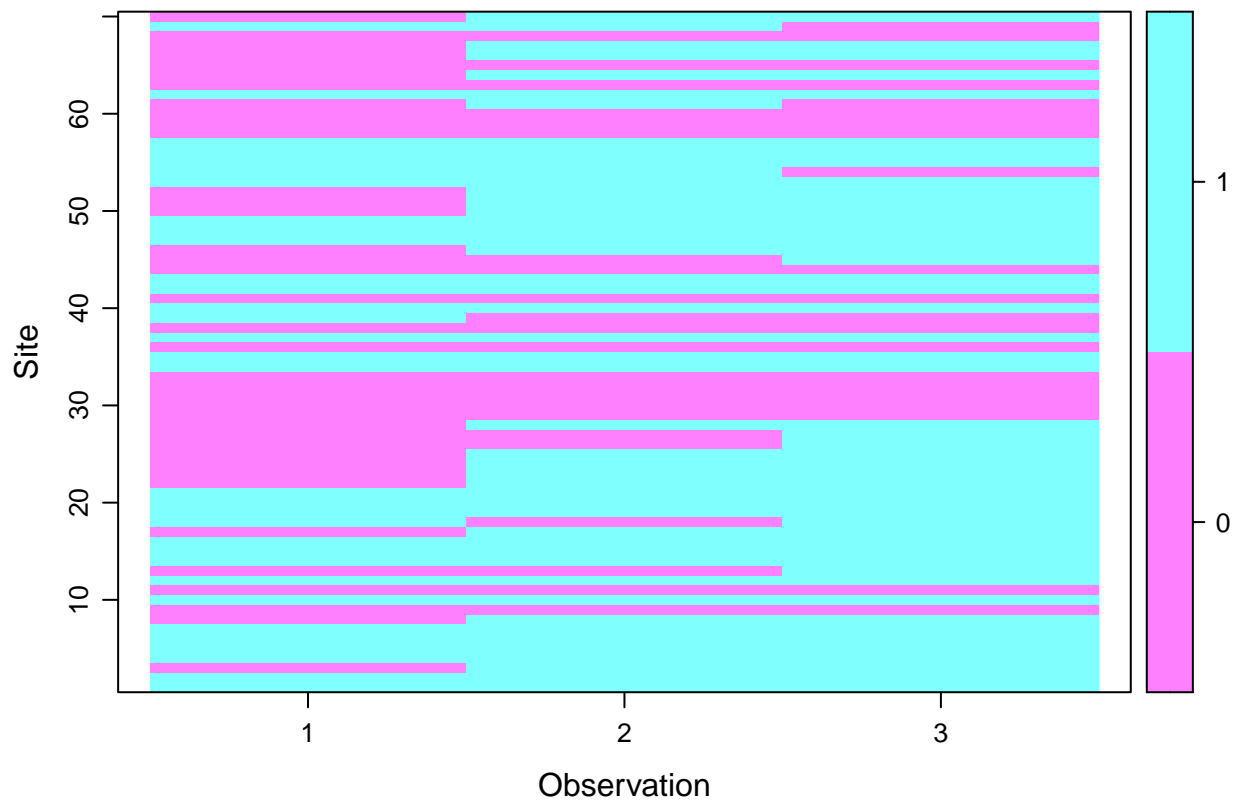
3. Modèle (ψ, p)

Aide de la fonction `occu`.

```
?occu
```

Ajuste premier modèle, avec détection d'abord, puis occupancy. Ici ces paramètres sont constants.

```
fm <- occu(~ 1 ~ 1, lezard)
```

Les estimations sont sur l'échelle logit.

```
fm
```

```
##
## Call:
## occu(formula = ~1 ~ 1, data = lezard)
##
## Occupancy:
##  Estimate    SE    z  P(>|z|)
##      1.17 0.287 4.09 4.37e-05
##
## Detection:
##  Estimate    SE    z  P(>|z|)
##      1.38 0.207 6.64 3.13e-11
##
## AIC: 237.6654
```

On les back-transforme, c'est-à-dire qu'on obtient les estimations des probabilités entre 0 et 1.

```
#names(fm)
#fm['state']
#fm['det']
backTransform(fm, type ='state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##     0.763 0.0518    1.17           1
##
## Transformation: logistic
```

```
backTransform(fm, type ='det')
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##     0.798 0.0334    1.38           1
##
## Transformation: logistic
```

```
confint(backTransform(fm, type='state'))
```

```
##     0.025     0.975
##  0.647844 0.8498077
```

```
confint(backTransform(fm, type='det'))
```

```
##      0.025     0.975
##  0.7251664 0.8560502
```

Occupancy conditionnelle.

```
re <- ranef(fm)
re
```

```
##              Mean Mode 2.5% 97.5%
##  [1,] 1.00000000    1    1     1
##  [2,] 1.00000000    1    1     1
##  [3,] 1.00000000    1    1     1
##  [4,] 1.00000000    1    1     1
##  [5,] 1.00000000    1    1     1
##  [6,] 1.00000000    1    1     1
##  [7,] 1.00000000    1    1     1
##  [8,] 1.00000000    1    1     1
##  [9,] 0.02574042    0    0     1
## [10,] 1.00000000    1    1     1
## [11,] 0.02574042    0    0     1
```

```
## [12,] 1.00000000   1   1   1
## [13,] 1.00000000   1   1   1
## [14,] 1.00000000   1   1   1
## [15,] 1.00000000   1   1   1
## [16,] 1.00000000   1   1   1
## [17,] 1.00000000   1   1   1
## [18,] 1.00000000   1   1   1
## [19,] 1.00000000   1   1   1
## [20,] 1.00000000   1   1   1
## [21,] 1.00000000   1   1   1
## [22,] 1.00000000   1   1   1
## [23,] 1.00000000   1   1   1
## [24,] 1.00000000   1   1   1
## [25,] 1.00000000   1   1   1
## [26,] 1.00000000   1   1   1
## [27,] 1.00000000   1   1   1
## [28,] 1.00000000   1   1   1
## [29,] 0.02574042   0   0   1
## [30,] 0.02574042   0   0   1
## [31,] 0.02574042   0   0   1
## [32,] 0.02574042   0   0   1
## [33,] 0.02574042   0   0   1
## [34,] 1.00000000   1   1   1
## [35,] 1.00000000   1   1   1
## [36,] 0.02574042   0   0   1
## [37,] 1.00000000   1   1   1
## [38,] 0.02574042   0   0   1
## [39,] 1.00000000   1   1   1
## [40,] 1.00000000   1   1   1
## [41,] 0.02574042   0   0   1
## [42,] 1.00000000   1   1   1
## [43,] 1.00000000   1   1   1
## [44,] 0.02574042   0   0   1
## [45,] 1.00000000   1   1   1
## [46,] 1.00000000   1   1   1
## [47,] 1.00000000   1   1   1
## [48,] 1.00000000   1   1   1
## [49,] 1.00000000   1   1   1
## [50,] 1.00000000   1   1   1
## [51,] 1.00000000   1   1   1
## [52,] 1.00000000   1   1   1
## [53,] 1.00000000   1   1   1
## [54,] 1.00000000   1   1   1
## [55,] 1.00000000   1   1   1
## [56,] 1.00000000   1   1   1
## [57,] 1.00000000   1   1   1
## [58,] 0.02574042   0   0   1
## [59,] 0.02574042   0   0   1
## [60,] 0.02574042   0   0   1
## [61,] 1.00000000   1   1   1
## [62,] 1.00000000   1   1   1
## [63,] 0.02574042   0   0   1
## [64,] 1.00000000   1   1   1
## [65,] 0.02574042   0   0   1
```

```
## [66,] 1.00000000     1    1     1
## [67,] 1.00000000     1    1     1
## [68,] 0.02574042     0    0     1
## [69,] 1.00000000     1    1     1
## [70,] 1.00000000     1    1     1
```

4. Modèle (ψ, p_t)

On crée une variable pour l'effet du temps.

```
temps <- matrix(c('tps 1','tps 2','tps 3'),
                nrow = 70, # nrow(lezard@y),
                ncol = 3, #ncol(lezard),
                byrow = TRUE)
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                            obsCovs = list(temps = temps))
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##    0    1
##   82 128
##
## Observation-level covariates:
##     temps
##   tps 1:70
##   tps 2:70
##   tps 3:70
```

Ajuste le modèle avec effet temps sur la détection.

```
fm1 <- occu(~ temps ~ 1, lezard)
```

L'occupancy.

```
backTransform(fm1, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##      0.76 0.0515    1.15              1
##
## Transformation: logistic
```

```r
confint(backTransform(fm1, type='state'))
```

```
##      0.025     0.975
##  0.6454809 0.846208
```

Et pour la détection.

```r
nd <- data.frame(temps = c('tps 1','tps 2','tps 3'))
predict(fm1, type = 'det', newdata = nd)
```

```
##   Predicted        SE     lower     upper
## 1 0.6015503 0.06732683 0.4654020 0.7236164
## 2 0.8835590 0.04463644 0.7642686 0.9466936
## 3 0.9211504 0.03779961 0.8081554 0.9700580
```

Occupancy conditionnelle.

```r
ranef(fm1)
```

```
##           Mean Mode 2.5% 97.5%
##  [1,] 1.0000000    1    1     1
##  [2,] 1.0000000    1    1     1
##  [3,] 1.0000000    1    1     1
##  [4,] 1.0000000    1    1     1
##  [5,] 1.0000000    1    1     1
##  [6,] 1.0000000    1    1     1
##  [7,] 1.0000000    1    1     1
##  [8,] 1.0000000    1    1     1
##  [9,] 0.0114465    0    0     0
## [10,] 1.0000000    1    1     1
## [11,] 0.0114465    0    0     0
## [12,] 1.0000000    1    1     1
## [13,] 1.0000000    1    1     1
## [14,] 1.0000000    1    1     1
## [15,] 1.0000000    1    1     1
## [16,] 1.0000000    1    1     1
## [17,] 1.0000000    1    1     1
## [18,] 1.0000000    1    1     1
## [19,] 1.0000000    1    1     1
## [20,] 1.0000000    1    1     1
## [21,] 1.0000000    1    1     1
## [22,] 1.0000000    1    1     1
## [23,] 1.0000000    1    1     1
## [24,] 1.0000000    1    1     1
```

```
## [25,] 1.0000000   1   1   1
## [26,] 1.0000000   1   1   1
## [27,] 1.0000000   1   1   1
## [28,] 1.0000000   1   1   1
## [29,] 0.0114465   0   0   0
## [30,] 0.0114465   0   0   0
## [31,] 0.0114465   0   0   0
## [32,] 0.0114465   0   0   0
## [33,] 0.0114465   0   0   0
## [34,] 1.0000000   1   1   1
## [35,] 1.0000000   1   1   1
## [36,] 0.0114465   0   0   0
## [37,] 1.0000000   1   1   1
## [38,] 0.0114465   0   0   0
## [39,] 1.0000000   1   1   1
## [40,] 1.0000000   1   1   1
## [41,] 0.0114465   0   0   0
## [42,] 1.0000000   1   1   1
## [43,] 1.0000000   1   1   1
## [44,] 0.0114465   0   0   0
## [45,] 1.0000000   1   1   1
## [46,] 1.0000000   1   1   1
## [47,] 1.0000000   1   1   1
## [48,] 1.0000000   1   1   1
## [49,] 1.0000000   1   1   1
## [50,] 1.0000000   1   1   1
## [51,] 1.0000000   1   1   1
## [52,] 1.0000000   1   1   1
## [53,] 1.0000000   1   1   1
## [54,] 1.0000000   1   1   1
## [55,] 1.0000000   1   1   1
## [56,] 1.0000000   1   1   1
## [57,] 1.0000000   1   1   1
## [58,] 0.0114465   0   0   0
## [59,] 0.0114465   0   0   0
## [60,] 0.0114465   0   0   0
## [61,] 1.0000000   1   1   1
## [62,] 1.0000000   1   1   1
## [63,] 0.0114465   0   0   0
## [64,] 1.0000000   1   1   1
## [65,] 0.0114465   0   0   0
## [66,] 1.0000000   1   1   1
## [67,] 1.0000000   1   1   1
## [68,] 0.0114465   0   0   0
## [69,] 1.0000000   1   1   1
## [70,] 1.0000000   1   1   1
```

5. Modèle $(\psi_{\mathbf{lapin}}, p)$

On récupère la variable lapin.

```
site.covs <- data.frame(lapin = dat$nb_terriers_lapins)
site.covs
```

```
##    lapin
## 1      0
## 2      5
## 3      1
## 4      2
## 5      5
## 6     10
## 7      0
## 8      0
## 9      0
## 10     5
## 11     0
## 12    20
## 13     0
## 14     0
## 15     2
## 16     0
## 17     0
## 18     1
## 19     0
## 20    10
## 21     0
## 22     0
## 23     0
## 24     0
## 25     0
## 26     0
## 27     0
## 28     5
## 29    10
## 30     0
## 31     0
## 32     0
## 33     0
## 34     0
## 35     4
## 36     0
## 37     0
## 38     0
## 39     0
## 40     0
## 41     0
## 42     3
## 43     0
## 44     0
## 45     1
## 46     0
## 47     4
## 48     5
## 49     0
## 50     0
## 51     0
## 52     0
## 53     0
```

```
## 54      0
## 55      0
## 56      0
## 57     15
## 58      0
## 59      0
## 60      0
## 61      0
## 62      1
## 63      0
## 64      0
## 65      0
## 66      0
## 67      5
## 68      1
## 69      0
## 70      0
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                            siteCovs = site.covs)
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##    0    1
##   82  128
##
## Site-level covariates:
##      lapin
##   Min.   : 0.000
##   1st Qu.: 0.000
##   Median : 0.000
##   Mean   : 1.643
##   3rd Qu.: 1.000
##   Max.   :20.000
```

Ajuste modèle.

```
fm2 <- occu(~ 1 ~ lapin, lezard)
```

On back-transforme la détection.

```
backTransform(fm2, type = 'det')
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##     0.784 0.0336    1.29           1
##
## Transformation: logistic
```

```
confint(backTransform(fm2, type='det'))
```

```
##      0.025     0.975
##   0.7112384 0.8428953
```

Et pour l'occupancy, on crée d'abord une grille de valeurs pour le nombre de terriers sur laquelle on va calculer cette probabilité.

```
nd <- data.frame(lapin = seq(min(dat$nb_terriers_lapins),
                             max(dat$nb_terriers_lapins),
                             length = 50))
```

On calcule la probabilité d'occupancy pour chaque valeur de terriers.

```
psi_pred <- predict(fm2, type = 'state', newdata = nd)
psi_pred
```

```
##      Predicted           SE        lower      upper
## 1   0.6970174 6.636942e-02 5.540805e-01 0.8098596
## 2   0.7836811 7.266438e-02 6.099588e-01 0.8935339
## 3   0.8508600 9.278133e-02 5.764772e-01 0.9598593
## 4   0.8998425 9.670554e-02 5.230901e-01 0.9865936
## 5   0.9339857 8.793310e-02 4.636466e-01 0.9957001
## 6   0.9570453 7.333818e-02 4.030423e-01 0.9986418
## 7   0.9722888 5.776786e-02 3.442402e-01 0.9995738
## 8   0.9822233 4.374697e-02 2.893231e-01 0.9998667
## 9   0.9886379 3.221259e-02 2.396697e-01 0.9999584
## 10  0.9927549 2.323522e-02 1.960183e-01 0.9999870
## 11  0.9953871 1.650034e-02 1.585596e-01 0.9999960
## 12  0.9970658 1.157644e-02 1.270678e-01 0.9999987
## 13  0.9981348 8.043888e-03 1.010429e-01 0.9999996
## 14  0.9988147 5.545562e-03 7.983801e-02 0.9999999
## 15  0.9992470 3.798334e-03 6.275826e-02 1.0000000
## 16  0.9995217 2.587313e-03 4.912828e-02 1.0000000
## 17  0.9996962 1.754103e-03 3.833166e-02 1.0000000
## 18  0.9998071 1.184354e-03 2.982959e-02 1.0000000
## 19  0.9998775 7.967952e-04 2.316546e-02 1.0000000
## 20  0.9999222 5.343538e-04 1.796100e-02 1.0000000
## 21  0.9999506 3.573356e-04 1.390810e-02 1.0000000
## 22  0.9999686 2.383492e-04 1.075902e-02 1.0000000
## 23  0.9999801 1.586161e-04 8.316482e-03 1.0000000
## 24  0.9999873 1.053339e-04 6.424541e-03 1.0000000
```

```
## 25 0.9999920 6.981603e-05 4.960639e-03 1.0000000
## 26 0.9999949 4.619315e-05 3.828875e-03 1.0000000
## 27 0.9999968 3.051377e-05 2.954457e-03 1.0000000
## 28 0.9999979 2.012629e-05 2.279210e-03 1.0000000
## 29 0.9999987 1.325650e-05 1.757973e-03 1.0000000
## 30 0.9999992 8.720345e-06 1.355745e-03 1.0000000
## 31 0.9999995 5.729497e-06 1.045430e-03 1.0000000
## 32 0.9999997 3.760207e-06 8.060691e-04 1.0000000
## 33 0.9999998 2.465191e-06 6.214674e-04 1.0000000
## 34 0.9999999 1.614585e-06 4.791144e-04 1.0000000
## 35 0.9999999 1.056498e-06 3.693514e-04 1.0000000
## 36 0.9999999 6.907127e-07 2.847237e-04 1.0000000
## 37 1.0000000 4.511992e-07 2.194794e-04 1.0000000
## 38 1.0000000 2.945108e-07 1.691815e-04 1.0000000
## 39 1.0000000 1.920941e-07 1.304074e-04 1.0000000
## 40 1.0000000 1.252056e-07 1.005180e-04 1.0000000
## 41 1.0000000 8.155402e-08 7.747805e-05 1.0000000
## 42 1.0000000 5.308765e-08 5.971834e-05 1.0000000
## 43 1.0000000 3.453673e-08 4.602902e-05 1.0000000
## 44 1.0000000 2.245540e-08 3.547737e-05 1.0000000
## 45 1.0000000 1.459230e-08 2.734433e-05 1.0000000
## 46 1.0000000 9.477651e-09 2.107558e-05 1.0000000
## 47 1.0000000 6.152642e-09 1.624385e-05 1.0000000
## 48 1.0000000 3.992233e-09 1.251974e-05 1.0000000
## 49 1.0000000 2.589239e-09 9.649380e-06 1.0000000
## 50 1.0000000 1.678567e-09 7.437057e-06 1.0000000
```

Visualise.

```
plot(nd$lapin,
     psi_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nombre de terriers de lapin",
     ylab = "probabilité estimée d'occupancy du lézard")
```
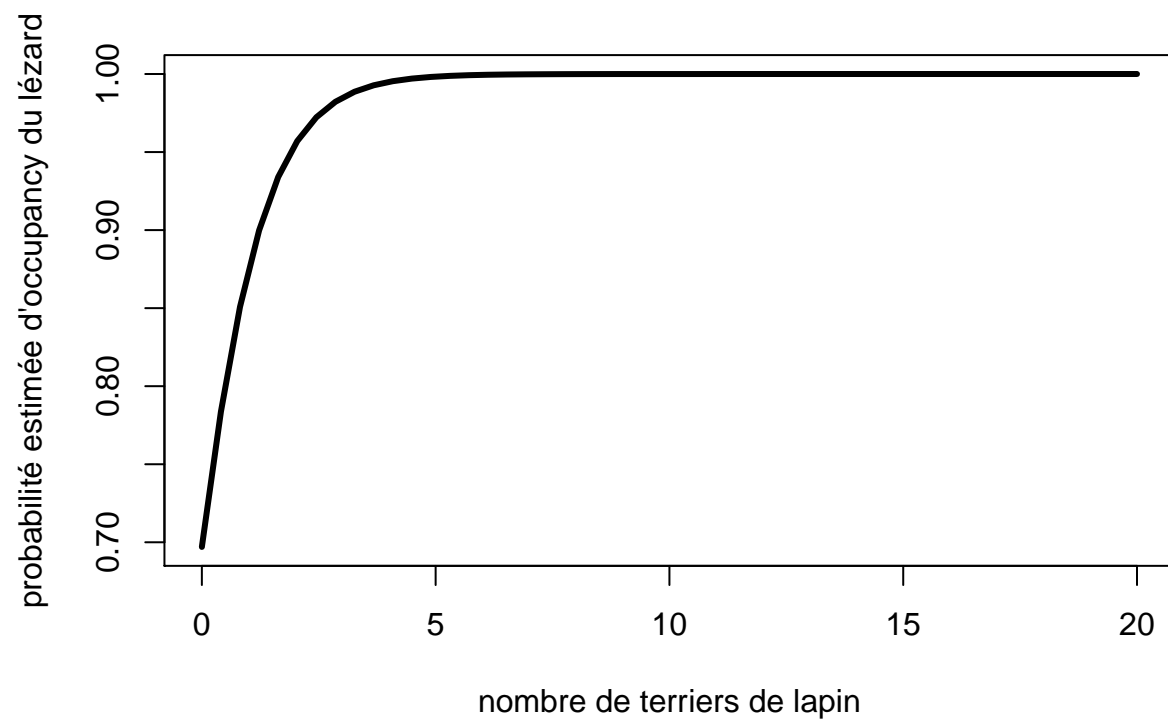
Occupancy conditionnelle.

```r
ranef(fm2)
```

```
##              Mean Mode 2.5% 97.5%
## [1,] 1.00000000    1    1     1
## [2,] 1.00000000    1    1     1
## [3,] 1.00000000    1    1     1
## [4,] 1.00000000    1    1     1
## [5,] 1.00000000    1    1     1
## [6,] 1.00000000    1    1     1
## [7,] 1.00000000    1    1     1
## [8,] 1.00000000    1    1     1
## [9,] 0.02257866    0    0     0
## [10,] 1.00000000   1    1     1
## [11,] 0.02257866   0    0     0
## [12,] 1.00000000   1    1     1
## [13,] 1.00000000   1    1     1
## [14,] 1.00000000   1    1     1
## [15,] 1.00000000   1    1     1
## [16,] 1.00000000   1    1     1
## [17,] 1.00000000   1    1     1
## [18,] 1.00000000   1    1     1
## [19,] 1.00000000   1    1     1
## [20,] 1.00000000   1    1     1
## [21,] 1.00000000   1    1     1
## [22,] 1.00000000   1    1     1
## [23,] 1.00000000   1    1     1
## [24,] 1.00000000   1    1     1
## [25,] 1.00000000   1    1     1
## [26,] 1.00000000   1    1     1
```

```
## [27,] 1.00000000    1    1    1
## [28,] 1.00000000    1    1    1
## [29,] 0.99936285    1    1    1
## [30,] 0.02257866    0    0    0
## [31,] 0.02257866    0    0    0
## [32,] 0.02257866    0    0    0
## [33,] 0.02257866    0    0    0
## [34,] 1.00000000    1    1    1
## [35,] 1.00000000    1    1    1
## [36,] 0.02257866    0    0    0
## [37,] 1.00000000    1    1    1
## [38,] 0.02257866    0    0    0
## [39,] 1.00000000    1    1    1
## [40,] 1.00000000    1    1    1
## [41,] 0.02257866    0    0    0
## [42,] 1.00000000    1    1    1
## [43,] 1.00000000    1    1    1
## [44,] 0.02257866    0    0    0
## [45,] 1.00000000    1    1    1
## [46,] 1.00000000    1    1    1
## [47,] 1.00000000    1    1    1
## [48,] 1.00000000    1    1    1
## [49,] 1.00000000    1    1    1
## [50,] 1.00000000    1    1    1
## [51,] 1.00000000    1    1    1
## [52,] 1.00000000    1    1    1
## [53,] 1.00000000    1    1    1
## [54,] 1.00000000    1    1    1
## [55,] 1.00000000    1    1    1
## [56,] 1.00000000    1    1    1
## [57,] 1.00000000    1    1    1
## [58,] 0.02257866    0    0    0
## [59,] 0.02257866    0    0    0
## [60,] 0.02257866    0    0    0
## [61,] 1.00000000    1    1    1
## [62,] 1.00000000    1    1    1
## [63,] 0.02257866    0    0    0
## [64,] 1.00000000    1    1    1
## [65,] 0.02257866    0    0    0
## [66,] 1.00000000    1    1    1
## [67,] 1.00000000    1    1    1
## [68,] 0.06566100    0    0    1
## [69,] 1.00000000    1    1    1
## [70,] 1.00000000    1    1    1
```

6. Modèle $(\psi, p_{\textbf{température}})$

On crée un variable pour l'effet des températures.

```
temp <- cbind(dat$temp_R1, dat$temp_R2, dat$temp_R3)
```

On refait le jeu de données.

```r
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                            obsCovs = list(temp = temp))
```

Données?

```r
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
##  82 128
##
## Observation-level covariates:
##       temp
##  Min.   :15.30
##  1st Qu.:20.43
##  Median :23.20
##  Mean   :22.74
##  3rd Qu.:24.80
##  Max.   :30.50
```

Ajuste modèle.

```r
fm3 <- occu(~ temp ~ 1, lezard)
```

On back-transforme l'occupancy.

```r
backTransform(fm3, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##     0.763 0.0517    1.17           1
##
## Transformation: logistic
```

```r
confint(backTransform(fm3, type='state'))
```

```
##      0.025     0.975
##  0.6473567 0.8489874
```

Et pour la détection.

```
temp_partout <- c(dat$temp_R1, dat$temp_R2, dat$temp_R3)
nd <- data.frame(temp = seq(min(temp_partout), max(temp_partout), length = 50))
ppred <- predict(fm3, type = 'det', newdata = nd)
```

Visualise.

```
plot(nd$temp,
     ppred[,1],
     type = "l",
     lwd = 3,
     xlab = "température",
     ylab = "probabilité estimée de détection du lézard")
```
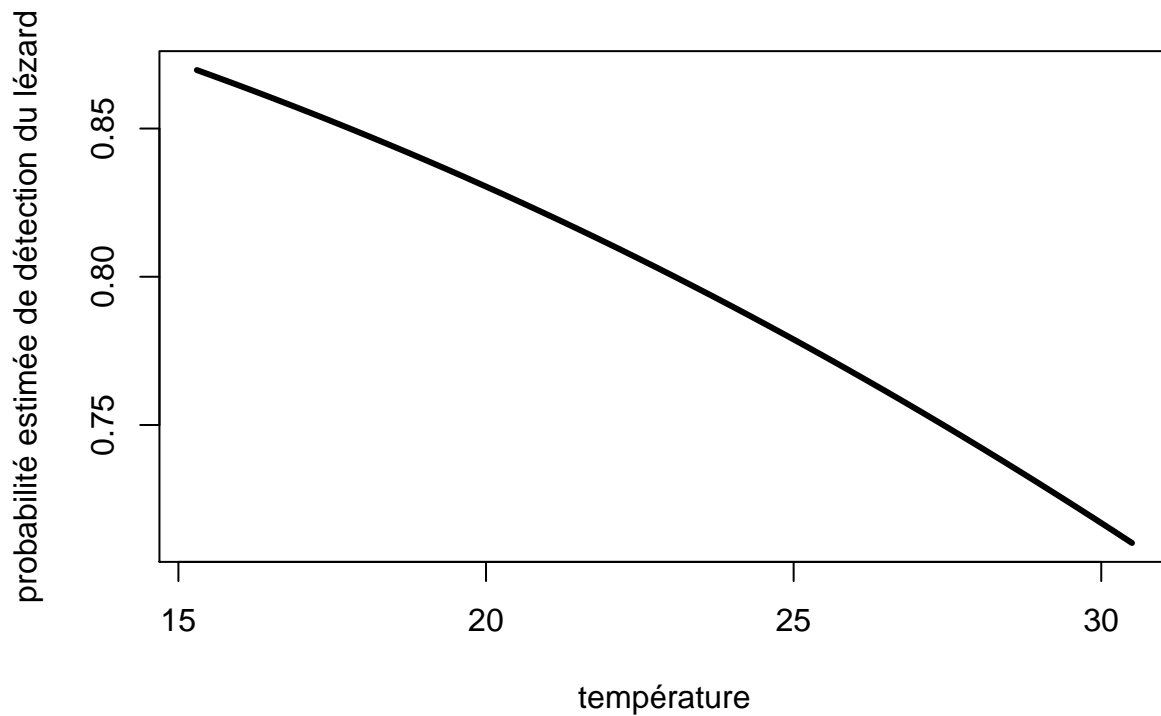

Occupancy conditionnelle.

```
ranef(fm3)
```

```
##           Mean Mode 2.5% 97.5%
## [1,] 1.00000000    1    1     1
## [2,] 1.00000000    1    1     1
## [3,] 1.00000000    1    1     1
## [4,] 1.00000000    1    1     1
## [5,] 1.00000000    1    1     1
## [6,] 1.00000000    1    1     1
## [7,] 1.00000000    1    1     1
## [8,] 1.00000000    1    1     1
## [9,] 0.03078700    0    0     1
## [10,] 1.00000000    1    1     1
## [11,] 0.02727979    0    0     1
## [12,] 1.00000000    1    1     1
```

```
## [13,] 1.00000000   1   1   1
## [14,] 1.00000000   1   1   1
## [15,] 1.00000000   1   1   1
## [16,] 1.00000000   1   1   1
## [17,] 1.00000000   1   1   1
## [18,] 1.00000000   1   1   1
## [19,] 1.00000000   1   1   1
## [20,] 1.00000000   1   1   1
## [21,] 1.00000000   1   1   1
## [22,] 1.00000000   1   1   1
## [23,] 1.00000000   1   1   1
## [24,] 1.00000000   1   1   1
## [25,] 1.00000000   1   1   1
## [26,] 1.00000000   1   1   1
## [27,] 1.00000000   1   1   1
## [28,] 1.00000000   1   1   1
## [29,] 0.01913400   0   0   0
## [30,] 0.02338107   0   0   0
## [31,] 0.01493132   0   0   0
## [32,] 0.01366491   0   0   0
## [33,] 0.01678882   0   0   0
## [34,] 1.00000000   1   1   1
## [35,] 1.00000000   1   1   1
## [36,] 0.01867697   0   0   0
## [37,] 1.00000000   1   1   1
## [38,] 0.02349402   0   0   0
## [39,] 1.00000000   1   1   1
## [40,] 1.00000000   1   1   1
## [41,] 0.01891895   0   0   0
## [42,] 1.00000000   1   1   1
## [43,] 1.00000000   1   1   1
## [44,] 0.02175670   0   0   0
## [45,] 1.00000000   1   1   1
## [46,] 1.00000000   1   1   1
## [47,] 1.00000000   1   1   1
## [48,] 1.00000000   1   1   1
## [49,] 1.00000000   1   1   1
## [50,] 1.00000000   1   1   1
## [51,] 1.00000000   1   1   1
## [52,] 1.00000000   1   1   1
## [53,] 1.00000000   1   1   1
## [54,] 1.00000000   1   1   1
## [55,] 1.00000000   1   1   1
## [56,] 1.00000000   1   1   1
## [57,] 1.00000000   1   1   1
## [58,] 0.01932929   0   0   0
## [59,] 0.01859282   0   0   0
## [60,] 0.01555955   0   0   0
## [61,] 1.00000000   1   1   1
## [62,] 1.00000000   1   1   1
## [63,] 0.03437123   0   0   1
## [64,] 1.00000000   1   1   1
## [65,] 0.03401164   0   0   1
## [66,] 1.00000000   1   1   1
```

```
## [67,] 1.00000000    1    1     1
## [68,] 0.02802116    0    0     1
## [69,] 1.00000000    1    1     1
## [70,] 1.00000000    1    1     1
```

7. Modèle $(\psi, p_{\mathbf{vent}})$

On crée un variable pour l'effet des vents.

```
vent <- cbind(dat$vent_R1, dat$vent_R2, dat$vent_R3)
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                            obsCovs = list(vent = vent))
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
##  82 128
##
## Observation-level covariates:
##       vent
##  Min.   :0.000
##  1st Qu.:2.500
##  Median :3.750
##  Mean   :3.941
##  3rd Qu.:5.000
##  Max.   :9.300
```

Ajuste modèle.

```
fm4 <- occu(~ vent ~ 1, lezard)
```

On back-transforme l'occupancy.

```
backTransform(fm4, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
```

```
##   Estimate     SE LinComb (Intercept)
##      0.763 0.0517    1.17            1
##
## Transformation: logistic
```

```r
confint(backTransform(fm4, type='state'))
```

```
##       0.025     0.975
##   0.6474851 0.8491763
```

Et pour la détection.

```r
vent_partout <- c(dat$vent_R1, dat$vent_R2, dat$vent_R3)
nd <- data.frame(vent = seq(min(vent_partout), max(vent_partout), length = 50))
det_pred <- predict(fm4, type = 'det', newdata = nd)
```

Visualise.

```r
plot(nd$vent,
     det_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "vent",
     ylab = "probabilité estimée de détection du lézard")
```
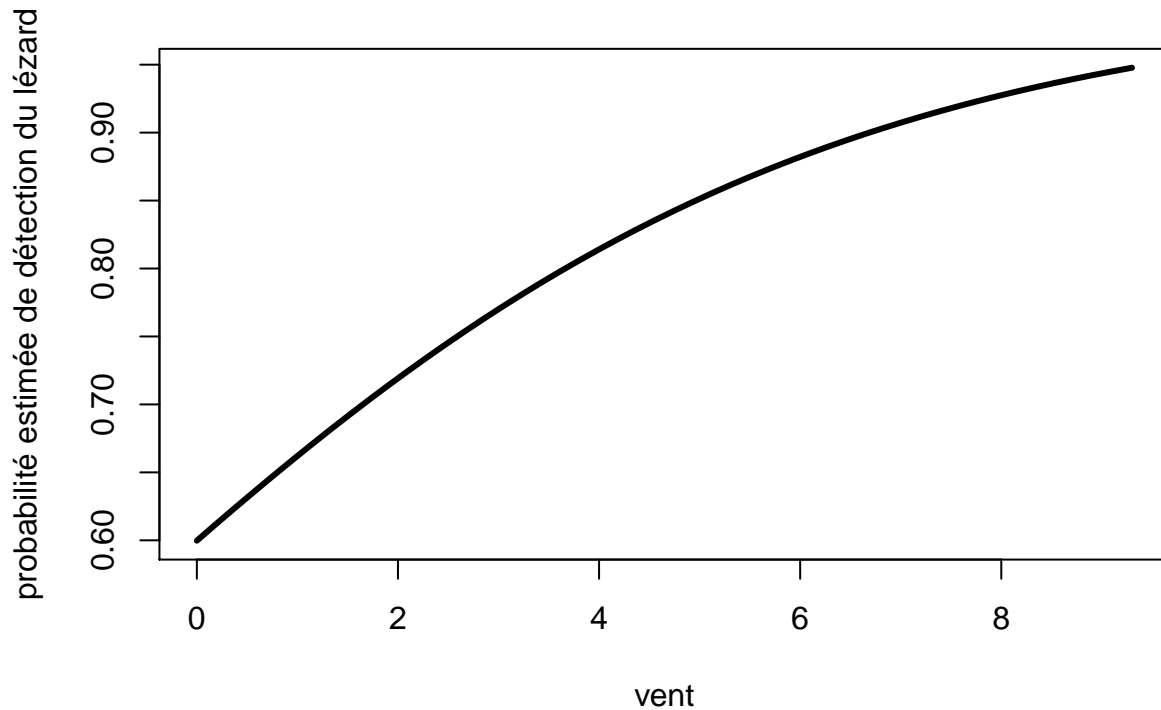

Occupancy conditionnelle.

```r
ranef(fm4)
```

```
##               Mean Mode 2.5% 97.5%
##  [1,] 1.000000000    1    1     1
##  [2,] 1.000000000    1    1     1
##  [3,] 1.000000000    1    1     1
##  [4,] 1.000000000    1    1     1
##  [5,] 1.000000000    1    1     1
##  [6,] 1.000000000    1    1     1
##  [7,] 1.000000000    1    1     1
##  [8,] 1.000000000    1    1     1
##  [9,] 0.056303334    0    0     1
## [10,] 1.000000000    1    1     1
## [11,] 0.004533178    0    0     0
## [12,] 1.000000000    1    1     1
## [13,] 1.000000000    1    1     1
## [14,] 1.000000000    1    1     1
## [15,] 1.000000000    1    1     1
## [16,] 1.000000000    1    1     1
## [17,] 1.000000000    1    1     1
## [18,] 1.000000000    1    1     1
## [19,] 1.000000000    1    1     1
## [20,] 1.000000000    1    1     1
## [21,] 1.000000000    1    1     1
## [22,] 1.000000000    1    1     1
## [23,] 1.000000000    1    1     1
## [24,] 1.000000000    1    1     1
## [25,] 1.000000000    1    1     1
## [26,] 1.000000000    1    1     1
## [27,] 1.000000000    1    1     1
## [28,] 1.000000000    1    1     1
## [29,] 0.030717053    0    0     1
## [30,] 0.029764348    0    0     1
## [31,] 0.006046676    0    0     0
## [32,] 0.005759066    0    0     0
## [33,] 0.009625633    0    0     0
## [34,] 1.000000000    1    1     1
## [35,] 1.000000000    1    1     1
## [36,] 0.024972106    0    0     0
## [37,] 1.000000000    1    1     1
## [38,] 0.030246509    0    0     1
## [39,] 1.000000000    1    1     1
## [40,] 1.000000000    1    1     1
## [41,] 0.038556115    0    0     1
## [42,] 1.000000000    1    1     1
## [43,] 1.000000000    1    1     1
## [44,] 0.014784745    0    0     0
## [45,] 1.000000000    1    1     1
## [46,] 1.000000000    1    1     1
## [47,] 1.000000000    1    1     1
## [48,] 1.000000000    1    1     1
## [49,] 1.000000000    1    1     1
## [50,] 1.000000000    1    1     1
## [51,] 1.000000000    1    1     1
## [52,] 1.000000000    1    1     1
## [53,] 1.000000000    1    1     1
```

```
## [54,] 1.000000000   1   1      1
## [55,] 1.000000000   1   1      1
## [56,] 1.000000000   1   1      1
## [57,] 1.000000000   1   1      1
## [58,] 0.017322393   0   0      0
## [59,] 0.016014435   0   0      0
## [60,] 0.032906935   0   0      1
## [61,] 1.000000000   1   1      1
## [62,] 1.000000000   1   1      1
## [63,] 0.011400297   0   0      0
## [64,] 1.000000000   1   1      1
## [65,] 0.024713128   0   0      0
## [66,] 1.000000000   1   1      1
## [67,] 1.000000000   1   1      1
## [68,] 0.042572489   0   0      1
## [69,] 1.000000000   1   1      1
## [70,] 1.000000000   1   1      1
```

8. Modèle $(\psi, p_{\textbf{nuages}})$

On crée un variable pour l'effet des nuages.

```
nuage <- cbind(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                            obsCovs = list(nuage = nuage))
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##    0    1
##   82  128
##
## Observation-level covariates:
##       nuage
##  Min.    :1.000
##  1st Qu.:1.000
##  Median :1.000
##  Mean    :1.957
##  3rd Qu.:3.000
##  Max.    :5.000
```

Ajuste modèle.

```
fm5 <- occu(~ nuage ~ 1, lezard)
```

On back-transforme l'occupancy.

```
backTransform(fm5, type = 'state')
```

```
## Backtransformed linear combination(s) of Occupancy estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##     0.763 0.0517    1.17           1
##
## Transformation: logistic
```

```
confint(backTransform(fm5, type='state'))
```

```
##      0.025      0.975
##   0.6476831 0.8495228
```

Et pour la détection.

```
nuage_partout <- c(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
nd <- data.frame(nuage = seq(min(nuage_partout), max(nuage_partout), length = 50))
det_pred <- predict(fm5, type = 'det', newdata = nd)
```

Visualise.

```
plot(nd$nuage,
     det_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nuages",
     ylab = "probabilité estimée de détection du lézard")
```
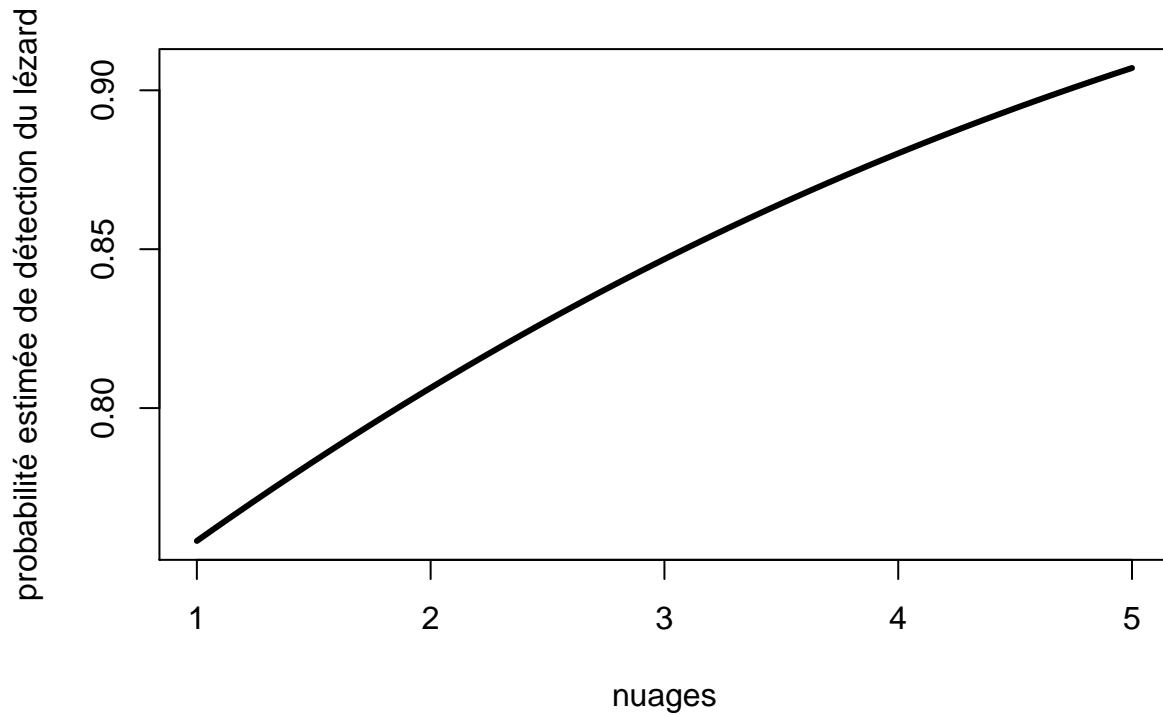
9. Modèle (ψ_{lapins}, p_t)

On a refait le jeu de données à chaque fois, mais on aurait pu mettre toutes les covariables en une fois.

Les covariables qui dépendent du temps.

```r
temps <- matrix(c('tps 1','tps 2','tps 3'),
                nrow = 70, # nrow(lezard@y),
                ncol = 3, #ncol(lezard),
                byrow = TRUE)

temp <- cbind(dat$temp_R1, dat$temp_R2, dat$temp_R3)
vent <- cbind(dat$vent_R1, dat$vent_R2, dat$vent_R3)
nuage <- cbind(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
```

La covariable qui dépend du site.

```r
site.covs <- data.frame(lapin = dat$nb_terriers_lapins)
site.covs
```

```
##    lapin
## 1      0
## 2      5
## 3      1
## 4      2
## 5      5
## 6     10
## 7      0
## 8      0
## 9      0
```

```
## 10     5
## 11     0
## 12    20
## 13     0
## 14     0
## 15     2
## 16     0
## 17     0
## 18     1
## 19     0
## 20    10
## 21     0
## 22     0
## 23     0
## 24     0
## 25     0
## 26     0
## 27     0
## 28     5
## 29    10
## 30     0
## 31     0
## 32     0
## 33     0
## 34     0
## 35     4
## 36     0
## 37     0
## 38     0
## 39     0
## 40     0
## 41     0
## 42     3
## 43     0
## 44     0
## 45     1
## 46     0
## 47     4
## 48     5
## 49     0
## 50     0
## 51     0
## 52     0
## 53     0
## 54     0
## 55     0
## 56     0
## 57    15
## 58     0
## 59     0
## 60     0
## 61     0
## 62     1
## 63     0
```

```
## 64      0
## 65      0
## 66      0
## 67      5
## 68      1
## 69      0
## 70      0
```

On refait le jeu de données.

```
lezard <- unmarkedFrameOccu(y = cbind(dat$presence_R1, dat$presence_R2, dat$presence_R3),
                            obsCovs = list(temp = temp,
                                           vent = vent,
                                           nuage = nuage,
                                           temps = temps),
                            siteCovs = site.covs)
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 53
##
## Tabulation of y observations:
##   0   1
##  82 128
##
## Site-level covariates:
##      lapin
##  Min.   : 0.000
##  1st Qu.: 0.000
##  Median : 0.000
##  Mean   : 1.643
##  3rd Qu.: 1.000
##  Max.   :20.000
##
## Observation-level covariates:
##      temp             vent            nuage          temps
##  Min.   :15.30   Min.   :0.000   Min.   :1.000   tps 1:70
##  1st Qu.:20.43   1st Qu.:2.500   1st Qu.:1.000   tps 2:70
##  Median :23.20   Median :3.750   Median :1.000   tps 3:70
##  Mean   :22.74   Mean   :3.941   Mean   :1.957
##  3rd Qu.:24.80   3rd Qu.:5.000   3rd Qu.:3.000
##  Max.   :30.50   Max.   :9.300   Max.   :5.000
```

Ajuste modèle.

```
fm6 <- occu(~ temps ~ lapin, lezard)
```

On back-transforme la détection.

```
nd <- data.frame(temps = c('tps 1','tps 2','tps 3'))
predict(fm6, type = 'det', newdata = nd)
```

```
##   Predicted         SE     lower     upper
## 1 0.5903143 0.06699593 0.4556944 0.7126354
## 2 0.8670254 0.04674690 0.7465347 0.9352091
## 3 0.9039182 0.04081258 0.7892671 0.9594010
```

Et pour l'occupancy.

```
nd <- data.frame(lapin = seq(min(dat$nb_terriers_lapins),
                             max(dat$nb_terriers_lapins),
                             length = 50))
occ_pred <- predict(fm6, type = 'state', newdata = nd)
```

Visualise.

```
plot(nd$lapin,
     occ_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nb terriers lapins",
     ylab = "probabilité estimée d'occupancy du lézard")
```
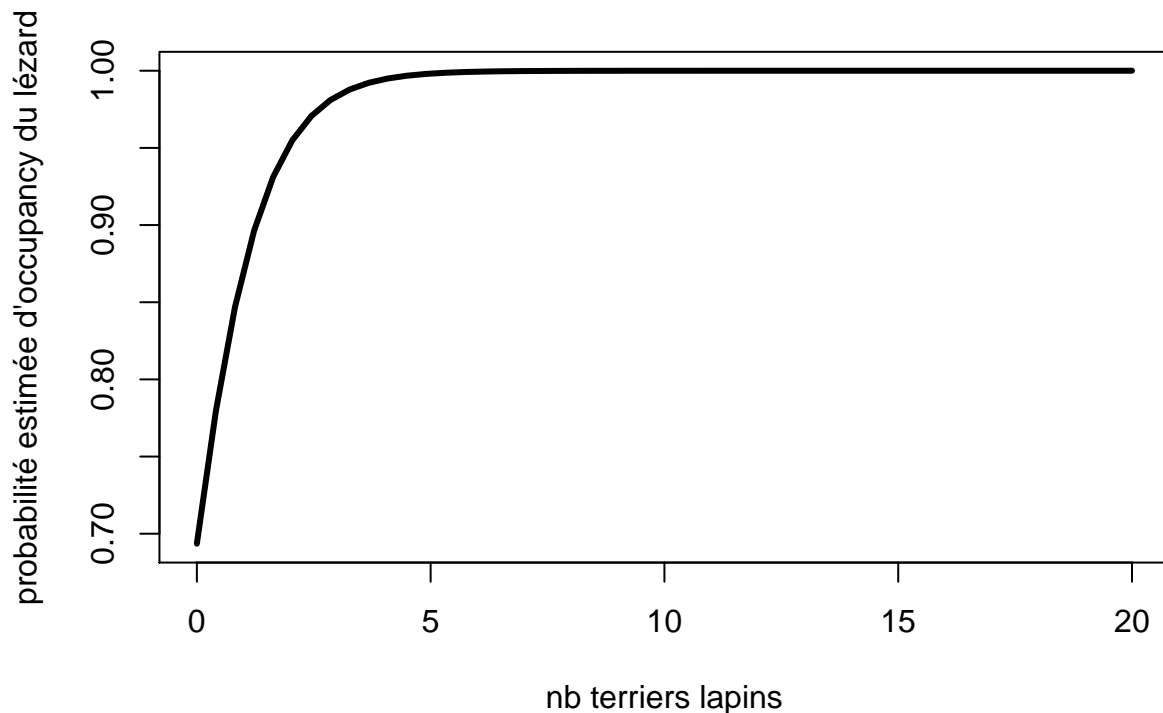
10. Sélection de modèles

On fait tourner les modèles avec le même jeu de données.

```
fm <- occu(~ 1 ~ 1, lezard)
fm1 <- occu(~ temps ~ 1, lezard)
fm2 <- occu(~ 1 ~ lapin, lezard)
fm3 <- occu(~ temp ~ 1, lezard)
fm4 <- occu(~ vent ~ 1, lezard)
fm5 <- occu(~ nuage ~ 1, lezard)
fm6 <- occu(~ temps ~ lapin, lezard)
```

On les rassemble.

```
fmList <- fitList('{psi, p}' = fm,
                  '{psi, p(temps)}' = fm1,
                  '{psi(terrier), p}' = fm2,
                  '{psi, p(temp)}' = fm3,
                  '{psi, p(vent)}' = fm4,
                  '{psi, p(nuage)}' = fm5,
                  '{psi(terrier), p(temps)}' = fm6)
```

Les AIC.

```
modSel(fmList)
```

```
##                          nPars    AIC delta   AICwt cumltvWt
## {psi, p(temps)}              4 222.21  0.00 0.64237     0.64
## {psi(terrier), p(temps)}     5 223.39  1.19 0.35505     1.00
## {psi, p(vent)}               3 234.43 12.22 0.00142     1.00
## {psi, p(nuage)}              3 237.02 14.81 0.00039     1.00
## {psi(terrier), p}            3 237.53 15.32 0.00030     1.00
## {psi, p}                     2 237.67 15.46 0.00028     1.00
## {psi, p(temp)}               3 238.59 16.38 0.00018     1.00
```

Les coefficients et SE.

```
coef(fmList)
```

```
##                             psi(Int)    p(Int) p(tempstps 2) p(tempstps 3)
## {psi, p}                   1.1713346 1.3765499            NA            NA
## {psi, p(temps)}            1.1521988 0.4119290      1.614644      2.046152
## {psi(terrier), p}          0.8331349 1.2906682            NA            NA
## {psi, p(temp)}             1.1670606 2.9072854            NA            NA
## {psi, p(vent)}             1.1680789 0.4044432            NA            NA
## {psi, p(nuage)}            1.1698669 0.8590802            NA            NA
## {psi(terrier), p(temps)}   0.8168358 0.3652647      1.509645      1.876275
##                             psi(lapin)    p(temp)   p(vent) p(nuage)
## {psi, p}                           NA         NA        NA       NA
## {psi, p(temps)}                    NA         NA        NA       NA
## {psi(terrier), p}            1.112579         NA        NA       NA
## {psi, p(temp)}                     NA -0.06593141        NA       NA
```

```
## {psi, p(vent)}                      NA        NA 0.2681045        NA
## {psi, p(nuage)}                     NA        NA        NA 0.2837187
## {psi(terrier), p(temps)}   1.095185        NA        NA        NA
```

```r
SE(fmList)
```

```
##                          psi(Int)    p(Int) p(tempstps 2) p(tempstps 3)
## {psi, p}                0.2866169 0.2073071            NA            NA
## {psi, p(temps)}         0.2821304 0.2808942     0.5137252     0.5873551
## {psi(terrier), p}       0.3142727 0.1986067            NA            NA
## {psi, p(temp)}          0.2855257 1.5146917            NA            NA
## {psi, p(vent)}          0.2857584 0.4670586            NA            NA
## {psi, p(nuage)}         0.2862278 0.3770512            NA            NA
## {psi(terrier), p(temps)} 0.3107411 0.2770220     0.4881479     0.5418638
##                          psi(lapin)    p(temp)   p(vent)  p(nuage)
## {psi, p}                        NA         NA        NA        NA
## {psi, p(temps)}                 NA         NA        NA        NA
## {psi(terrier), p}        0.8933203         NA        NA        NA
## {psi, p(temp)}                  NA 0.06408379        NA        NA
## {psi, p(vent)}                  NA         NA 0.1235454        NA
## {psi, p(nuage)}                 NA         NA        NA 0.1856837
## {psi(terrier), p(temps)} 0.8866299         NA        NA        NA
```

Partie 2

On lit les données lézard ocelés.

```r
dat <- read.csv2("dat/lezard-ocelle-oleron-2007-pa.csv")
```

Les covariables qui dépendent du temps.

```r
temps <- matrix(c('tps 1','tps 2','tps 3'),
                nrow = 70, # nrow(lezard@y),
                ncol = 3, #ncol(lezard),
                byrow = TRUE)

temp <- cbind(dat$temp_R1, dat$temp_R2, dat$temp_R3)
vent <- cbind(dat$vent_R1, dat$vent_R2, dat$vent_R3)
nuage <- cbind(dat$nuage_R1, dat$nuage_R2, dat$nuage_R3)
```

La covariable qui dépend du site.

```r
site.covs <- data.frame(lapin = dat$nb_terriers_lapins)
site.covs
```

```
##     lapin
## 1       0
## 2       5
## 3       1
## 4       2
```

```
## 5        5
## 6       10
## 7        0
## 8        0
## 9        0
## 10       5
## 11       0
## 12      20
## 13       0
## 14       0
## 15       2
## 16       0
## 17       0
## 18       1
## 19       0
## 20      10
## 21       0
## 22       0
## 23       0
## 24       0
## 25       0
## 26       0
## 27       0
## 28       5
## 29      10
## 30       0
## 31       0
## 32       0
## 33       0
## 34       0
## 35       4
## 36       0
## 37       0
## 38       0
## 39       0
## 40       0
## 41       0
## 42       3
## 43       0
## 44       0
## 45       1
## 46       0
## 47       4
## 48       5
## 49       0
## 50       0
## 51       0
## 52       0
## 53       0
## 54       0
## 55       0
## 56       0
## 57      15
## 58       0
```

```
## 59        0
## 60        0
## 61        0
## 62        1
## 63        0
## 64        0
## 65        0
## 66        0
## 67        5
## 68        1
## 69        0
## 70        0
```

On refait le jeu de données.

```
lezard <- unmarkedFramePCount(y = cbind(dat$Abond_R1, dat$Abond_R2, dat$Abond_R3),
                              obsCovs = list(temp = temp,
                                             vent = vent,
                                             nuage = nuage,
                                             temps = temps),
                              siteCovs = site.covs)
```

Données?

```
summary(lezard)
```

```
## unmarkedFrame Object
##
## 70 sites
## Maximum number of observations per site: 3
## Mean number of observations per site: 3
## Sites with at least one detection: 44
##
## Tabulation of y observations:
##   0   1   2   3   5
## 124  65  18   2   1
##
## Site-level covariates:
##      lapin
##  Min.   : 0.000
##  1st Qu.: 0.000
##  Median : 0.000
##  Mean   : 1.643
##  3rd Qu.: 1.000
##  Max.   :20.000
##
## Observation-level covariates:
##       temp           vent           nuage          temps
##  Min.   :15.30   Min.   :0.000   Min.   :1.000   tps 1:70
##  1st Qu.:20.43   1st Qu.:2.500   1st Qu.:1.000   tps 2:70
##  Median :23.20   Median :3.750   Median :1.000   tps 3:70
##  Mean   :22.74   Mean   :3.941   Mean   :1.957
##  3rd Qu.:24.80   3rd Qu.:5.000   3rd Qu.:3.000
##  Max.   :30.50   Max.   :9.300   Max.   :5.000
```

Ajuste modèle.

```r
fm <- pcount(~ 1 ~ 1, lezard, K = 100) # detection, then abundance
```

On back-transforme la détection.

```r
names(fm)
```

```
## [1] "state" "det"
```

```r
backTransform(fm, "state")
```

```
## Backtransformed linear combination(s) of Abundance estimate(s)
##
##  Estimate    SE LinComb (Intercept)
##      1.48 0.306   0.392           1
##
## Transformation: exp
```

```r
backTransform(fm, "det")
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##      0.36 0.0711  -0.573           1
##
## Transformation: logistic
```

Abondance.

```r
ranef(fm)
```

```
##             Mean Mode 2.5% 97.5%
##  [1,] 2.3870908    2    2     4
##  [2,] 5.6583727    5    5     8
##  [3,] 3.5013750    3    3     5
##  [4,] 2.5492509    2    2     4
##  [5,] 3.1355654    3    2     5
##  [6,] 3.6408386    3    3     5
##  [7,] 2.7543916    2    2     5
##  [8,] 1.6661575    1    1     3
##  [9,] 0.3870908    0    0     2
## [10,] 2.0192330    2    1     4
## [11,] 0.3870908    0    0     2
## [12,] 2.0192330    2    1     4
## [13,] 0.3870908    0    0     2
## [14,] 1.3870908    1    1     3
## [15,] 1.3870908    1    1     3
## [16,] 1.6661575    1    1     3
## [17,] 0.3870908    0    0     2
## [18,] 0.3870908    0    0     2
```

```
## [19,] 1.6661575   1   1      3
## [20,] 1.6661575   1   1      3
## [21,] 2.7543916   2   2      5
## [22,] 2.8868044   3   2      5
## [23,] 2.8868044   3   2      5
## [24,] 2.5492509   2   2      4
## [25,] 1.6661575   1   1      3
## [26,] 1.3870908   1   1      3
## [27,] 0.3870908   0   0      2
## [28,] 1.3870908   1   1      3
## [29,] 0.3870908   0   0      2
## [30,] 0.3870908   0   0      2
## [31,] 0.3870908   0   0      2
## [32,] 0.3870908   0   0      2
## [33,] 0.3870908   0   0      2
## [34,] 2.0192330   2   1      4
## [35,] 1.6661575   1   1      3
## [36,] 0.3870908   0   0      2
## [37,] 1.6661575   1   1      3
## [38,] 0.3870908   0   0      2
## [39,] 1.3870908   1   1      3
## [40,] 1.3870908   1   1      3
## [41,] 0.3870908   0   0      2
## [42,] 1.3870908   1   1      3
## [43,] 2.0192330   2   1      4
## [44,] 0.3870908   0   0      2
## [45,] 0.3870908   0   0      2
## [46,] 1.6661575   1   1      3
## [47,] 2.0192330   2   1      4
## [48,] 2.0192330   2   1      4
## [49,] 1.3870908   1   1      3
## [50,] 2.8868044   3   2      5
## [51,] 1.6661575   1   1      3
## [52,] 2.5492509   2   2      4
## [53,] 1.3870908   1   1      3
## [54,] 1.6661575   1   1      3
## [55,] 1.3870908   1   1      3
## [56,] 2.0192330   2   1      4
## [57,] 2.3870908   2   2      4
## [58,] 0.3870908   0   0      2
## [59,] 0.3870908   0   0      2
## [60,] 0.3870908   0   0      2
## [61,] 1.3870908   1   1      3
## [62,] 0.3870908   0   0      2
## [63,] 0.3870908   0   0      2
## [64,] 0.3870908   0   0      2
## [65,] 0.3870908   0   0      2
## [66,] 0.3870908   0   0      2
## [67,] 2.3870908   2   2      4
## [68,] 0.3870908   0   0      2
## [69,] 0.3870908   0   0      2
## [70,] 2.5492509   2   2      4
```

On fait tourner qqs modèles avec le même jeu de données.

```
fm  <- pcount(~ 1 ~ 1, lezard, K = 100)
fm1 <- pcount(~ temps ~ 1, lezard, K = 100)
fm2 <- pcount(~ 1 ~ lapin, lezard, K = 100)
fm3 <- pcount(~ temp ~ 1, lezard, K = 100)
fm4 <- pcount(~ temps ~ lapin, lezard, K = 100)
```

On les rassemble.

```
fmList <- fitList('{lambda, r}' = fm,
                  '{lambda, p(temps)}' = fm1,
                  '{lambda(terrier), p}' = fm2,
                  '{lambda, p(temp)}' = fm3,
                  '{lambda(terrier), p(temps)}' = fm4)
```

Les AIC.

```
modSel(fmList)
```

```
##                             nPars    AIC delta   AICwt cumltvWt
## {lambda(terrier), p(temps)}     5 370.70  0.00 8.2e-01     0.82
## {lambda, p(temps)}              4 373.73  3.03 1.8e-01     1.00
## {lambda(terrier), p}            3 384.92 14.21 6.7e-04     1.00
## {lambda, r}                     2 388.28 17.58 1.2e-04     1.00
## {lambda, p(temp)}               3 390.22 19.52 4.7e-05     1.00
```

On back-transforme la détection.

```
nd <- data.frame(temps = c('tps 1','tps 2','tps 3'))
predict(fm4, type = 'det', newdata = nd)
```

```
##   Predicted         SE     lower     upper
## 1 0.2256764 0.05521334 0.1356192 0.3512355
## 2 0.5050785 0.09246544 0.3307763 0.6781549
## 3 0.4728425 0.08841737 0.3091775 0.6425602
```

Et pour l'abondance.

```
nd <- data.frame(lapin = seq(min(dat$nb_terriers_lapins),
                             max(dat$nb_terriers_lapins),
                             length = 50))
N_pred <- predict(fm4, type = 'state', newdata = nd)
```

Visualise.

```
plot(nd$lapin,
     N_pred[,1],
     type = "l",
     lwd = 3,
     xlab = "nb terriers lapins",
     ylab = "abondance du lézard")
```

Partie 3

On lit les données.

```
dat <- readxl::read_xlsx("dat/dynoccupancy.xlsx")
dat
```

```
## # A tibble: 250 x 30
##    'Session 1-1' 'Session 1-2' 'Session 1-3' 'Session 2-1' 'Session 2-2'
##            <dbl>         <dbl>         <dbl>         <dbl>         <dbl>
##  1             0             0             0             0             1
##  2             0             0             0             0             0
##  3             0             0             0             0             0
##  4             1             0             0             1             0
##  5             0             0             0             0             0
##  6             0             0             0             0             0
##  7             0             0             0             0             0
##  8             0             0             1             0             0
##  9             1             1             0             0             1
## 10             0             0             0             0             0
## # ... with 240 more rows, and 25 more variables: 'Session 2-3' <dbl>, 'Session
## #   3-1' <dbl>, 'Session 3-2' <dbl>, 'Session 3-3' <dbl>, 'Session 4-1' <dbl>,
## #   'Session 4-2' <dbl>, 'Session 4-3' <dbl>, 'Session 5-1' <dbl>, 'Session
## #   5-2' <dbl>, 'Session 5-3' <dbl>, 'Session 6-1' <dbl>, 'Session 6-2' <dbl>,
## #   'Session 6-3' <dbl>, 'Session 7-1' <dbl>, 'Session 7-2' <dbl>, 'Session
## #   7-3' <dbl>, 'Session 8-1' <dbl>, 'Session 8-2' <dbl>, 'Session 8-3' <dbl>,
## #   'Session 9-1' <dbl>, 'Session 9-2' <dbl>, 'Session 9-3' <dbl>, 'Session
## #   10-1' <dbl>, 'Session 10-2' <dbl>, 'Session 10-3' <dbl>
```

La covariable année.

```
yearly.site.covs <- list(
    year = matrix(paste0("year", 1:10),
                  nrow = 250,
                  ncol = 10,
                  byrow = TRUE))
head(yearly.site.covs)
```

```
## $year
##          [,1]    [,2]    [,3]    [,4]    [,5]    [,6]    [,7]    [,8]    [,9]
##    [1,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [2,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [3,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [4,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [5,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [6,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [7,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [8,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##    [9,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [10,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [11,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [12,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [13,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [14,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [15,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [16,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [17,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [18,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [19,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [20,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [21,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [22,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [23,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [24,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [25,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [26,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [27,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [28,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [29,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [30,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [31,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [32,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [33,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [34,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [35,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [36,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [37,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [38,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [39,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [40,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [41,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [42,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [43,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
##   [44,] "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
```

```
## [45,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [46,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [47,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [48,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [49,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [50,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [51,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [52,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [53,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [54,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [55,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [56,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [57,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [58,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [59,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [60,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [61,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [62,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [63,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [64,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [65,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [66,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [67,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [68,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [69,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [70,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [71,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [72,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [73,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [74,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [75,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [76,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [77,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [78,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [79,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [80,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [81,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [82,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [83,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [84,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [85,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
## [86,]  "year1" "year2" "year3" "year4" "year5" "year6" "year7" "year8" "year9"
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```

Le jeu de données formaté pour unmarked.

```r
umf <- unmarkedMultFrame(y = dat,
                         yearlySiteCovs = yearly.site.covs,
                         numPrimary = 10)
umf                                    # look at data
```

```
## Data frame representation of unmarkedFrame object.
##      y.1 y.2 y.3 y.4 y.5 y.6 y.7 y.8 y.9 y.10 y.11 y.12 y.13 y.14 y.15 y.16 y.17
## 1      0   0   0   0   1   1   1   0   0    0    0    0    0    0    0    0    0
## 2      0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 3      0   0   0   0   0   0   1   1   1    0    0    1    0    0    0    0    0
## 4      1   0   0   1   0   1   1   1   0    0    0    0    0    0    0    0    0
## 5      0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 6      0   0   0   0   0   0   0   0   1    0    0    0    0    0    0    0    0
## 7      0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 8      0   0   1   0   0   0   0   1   1    1    0    1    0    0    0    0    0
## 9      1   1   0   0   1   0   0   0   0    0    0    0    0    0    0    0    0
## 10     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 11     1   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 12     0   0   0   1   1   0   1   1   0    0    0    0    0    0    0    1    1
## 13     0   0   0   0   0   0   0   0   0    0    0    1    0    1    0    0    0
## 14     0   0   0   1   1   0   0   0   0    0    1    0    0    1    0    0    0
## 15     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 16     0   0   1   0   1   0   1   0   0    1    1    1    0    0    0    0    0
## 17     0   0   1   0   1   1   0   0   0    0    0    0    0    0    0    0    0
## 18     0   0   0   1   0   1   0   0   0    0    0    0    0    0    0    0    0
## 19     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
```

```
## 20   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 21   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 22   0   0   0   1   0   1   0   0   0   1   1   0   0   0   0   0   0
## 23   0   1   1   0   1   0   0   1   1   0   1   1   0   0   0   0   0
## 24   0   0   0   0   1   0   0   1   0   0   0   0   1   1   0   0   0
## 25   0   1   1   1   1   0   1   1   1   0   1   1   0   0   0   1   0
## 26   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 27   1   0   0   1   0   0   0   0   0   0   0   0   0   0   1   0   0
## 28   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 29   1   0   0   1   0   0   0   0   0   0   0   0   0   0   1   0
## 30   1   1   0   1   1   1   0   1   1   1   1   0   0   0   0   0   0
## 31   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 32   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 33   1   0   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0
## 34   1   0   0   0   0   1   0   0   0   1   1   1   0   0   0   0   0
## 35   0   0   0   0   1   1   0   1   0   1   0   0   0   0   0   0   0
## 36   0   0   0   0   1   1   1   1   1   0   0   0   0   0   0   0   0
## 37   0   0   0   0   0   1   0   1   0   1   0   1   0   0   0   0   0
## 38   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 39   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0
## 40   0   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0
## 41   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0
## 42   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 43   0   1   0   0   1   1   0   0   0   0   0   0   0   0   0   0   0
## 44   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 45   0   0   0   1   0   1   0   0   1   1   1   0   0   0   0   0   0
## 46   0   0   0   0   1   1   0   0   0   0   0   0   0   0   0   0   0
## 47   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 48   0   0   1   0   1   1   1   1   1   1   1   0   0   0   0   1   0
## 49   0   0   0   0   0   0   0   0   0   1   1   1   0   0   0   0   1
## 50   1   0   1   1   0   1   0   0   0   0   0   0   0   0   0   0   0
## 51   0   1   0   0   1   1   0   0   0   0   0   0   0   0   0   0   0
## 52   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 53   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 54   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 55   0   0   0   1   1   1   0   0   0   0   0   0   0   0   0   0   0
## 56   0   0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0
## 57   0   0   0   0   0   0   1   1   0   1   0   0   0   0   0   0   0
## 58   0   0   0   1   1   0   1   1   0   0   0   0   0   0   0   0   0
## 59   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 60   0   0   0   0   0   0   0   0   0   1   0   0   0   0   0   0   0
## 61   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 62   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 63   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 64   0   0   0   1   0   1   1   0   0   0   1   0   0   0   0   0   0
## 65   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 66   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 67   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 68   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 69   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 70   1   1   1   1   0   1   0   0   0   0   0   0   0   0   0   0   0
## 71   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 72   0   0   0   0   1   0   1   1   1   1   0   1   0   0   0   0   0
## 73   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
```

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## 74    0  0  0  0  0  0  1  1  0  0  0  1  0  0  0  1  1
## 75    0  1  1  0  0  1  1  0  1  1  1  0  0  0  0  0  0
## 76    0  0  0  0  0  0  1  1  0  0  0  0  0  0  0  0  0
## 77    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 78    0  0  0  0  0  0  0  0  0  0  0  0  0  0  1  0  0
## 79    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 80    0  0  0  0  0  0  0  1  1  0  0  0  0  0  0  0  0
## 81    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 82    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 83    0  1  1  1  1  0  1  0  1  0  1  1  0  0  1  0  0
## 84    0  0  0  0  0  1  1  1  1  1  0  0  0  1  0  0  1
## 85    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 86    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 87    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 88    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  1  1
## 89    0  0  0  0  0  1  1  0  1  1  1  0  0  0  0  1  1
## 90    0  0  0  1  1  0  0  0  0  0  0  0  0  0  0  0  0
## 91    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 92    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 93    0  0  0  1  1  0  0  1  1  0  0  1  0  1  1  0  0
## 94    0  0  0  0  0  0  0  0  0  1  0  1  0  0  0  0  0
## 95    1  0  0  1  0  1  0  0  0  0  1  1  0  0  0  0  0
## 96    0  0  0  0  0  0  0  0  0  0  1  1  0  0  0  0  0
## 97    0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 98    0  0  0  0  0  0  0  0  0  0  0  0  0  0  1  0  1
## 99    0  0  0  0  1  1  1  1  0  0  0  0  0  0  0  0  0
## 100   0  0  0  0  1  1  0  0  1  0  0  0  0  0  0  0  0
## 101   0  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 102   0  1  0  0  1  0  0  0  0  0  0  0  0  0  0  0  0
## 103   0  0  0  0  0  0  1  1  0  0  0  0  0  0  0  0  1
## 104   0  0  0  0  0  0  0  0  0  0  0  1  0  0  0  0  0
## 105   0  0  0  0  0  1  0  1  1  1  0  1  0  0  0  0  0
## 106   0  0  0  0  0  0  0  0  0  1  1  0  0  0  0  0  0
## 107   0  0  0  0  0  0  0  1  0  1  1  0  0  0  0  0  0
## 108   0  0  0  0  0  0  0  0  0  1  1  0  0  0  0  0  0
## 109   0  0  0  0  0  0  0  0  0  1  0  0  0  0  0  1  0
## 110   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 111   0  0  0  0  0  0  1  0  1  1  1  0  0  0  0  0  0
## 112   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 113   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  1  1
## 114   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 115   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 116   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  1  1
## 117   1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 118   0  1  0  1  0  1  1  1  0  1  1  0  0  0  0  0  0
## 119   0  0  0  0  1  0  0  0  0  0  0  0  0  0  0  0  0
## 120   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 121   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 122   0  1  0  1  0  0  0  0  0  0  0  0  0  0  0  0  0
## 123   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 124   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 125   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 126   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
## 127   0  0  0  0  1  0  0  0  0  1  0  0  0  0  0  0  1
```

```
## 128   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 129   1   0   0   1   0   1   0   1   1   1   0   1   0   0   0   0   0
## 130   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 131   0   0   0   0   0   0   0   0   1   0   0   0   0   0   0   0   0
## 132   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1
## 133   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 134   0   1   0   1   0   0   1   0   1   1   0   0   0   0   0   1   0
## 135   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0
## 136   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 137   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 138   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 139   0   0   0   0   0   0   1   1   0   0   0   1   0   0   0   1   0
## 140   0   0   0   0   0   0   0   0   0   1   0   0   0   0   0   0   1
## 141   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 142   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 143   0   0   0   0   0   0   0   0   0   0   1   1   0   1   0   0   0
## 144   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 145   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 146   1   0   1   0   0   1   0   0   0   0   0   0   0   0   0   0   0
## 147   0   0   1   0   0   0   0   0   1   0   1   1   0   0   0   0   0
## 148   0   1   0   1   1   0   1   1   0   1   0   1   0   0   0   0   1
## 149   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 150   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 151   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 152   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 153   1   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0
## 154   0   0   0   1   0   0   1   0   1   1   1   1   0   0   0   0   0
## 155   0   1   0   0   0   0   1   1   1   1   0   1   0   0   0   0   0
## 156   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   1
## 157   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 158   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 159   0   0   1   0   1   1   0   0   0   0   0   0   0   0   0   0   0
## 160   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 161   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 162   0   0   0   0   0   0   0   0   0   1   0   1   0   0   0   0   0
## 163   0   0   0   1   1   1   0   1   0   0   0   0   0   0   0   0   0
## 164   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 165   0   1   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0
## 166   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 167   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 168   0   0   0   1   0   0   0   1   1   1   1   1   0   0   0   0   0
## 169   0   0   0   0   0   0   0   0   0   0   0   0   0   1   1   0   1
## 170   0   0   0   0   0   0   0   0   0   1   1   1   0   0   0   0   0
## 171   1   0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0
## 172   0   0   0   1   1   1   0   0   0   0   0   0   0   0   0   0   0
## 173   0   0   0   0   1   0   1   1   1   1   0   0   1   1   0   0   0
## 174   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 175   0   0   0   0   1   0   1   0   1   1   1   0   0   0   0   0   0
## 176   0   0   0   1   1   0   0   1   1   1   0   0   0   0   0   0   0
## 177   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0
## 178   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 179   0   1   0   1   1   0   0   0   1   0   1   0   1   0   0   0   0
## 180   0   0   0   0   0   0   1   0   1   1   0   0   0   0   0   1   0
## 181   0   0   0   0   1   0   1   0   1   0   0   0   0   0   0   0   0
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## 182   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 183   1   0   0   0   0   1   0   1   0   0   0   0   0   0   0   0   0
## 184   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 185   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 186   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 187   1   0   0   1   0   1   0   0   0   0   0   0   0   0   0   0   0
## 188   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 189   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 190   0   0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0
## 191   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 192   0   1   1   0   0   0   0   0   0   0   0   1   0   0   0   0   0
## 193   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 194   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 195   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0   0   0
## 196   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 197   0   0   0   0   0   0   0   0   0   0   1   1   0   0   0   0   1
## 198   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 199   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 200   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 201   0   1   0   0   1   0   1   1   1   0   1   0   0   0   0   1   0
## 202   0   0   0   0   0   0   1   0   1   1   1   0   0   0   0   0   0
## 203   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 204   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 205   1   0   0   1   1   1   1   0   0   1   0   1   0   0   0   1   1
## 206   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 207   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 208   0   1   0   0   0   1   0   0   1   1   1   1   0   0   0   0   0
## 209   0   0   0   0   0   0   0   0   0   1   0   0   0   0   0   0   0
## 210   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   1
## 211   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 212   0   0   0   0   0   0   0   0   0   0   1   1   0   1   0   1   0
## 213   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 214   0   0   0   0   0   0   0   1   1   0   0   0   0   0   0   0   0
## 215   0   0   0   0   0   1   1   1   0   1   0   1   0   0   0   0   0
## 216   1   1   1   0   1   0   0   1   0   0   0   0   0   0   0   0   0
## 217   0   1   0   0   1   1   0   1   1   1   0   1   0   0   0   0   0
## 218   0   0   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
## 219   0   0   0   1   1   0   1   1   1   0   0   0   0   0   0   0   0
## 220   0   0   0   0   0   0   0   1   1   1   0   0   0   0   0   0   0
## 221   0   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 222   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   1   0
## 223   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 224   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 225   1   0   0   0   0   0   0   1   1   1   0   0   0   0   0   0   0
## 226   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 227   0   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 228   1   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 229   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 230   0   0   0   1   0   0   0   0   1   0   1   1   0   0   0   0   0
## 231   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 232   1   1   0   0   0   0   0   0   0   0   0   0   0   0   0   1   0
## 233   0   1   0   0   0   0   1   0   0   0   0   0   0   0   0   0   0
## 234   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
## 235   0   0   0   1   1   0   0   0   0   0   0   0   0   0   0   0   1
```

```
## 236     0   1   1   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 237     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 238     0   0   0   0   0   0   0   1   1    1    0    1    0    0    0    0    0
## 239     0   0   0   1   0   1   1   0   1    1    1    1    0    0    0    0    0
## 240     0   0   0   0   0   0   1   0   0    0    0    0    0    0    0    0    0
## 241     0   0   0   0   0   1   0   1   0    0    0    0    0    0    0    0    0
## 242     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 243     0   1   0   0   1   1   1   1   0    0    1    0    0    0    0    0    0
## 244     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 245     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 246     0   0   0   0   0   0   1   1   0    0    1    0    0    1    0    1    1
## 247     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 248     0   0   0   0   0   0   0   0   0    0    0    0    0    0    0    0    0
## 249     0   0   0   1   0   1   0   1   1    0    1    1    0    0    0    0    0
## 250     0   1   0   1   0   0   1   1   1    1    1    0    0    0    0    0    0
##      y.18 y.19 y.20 y.21 y.22 y.23 y.24 y.25 y.26 y.27 y.28 y.29 y.30 year.1
## 1       0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 2       0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 3       0    0    0    0    0    0    1    0    1    1    1    0    0  year1
## 4       0    0    0    0    0    0    0    1    1    0    0    0    0  year1
## 5       0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 6       0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 7       0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 8       1    1    1    1    0    0    0    0    1    1    0    0    1  year1
## 9       0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 10      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 11      0    0    0    1    0    0    0    0    0    0    0    0    0  year1
## 12      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 13      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 14      0    0    0    0    0    0    0    1    1    1    0    0    0  year1
## 15      0    0    0    0    0    1    1    0    1    0    0    0    0  year1
## 16      0    0    0    0    0    0    0    1    0    0    0    0    0  year1
## 17      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 18      0    0    0    0    1    0    0    1    1    1    1    0    0  year1
## 19      0    0    0    0    0    0    0    1    1    0    0    1    0  year1
## 20      0    0    0    0    0    0    0    0    1    1    0    0    0  year1
## 21      0    0    0    0    0    0    0    0    0    0    1    0    0  year1
## 22      0    0    0    0    1    1    1    0    0    0    0    1    0  year1
## 23      0    1    1    0    0    1    0    1    1    0    0    0    0  year1
## 24      0    0    0    0    0    0    0    1    1    0    1    1    0  year1
## 25      0    1    0    1    0    0    0    0    0    0    0    0    0  year1
## 26      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 27      1    0    0    0    0    0    0    1    1    1    0    0    0  year1
## 28      0    0    0    0    0    1    1    0    0    1    0    0    1  year1
## 29      1    1    1    1    0    0    1    0    1    1    0    1    0  year1
## 30      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 31      0    1    0    1    1    1    1    0    0    0    0    0    0  year1
## 32      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 33      0    1    0    1    0    0    0    1    0    1    0    1    0  year1
## 34      0    1    0    1    0    0    0    0    0    0    0    0    0  year1
## 35      0    1    0    0    1    1    0    0    1    0    0    0    0  year1
## 36      1    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 37      0    0    0    0    0    0    0    0    0    0    0    0    0  year1
## 38      0    0    0    0    0    1    0    1    0    1    0    0    0  year1
```

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## 39   0   0   0   0   1   0   1   0   1   1   0   0   0   year1
## 40   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 41   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 42   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 43   0   0   0   0   1   0   0   0   0   0   0   0   0   year1
## 44   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 45   0   0   0   0   0   0   0   0   0   1   0   0   0   year1
## 46   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 47   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 48   0   0   0   0   0   1   1   1   1   1   0   0   0   year1
## 49   0   0   1   0   1   1   1   1   1   1   0   0   0   year1
## 50   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 51   0   0   0   0   0   0   0   0   0   0   0   0   1   year1
## 52   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 53   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 54   1   0   1   1   0   1   0   0   0   0   0   0   0   year1
## 55   0   1   0   0   0   1   0   0   0   0   0   0   0   year1
## 56   0   0   0   0   1   1   1   1   1   1   0   1   0   year1
## 57   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 58   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 59   0   0   0   0   0   1   0   0   0   1   0   0   0   year1
## 60   1   0   1   1   1   0   0   1   1   1   0   0   0   year1
## 61   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 62   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 63   0   1   1   1   1   1   1   1   0   0   0   0   0   year1
## 64   0   0   0   1   1   1   1   1   0   0   0   1   0   year1
## 65   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 66   0   0   0   0   1   0   0   1   1   1   0   0   0   year1
## 67   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 68   0   0   0   0   1   0   0   0   0   0   0   0   0   year1
## 69   0   1   1   1   1   0   0   0   0   0   0   0   0   year1
## 70   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 71   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 72   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 73   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 74   0   1   1   0   0   0   0   1   1   1   0   0   0   year1
## 75   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 76   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 77   0   1   0   1   0   1   1   0   0   0   0   0   0   year1
## 78   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 79   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 80   0   1   0   1   1   1   0   0   1   1   1   0   0   year1
## 81   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 82   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 83   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 84   0   0   1   1   1   1   1   1   1   0   0   0   0   year1
## 85   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 86   0   1   1   0   0   1   1   0   0   0   0   0   0   year1
## 87   0   0   0   0   0   0   0   1   1   1   0   1   0   year1
## 88   1   0   0   0   1   1   0   0   0   1   0   0   0   year1
## 89   0   1   0   0   0   1   1   1   1   1   0   0   0   year1
## 90   0   0   0   0   0   0   0   1   0   1   0   0   0   year1
## 91   0   0   0   0   0   0   0   0   1   1   0   0   0   year1
## 92   0   1   0   1   0   0   0   1   1   0   0   0   0   year1
```

```
## 93    0    0    0    0    1    1    1    0    0    0    0    0    0    year1
## 94    0    0    0    0    0    0    0    1    1    0    0    0    0    year1
## 95    0    0    0    0    0    0    0    1    0    1    0    0    0    year1
## 96    0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 97    0    0    0    0    0    0    0    1    0    1    0    1    0    year1
## 98    0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 99    0    1    1    0    0    1    1    0    1    1    0    0    0    year1
## 100   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 101   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 102   0    1    1    0    0    1    1    1    1    1    0    0    0    year1
## 103   0    1    1    1    0    1    0    0    1    0    0    1    0    year1
## 104   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 105   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 106   0    0    0    0    0    0    0    1    0    0    0    1    0    year1
## 107   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 108   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 109   0    0    1    0    0    1    0    0    0    0    0    0    0    year1
## 110   0    0    0    0    0    0    0    1    1    0    0    0    0    year1
## 111   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 112   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 113   1    0    1    1    0    0    0    0    0    1    0    1    1    year1
## 114   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 115   0    0    0    1    0    1    0    1    0    1    0    0    0    year1
## 116   0    0    1    1    1    0    1    0    1    1    0    0    0    year1
## 117   0    0    0    0    0    0    0    1    1    1    0    0    1    year1
## 118   0    0    1    1    0    0    0    0    0    0    1    0    0    year1
## 119   0    0    0    0    0    0    0    0    0    0    1    0    0    year1
## 120   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 121   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 122   1    1    1    1    0    0    0    0    0    0    0    0    0    year1
## 123   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 124   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 125   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 126   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 127   0    0    1    0    1    1    0    0    1    0    0    0    0    year1
## 128   0    0    0    0    1    0    0    0    0    0    0    0    0    year1
## 129   0    1    0    1    1    1    0    0    1    0    0    0    0    year1
## 130   0    0    0    0    1    1    0    1    0    0    0    0    0    year1
## 131   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 132   1    1    1    0    1    1    1    1    1    1    0    0    0    year1
## 133   0    1    1    1    0    0    0    1    1    0    0    0    0    year1
## 134   1    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 135   0    1    1    0    0    0    0    1    0    0    1    0    0    year1
## 136   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 137   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 138   0    0    0    0    0    0    0    0    1    1    0    1    1    year1
## 139   1    0    0    0    0    0    0    0    0    0    1    1    1    year1
## 140   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 141   0    1    1    1    0    0    0    0    0    0    0    0    0    year1
## 142   0    0    0    0    0    0    0    1    0    1    0    1    0    year1
## 143   1    0    1    0    0    0    0    0    0    0    0    0    0    year1
## 144   0    0    0    0    0    0    0    1    1    1    0    0    1    year1
## 145   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
## 146   0    0    0    0    0    0    0    0    0    0    0    0    0    year1
```

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## 147   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 148   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 149   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 150   0   0   0   0   0   0   0   1   1   1   0   0   0   year1
## 151   1   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 152   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 153   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 154   0   0   1   0   1   1   0   0   1   1   1   0   0   year1
## 155   0   1   0   1   0   1   1   0   1   1   0   0   0   year1
## 156   0   0   0   0   0   0   1   1   1   0   0   0   1   year1
## 157   0   0   0   0   0   0   0   0   0   0   0   0   1   year1
## 158   0   0   0   0   0   1   1   1   1   0   0   0   1   year1
## 159   0   1   0   0   0   0   0   0   0   0   0   0   0   year1
## 160   0   0   0   0   0   0   0   1   0   1   0   0   0   year1
## 161   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 162   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 163   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 164   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 165   0   0   0   0   1   1   0   0   1   1   0   0   0   year1
## 166   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 167   1   1   0   0   1   1   1   1   0   0   0   0   0   year1
## 168   0   0   0   0   0   0   1   1   1   1   0   0   0   year1
## 169   0   1   0   0   0   0   0   0   0   0   0   0   0   year1
## 170   0   0   0   0   0   0   0   0   0   1   0   1   1   year1
## 171   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 172   0   0   0   0   1   1   0   0   0   0   0   0   0   year1
## 173   0   1   0   1   1   1   1   1   1   1   0   0   0   year1
## 174   0   1   1   0   1   0   0   0   0   0   0   0   0   year1
## 175   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 176   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 177   1   0   0   0   1   0   0   0   0   1   0   0   0   year1
## 178   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 179   0   1   0   1   0   1   1   1   1   1   0   0   0   year1
## 180   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 181   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 182   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 183   0   0   0   0   0   1   0   1   1   1   0   0   0   year1
## 184   0   0   0   1   0   1   1   0   0   0   0   0   0   year1
## 185   0   0   0   0   1   0   1   1   1   1   0   0   0   year1
## 186   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 187   0   1   0   1   1   0   0   0   1   0   0   0   1   year1
## 188   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 189   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 190   0   1   0   1   1   1   1   0   0   0   0   0   0   year1
## 191   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 192   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 193   1   1   1   1   0   1   0   1   1   1   0   0   0   year1
## 194   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 195   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 196   0   1   0   0   0   0   0   1   1   0   0   0   0   year1
## 197   0   1   1   1   0   0   0   0   0   0   0   0   0   year1
## 198   0   0   1   1   1   1   0   0   0   1   0   1   1   year1
## 199   0   0   0   0   0   0   0   0   0   0   0   0   0   year1
## 200   0   0   0   0   0   1   0   1   1   1   0   0   0   year1
```

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## 201    0    0    1    0    1    1    1    1    1    0    0    0    0 year1
## 202    0    0    0    0    0    0    0    1    0    0    1    0    0 year1
## 203    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 204    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 205    0    0    1    1    0    0    0    0    0    0    0    0    0 year1
## 206    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 207    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 208    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 209    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 210    0    0    0    1    0    0    1    0    1    1    0    1    0 year1
## 211    0    0    0    0    0    0    0    0    1    1    0    0    0 year1
## 212    0    0    1    1    1    1    0    0    0    0    0    0    0 year1
## 213    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 214    0    0    0    0    0    1    0    0    0    1    0    1    1 year1
## 215    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 216    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 217    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 218    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 219    0    1    1    1    0    1    0    0    0    0    0    0    0 year1
## 220    1    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 221    0    0    1    1    0    0    0    0    0    0    0    0    0 year1
## 222    1    1    0    1    1    0    1    0    0    0    0    0    0 year1
## 223    0    0    0    0    1    1    0    1    0    1    0    0    0 year1
## 224    0    0    0    0    1    1    1    1    1    0    0    0    0 year1
## 225    0    1    0    0    0    0    0    0    0    1    0    0    0 year1
## 226    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 227    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 228    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 229    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 230    0    0    0    0    1    0    0    1    1    1    0    0    0 year1
## 231    0    0    1    0    0    0    0    0    0    0    0    0    0 year1
## 232    0    0    0    1    1    1    1    1    1    1    1    1    0 year1
## 233    0    0    0    0    0    0    0    1    1    0    0    0    0 year1
## 234    0    0    0    0    0    0    0    0    0    0    0    1    1 year1
## 235    0    1    1    1    1    0    0    0    1    1    0    1    0 year1
## 236    0    0    0    0    1    1    0    0    0    0    1    0    1 year1
## 237    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 238    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 239    0    0    0    0    0    0    1    0    0    0    0    0    0 year1
## 240    0    0    0    0    0    0    0    1    1    1    0    0    0 year1
## 241    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 242    0    0    0    0    0    0    0    1    0    0    0    0    0 year1
## 243    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 244    0    0    0    0    0    0    0    1    1    1    0    1    0 year1
## 245    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 246    1    1    0    0    1    0    0    0    1    1    0    1    1 year1
## 247    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 248    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
## 249    0    1    0    0    0    1    1    1    1    1    0    0    0 year1
## 250    0    0    0    0    0    0    0    0    0    0    0    0    0 year1
##     year.2 year.3 year.4 year.5 year.6 year.7 year.8 year.9 year.10 year.1.1
## 1    year2  year3  year4  year5  year6  year7  year8  year9  year10    year1
## 2    year2  year3  year4  year5  year6  year7  year8  year9  year10    year1
## 3    year2  year3  year4  year5  year6  year7  year8  year9  year10    year1
```

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## 4     year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 5     year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 6     year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 7     year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 8     year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 9     year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 10    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 11    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 12    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 13    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 14    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 15    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 16    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 17    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 18    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 19    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 20    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 21    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 22    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 23    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 24    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 25    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 26    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 27    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 28    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 29    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 30    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 31    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 32    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 33    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 34    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 35    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 36    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 37    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 38    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 39    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 40    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 41    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 42    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 43    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 44    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 45    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 46    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 47    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 48    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 49    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 50    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 51    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 52    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 53    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 54    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 55    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 56    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 57    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
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## 58    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 59    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 60    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 61    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 62    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 63    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 64    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 65    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 66    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 67    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 68    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 69    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 70    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 71    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 72    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 73    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 74    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 75    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 76    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 77    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 78    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 79    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 80    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 81    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 82    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 83    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 84    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 85    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 86    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 87    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 88    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 89    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 90    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 91    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 92    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 93    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 94    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 95    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 96    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 97    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 98    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 99    year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 100   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 101   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 102   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 103   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 104   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 105   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 106   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 107   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 108   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 109   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 110   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
## 111   year2 year3 year4 year5 year6 year7 year8 year9 year10    year1
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## 112   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 113   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 114   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 115   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 116   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 117   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 118   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 119   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 120   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 121   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 122   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 123   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 124   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 125   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 126   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 127   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 128   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 129   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 130   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 131   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 132   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 133   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 134   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 135   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 136   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 137   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 138   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 139   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 140   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 141   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 142   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 143   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 144   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 145   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 146   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 147   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 148   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 149   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 150   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 151   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 152   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 153   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 154   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 155   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 156   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 157   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 158   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 159   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 160   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 161   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 162   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 163   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 164   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 165   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 166   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 167   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 168   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 169   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 170   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 171   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 172   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 173   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 174   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 175   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 176   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 177   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 179   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 180   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 181   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 183   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 184   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 189   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 190   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
## 191   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 193   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 211   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 213   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 219   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 220   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 227   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 243   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 247   year2   year3   year4   year5   year6   year7   year8   year9   year10     year1
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## 4      year2    year3    year4    year5    year6    year7    year8    year9
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## 21     year2    year3    year4    year5    year6    year7    year8    year9
## 22     year2    year3    year4    year5    year6    year7    year8    year9
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## 77       year2     year3     year4     year5     year6     year7     year8     year9
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## 168      year2     year3     year4     year5     year6     year7     year8     year9
## 169      year2     year3     year4     year5     year6     year7     year8     year9
## 170      year2     year3     year4     year5     year6     year7     year8     year9
## 171      year2     year3     year4     year5     year6     year7     year8     year9
## 172      year2     year3     year4     year5     year6     year7     year8     year9
## 173      year2     year3     year4     year5     year6     year7     year8     year9
## 174      year2     year3     year4     year5     year6     year7     year8     year9
## 175      year2     year3     year4     year5     year6     year7     year8     year9
## 176      year2     year3     year4     year5     year6     year7     year8     year9
## 177      year2     year3     year4     year5     year6     year7     year8     year9
## 178      year2     year3     year4     year5     year6     year7     year8     year9
## 179      year2     year3     year4     year5     year6     year7     year8     year9
## 180      year2     year3     year4     year5     year6     year7     year8     year9
## 181      year2     year3     year4     year5     year6     year7     year8     year9
## 182      year2     year3     year4     year5     year6     year7     year8     year9
## 183      year2     year3     year4     year5     year6     year7     year8     year9
## 184      year2     year3     year4     year5     year6     year7     year8     year9
```

```
## 185      year2      year3      year4      year5      year6      year7      year8      year9
## 186      year2      year3      year4      year5      year6      year7      year8      year9
## 187      year2      year3      year4      year5      year6      year7      year8      year9
## 188      year2      year3      year4      year5      year6      year7      year8      year9
## 189      year2      year3      year4      year5      year6      year7      year8      year9
## 190      year2      year3      year4      year5      year6      year7      year8      year9
## 191      year2      year3      year4      year5      year6      year7      year8      year9
## 192      year2      year3      year4      year5      year6      year7      year8      year9
## 193      year2      year3      year4      year5      year6      year7      year8      year9
## 194      year2      year3      year4      year5      year6      year7      year8      year9
## 195      year2      year3      year4      year5      year6      year7      year8      year9
## 196      year2      year3      year4      year5      year6      year7      year8      year9
## 197      year2      year3      year4      year5      year6      year7      year8      year9
## 198      year2      year3      year4      year5      year6      year7      year8      year9
## 199      year2      year3      year4      year5      year6      year7      year8      year9
## 200      year2      year3      year4      year5      year6      year7      year8      year9
## 201      year2      year3      year4      year5      year6      year7      year8      year9
## 202      year2      year3      year4      year5      year6      year7      year8      year9
## 203      year2      year3      year4      year5      year6      year7      year8      year9
## 204      year2      year3      year4      year5      year6      year7      year8      year9
## 205      year2      year3      year4      year5      year6      year7      year8      year9
## 206      year2      year3      year4      year5      year6      year7      year8      year9
## 207      year2      year3      year4      year5      year6      year7      year8      year9
## 208      year2      year3      year4      year5      year6      year7      year8      year9
## 209      year2      year3      year4      year5      year6      year7      year8      year9
## 210      year2      year3      year4      year5      year6      year7      year8      year9
## 211      year2      year3      year4      year5      year6      year7      year8      year9
## 212      year2      year3      year4      year5      year6      year7      year8      year9
## 213      year2      year3      year4      year5      year6      year7      year8      year9
## 214      year2      year3      year4      year5      year6      year7      year8      year9
## 215      year2      year3      year4      year5      year6      year7      year8      year9
## 216      year2      year3      year4      year5      year6      year7      year8      year9
## 217      year2      year3      year4      year5      year6      year7      year8      year9
## 218      year2      year3      year4      year5      year6      year7      year8      year9
## 219      year2      year3      year4      year5      year6      year7      year8      year9
## 220      year2      year3      year4      year5      year6      year7      year8      year9
## 221      year2      year3      year4      year5      year6      year7      year8      year9
## 222      year2      year3      year4      year5      year6      year7      year8      year9
## 223      year2      year3      year4      year5      year6      year7      year8      year9
## 224      year2      year3      year4      year5      year6      year7      year8      year9
## 225      year2      year3      year4      year5      year6      year7      year8      year9
## 226      year2      year3      year4      year5      year6      year7      year8      year9
## 227      year2      year3      year4      year5      year6      year7      year8      year9
## 228      year2      year3      year4      year5      year6      year7      year8      year9
## 229      year2      year3      year4      year5      year6      year7      year8      year9
## 230      year2      year3      year4      year5      year6      year7      year8      year9
## 231      year2      year3      year4      year5      year6      year7      year8      year9
## 232      year2      year3      year4      year5      year6      year7      year8      year9
## 233      year2      year3      year4      year5      year6      year7      year8      year9
## 234      year2      year3      year4      year5      year6      year7      year8      year9
## 235      year2      year3      year4      year5      year6      year7      year8      year9
## 236      year2      year3      year4      year5      year6      year7      year8      year9
## 237      year2      year3      year4      year5      year6      year7      year8      year9
## 238      year2      year3      year4      year5      year6      year7      year8      year9
```

```
## 239     year2     year3     year4     year5     year6     year7     year8     year9
## 240     year2     year3     year4     year5     year6     year7     year8     year9
## 241     year2     year3     year4     year5     year6     year7     year8     year9
## 242     year2     year3     year4     year5     year6     year7     year8     year9
## 243     year2     year3     year4     year5     year6     year7     year8     year9
## 244     year2     year3     year4     year5     year6     year7     year8     year9
## 245     year2     year3     year4     year5     year6     year7     year8     year9
## 246     year2     year3     year4     year5     year6     year7     year8     year9
## 247     year2     year3     year4     year5     year6     year7     year8     year9
## 248     year2     year3     year4     year5     year6     year7     year8     year9
## 249     year2     year3     year4     year5     year6     year7     year8     year9
## 250     year2     year3     year4     year5     year6     year7     year8     year9
##       year.10.1
## 1       year10
## 2       year10
## 3       year10
## 4       year10
## 5       year10
## 6       year10
## 7       year10
## 8       year10
## 9       year10
## 10      year10
## 11      year10
## 12      year10
## 13      year10
## 14      year10
## 15      year10
## 16      year10
## 17      year10
## 18      year10
## 19      year10
## 20      year10
## 21      year10
## 22      year10
## 23      year10
## 24      year10
## 25      year10
## 26      year10
## 27      year10
## 28      year10
## 29      year10
## 30      year10
## 31      year10
## 32      year10
## 33      year10
## 34      year10
## 35      year10
## 36      year10
## 37      year10
## 38      year10
## 39      year10
## 40      year10
## 41      year10
```

```
## 42       year10
## 43       year10
## 44       year10
## 45       year10
## 46       year10
## 47       year10
## 48       year10
## 49       year10
## 50       year10
## 51       year10
## 52       year10
## 53       year10
## 54       year10
## 55       year10
## 56       year10
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## 62       year10
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## 69       year10
## 70       year10
## 71       year10
## 72       year10
## 73       year10
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## 75       year10
## 76       year10
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## 78       year10
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## 80       year10
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## 86       year10
## 87       year10
## 88       year10
## 89       year10
## 90       year10
## 91       year10
## 92       year10
## 93       year10
## 94       year10
## 95       year10
```

```
## 96       year10
## 97       year10
## 98       year10
## 99       year10
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## 105      year10
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## 140      year10
## 141      year10
## 142      year10
## 143      year10
## 144      year10
## 145      year10
## 146      year10
## 147      year10
## 148      year10
## 149      year10
```

```
## 150     year10
## 151     year10
## 152     year10
## 153     year10
## 154     year10
## 155     year10
## 156     year10
## 157     year10
## 158     year10
## 159     year10
## 160     year10
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## 165     year10
## 166     year10
## 167     year10
## 168     year10
## 169     year10
## 170     year10
## 171     year10
## 172     year10
## 173     year10
## 174     year10
## 175     year10
## 176     year10
## 177     year10
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## 191     year10
## 192     year10
## 193     year10
## 194     year10
## 195     year10
## 196     year10
## 197     year10
## 198     year10
## 199     year10
## 200     year10
## 201     year10
## 202     year10
## 203     year10
```

```
## 204    year10
## 205    year10
## 206    year10
## 207    year10
## 208    year10
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## 211    year10
## 212    year10
## 213    year10
## 214    year10
## 215    year10
## 216    year10
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## 219    year10
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## 226    year10
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## 231    year10
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## 238    year10
## 239    year10
## 240    year10
## 241    year10
## 242    year10
## 243    year10
## 244    year10
## 245    year10
## 246    year10
## 247    year10
## 248    year10
## 249    year10
## 250    year10
```

Résumé.

```r
summary(umf)                          # summarize
```

```
## unmarkedFrame Object
```

```
## 
## 250 sites
## Maximum number of observations per site: 30
## Mean number of observations per site: 30
## Number of primary survey periods: 10
## Number of secondary survey periods: 3
## Sites with at least one detection: 195
## 
## Tabulation of y observations:
##    0    1
## 6430 1070
## 
## Yearly-site-level covariates:
##        year
## year1  : 250
## year10 : 250
## year2  : 250
## year3  : 250
## year4  : 250
## year5  : 250
## (Other):1000
```

Le modèle avec paramètres tous constants.

```
fm <- colext(~1, ~1, ~1, ~1, umf)  # fit constant param model
                                   # psi, gam (colonization), eps (extinction), det
fm
```

```
## 
## Call:
## colext(psiformula = ~1, gammaformula = ~1, epsilonformula = ~1,
##     pformula = ~1, data = umf)
## 
## Initial:
##  Estimate    SE     z  P(>|z|)
##    -0.813 0.158 -5.16 2.46e-07
## 
## Colonization:
##  Estimate     SE   z   P(>|z|)
##     -1.77 0.0807 -22 2.75e-107
## 
## Extinction:
##  Estimate    SE     z  P(>|z|)
##     -0.59 0.102 -5.79 7.04e-09
## 
## Detection:
##  Estimate     SE     z P(>|z|)
##   -0.0837 0.0562 -1.49   0.137
## 
## AIC: 4972.597
```

On back-transforme l'occupancy.

```r
names(fm)
```

```
## [1] "psi" "col" "ext" "det"
```

```r
backTransform(fm, type = 'psi')
```

```
## Backtransformed linear combination(s) of Initial estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##     0.307 0.0335  -0.813           1
##
## Transformation: logistic
```

```r
confint(backTransform(fm, type='psi'))
```

```
##       0.025     0.975
##   0.2457313 0.3765804
```

```r
backTransform(fm, type = 'col')
```

```
## Backtransformed linear combination(s) of Colonization estimate(s)
##
##  Estimate    SE LinComb (Intercept)
##     0.145 0.01   -1.77           1
##
## Transformation: logistic
```

```r
confint(backTransform(fm, type='col'))
```

```
##       0.025     0.975
##   0.1264488 0.1656803
```

```r
backTransform(fm, type = 'ext')
```

```
## Backtransformed linear combination(s) of Extinction estimate(s)
##
##  Estimate     SE LinComb (Intercept)
##     0.357 0.0234   -0.59           1
##
## Transformation: logistic
```

```r
confint(backTransform(fm, type='ext'))
```

```
##       0.025     0.975
##   0.3121051 0.4035828
```

```r
backTransform(fm, type = 'det')
```

```
## Backtransformed linear combination(s) of Detection estimate(s)
##
##  Estimate    SE LinComb (Intercept)
##     0.479 0.014 -0.0837           1
##
## Transformation: logistic
```

```r
confint(backTransform(fm, type='det'))
```

```
##       0.025     0.975
##   0.4516614 0.5066307
```

Occupany conditionnelle

```r
ranef(fm)
```

```
## , , Year1
##
##             Mean Mode 2.5% 97.5%
##  [1,] 0.05900634    0    0     1
##  [2,] 0.05900634    0    0     1
##  [3,] 0.05900634    0    0     1
##  [4,] 1.00000000    1    1     1
##  [5,] 0.05900634    0    0     1
##  [6,] 0.05900634    0    0     1
##  [7,] 0.05900634    0    0     1
##  [8,] 1.00000000    1    1     1
##  [9,] 1.00000000    1    1     1
## [10,] 0.05900634    0    0     1
## [11,] 1.00000000    1    1     1
## [12,] 0.05900634    0    0     1
## [13,] 0.05900634    0    0     1
## [14,] 0.05900634    0    0     1
## [15,] 0.05900634    0    0     1
## [16,] 1.00000000    1    1     1
## [17,] 1.00000000    1    1     1
## [18,] 0.05900634    0    0     1
## [19,] 0.05900634    0    0     1
## [20,] 1.00000000    1    1     1
## [21,] 0.05900634    0    0     1
## [22,] 0.05900634    0    0     1
## [23,] 1.00000000    1    1     1
## [24,] 0.05900634    0    0     1
## [25,] 1.00000000    1    1     1
## [26,] 0.05900634    0    0     1
## [27,] 1.00000000    1    1     1
## [28,] 1.00000000    1    1     1
## [29,] 1.00000000    1    1     1
## [30,] 1.00000000    1    1     1
## [31,] 0.05900634    0    0     1
```

```
##  [32,] 0.05900634   0   0    1
##  [33,] 1.00000000   1   1    1
##  [34,] 1.00000000   1   1    1
##  [35,] 0.05900634   0   0    1
##  [36,] 0.05900634   0   0    1
##  [37,] 0.05900634   0   0    1
##  [38,] 0.05900634   0   0    1
##  [39,] 0.05900634   0   0    1
##  [40,] 0.05900634   0   0    1
##  [41,] 0.05900634   0   0    1
##  [42,] 0.05900634   0   0    1
##  [43,] 1.00000000   1   1    1
##  [44,] 0.05900634   0   0    1
##  [45,] 0.05900634   0   0    1
##  [46,] 0.05900634   0   0    1
##  [47,] 0.05900634   0   0    1
##  [48,] 1.00000000   1   1    1
##  [49,] 0.05900634   0   0    1
##  [50,] 1.00000000   1   1    1
##  [51,] 1.00000000   1   1    1
##  [52,] 0.05900634   0   0    1
##  [53,] 0.05900634   0   0    1
##  [54,] 1.00000000   1   1    1
##  [55,] 0.05900634   0   0    1
##  [56,] 1.00000000   1   1    1
##  [57,] 0.05900634   0   0    1
##  [58,] 0.05900634   0   0    1
##  [59,] 0.05900634   0   0    1
##  [60,] 0.05900634   0   0    1
##  [61,] 0.05900634   0   0    1
##  [62,] 0.05900634   0   0    1
##  [63,] 0.05900634   0   0    1
##  [64,] 0.05900634   0   0    1
##  [65,] 0.05900634   0   0    1
##  [66,] 0.05900634   0   0    1
##  [67,] 0.05900634   0   0    1
##  [68,] 0.05900634   0   0    1
##  [69,] 0.05900634   0   0    1
##  [70,] 1.00000000   1   1    1
##  [71,] 0.05900634   0   0    1
##  [72,] 0.05900634   0   0    1
##  [73,] 0.05900634   0   0    1
##  [74,] 0.05900634   0   0    1
##  [75,] 1.00000000   1   1    1
##  [76,] 0.05900634   0   0    1
##  [77,] 0.05900634   0   0    1
##  [78,] 0.05900634   0   0    1
##  [79,] 0.05900634   0   0    1
##  [80,] 0.05900634   0   0    1
##  [81,] 0.05900634   0   0    1
##  [82,] 0.05900634   0   0    1
##  [83,] 1.00000000   1   1    1
##  [84,] 0.05900634   0   0    1
##  [85,] 0.05900634   0   0    1
```

```
##  [86,] 0.05900634   0   0   1
##  [87,] 0.05900634   0   0   1
##  [88,] 0.05900634   0   0   1
##  [89,] 0.05900634   0   0   1
##  [90,] 0.05900634   0   0   1
##  [91,] 0.05900634   0   0   1
##  [92,] 0.05900634   0   0   1
##  [93,] 0.05900634   0   0   1
##  [94,] 0.05900634   0   0   1
##  [95,] 1.00000000   1   1   1
##  [96,] 0.05900634   0   0   1
##  [97,] 0.05900634   0   0   1
##  [98,] 0.05900634   0   0   1
##  [99,] 0.05900634   0   0   1
## [100,] 0.05900634   0   0   1
## [101,] 1.00000000   1   1   1
## [102,] 1.00000000   1   1   1
## [103,] 0.05900634   0   0   1
## [104,] 0.05900634   0   0   1
## [105,] 0.05900634   0   0   1
## [106,] 0.05900634   0   0   1
## [107,] 0.05900634   0   0   1
## [108,] 0.05900634   0   0   1
## [109,] 0.05900634   0   0   1
## [110,] 0.05900634   0   0   1
## [111,] 0.05900634   0   0   1
## [112,] 0.05900634   0   0   1
## [113,] 0.05900634   0   0   1
## [114,] 0.05900634   0   0   1
## [115,] 0.05900634   0   0   1
## [116,] 0.05900634   0   0   1
## [117,] 1.00000000   1   1   1
## [118,] 1.00000000   1   1   1
## [119,] 0.05900634   0   0   1
## [120,] 0.05900634   0   0   1
## [121,] 0.05900634   0   0   1
## [122,] 1.00000000   1   1   1
## [123,] 0.05900634   0   0   1
## [124,] 0.05900634   0   0   1
## [125,] 0.05900634   0   0   1
## [126,] 0.05900634   0   0   1
## [127,] 0.05900634   0   0   1
## [128,] 0.05900634   0   0   1
## [129,] 1.00000000   1   1   1
## [130,] 1.00000000   1   1   1
## [131,] 0.05900634   0   0   1
## [132,] 0.05900634   0   0   1
## [133,] 0.05900634   0   0   1
## [134,] 1.00000000   1   1   1
## [135,] 0.05900634   0   0   1
## [136,] 0.05900634   0   0   1
## [137,] 0.05900634   0   0   1
## [138,] 0.05900634   0   0   1
## [139,] 0.05900634   0   0   1
```

```
## [140,] 0.05900634   0   0   1
## [141,] 0.05900634   0   0   1
## [142,] 0.05900634   0   0   1
## [143,] 0.05900634   0   0   1
## [144,] 0.05900634   0   0   1
## [145,] 0.05900634   0   0   1
## [146,] 1.00000000   1   1   1
## [147,] 1.00000000   1   1   1
## [148,] 1.00000000   1   1   1
## [149,] 0.05900634   0   0   1
## [150,] 0.05900634   0   0   1
## [151,] 0.05900634   0   0   1
## [152,] 0.05900634   0   0   1
## [153,] 1.00000000   1   1   1
## [154,] 0.05900634   0   0   1
## [155,] 1.00000000   1   1   1
## [156,] 1.00000000   1   1   1
## [157,] 0.05900634   0   0   1
## [158,] 0.05900634   0   0   1
## [159,] 1.00000000   1   1   1
## [160,] 0.05900634   0   0   1
## [161,] 0.05900634   0   0   1
## [162,] 0.05900634   0   0   1
## [163,] 0.05900634   0   0   1
## [164,] 0.05900634   0   0   1
## [165,] 1.00000000   1   1   1
## [166,] 0.05900634   0   0   1
## [167,] 0.05900634   0   0   1
## [168,] 0.05900634   0   0   1
## [169,] 0.05900634   0   0   1
## [170,] 0.05900634   0   0   1
## [171,] 1.00000000   1   1   1
## [172,] 0.05900634   0   0   1
## [173,] 0.05900634   0   0   1
## [174,] 0.05900634   0   0   1
## [175,] 0.05900634   0   0   1
## [176,] 0.05900634   0   0   1
## [177,] 0.05900634   0   0   1
## [178,] 0.05900634   0   0   1
## [179,] 1.00000000   1   1   1
## [180,] 0.05900634   0   0   1
## [181,] 0.05900634   0   0   1
## [182,] 0.05900634   0   0   1
## [183,] 1.00000000   1   1   1
## [184,] 0.05900634   0   0   1
## [185,] 0.05900634   0   0   1
## [186,] 0.05900634   0   0   1
## [187,] 1.00000000   1   1   1
## [188,] 0.05900634   0   0   1
## [189,] 0.05900634   0   0   1
## [190,] 1.00000000   1   1   1
## [191,] 0.05900634   0   0   1
## [192,] 1.00000000   1   1   1
## [193,] 0.05900634   0   0   1
```

```
## [194,] 0.05900634   0   0   1
## [195,] 0.05900634   0   0   1
## [196,] 0.05900634   0   0   1
## [197,] 0.05900634   0   0   1
## [198,] 0.05900634   0   0   1
## [199,] 0.05900634   0   0   1
## [200,] 0.05900634   0   0   1
## [201,] 1.00000000   1   1   1
## [202,] 0.05900634   0   0   1
## [203,] 0.05900634   0   0   1
## [204,] 1.00000000   1   1   1
## [205,] 1.00000000   1   1   1
## [206,] 0.05900634   0   0   1
## [207,] 0.05900634   0   0   1
## [208,] 1.00000000   1   1   1
## [209,] 0.05900634   0   0   1
## [210,] 0.05900634   0   0   1
## [211,] 0.05900634   0   0   1
## [212,] 0.05900634   0   0   1
## [213,] 0.05900634   0   0   1
## [214,] 0.05900634   0   0   1
## [215,] 0.05900634   0   0   1
## [216,] 1.00000000   1   1   1
## [217,] 1.00000000   1   1   1
## [218,] 1.00000000   1   1   1
## [219,] 0.05900634   0   0   1
## [220,] 0.05900634   0   0   1
## [221,] 1.00000000   1   1   1
## [222,] 0.05900634   0   0   1
## [223,] 0.05900634   0   0   1
## [224,] 0.05900634   0   0   1
## [225,] 1.00000000   1   1   1
## [226,] 0.05900634   0   0   1
## [227,] 1.00000000   1   1   1
## [228,] 1.00000000   1   1   1
## [229,] 0.05900634   0   0   1
## [230,] 0.05900634   0   0   1
## [231,] 0.05900634   0   0   1
## [232,] 1.00000000   1   1   1
## [233,] 1.00000000   1   1   1
## [234,] 0.05900634   0   0   1
## [235,] 0.05900634   0   0   1
## [236,] 1.00000000   1   1   1
## [237,] 0.05900634   0   0   1
## [238,] 0.05900634   0   0   1
## [239,] 0.05900634   0   0   1
## [240,] 0.05900634   0   0   1
## [241,] 0.05900634   0   0   1
## [242,] 0.05900634   0   0   1
## [243,] 1.00000000   1   1   1
## [244,] 0.05900634   0   0   1
## [245,] 0.05900634   0   0   1
## [246,] 0.05900634   0   0   1
## [247,] 0.05900634   0   0   1
```

```
## [248,] 0.05900634    0    0     1
## [249,] 0.05900634    0    0     1
## [250,] 1.00000000    1    1     1
##
## , , Year2
##
##              Mean Mode 2.5% 97.5%
##   [1,] 1.0000000    1    1     1
##   [2,] 0.0566466    0    0     1
##   [3,] 0.0566466    0    0     1
##   [4,] 1.0000000    1    1     1
##   [5,] 0.0566466    0    0     1
##   [6,] 0.0566466    0    0     1
##   [7,] 0.0566466    0    0     1
##   [8,] 0.0566466    0    0     1
##   [9,] 1.0000000    1    1     1
##  [10,] 0.0566466    0    0     1
##  [11,] 0.0566466    0    0     1
##  [12,] 1.0000000    1    1     1
##  [13,] 0.0566466    0    0     1
##  [14,] 1.0000000    1    1     1
##  [15,] 0.0566466    0    0     1
##  [16,] 1.0000000    1    1     1
##  [17,] 1.0000000    1    1     1
##  [18,] 1.0000000    1    1     1
##  [19,] 0.0566466    0    0     1
##  [20,] 0.0566466    0    0     1
##  [21,] 0.0566466    0    0     1
##  [22,] 1.0000000    1    1     1
##  [23,] 1.0000000    1    1     1
##  [24,] 1.0000000    1    1     1
##  [25,] 1.0000000    1    1     1
##  [26,] 0.0566466    0    0     1
##  [27,] 1.0000000    1    1     1
##  [28,] 0.0566466    0    0     1
##  [29,] 1.0000000    1    1     1
##  [30,] 1.0000000    1    1     1
##  [31,] 0.0566466    0    0     1
##  [32,] 0.0566466    0    0     1
##  [33,] 1.0000000    1    1     1
##  [34,] 1.0000000    1    1     1
##  [35,] 1.0000000    1    1     1
##  [36,] 1.0000000    1    1     1
##  [37,] 1.0000000    1    1     1
##  [38,] 0.0566466    0    0     1
##  [39,] 1.0000000    1    1     1
##  [40,] 1.0000000    1    1     1
##  [41,] 1.0000000    1    1     1
##  [42,] 0.0566466    0    0     1
##  [43,] 1.0000000    1    1     1
##  [44,] 0.0566466    0    0     1
##  [45,] 1.0000000    1    1     1
##  [46,] 1.0000000    1    1     1
##  [47,] 0.0566466    0    0     1
```

```
##  [48,] 1.0000000   1   1   1
##  [49,] 0.0566466   0   0   1
##  [50,] 1.0000000   1   1   1
##  [51,] 1.0000000   1   1   1
##  [52,] 0.0566466   0   0   1
##  [53,] 0.0566466   0   0   1
##  [54,] 0.0566466   0   0   1
##  [55,] 1.0000000   1   1   1
##  [56,] 1.0000000   1   1   1
##  [57,] 0.0566466   0   0   1
##  [58,] 1.0000000   1   1   1
##  [59,] 0.0566466   0   0   1
##  [60,] 0.0566466   0   0   1
##  [61,] 0.0566466   0   0   1
##  [62,] 0.0566466   0   0   1
##  [63,] 0.0566466   0   0   1
##  [64,] 1.0000000   1   1   1
##  [65,] 0.0566466   0   0   1
##  [66,] 0.0566466   0   0   1
##  [67,] 0.0566466   0   0   1
##  [68,] 0.0566466   0   0   1
##  [69,] 0.0566466   0   0   1
##  [70,] 1.0000000   1   1   1
##  [71,] 0.0566466   0   0   1
##  [72,] 1.0000000   1   1   1
##  [73,] 0.0566466   0   0   1
##  [74,] 0.0566466   0   0   1
##  [75,] 1.0000000   1   1   1
##  [76,] 0.0566466   0   0   1
##  [77,] 0.0566466   0   0   1
##  [78,] 0.0566466   0   0   1
##  [79,] 0.0566466   0   0   1
##  [80,] 0.0566466   0   0   1
##  [81,] 0.0566466   0   0   1
##  [82,] 0.0566466   0   0   1
##  [83,] 1.0000000   1   1   1
##  [84,] 1.0000000   1   1   1
##  [85,] 0.0566466   0   0   1
##  [86,] 0.0566466   0   0   1
##  [87,] 0.0566466   0   0   1
##  [88,] 0.0566466   0   0   1
##  [89,] 1.0000000   1   1   1
##  [90,] 1.0000000   1   1   1
##  [91,] 0.0566466   0   0   1
##  [92,] 0.0566466   0   0   1
##  [93,] 1.0000000   1   1   1
##  [94,] 0.0566466   0   0   1
##  [95,] 1.0000000   1   1   1
##  [96,] 0.0566466   0   0   1
##  [97,] 0.0566466   0   0   1
##  [98,] 0.0566466   0   0   1
##  [99,] 1.0000000   1   1   1
## [100,] 1.0000000   1   1   1
## [101,] 0.0566466   0   0   1
```

```
## [102,] 1.0000000    1    1    1
## [103,] 0.0566466    0    0    1
## [104,] 0.0566466    0    0    1
## [105,] 1.0000000    1    1    1
## [106,] 0.0566466    0    0    1
## [107,] 0.0566466    0    0    1
## [108,] 0.0566466    0    0    1
## [109,] 0.0566466    0    0    1
## [110,] 0.0566466    0    0    1
## [111,] 0.0566466    0    0    1
## [112,] 0.0566466    0    0    1
## [113,] 0.0566466    0    0    1
## [114,] 0.0566466    0    0    1
## [115,] 0.0566466    0    0    1
## [116,] 0.0566466    0    0    1
## [117,] 0.0566466    0    0    1
## [118,] 1.0000000    1    1    1
## [119,] 1.0000000    1    1    1
## [120,] 0.0566466    0    0    1
## [121,] 0.0566466    0    0    1
## [122,] 1.0000000    1    1    1
## [123,] 0.0566466    0    0    1
## [124,] 0.0566466    0    0    1
## [125,] 0.0566466    0    0    1
## [126,] 0.0566466    0    0    1
## [127,] 1.0000000    1    1    1
## [128,] 0.0566466    0    0    1
## [129,] 1.0000000    1    1    1
## [130,] 0.0566466    0    0    1
## [131,] 0.0566466    0    0    1
## [132,] 0.0566466    0    0    1
## [133,] 0.0566466    0    0    1
## [134,] 1.0000000    1    1    1
## [135,] 0.0566466    0    0    1
## [136,] 0.0566466    0    0    1
## [137,] 0.0566466    0    0    1
## [138,] 0.0566466    0    0    1
## [139,] 0.0566466    0    0    1
## [140,] 0.0566466    0    0    1
## [141,] 0.0566466    0    0    1
## [142,] 0.0566466    0    0    1
## [143,] 0.0566466    0    0    1
## [144,] 0.0566466    0    0    1
## [145,] 0.0566466    0    0    1
## [146,] 1.0000000    1    1    1
## [147,] 0.0566466    0    0    1
## [148,] 1.0000000    1    1    1
## [149,] 0.0566466    0    0    1
## [150,] 0.0566466    0    0    1
## [151,] 0.0566466    0    0    1
## [152,] 0.0566466    0    0    1
## [153,] 1.0000000    1    1    1
## [154,] 1.0000000    1    1    1
## [155,] 0.0566466    0    0    1
```

```
## [156,] 0.0566466     0     0     1
## [157,] 0.0566466     0     0     1
## [158,] 0.0566466     0     0     1
## [159,] 1.0000000     1     1     1
## [160,] 0.0566466     0     0     1
## [161,] 0.0566466     0     0     1
## [162,] 0.0566466     0     0     1
## [163,] 1.0000000     1     1     1
## [164,] 0.0566466     0     0     1
## [165,] 1.0000000     1     1     1
## [166,] 0.0566466     0     0     1
## [167,] 0.0566466     0     0     1
## [168,] 1.0000000     1     1     1
## [169,] 0.0566466     0     0     1
## [170,] 0.0566466     0     0     1
## [171,] 1.0000000     1     1     1
## [172,] 1.0000000     1     1     1
## [173,] 1.0000000     1     1     1
## [174,] 0.0566466     0     0     1
## [175,] 1.0000000     1     1     1
## [176,] 1.0000000     1     1     1
## [177,] 0.0566466     0     0     1
## [178,] 0.0566466     0     0     1
## [179,] 1.0000000     1     1     1
## [180,] 0.0566466     0     0     1
## [181,] 1.0000000     1     1     1
## [182,] 0.0566466     0     0     1
## [183,] 1.0000000     1     1     1
## [184,] 0.0566466     0     0     1
## [185,] 0.0566466     0     0     1
## [186,] 0.0566466     0     0     1
## [187,] 1.0000000     1     1     1
## [188,] 0.0566466     0     0     1
## [189,] 0.0566466     0     0     1
## [190,] 1.0000000     1     1     1
## [191,] 0.0566466     0     0     1
## [192,] 0.0566466     0     0     1
## [193,] 0.0566466     0     0     1
## [194,] 0.0566466     0     0     1
## [195,] 0.0566466     0     0     1
## [196,] 0.0566466     0     0     1
## [197,] 0.0566466     0     0     1
## [198,] 0.0566466     0     0     1
## [199,] 0.0566466     0     0     1
## [200,] 0.0566466     0     0     1
## [201,] 1.0000000     1     1     1
## [202,] 0.0566466     0     0     1
## [203,] 0.0566466     0     0     1
## [204,] 0.0566466     0     0     1
## [205,] 1.0000000     1     1     1
## [206,] 0.0566466     0     0     1
## [207,] 0.0566466     0     0     1
## [208,] 1.0000000     1     1     1
## [209,] 0.0566466     0     0     1
```

```
## [210,] 0.0566466     0    0     1
## [211,] 0.0566466     0    0     1
## [212,] 0.0566466     0    0     1
## [213,] 0.0566466     0    0     1
## [214,] 0.0566466     0    0     1
## [215,] 1.0000000     1    1     1
## [216,] 1.0000000     1    1     1
## [217,] 1.0000000     1    1     1
## [218,] 1.0000000     1    1     1
## [219,] 1.0000000     1    1     1
## [220,] 0.0566466     0    0     1
## [221,] 0.0566466     0    0     1
## [222,] 1.0000000     1    1     1
## [223,] 0.0566466     0    0     1
## [224,] 0.0566466     0    0     1
## [225,] 0.0566466     0    0     1
## [226,] 0.0566466     0    0     1
## [227,] 0.0566466     0    0     1
## [228,] 0.0566466     0    0     1
## [229,] 0.0566466     0    0     1
## [230,] 1.0000000     1    1     1
## [231,] 0.0566466     0    0     1
## [232,] 0.0566466     0    0     1
## [233,] 0.0566466     0    0     1
## [234,] 0.0566466     0    0     1
## [235,] 1.0000000     1    1     1
## [236,] 0.0566466     0    0     1
## [237,] 0.0566466     0    0     1
## [238,] 0.0566466     0    0     1
## [239,] 1.0000000     1    1     1
## [240,] 0.0566466     0    0     1
## [241,] 1.0000000     1    1     1
## [242,] 0.0566466     0    0     1
## [243,] 1.0000000     1    1     1
## [244,] 0.0566466     0    0     1
## [245,] 0.0566466     0    0     1
## [246,] 0.0566466     0    0     1
## [247,] 0.0566466     0    0     1
## [248,] 0.0566466     0    0     1
## [249,] 1.0000000     1    1     1
## [250,] 1.0000000     1    1     1
##
## , , Year3
##
##             Mean Mode 2.5% 97.5%
##   [1,] 1.00000000     1    1     1
##   [2,] 0.05548877     0    0     1
##   [3,] 1.00000000     1    1     1
##   [4,] 1.00000000     1    1     1
##   [5,] 0.05548877     0    0     1
##   [6,] 1.00000000     1    1     1
##   [7,] 0.05548877     0    0     1
##   [8,] 1.00000000     1    1     1
##   [9,] 0.05548877     0    0     1
```

```
## [10,] 0.05548877   0   0   1
## [11,] 0.05548877   0   0   1
## [12,] 1.00000000   1   1   1
## [13,] 0.05548877   0   0   1
## [14,] 0.05548877   0   0   1
## [15,] 0.05548877   0   0   1
## [16,] 1.00000000   1   1   1
## [17,] 0.05548877   0   0   1
## [18,] 0.05548877   0   0   1
## [19,] 0.05548877   0   0   1
## [20,] 0.05548877   0   0   1
## [21,] 0.05548877   0   0   1
## [22,] 0.05548877   0   0   1
## [23,] 1.00000000   1   1   1
## [24,] 1.00000000   1   1   1
## [25,] 1.00000000   1   1   1
## [26,] 0.05548877   0   0   1
## [27,] 0.05548877   0   0   1
## [28,] 0.05548877   0   0   1
## [29,] 0.05548877   0   0   1
## [30,] 1.00000000   1   1   1
## [31,] 0.05548877   0   0   1
## [32,] 0.05548877   0   0   1
## [33,] 0.05548877   0   0   1
## [34,] 0.05548877   0   0   1
## [35,] 1.00000000   1   1   1
## [36,] 1.00000000   1   1   1
## [37,] 1.00000000   1   1   1
## [38,] 0.05548877   0   0   1
## [39,] 0.05548877   0   0   1
## [40,] 0.05548877   0   0   1
## [41,] 0.05548877   0   0   1
## [42,] 0.05548877   0   0   1
## [43,] 0.05548877   0   0   1
## [44,] 0.05548877   0   0   1
## [45,] 1.00000000   1   1   1
## [46,] 0.05548877   0   0   1
## [47,] 0.05548877   0   0   1
## [48,] 1.00000000   1   1   1
## [49,] 0.05548877   0   0   1
## [50,] 0.05548877   0   0   1
## [51,] 0.05548877   0   0   1
## [52,] 0.05548877   0   0   1
## [53,] 0.05548877   0   0   1
## [54,] 0.05548877   0   0   1
## [55,] 0.05548877   0   0   1
## [56,] 0.05548877   0   0   1
## [57,] 1.00000000   1   1   1
## [58,] 1.00000000   1   1   1
## [59,] 0.05548877   0   0   1
## [60,] 0.05548877   0   0   1
## [61,] 0.05548877   0   0   1
## [62,] 0.05548877   0   0   1
## [63,] 0.05548877   0   0   1
```

```
##  [64,] 1.00000000    1    1    1
##  [65,] 0.05548877    0    0    1
##  [66,] 0.05548877    0    0    1
##  [67,] 0.05548877    0    0    1
##  [68,] 0.05548877    0    0    1
##  [69,] 0.05548877    0    0    1
##  [70,] 0.05548877    0    0    1
##  [71,] 0.05548877    0    0    1
##  [72,] 1.00000000    1    1    1
##  [73,] 0.05548877    0    0    1
##  [74,] 1.00000000    1    1    1
##  [75,] 1.00000000    1    1    1
##  [76,] 1.00000000    1    1    1
##  [77,] 0.05548877    0    0    1
##  [78,] 0.05548877    0    0    1
##  [79,] 0.05548877    0    0    1
##  [80,] 1.00000000    1    1    1
##  [81,] 0.05548877    0    0    1
##  [82,] 0.05548877    0    0    1
##  [83,] 1.00000000    1    1    1
##  [84,] 1.00000000    1    1    1
##  [85,] 0.05548877    0    0    1
##  [86,] 0.05548877    0    0    1
##  [87,] 0.05548877    0    0    1
##  [88,] 0.05548877    0    0    1
##  [89,] 1.00000000    1    1    1
##  [90,] 0.05548877    0    0    1
##  [91,] 0.05548877    0    0    1
##  [92,] 0.05548877    0    0    1
##  [93,] 1.00000000    1    1    1
##  [94,] 0.05548877    0    0    1
##  [95,] 0.05548877    0    0    1
##  [96,] 0.05548877    0    0    1
##  [97,] 0.05548877    0    0    1
##  [98,] 0.05548877    0    0    1
##  [99,] 1.00000000    1    1    1
## [100,] 1.00000000    1    1    1
## [101,] 0.05548877    0    0    1
## [102,] 0.05548877    0    0    1
## [103,] 1.00000000    1    1    1
## [104,] 0.05548877    0    0    1
## [105,] 1.00000000    1    1    1
## [106,] 0.05548877    0    0    1
## [107,] 1.00000000    1    1    1
## [108,] 0.05548877    0    0    1
## [109,] 0.05548877    0    0    1
## [110,] 0.05548877    0    0    1
## [111,] 1.00000000    1    1    1
## [112,] 0.05548877    0    0    1
## [113,] 0.05548877    0    0    1
## [114,] 0.05548877    0    0    1
## [115,] 0.05548877    0    0    1
## [116,] 0.05548877    0    0    1
## [117,] 0.05548877    0    0    1
```

```
## [118,] 1.00000000   1   1   1
## [119,] 0.05548877   0   0   1
## [120,] 0.05548877   0   0   1
## [121,] 0.05548877   0   0   1
## [122,] 0.05548877   0   0   1
## [123,] 0.05548877   0   0   1
## [124,] 0.05548877   0   0   1
## [125,] 0.05548877   0   0   1
## [126,] 0.05548877   0   0   1
## [127,] 0.05548877   0   0   1
## [128,] 0.05548877   0   0   1
## [129,] 1.00000000   1   1   1
## [130,] 0.05548877   0   0   1
## [131,] 1.00000000   1   1   1
## [132,] 0.05548877   0   0   1
## [133,] 0.05548877   0   0   1
## [134,] 1.00000000   1   1   1
## [135,] 0.05548877   0   0   1
## [136,] 0.05548877   0   0   1
## [137,] 0.05548877   0   0   1
## [138,] 0.05548877   0   0   1
## [139,] 1.00000000   1   1   1
## [140,] 0.05548877   0   0   1
## [141,] 0.05548877   0   0   1
## [142,] 0.05548877   0   0   1
## [143,] 0.05548877   0   0   1
## [144,] 0.05548877   0   0   1
## [145,] 0.05548877   0   0   1
## [146,] 0.05548877   0   0   1
## [147,] 1.00000000   1   1   1
## [148,] 1.00000000   1   1   1
## [149,] 0.05548877   0   0   1
## [150,] 0.05548877   0   0   1
## [151,] 0.05548877   0   0   1
## [152,] 0.05548877   0   0   1
## [153,] 0.05548877   0   0   1
## [154,] 1.00000000   1   1   1
## [155,] 1.00000000   1   1   1
## [156,] 0.05548877   0   0   1
## [157,] 0.05548877   0   0   1
## [158,] 0.05548877   0   0   1
## [159,] 0.05548877   0   0   1
## [160,] 0.05548877   0   0   1
## [161,] 0.05548877   0   0   1
## [162,] 0.05548877   0   0   1
## [163,] 1.00000000   1   1   1
## [164,] 0.05548877   0   0   1
## [165,] 0.05548877   0   0   1
## [166,] 0.05548877   0   0   1
## [167,] 0.05548877   0   0   1
## [168,] 1.00000000   1   1   1
## [169,] 0.05548877   0   0   1
## [170,] 0.05548877   0   0   1
## [171,] 0.05548877   0   0   1
```

```
## [172,] 0.05548877    0    0    1
## [173,] 1.00000000    1    1    1
## [174,] 0.05548877    0    0    1
## [175,] 1.00000000    1    1    1
## [176,] 1.00000000    1    1    1
## [177,] 0.05548877    0    0    1
## [178,] 0.05548877    0    0    1
## [179,] 1.00000000    1    1    1
## [180,] 1.00000000    1    1    1
## [181,] 1.00000000    1    1    1
## [182,] 0.05548877    0    0    1
## [183,] 1.00000000    1    1    1
## [184,] 0.05548877    0    0    1
## [185,] 0.05548877    0    0    1
## [186,] 0.05548877    0    0    1
## [187,] 0.05548877    0    0    1
## [188,] 0.05548877    0    0    1
## [189,] 0.05548877    0    0    1
## [190,] 0.05548877    0    0    1
## [191,] 0.05548877    0    0    1
## [192,] 0.05548877    0    0    1
## [193,] 0.05548877    0    0    1
## [194,] 0.05548877    0    0    1
## [195,] 0.05548877    0    0    1
## [196,] 0.05548877    0    0    1
## [197,] 0.05548877    0    0    1
## [198,] 0.05548877    0    0    1
## [199,] 0.05548877    0    0    1
## [200,] 0.05548877    0    0    1
## [201,] 1.00000000    1    1    1
## [202,] 1.00000000    1    1    1
## [203,] 0.05548877    0    0    1
## [204,] 0.05548877    0    0    1
## [205,] 1.00000000    1    1    1
## [206,] 0.05548877    0    0    1
## [207,] 0.05548877    0    0    1
## [208,] 1.00000000    1    1    1
## [209,] 0.05548877    0    0    1
## [210,] 0.05548877    0    0    1
## [211,] 0.05548877    0    0    1
## [212,] 0.05548877    0    0    1
## [213,] 0.05548877    0    0    1
## [214,] 1.00000000    1    1    1
## [215,] 1.00000000    1    1    1
## [216,] 1.00000000    1    1    1
## [217,] 1.00000000    1    1    1
## [218,] 0.05548877    0    0    1
## [219,] 1.00000000    1    1    1
## [220,] 1.00000000    1    1    1
## [221,] 0.05548877    0    0    1
## [222,] 0.05548877    0    0    1
## [223,] 0.05548877    0    0    1
## [224,] 0.05548877    0    0    1
## [225,] 1.00000000    1    1    1
```

```
## [226,] 0.05548877     0     0      1
## [227,] 0.05548877     0     0      1
## [228,] 0.05548877     0     0      1
## [229,] 0.05548877     0     0      1
## [230,] 1.00000000     1     1      1
## [231,] 0.05548877     0     0      1
## [232,] 0.05548877     0     0      1
## [233,] 1.00000000     1     1      1
## [234,] 0.05548877     0     0      1
## [235,] 0.05548877     0     0      1
## [236,] 0.05548877     0     0      1
## [237,] 0.05548877     0     0      1
## [238,] 1.00000000     1     1      1
## [239,] 1.00000000     1     1      1
## [240,] 1.00000000     1     1      1
## [241,] 1.00000000     1     1      1
## [242,] 0.05548877     0     0      1
## [243,] 1.00000000     1     1      1
## [244,] 0.05548877     0     0      1
## [245,] 0.05548877     0     0      1
## [246,] 1.00000000     1     1      1
## [247,] 0.05548877     0     0      1
## [248,] 0.05548877     0     0      1
## [249,] 1.00000000     1     1      1
## [250,] 1.00000000     1     1      1
##
## , , Year4
##
##              Mean Mode 2.5% 97.5%
##   [1,] 0.05491611     0     0      1
##   [2,] 0.05491611     0     0      1
##   [3,] 1.00000000     1     1      1
##   [4,] 0.05491611     0     0      1
##   [5,] 0.05491611     0     0      1
##   [6,] 0.05491611     0     0      1
##   [7,] 0.05491611     0     0      1
##   [8,] 1.00000000     1     1      1
##   [9,] 0.05491611     0     0      1
##  [10,] 0.05491611     0     0      1
##  [11,] 0.05491611     0     0      1
##  [12,] 0.05491611     0     0      1
##  [13,] 1.00000000     1     1      1
##  [14,] 1.00000000     1     1      1
##  [15,] 0.05491611     0     0      1
##  [16,] 1.00000000     1     1      1
##  [17,] 0.05491611     0     0      1
##  [18,] 0.05491611     0     0      1
##  [19,] 0.05491611     0     0      1
##  [20,] 0.05491611     0     0      1
##  [21,] 0.05491611     0     0      1
##  [22,] 1.00000000     1     1      1
##  [23,] 1.00000000     1     1      1
##  [24,] 0.05491611     0     0      1
##  [25,] 1.00000000     1     1      1
```

```
## [26,] 0.05491611   0   0   1
## [27,] 0.05491611   0   0   1
## [28,] 0.05491611   0   0   1
## [29,] 0.05491611   0   0   1
## [30,] 1.00000000   1   1   1
## [31,] 0.05491611   0   0   1
## [32,] 0.05491611   0   0   1
## [33,] 0.05491611   0   0   1
## [34,] 1.00000000   1   1   1
## [35,] 1.00000000   1   1   1
## [36,] 0.05491611   0   0   1
## [37,] 1.00000000   1   1   1
## [38,] 0.05491611   0   0   1
## [39,] 0.05491611   0   0   1
## [40,] 0.05491611   0   0   1
## [41,] 0.05491611   0   0   1
## [42,] 0.05491611   0   0   1
## [43,] 0.05491611   0   0   1
## [44,] 0.05491611   0   0   1
## [45,] 1.00000000   1   1   1
## [46,] 0.05491611   0   0   1
## [47,] 0.05491611   0   0   1
## [48,] 1.00000000   1   1   1
## [49,] 1.00000000   1   1   1
## [50,] 0.05491611   0   0   1
## [51,] 0.05491611   0   0   1
## [52,] 0.05491611   0   0   1
## [53,] 0.05491611   0   0   1
## [54,] 0.05491611   0   0   1
## [55,] 0.05491611   0   0   1
## [56,] 0.05491611   0   0   1
## [57,] 1.00000000   1   1   1
## [58,] 0.05491611   0   0   1
## [59,] 0.05491611   0   0   1
## [60,] 1.00000000   1   1   1
## [61,] 0.05491611   0   0   1
## [62,] 0.05491611   0   0   1
## [63,] 0.05491611   0   0   1
## [64,] 1.00000000   1   1   1
## [65,] 0.05491611   0   0   1
## [66,] 0.05491611   0   0   1
## [67,] 0.05491611   0   0   1
## [68,] 0.05491611   0   0   1
## [69,] 0.05491611   0   0   1
## [70,] 0.05491611   0   0   1
## [71,] 0.05491611   0   0   1
## [72,] 1.00000000   1   1   1
## [73,] 0.05491611   0   0   1
## [74,] 1.00000000   1   1   1
## [75,] 1.00000000   1   1   1
## [76,] 0.05491611   0   0   1
## [77,] 0.05491611   0   0   1
## [78,] 0.05491611   0   0   1
## [79,] 0.05491611   0   0   1
```

```
##  [80,] 0.05491611   0   0   1
##  [81,] 0.05491611   0   0   1
##  [82,] 0.05491611   0   0   1
##  [83,] 1.00000000   1   1   1
##  [84,] 1.00000000   1   1   1
##  [85,] 0.05491611   0   0   1
##  [86,] 0.05491611   0   0   1
##  [87,] 0.05491611   0   0   1
##  [88,] 0.05491611   0   0   1
##  [89,] 1.00000000   1   1   1
##  [90,] 0.05491611   0   0   1
##  [91,] 0.05491611   0   0   1
##  [92,] 0.05491611   0   0   1
##  [93,] 1.00000000   1   1   1
##  [94,] 1.00000000   1   1   1
##  [95,] 1.00000000   1   1   1
##  [96,] 1.00000000   1   1   1
##  [97,] 0.05491611   0   0   1
##  [98,] 0.05491611   0   0   1
##  [99,] 0.05491611   0   0   1
## [100,] 0.05491611   0   0   1
## [101,] 0.05491611   0   0   1
## [102,] 0.05491611   0   0   1
## [103,] 0.05491611   0   0   1
## [104,] 1.00000000   1   1   1
## [105,] 1.00000000   1   1   1
## [106,] 1.00000000   1   1   1
## [107,] 1.00000000   1   1   1
## [108,] 1.00000000   1   1   1
## [109,] 1.00000000   1   1   1
## [110,] 0.05491611   0   0   1
## [111,] 1.00000000   1   1   1
## [112,] 0.05491611   0   0   1
## [113,] 0.05491611   0   0   1
## [114,] 0.05491611   0   0   1
## [115,] 0.05491611   0   0   1
## [116,] 0.05491611   0   0   1
## [117,] 0.05491611   0   0   1
## [118,] 1.00000000   1   1   1
## [119,] 0.05491611   0   0   1
## [120,] 0.05491611   0   0   1
## [121,] 0.05491611   0   0   1
## [122,] 0.05491611   0   0   1
## [123,] 0.05491611   0   0   1
## [124,] 0.05491611   0   0   1
## [125,] 0.05491611   0   0   1
## [126,] 0.05491611   0   0   1
## [127,] 1.00000000   1   1   1
## [128,] 0.05491611   0   0   1
## [129,] 1.00000000   1   1   1
## [130,] 0.05491611   0   0   1
## [131,] 0.05491611   0   0   1
## [132,] 0.05491611   0   0   1
## [133,] 0.05491611   0   0   1
```

```
## [134,] 1.00000000   1   1   1
## [135,] 0.05491611   0   0   1
## [136,] 0.05491611   0   0   1
## [137,] 0.05491611   0   0   1
## [138,] 0.05491611   0   0   1
## [139,] 1.00000000   1   1   1
## [140,] 1.00000000   1   1   1
## [141,] 0.05491611   0   0   1
## [142,] 0.05491611   0   0   1
## [143,] 1.00000000   1   1   1
## [144,] 0.05491611   0   0   1
## [145,] 0.05491611   0   0   1
## [146,] 0.05491611   0   0   1
## [147,] 1.00000000   1   1   1
## [148,] 1.00000000   1   1   1
## [149,] 0.05491611   0   0   1
## [150,] 0.05491611   0   0   1
## [151,] 0.05491611   0   0   1
## [152,] 0.05491611   0   0   1
## [153,] 0.05491611   0   0   1
## [154,] 1.00000000   1   1   1
## [155,] 1.00000000   1   1   1
## [156,] 0.05491611   0   0   1
## [157,] 0.05491611   0   0   1
## [158,] 0.05491611   0   0   1
## [159,] 0.05491611   0   0   1
## [160,] 0.05491611   0   0   1
## [161,] 0.05491611   0   0   1
## [162,] 1.00000000   1   1   1
## [163,] 0.05491611   0   0   1
## [164,] 0.05491611   0   0   1
## [165,] 0.05491611   0   0   1
## [166,] 0.05491611   0   0   1
## [167,] 0.05491611   0   0   1
## [168,] 1.00000000   1   1   1
## [169,] 0.05491611   0   0   1
## [170,] 1.00000000   1   1   1
## [171,] 0.05491611   0   0   1
## [172,] 0.05491611   0   0   1
## [173,] 1.00000000   1   1   1
## [174,] 0.05491611   0   0   1
## [175,] 1.00000000   1   1   1
## [176,] 1.00000000   1   1   1
## [177,] 0.05491611   0   0   1
## [178,] 0.05491611   0   0   1
## [179,] 1.00000000   1   1   1
## [180,] 1.00000000   1   1   1
## [181,] 0.05491611   0   0   1
## [182,] 0.05491611   0   0   1
## [183,] 0.05491611   0   0   1
## [184,] 0.05491611   0   0   1
## [185,] 0.05491611   0   0   1
## [186,] 0.05491611   0   0   1
## [187,] 0.05491611   0   0   1
```

```
## [188,] 0.05491611   0   0   1
## [189,] 0.05491611   0   0   1
## [190,] 0.05491611   0   0   1
## [191,] 0.05491611   0   0   1
## [192,] 1.00000000   1   1   1
## [193,] 0.05491611   0   0   1
## [194,] 0.05491611   0   0   1
## [195,] 0.05491611   0   0   1
## [196,] 0.05491611   0   0   1
## [197,] 1.00000000   1   1   1
## [198,] 0.05491611   0   0   1
## [199,] 0.05491611   0   0   1
## [200,] 0.05491611   0   0   1
## [201,] 1.00000000   1   1   1
## [202,] 1.00000000   1   1   1
## [203,] 0.05491611   0   0   1
## [204,] 0.05491611   0   0   1
## [205,] 1.00000000   1   1   1
## [206,] 0.05491611   0   0   1
## [207,] 0.05491611   0   0   1
## [208,] 1.00000000   1   1   1
## [209,] 1.00000000   1   1   1
## [210,] 0.05491611   0   0   1
## [211,] 0.05491611   0   0   1
## [212,] 1.00000000   1   1   1
## [213,] 0.05491611   0   0   1
## [214,] 0.05491611   0   0   1
## [215,] 1.00000000   1   1   1
## [216,] 0.05491611   0   0   1
## [217,] 1.00000000   1   1   1
## [218,] 0.05491611   0   0   1
## [219,] 0.05491611   0   0   1
## [220,] 1.00000000   1   1   1
## [221,] 0.05491611   0   0   1
## [222,] 0.05491611   0   0   1
## [223,] 0.05491611   0   0   1
## [224,] 0.05491611   0   0   1
## [225,] 1.00000000   1   1   1
## [226,] 0.05491611   0   0   1
## [227,] 0.05491611   0   0   1
## [228,] 0.05491611   0   0   1
## [229,] 0.05491611   0   0   1
## [230,] 1.00000000   1   1   1
## [231,] 0.05491611   0   0   1
## [232,] 0.05491611   0   0   1
## [233,] 0.05491611   0   0   1
## [234,] 0.05491611   0   0   1
## [235,] 0.05491611   0   0   1
## [236,] 0.05491611   0   0   1
## [237,] 0.05491611   0   0   1
## [238,] 1.00000000   1   1   1
## [239,] 1.00000000   1   1   1
## [240,] 0.05491611   0   0   1
## [241,] 0.05491611   0   0   1
```

```
## [242,] 0.05491611    0    0    1
## [243,] 1.00000000    1    1    1
## [244,] 0.05491611    0    0    1
## [245,] 0.05491611    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05491611    0    0    1
## [248,] 0.05491611    0    0    1
## [249,] 1.00000000    1    1    1
## [250,] 1.00000000    1    1    1
##
## , , Year5
##
##              Mean Mode 2.5% 97.5%
##   [1,] 0.05463175    0    0    1
##   [2,] 0.05463175    0    0    1
##   [3,] 0.05463175    0    0    1
##   [4,] 0.05463175    0    0    1
##   [5,] 0.05463175    0    0    1
##   [6,] 0.05463175    0    0    1
##   [7,] 0.05463175    0    0    1
##   [8,] 0.05463175    0    0    1
##   [9,] 0.05463175    0    0    1
##  [10,] 0.05463175    0    0    1
##  [11,] 0.05463175    0    0    1
##  [12,] 0.05463175    0    0    1
##  [13,] 1.00000000    1    1    1
##  [14,] 1.00000000    1    1    1
##  [15,] 0.05463175    0    0    1
##  [16,] 0.05463175    0    0    1
##  [17,] 0.05463175    0    0    1
##  [18,] 0.05463175    0    0    1
##  [19,] 0.05463175    0    0    1
##  [20,] 0.05463175    0    0    1
##  [21,] 0.05463175    0    0    1
##  [22,] 0.05463175    0    0    1
##  [23,] 0.05463175    0    0    1
##  [24,] 1.00000000    1    1    1
##  [25,] 0.05463175    0    0    1
##  [26,] 0.05463175    0    0    1
##  [27,] 1.00000000    1    1    1
##  [28,] 0.05463175    0    0    1
##  [29,] 0.05463175    0    0    1
##  [30,] 0.05463175    0    0    1
##  [31,] 0.05463175    0    0    1
##  [32,] 0.05463175    0    0    1
##  [33,] 0.05463175    0    0    1
##  [34,] 0.05463175    0    0    1
##  [35,] 0.05463175    0    0    1
##  [36,] 0.05463175    0    0    1
##  [37,] 0.05463175    0    0    1
##  [38,] 0.05463175    0    0    1
##  [39,] 0.05463175    0    0    1
##  [40,] 0.05463175    0    0    1
##  [41,] 0.05463175    0    0    1
```

```
## [42,] 0.05463175    0    0    1
## [43,] 0.05463175    0    0    1
## [44,] 0.05463175    0    0    1
## [45,] 0.05463175    0    0    1
## [46,] 0.05463175    0    0    1
## [47,] 0.05463175    0    0    1
## [48,] 0.05463175    0    0    1
## [49,] 0.05463175    0    0    1
## [50,] 0.05463175    0    0    1
## [51,] 0.05463175    0    0    1
## [52,] 0.05463175    0    0    1
## [53,] 0.05463175    0    0    1
## [54,] 0.05463175    0    0    1
## [55,] 0.05463175    0    0    1
## [56,] 0.05463175    0    0    1
## [57,] 0.05463175    0    0    1
## [58,] 0.05463175    0    0    1
## [59,] 0.05463175    0    0    1
## [60,] 0.05463175    0    0    1
## [61,] 0.05463175    0    0    1
## [62,] 0.05463175    0    0    1
## [63,] 0.05463175    0    0    1
## [64,] 0.05463175    0    0    1
## [65,] 0.05463175    0    0    1
## [66,] 0.05463175    0    0    1
## [67,] 0.05463175    0    0    1
## [68,] 0.05463175    0    0    1
## [69,] 0.05463175    0    0    1
## [70,] 0.05463175    0    0    1
## [71,] 0.05463175    0    0    1
## [72,] 0.05463175    0    0    1
## [73,] 0.05463175    0    0    1
## [74,] 0.05463175    0    0    1
## [75,] 0.05463175    0    0    1
## [76,] 0.05463175    0    0    1
## [77,] 0.05463175    0    0    1
## [78,] 1.00000000    1    1    1
## [79,] 0.05463175    0    0    1
## [80,] 0.05463175    0    0    1
## [81,] 0.05463175    0    0    1
## [82,] 0.05463175    0    0    1
## [83,] 1.00000000    1    1    1
## [84,] 1.00000000    1    1    1
## [85,] 0.05463175    0    0    1
## [86,] 0.05463175    0    0    1
## [87,] 0.05463175    0    0    1
## [88,] 0.05463175    0    0    1
## [89,] 0.05463175    0    0    1
## [90,] 0.05463175    0    0    1
## [91,] 0.05463175    0    0    1
## [92,] 0.05463175    0    0    1
## [93,] 1.00000000    1    1    1
## [94,] 0.05463175    0    0    1
## [95,] 0.05463175    0    0    1
```

```
## [96,] 0.05463175   0   0   1
## [97,] 0.05463175   0   0   1
## [98,] 1.00000000   1   1   1
## [99,] 0.05463175   0   0   1
## [100,] 0.05463175   0   0   1
## [101,] 0.05463175   0   0   1
## [102,] 0.05463175   0   0   1
## [103,] 0.05463175   0   0   1
## [104,] 0.05463175   0   0   1
## [105,] 0.05463175   0   0   1
## [106,] 0.05463175   0   0   1
## [107,] 0.05463175   0   0   1
## [108,] 0.05463175   0   0   1
## [109,] 0.05463175   0   0   1
## [110,] 0.05463175   0   0   1
## [111,] 0.05463175   0   0   1
## [112,] 0.05463175   0   0   1
## [113,] 0.05463175   0   0   1
## [114,] 0.05463175   0   0   1
## [115,] 0.05463175   0   0   1
## [116,] 0.05463175   0   0   1
## [117,] 0.05463175   0   0   1
## [118,] 0.05463175   0   0   1
## [119,] 0.05463175   0   0   1
## [120,] 0.05463175   0   0   1
## [121,] 0.05463175   0   0   1
## [122,] 0.05463175   0   0   1
## [123,] 0.05463175   0   0   1
## [124,] 0.05463175   0   0   1
## [125,] 0.05463175   0   0   1
## [126,] 0.05463175   0   0   1
## [127,] 0.05463175   0   0   1
## [128,] 0.05463175   0   0   1
## [129,] 0.05463175   0   0   1
## [130,] 0.05463175   0   0   1
## [131,] 0.05463175   0   0   1
## [132,] 0.05463175   0   0   1
## [133,] 0.05463175   0   0   1
## [134,] 0.05463175   0   0   1
## [135,] 0.05463175   0   0   1
## [136,] 0.05463175   0   0   1
## [137,] 0.05463175   0   0   1
## [138,] 0.05463175   0   0   1
## [139,] 0.05463175   0   0   1
## [140,] 0.05463175   0   0   1
## [141,] 0.05463175   0   0   1
## [142,] 0.05463175   0   0   1
## [143,] 1.00000000   1   1   1
## [144,] 0.05463175   0   0   1
## [145,] 0.05463175   0   0   1
## [146,] 0.05463175   0   0   1
## [147,] 0.05463175   0   0   1
## [148,] 0.05463175   0   0   1
## [149,] 0.05463175   0   0   1
```

```
## [150,] 0.05463175   0   0   1
## [151,] 0.05463175   0   0   1
## [152,] 0.05463175   0   0   1
## [153,] 0.05463175   0   0   1
## [154,] 0.05463175   0   0   1
## [155,] 0.05463175   0   0   1
## [156,] 0.05463175   0   0   1
## [157,] 0.05463175   0   0   1
## [158,] 0.05463175   0   0   1
## [159,] 0.05463175   0   0   1
## [160,] 0.05463175   0   0   1
## [161,] 0.05463175   0   0   1
## [162,] 0.05463175   0   0   1
## [163,] 0.05463175   0   0   1
## [164,] 0.05463175   0   0   1
## [165,] 0.05463175   0   0   1
## [166,] 0.05463175   0   0   1
## [167,] 0.05463175   0   0   1
## [168,] 0.05463175   0   0   1
## [169,] 1.00000000   1   1   1
## [170,] 0.05463175   0   0   1
## [171,] 0.05463175   0   0   1
## [172,] 0.05463175   0   0   1
## [173,] 1.00000000   1   1   1
## [174,] 0.05463175   0   0   1
## [175,] 0.05463175   0   0   1
## [176,] 0.05463175   0   0   1
## [177,] 0.05463175   0   0   1
## [178,] 0.05463175   0   0   1
## [179,] 1.00000000   1   1   1
## [180,] 0.05463175   0   0   1
## [181,] 0.05463175   0   0   1
## [182,] 0.05463175   0   0   1
## [183,] 0.05463175   0   0   1
## [184,] 0.05463175   0   0   1
## [185,] 0.05463175   0   0   1
## [186,] 0.05463175   0   0   1
## [187,] 0.05463175   0   0   1
## [188,] 0.05463175   0   0   1
## [189,] 0.05463175   0   0   1
## [190,] 0.05463175   0   0   1
## [191,] 0.05463175   0   0   1
## [192,] 0.05463175   0   0   1
## [193,] 0.05463175   0   0   1
## [194,] 0.05463175   0   0   1
## [195,] 1.00000000   1   1   1
## [196,] 0.05463175   0   0   1
## [197,] 0.05463175   0   0   1
## [198,] 0.05463175   0   0   1
## [199,] 0.05463175   0   0   1
## [200,] 0.05463175   0   0   1
## [201,] 0.05463175   0   0   1
## [202,] 0.05463175   0   0   1
## [203,] 0.05463175   0   0   1
```

```
## [204,] 0.05463175    0    0    1
## [205,] 0.05463175    0    0    1
## [206,] 0.05463175    0    0    1
## [207,] 0.05463175    0    0    1
## [208,] 0.05463175    0    0    1
## [209,] 0.05463175    0    0    1
## [210,] 0.05463175    0    0    1
## [211,] 0.05463175    0    0    1
## [212,] 1.00000000    1    1    1
## [213,] 0.05463175    0    0    1
## [214,] 0.05463175    0    0    1
## [215,] 0.05463175    0    0    1
## [216,] 0.05463175    0    0    1
## [217,] 0.05463175    0    0    1
## [218,] 0.05463175    0    0    1
## [219,] 0.05463175    0    0    1
## [220,] 0.05463175    0    0    1
## [221,] 0.05463175    0    0    1
## [222,] 0.05463175    0    0    1
## [223,] 0.05463175    0    0    1
## [224,] 0.05463175    0    0    1
## [225,] 0.05463175    0    0    1
## [226,] 0.05463175    0    0    1
## [227,] 0.05463175    0    0    1
## [228,] 0.05463175    0    0    1
## [229,] 0.05463175    0    0    1
## [230,] 0.05463175    0    0    1
## [231,] 0.05463175    0    0    1
## [232,] 0.05463175    0    0    1
## [233,] 0.05463175    0    0    1
## [234,] 0.05463175    0    0    1
## [235,] 0.05463175    0    0    1
## [236,] 0.05463175    0    0    1
## [237,] 0.05463175    0    0    1
## [238,] 0.05463175    0    0    1
## [239,] 0.05463175    0    0    1
## [240,] 0.05463175    0    0    1
## [241,] 0.05463175    0    0    1
## [242,] 0.05463175    0    0    1
## [243,] 0.05463175    0    0    1
## [244,] 0.05463175    0    0    1
## [245,] 0.05463175    0    0    1
## [246,] 1.00000000    1    1    1
## [247,] 0.05463175    0    0    1
## [248,] 0.05463175    0    0    1
## [249,] 0.05463175    0    0    1
## [250,] 0.05463175    0    0    1
##
## , , Year6
##
##             Mean Mode 2.5% 97.5%
##   [1,] 0.05449028    0    0    1
##   [2,] 0.05449028    0    0    1
##   [3,] 0.05449028    0    0    1
```

```
##  [4,] 0.05449028   0   0   1
##  [5,] 0.05449028   0   0   1
##  [6,] 0.05449028   0   0   1
##  [7,] 0.05449028   0   0   1
##  [8,] 1.00000000   1   1   1
##  [9,] 0.05449028   0   0   1
## [10,] 0.05449028   0   0   1
## [11,] 0.05449028   0   0   1
## [12,] 1.00000000   1   1   1
## [13,] 0.05449028   0   0   1
## [14,] 0.05449028   0   0   1
## [15,] 0.05449028   0   0   1
## [16,] 0.05449028   0   0   1
## [17,] 0.05449028   0   0   1
## [18,] 0.05449028   0   0   1
## [19,] 0.05449028   0   0   1
## [20,] 0.05449028   0   0   1
## [21,] 0.05449028   0   0   1
## [22,] 0.05449028   0   0   1
## [23,] 0.05449028   0   0   1
## [24,] 0.05449028   0   0   1
## [25,] 1.00000000   1   1   1
## [26,] 0.05449028   0   0   1
## [27,] 1.00000000   1   1   1
## [28,] 0.05449028   0   0   1
## [29,] 1.00000000   1   1   1
## [30,] 0.05449028   0   0   1
## [31,] 0.05449028   0   0   1
## [32,] 0.05449028   0   0   1
## [33,] 0.05449028   0   0   1
## [34,] 0.05449028   0   0   1
## [35,] 0.05449028   0   0   1
## [36,] 1.00000000   1   1   1
## [37,] 0.05449028   0   0   1
## [38,] 0.05449028   0   0   1
## [39,] 0.05449028   0   0   1
## [40,] 0.05449028   0   0   1
## [41,] 0.05449028   0   0   1
## [42,] 0.05449028   0   0   1
## [43,] 0.05449028   0   0   1
## [44,] 0.05449028   0   0   1
## [45,] 0.05449028   0   0   1
## [46,] 0.05449028   0   0   1
## [47,] 0.05449028   0   0   1
## [48,] 1.00000000   1   1   1
## [49,] 1.00000000   1   1   1
## [50,] 0.05449028   0   0   1
## [51,] 0.05449028   0   0   1
## [52,] 0.05449028   0   0   1
## [53,] 0.05449028   0   0   1
## [54,] 1.00000000   1   1   1
## [55,] 0.05449028   0   0   1
## [56,] 0.05449028   0   0   1
## [57,] 0.05449028   0   0   1
```

```
##  [58,] 0.05449028   0   0   1
##  [59,] 0.05449028   0   0   1
##  [60,] 1.00000000   1   1   1
##  [61,] 0.05449028   0   0   1
##  [62,] 0.05449028   0   0   1
##  [63,] 0.05449028   0   0   1
##  [64,] 0.05449028   0   0   1
##  [65,] 0.05449028   0   0   1
##  [66,] 0.05449028   0   0   1
##  [67,] 0.05449028   0   0   1
##  [68,] 0.05449028   0   0   1
##  [69,] 0.05449028   0   0   1
##  [70,] 0.05449028   0   0   1
##  [71,] 0.05449028   0   0   1
##  [72,] 0.05449028   0   0   1
##  [73,] 0.05449028   0   0   1
##  [74,] 1.00000000   1   1   1
##  [75,] 0.05449028   0   0   1
##  [76,] 0.05449028   0   0   1
##  [77,] 0.05449028   0   0   1
##  [78,] 0.05449028   0   0   1
##  [79,] 0.05449028   0   0   1
##  [80,] 0.05449028   0   0   1
##  [81,] 0.05449028   0   0   1
##  [82,] 0.05449028   0   0   1
##  [83,] 0.05449028   0   0   1
##  [84,] 1.00000000   1   1   1
##  [85,] 0.05449028   0   0   1
##  [86,] 0.05449028   0   0   1
##  [87,] 0.05449028   0   0   1
##  [88,] 1.00000000   1   1   1
##  [89,] 1.00000000   1   1   1
##  [90,] 0.05449028   0   0   1
##  [91,] 0.05449028   0   0   1
##  [92,] 0.05449028   0   0   1
##  [93,] 0.05449028   0   0   1
##  [94,] 0.05449028   0   0   1
##  [95,] 0.05449028   0   0   1
##  [96,] 0.05449028   0   0   1
##  [97,] 0.05449028   0   0   1
##  [98,] 1.00000000   1   1   1
##  [99,] 0.05449028   0   0   1
## [100,] 0.05449028   0   0   1
## [101,] 0.05449028   0   0   1
## [102,] 0.05449028   0   0   1
## [103,] 1.00000000   1   1   1
## [104,] 0.05449028   0   0   1
## [105,] 0.05449028   0   0   1
## [106,] 0.05449028   0   0   1
## [107,] 0.05449028   0   0   1
## [108,] 0.05449028   0   0   1
## [109,] 1.00000000   1   1   1
## [110,] 0.05449028   0   0   1
## [111,] 0.05449028   0   0   1
```

```
## [112,] 0.05449028    0    0    1
## [113,] 1.00000000    1    1    1
## [114,] 0.05449028    0    0    1
## [115,] 0.05449028    0    0    1
## [116,] 1.00000000    1    1    1
## [117,] 0.05449028    0    0    1
## [118,] 0.05449028    0    0    1
## [119,] 0.05449028    0    0    1
## [120,] 0.05449028    0    0    1
## [121,] 0.05449028    0    0    1
## [122,] 1.00000000    1    1    1
## [123,] 0.05449028    0    0    1
## [124,] 0.05449028    0    0    1
## [125,] 0.05449028    0    0    1
## [126,] 0.05449028    0    0    1
## [127,] 1.00000000    1    1    1
## [128,] 0.05449028    0    0    1
## [129,] 0.05449028    0    0    1
## [130,] 0.05449028    0    0    1
## [131,] 0.05449028    0    0    1
## [132,] 1.00000000    1    1    1
## [133,] 0.05449028    0    0    1
## [134,] 1.00000000    1    1    1
## [135,] 1.00000000    1    1    1
## [136,] 0.05449028    0    0    1
## [137,] 0.05449028    0    0    1
## [138,] 0.05449028    0    0    1
## [139,] 1.00000000    1    1    1
## [140,] 1.00000000    1    1    1
## [141,] 0.05449028    0    0    1
## [142,] 0.05449028    0    0    1
## [143,] 1.00000000    1    1    1
## [144,] 0.05449028    0    0    1
## [145,] 0.05449028    0    0    1
## [146,] 0.05449028    0    0    1
## [147,] 0.05449028    0    0    1
## [148,] 1.00000000    1    1    1
## [149,] 0.05449028    0    0    1
## [150,] 0.05449028    0    0    1
## [151,] 1.00000000    1    1    1
## [152,] 0.05449028    0    0    1
## [153,] 0.05449028    0    0    1
## [154,] 0.05449028    0    0    1
## [155,] 0.05449028    0    0    1
## [156,] 1.00000000    1    1    1
## [157,] 0.05449028    0    0    1
## [158,] 0.05449028    0    0    1
## [159,] 0.05449028    0    0    1
## [160,] 0.05449028    0    0    1
## [161,] 0.05449028    0    0    1
## [162,] 0.05449028    0    0    1
## [163,] 0.05449028    0    0    1
## [164,] 0.05449028    0    0    1
## [165,] 0.05449028    0    0    1
```

```
## [166,] 0.05449028    0    0    1
## [167,] 1.00000000    1    1    1
## [168,] 0.05449028    0    0    1
## [169,] 1.00000000    1    1    1
## [170,] 0.05449028    0    0    1
## [171,] 0.05449028    0    0    1
## [172,] 0.05449028    0    0    1
## [173,] 0.05449028    0    0    1
## [174,] 0.05449028    0    0    1
## [175,] 0.05449028    0    0    1
## [176,] 0.05449028    0    0    1
## [177,] 1.00000000    1    1    1
## [178,] 0.05449028    0    0    1
## [179,] 0.05449028    0    0    1
## [180,] 1.00000000    1    1    1
## [181,] 0.05449028    0    0    1
## [182,] 0.05449028    0    0    1
## [183,] 0.05449028    0    0    1
## [184,] 0.05449028    0    0    1
## [185,] 0.05449028    0    0    1
## [186,] 0.05449028    0    0    1
## [187,] 0.05449028    0    0    1
## [188,] 0.05449028    0    0    1
## [189,] 0.05449028    0    0    1
## [190,] 0.05449028    0    0    1
## [191,] 0.05449028    0    0    1
## [192,] 0.05449028    0    0    1
## [193,] 1.00000000    1    1    1
## [194,] 0.05449028    0    0    1
## [195,] 0.05449028    0    0    1
## [196,] 0.05449028    0    0    1
## [197,] 1.00000000    1    1    1
## [198,] 0.05449028    0    0    1
## [199,] 0.05449028    0    0    1
## [200,] 0.05449028    0    0    1
## [201,] 1.00000000    1    1    1
## [202,] 0.05449028    0    0    1
## [203,] 0.05449028    0    0    1
## [204,] 0.05449028    0    0    1
## [205,] 1.00000000    1    1    1
## [206,] 0.05449028    0    0    1
## [207,] 0.05449028    0    0    1
## [208,] 0.05449028    0    0    1
## [209,] 0.05449028    0    0    1
## [210,] 1.00000000    1    1    1
## [211,] 0.05449028    0    0    1
## [212,] 1.00000000    1    1    1
## [213,] 0.05449028    0    0    1
## [214,] 0.05449028    0    0    1
## [215,] 0.05449028    0    0    1
## [216,] 0.05449028    0    0    1
## [217,] 0.05449028    0    0    1
## [218,] 0.05449028    0    0    1
## [219,] 0.05449028    0    0    1
```

```
## [220,] 1.00000000    1    1      1
## [221,] 0.05449028    0    0      1
## [222,] 1.00000000    1    1      1
## [223,] 0.05449028    0    0      1
## [224,] 0.05449028    0    0      1
## [225,] 0.05449028    0    0      1
## [226,] 0.05449028    0    0      1
## [227,] 0.05449028    0    0      1
## [228,] 0.05449028    0    0      1
## [229,] 0.05449028    0    0      1
## [230,] 0.05449028    0    0      1
## [231,] 0.05449028    0    0      1
## [232,] 1.00000000    1    1      1
## [233,] 0.05449028    0    0      1
## [234,] 0.05449028    0    0      1
## [235,] 1.00000000    1    1      1
## [236,] 0.05449028    0    0      1
## [237,] 0.05449028    0    0      1
## [238,] 0.05449028    0    0      1
## [239,] 0.05449028    0    0      1
## [240,] 0.05449028    0    0      1
## [241,] 0.05449028    0    0      1
## [242,] 0.05449028    0    0      1
## [243,] 0.05449028    0    0      1
## [244,] 0.05449028    0    0      1
## [245,] 0.05449028    0    0      1
## [246,] 1.00000000    1    1      1
## [247,] 0.05449028    0    0      1
## [248,] 0.05449028    0    0      1
## [249,] 0.05449028    0    0      1
## [250,] 0.05449028    0    0      1
##
## , , Year7
##
##             Mean Mode 2.5% 97.5%
##    [1,] 0.05441982    0    0      1
##    [2,] 0.05441982    0    0      1
##    [3,] 0.05441982    0    0      1
##    [4,] 0.05441982    0    0      1
##    [5,] 0.05441982    0    0      1
##    [6,] 0.05441982    0    0      1
##    [7,] 0.05441982    0    0      1
##    [8,] 1.00000000    1    1      1
##    [9,] 0.05441982    0    0      1
##   [10,] 0.05441982    0    0      1
##   [11,] 1.00000000    1    1      1
##   [12,] 0.05441982    0    0      1
##   [13,] 0.05441982    0    0      1
##   [14,] 0.05441982    0    0      1
##   [15,] 0.05441982    0    0      1
##   [16,] 0.05441982    0    0      1
##   [17,] 0.05441982    0    0      1
##   [18,] 0.05441982    0    0      1
##   [19,] 0.05441982    0    0      1
```

```
## [20,] 0.05441982    0    0    1
## [21,] 0.05441982    0    0    1
## [22,] 0.05441982    0    0    1
## [23,] 1.00000000    1    1    1
## [24,] 0.05441982    0    0    1
## [25,] 1.00000000    1    1    1
## [26,] 0.05441982    0    0    1
## [27,] 0.05441982    0    0    1
## [28,] 0.05441982    0    0    1
## [29,] 1.00000000    1    1    1
## [30,] 0.05441982    0    0    1
## [31,] 1.00000000    1    1    1
## [32,] 0.05441982    0    0    1
## [33,] 1.00000000    1    1    1
## [34,] 1.00000000    1    1    1
## [35,] 1.00000000    1    1    1
## [36,] 0.05441982    0    0    1
## [37,] 0.05441982    0    0    1
## [38,] 0.05441982    0    0    1
## [39,] 0.05441982    0    0    1
## [40,] 0.05441982    0    0    1
## [41,] 0.05441982    0    0    1
## [42,] 0.05441982    0    0    1
## [43,] 0.05441982    0    0    1
## [44,] 0.05441982    0    0    1
## [45,] 0.05441982    0    0    1
## [46,] 0.05441982    0    0    1
## [47,] 0.05441982    0    0    1
## [48,] 0.05441982    0    0    1
## [49,] 1.00000000    1    1    1
## [50,] 0.05441982    0    0    1
## [51,] 0.05441982    0    0    1
## [52,] 0.05441982    0    0    1
## [53,] 0.05441982    0    0    1
## [54,] 1.00000000    1    1    1
## [55,] 1.00000000    1    1    1
## [56,] 0.05441982    0    0    1
## [57,] 0.05441982    0    0    1
## [58,] 0.05441982    0    0    1
## [59,] 0.05441982    0    0    1
## [60,] 1.00000000    1    1    1
## [61,] 0.05441982    0    0    1
## [62,] 0.05441982    0    0    1
## [63,] 1.00000000    1    1    1
## [64,] 1.00000000    1    1    1
## [65,] 0.05441982    0    0    1
## [66,] 0.05441982    0    0    1
## [67,] 0.05441982    0    0    1
## [68,] 0.05441982    0    0    1
## [69,] 1.00000000    1    1    1
## [70,] 0.05441982    0    0    1
## [71,] 0.05441982    0    0    1
## [72,] 0.05441982    0    0    1
## [73,] 0.05441982    0    0    1
```

```
## [74,]  1.00000000   1   1   1
## [75,]  0.05441982   0   0   1
## [76,]  0.05441982   0   0   1
## [77,]  1.00000000   1   1   1
## [78,]  0.05441982   0   0   1
## [79,]  0.05441982   0   0   1
## [80,]  1.00000000   1   1   1
## [81,]  0.05441982   0   0   1
## [82,]  0.05441982   0   0   1
## [83,]  0.05441982   0   0   1
## [84,]  1.00000000   1   1   1
## [85,]  0.05441982   0   0   1
## [86,]  1.00000000   1   1   1
## [87,]  0.05441982   0   0   1
## [88,]  0.05441982   0   0   1
## [89,]  1.00000000   1   1   1
## [90,]  0.05441982   0   0   1
## [91,]  0.05441982   0   0   1
## [92,]  1.00000000   1   1   1
## [93,]  0.05441982   0   0   1
## [94,]  0.05441982   0   0   1
## [95,]  0.05441982   0   0   1
## [96,]  0.05441982   0   0   1
## [97,]  0.05441982   0   0   1
## [98,]  0.05441982   0   0   1
## [99,]  1.00000000   1   1   1
## [100,]  0.05441982   0   0   1
## [101,]  0.05441982   0   0   1
## [102,]  1.00000000   1   1   1
## [103,]  1.00000000   1   1   1
## [104,]  0.05441982   0   0   1
## [105,]  0.05441982   0   0   1
## [106,]  0.05441982   0   0   1
## [107,]  0.05441982   0   0   1
## [108,]  0.05441982   0   0   1
## [109,]  1.00000000   1   1   1
## [110,]  0.05441982   0   0   1
## [111,]  0.05441982   0   0   1
## [112,]  0.05441982   0   0   1
## [113,]  1.00000000   1   1   1
## [114,]  0.05441982   0   0   1
## [115,]  1.00000000   1   1   1
## [116,]  1.00000000   1   1   1
## [117,]  0.05441982   0   0   1
## [118,]  1.00000000   1   1   1
## [119,]  0.05441982   0   0   1
## [120,]  0.05441982   0   0   1
## [121,]  0.05441982   0   0   1
## [122,]  1.00000000   1   1   1
## [123,]  0.05441982   0   0   1
## [124,]  0.05441982   0   0   1
## [125,]  0.05441982   0   0   1
## [126,]  0.05441982   0   0   1
## [127,]  1.00000000   1   1   1
```

```
## [128,] 0.05441982   0   0   1
## [129,] 1.00000000   1   1   1
## [130,] 0.05441982   0   0   1
## [131,] 0.05441982   0   0   1
## [132,] 1.00000000   1   1   1
## [133,] 1.00000000   1   1   1
## [134,] 0.05441982   0   0   1
## [135,] 1.00000000   1   1   1
## [136,] 0.05441982   0   0   1
## [137,] 0.05441982   0   0   1
## [138,] 0.05441982   0   0   1
## [139,] 0.05441982   0   0   1
## [140,] 0.05441982   0   0   1
## [141,] 1.00000000   1   1   1
## [142,] 0.05441982   0   0   1
## [143,] 1.00000000   1   1   1
## [144,] 0.05441982   0   0   1
## [145,] 0.05441982   0   0   1
## [146,] 0.05441982   0   0   1
## [147,] 0.05441982   0   0   1
## [148,] 0.05441982   0   0   1
## [149,] 0.05441982   0   0   1
## [150,] 0.05441982   0   0   1
## [151,] 0.05441982   0   0   1
## [152,] 0.05441982   0   0   1
## [153,] 0.05441982   0   0   1
## [154,] 1.00000000   1   1   1
## [155,] 1.00000000   1   1   1
## [156,] 0.05441982   0   0   1
## [157,] 0.05441982   0   0   1
## [158,] 0.05441982   0   0   1
## [159,] 1.00000000   1   1   1
## [160,] 0.05441982   0   0   1
## [161,] 0.05441982   0   0   1
## [162,] 0.05441982   0   0   1
## [163,] 0.05441982   0   0   1
## [164,] 0.05441982   0   0   1
## [165,] 0.05441982   0   0   1
## [166,] 0.05441982   0   0   1
## [167,] 1.00000000   1   1   1
## [168,] 0.05441982   0   0   1
## [169,] 1.00000000   1   1   1
## [170,] 0.05441982   0   0   1
## [171,] 0.05441982   0   0   1
## [172,] 0.05441982   0   0   1
## [173,] 1.00000000   1   1   1
## [174,] 1.00000000   1   1   1
## [175,] 0.05441982   0   0   1
## [176,] 0.05441982   0   0   1
## [177,] 0.05441982   0   0   1
## [178,] 0.05441982   0   0   1
## [179,] 1.00000000   1   1   1
## [180,] 0.05441982   0   0   1
## [181,] 0.05441982   0   0   1
```

```
## [182,] 0.05441982   0   0   1
## [183,] 0.05441982   0   0   1
## [184,] 1.00000000   1   1   1
## [185,] 0.05441982   0   0   1
## [186,] 0.05441982   0   0   1
## [187,] 1.00000000   1   1   1
## [188,] 0.05441982   0   0   1
## [189,] 0.05441982   0   0   1
## [190,] 1.00000000   1   1   1
## [191,] 0.05441982   0   0   1
## [192,] 0.05441982   0   0   1
## [193,] 1.00000000   1   1   1
## [194,] 0.05441982   0   0   1
## [195,] 0.05441982   0   0   1
## [196,] 1.00000000   1   1   1
## [197,] 1.00000000   1   1   1
## [198,] 1.00000000   1   1   1
## [199,] 0.05441982   0   0   1
## [200,] 0.05441982   0   0   1
## [201,] 1.00000000   1   1   1
## [202,] 0.05441982   0   0   1
## [203,] 0.05441982   0   0   1
## [204,] 0.05441982   0   0   1
## [205,] 1.00000000   1   1   1
## [206,] 0.05441982   0   0   1
## [207,] 0.05441982   0   0   1
## [208,] 0.05441982   0   0   1
## [209,] 0.05441982   0   0   1
## [210,] 1.00000000   1   1   1
## [211,] 0.05441982   0   0   1
## [212,] 1.00000000   1   1   1
## [213,] 0.05441982   0   0   1
## [214,] 0.05441982   0   0   1
## [215,] 0.05441982   0   0   1
## [216,] 0.05441982   0   0   1
## [217,] 0.05441982   0   0   1
## [218,] 0.05441982   0   0   1
## [219,] 1.00000000   1   1   1
## [220,] 0.05441982   0   0   1
## [221,] 1.00000000   1   1   1
## [222,] 1.00000000   1   1   1
## [223,] 0.05441982   0   0   1
## [224,] 0.05441982   0   0   1
## [225,] 1.00000000   1   1   1
## [226,] 0.05441982   0   0   1
## [227,] 0.05441982   0   0   1
## [228,] 0.05441982   0   0   1
## [229,] 0.05441982   0   0   1
## [230,] 0.05441982   0   0   1
## [231,] 1.00000000   1   1   1
## [232,] 1.00000000   1   1   1
## [233,] 0.05441982   0   0   1
## [234,] 0.05441982   0   0   1
## [235,] 1.00000000   1   1   1
```

```
## [236,] 0.05441982   0   0     1
## [237,] 0.05441982   0   0     1
## [238,] 0.05441982   0   0     1
## [239,] 0.05441982   0   0     1
## [240,] 0.05441982   0   0     1
## [241,] 0.05441982   0   0     1
## [242,] 0.05441982   0   0     1
## [243,] 0.05441982   0   0     1
## [244,] 0.05441982   0   0     1
## [245,] 0.05441982   0   0     1
## [246,] 1.00000000   1   1     1
## [247,] 0.05441982   0   0     1
## [248,] 0.05441982   0   0     1
## [249,] 1.00000000   1   1     1
## [250,] 0.05441982   0   0     1
##
## , , Year8
##
##              Mean Mode 2.5% 97.5%
##   [1,] 0.05438472   0   0     1
##   [2,] 0.05438472   0   0     1
##   [3,] 1.00000000   1   1     1
##   [4,] 0.05438472   0   0     1
##   [5,] 0.05438472   0   0     1
##   [6,] 0.05438472   0   0     1
##   [7,] 0.05438472   0   0     1
##   [8,] 0.05438472   0   0     1
##   [9,] 0.05438472   0   0     1
## [10,] 0.05438472   0   0     1
## [11,] 0.05438472   0   0     1
## [12,] 0.05438472   0   0     1
## [13,] 0.05438472   0   0     1
## [14,] 0.05438472   0   0     1
## [15,] 1.00000000   1   1     1
## [16,] 0.05438472   0   0     1
## [17,] 0.05438472   0   0     1
## [18,] 1.00000000   1   1     1
## [19,] 0.05438472   0   0     1
## [20,] 0.05438472   0   0     1
## [21,] 0.05438472   0   0     1
## [22,] 1.00000000   1   1     1
## [23,] 1.00000000   1   1     1
## [24,] 0.05438472   0   0     1
## [25,] 0.05438472   0   0     1
## [26,] 0.05438472   0   0     1
## [27,] 0.05438472   0   0     1
## [28,] 1.00000000   1   1     1
## [29,] 1.00000000   1   1     1
## [30,] 0.05438472   0   0     1
## [31,] 1.00000000   1   1     1
## [32,] 0.05438472   0   0     1
## [33,] 0.05438472   0   0     1
## [34,] 0.05438472   0   0     1
## [35,] 1.00000000   1   1     1
```

```
## [36,] 0.05438472   0   0   1
## [37,] 0.05438472   0   0   1
## [38,] 1.00000000   1   1   1
## [39,] 1.00000000   1   1   1
## [40,] 0.05438472   0   0   1
## [41,] 0.05438472   0   0   1
## [42,] 0.05438472   0   0   1
## [43,] 1.00000000   1   1   1
## [44,] 0.05438472   0   0   1
## [45,] 0.05438472   0   0   1
## [46,] 0.05438472   0   0   1
## [47,] 0.05438472   0   0   1
## [48,] 1.00000000   1   1   1
## [49,] 1.00000000   1   1   1
## [50,] 0.05438472   0   0   1
## [51,] 0.05438472   0   0   1
## [52,] 0.05438472   0   0   1
## [53,] 0.05438472   0   0   1
## [54,] 1.00000000   1   1   1
## [55,] 1.00000000   1   1   1
## [56,] 1.00000000   1   1   1
## [57,] 0.05438472   0   0   1
## [58,] 0.05438472   0   0   1
## [59,] 1.00000000   1   1   1
## [60,] 1.00000000   1   1   1
## [61,] 0.05438472   0   0   1
## [62,] 0.05438472   0   0   1
## [63,] 1.00000000   1   1   1
## [64,] 1.00000000   1   1   1
## [65,] 0.05438472   0   0   1
## [66,] 1.00000000   1   1   1
## [67,] 0.05438472   0   0   1
## [68,] 1.00000000   1   1   1
## [69,] 1.00000000   1   1   1
## [70,] 0.05438472   0   0   1
## [71,] 0.05438472   0   0   1
## [72,] 0.05438472   0   0   1
## [73,] 0.05438472   0   0   1
## [74,] 0.05438472   0   0   1
## [75,] 0.05438472   0   0   1
## [76,] 0.05438472   0   0   1
## [77,] 1.00000000   1   1   1
## [78,] 0.05438472   0   0   1
## [79,] 0.05438472   0   0   1
## [80,] 1.00000000   1   1   1
## [81,] 0.05438472   0   0   1
## [82,] 0.05438472   0   0   1
## [83,] 0.05438472   0   0   1
## [84,] 1.00000000   1   1   1
## [85,] 0.05438472   0   0   1
## [86,] 1.00000000   1   1   1
## [87,] 0.05438472   0   0   1
## [88,] 1.00000000   1   1   1
## [89,] 1.00000000   1   1   1
```

```
## [90,]  0.05438472  0  0  1
## [91,]  0.05438472  0  0  1
## [92,]  0.05438472  0  0  1
## [93,]  1.00000000  1  1  1
## [94,]  0.05438472  0  0  1
## [95,]  0.05438472  0  0  1
## [96,]  0.05438472  0  0  1
## [97,]  0.05438472  0  0  1
## [98,]  0.05438472  0  0  1
## [99,]  1.00000000  1  1  1
## [100,] 0.05438472  0  0  1
## [101,] 0.05438472  0  0  1
## [102,] 1.00000000  1  1  1
## [103,] 1.00000000  1  1  1
## [104,] 0.05438472  0  0  1
## [105,] 0.05438472  0  0  1
## [106,] 0.05438472  0  0  1
## [107,] 0.05438472  0  0  1
## [108,] 0.05438472  0  0  1
## [109,] 1.00000000  1  1  1
## [110,] 0.05438472  0  0  1
## [111,] 0.05438472  0  0  1
## [112,] 0.05438472  0  0  1
## [113,] 0.05438472  0  0  1
## [114,] 0.05438472  0  0  1
## [115,] 1.00000000  1  1  1
## [116,] 1.00000000  1  1  1
## [117,] 0.05438472  0  0  1
## [118,] 0.05438472  0  0  1
## [119,] 0.05438472  0  0  1
## [120,] 0.05438472  0  0  1
## [121,] 0.05438472  0  0  1
## [122,] 0.05438472  0  0  1
## [123,] 0.05438472  0  0  1
## [124,] 0.05438472  0  0  1
## [125,] 0.05438472  0  0  1
## [126,] 0.05438472  0  0  1
## [127,] 1.00000000  1  1  1
## [128,] 1.00000000  1  1  1
## [129,] 1.00000000  1  1  1
## [130,] 1.00000000  1  1  1
## [131,] 0.05438472  0  0  1
## [132,] 1.00000000  1  1  1
## [133,] 0.05438472  0  0  1
## [134,] 0.05438472  0  0  1
## [135,] 0.05438472  0  0  1
## [136,] 0.05438472  0  0  1
## [137,] 0.05438472  0  0  1
## [138,] 0.05438472  0  0  1
## [139,] 0.05438472  0  0  1
## [140,] 0.05438472  0  0  1
## [141,] 0.05438472  0  0  1
## [142,] 0.05438472  0  0  1
## [143,] 0.05438472  0  0  1
```

```
## [144,] 0.05438472   0   0   1
## [145,] 0.05438472   0   0   1
## [146,] 0.05438472   0   0   1
## [147,] 0.05438472   0   0   1
## [148,] 0.05438472   0   0   1
## [149,] 0.05438472   0   0   1
## [150,] 0.05438472   0   0   1
## [151,] 0.05438472   0   0   1
## [152,] 0.05438472   0   0   1
## [153,] 0.05438472   0   0   1
## [154,] 1.00000000   1   1   1
## [155,] 1.00000000   1   1   1
## [156,] 1.00000000   1   1   1
## [157,] 0.05438472   0   0   1
## [158,] 1.00000000   1   1   1
## [159,] 0.05438472   0   0   1
## [160,] 0.05438472   0   0   1
## [161,] 0.05438472   0   0   1
## [162,] 0.05438472   0   0   1
## [163,] 0.05438472   0   0   1
## [164,] 0.05438472   0   0   1
## [165,] 1.00000000   1   1   1
## [166,] 0.05438472   0   0   1
## [167,] 1.00000000   1   1   1
## [168,] 1.00000000   1   1   1
## [169,] 0.05438472   0   0   1
## [170,] 0.05438472   0   0   1
## [171,] 0.05438472   0   0   1
## [172,] 1.00000000   1   1   1
## [173,] 1.00000000   1   1   1
## [174,] 1.00000000   1   1   1
## [175,] 0.05438472   0   0   1
## [176,] 0.05438472   0   0   1
## [177,] 1.00000000   1   1   1
## [178,] 0.05438472   0   0   1
## [179,] 1.00000000   1   1   1
## [180,] 0.05438472   0   0   1
## [181,] 0.05438472   0   0   1
## [182,] 0.05438472   0   0   1
## [183,] 1.00000000   1   1   1
## [184,] 1.00000000   1   1   1
## [185,] 1.00000000   1   1   1
## [186,] 0.05438472   0   0   1
## [187,] 1.00000000   1   1   1
## [188,] 0.05438472   0   0   1
## [189,] 0.05438472   0   0   1
## [190,] 1.00000000   1   1   1
## [191,] 0.05438472   0   0   1
## [192,] 0.05438472   0   0   1
## [193,] 1.00000000   1   1   1
## [194,] 0.05438472   0   0   1
## [195,] 0.05438472   0   0   1
## [196,] 0.05438472   0   0   1
## [197,] 0.05438472   0   0   1
```

```
## [198,] 1.00000000   1   1   1
## [199,] 0.05438472   0   0   1
## [200,] 1.00000000   1   1   1
## [201,] 1.00000000   1   1   1
## [202,] 0.05438472   0   0   1
## [203,] 0.05438472   0   0   1
## [204,] 0.05438472   0   0   1
## [205,] 0.05438472   0   0   1
## [206,] 0.05438472   0   0   1
## [207,] 0.05438472   0   0   1
## [208,] 0.05438472   0   0   1
## [209,] 0.05438472   0   0   1
## [210,] 1.00000000   1   1   1
## [211,] 0.05438472   0   0   1
## [212,] 1.00000000   1   1   1
## [213,] 0.05438472   0   0   1
## [214,] 1.00000000   1   1   1
## [215,] 0.05438472   0   0   1
## [216,] 0.05438472   0   0   1
## [217,] 0.05438472   0   0   1
## [218,] 0.05438472   0   0   1
## [219,] 1.00000000   1   1   1
## [220,] 0.05438472   0   0   1
## [221,] 0.05438472   0   0   1
## [222,] 1.00000000   1   1   1
## [223,] 1.00000000   1   1   1
## [224,] 1.00000000   1   1   1
## [225,] 0.05438472   0   0   1
## [226,] 0.05438472   0   0   1
## [227,] 0.05438472   0   0   1
## [228,] 0.05438472   0   0   1
## [229,] 0.05438472   0   0   1
## [230,] 1.00000000   1   1   1
## [231,] 0.05438472   0   0   1
## [232,] 1.00000000   1   1   1
## [233,] 0.05438472   0   0   1
## [234,] 0.05438472   0   0   1
## [235,] 1.00000000   1   1   1
## [236,] 1.00000000   1   1   1
## [237,] 0.05438472   0   0   1
## [238,] 0.05438472   0   0   1
## [239,] 1.00000000   1   1   1
## [240,] 0.05438472   0   0   1
## [241,] 0.05438472   0   0   1
## [242,] 0.05438472   0   0   1
## [243,] 0.05438472   0   0   1
## [244,] 0.05438472   0   0   1
## [245,] 0.05438472   0   0   1
## [246,] 1.00000000   1   1   1
## [247,] 0.05438472   0   0   1
## [248,] 0.05438472   0   0   1
## [249,] 1.00000000   1   1   1
## [250,] 0.05438472   0   0   1
##
```

```
## , , Year9
##
##              Mean Mode 2.5% 97.5%
##   [1,] 0.05436722    0    0     1
##   [2,] 0.05436722    0    0     1
##   [3,] 1.00000000    1    1     1
##   [4,] 1.00000000    1    1     1
##   [5,] 0.05436722    0    0     1
##   [6,] 0.05436722    0    0     1
##   [7,] 0.05436722    0    0     1
##   [8,] 1.00000000    1    1     1
##   [9,] 0.05436722    0    0     1
##  [10,] 0.05436722    0    0     1
##  [11,] 0.05436722    0    0     1
##  [12,] 0.05436722    0    0     1
##  [13,] 0.05436722    0    0     1
##  [14,] 1.00000000    1    1     1
##  [15,] 1.00000000    1    1     1
##  [16,] 1.00000000    1    1     1
##  [17,] 0.05436722    0    0     1
##  [18,] 1.00000000    1    1     1
##  [19,] 1.00000000    1    1     1
##  [20,] 1.00000000    1    1     1
##  [21,] 0.05436722    0    0     1
##  [22,] 0.05436722    0    0     1
##  [23,] 1.00000000    1    1     1
##  [24,] 1.00000000    1    1     1
##  [25,] 0.05436722    0    0     1
##  [26,] 0.05436722    0    0     1
##  [27,] 1.00000000    1    1     1
##  [28,] 1.00000000    1    1     1
##  [29,] 1.00000000    1    1     1
##  [30,] 0.05436722    0    0     1
##  [31,] 0.05436722    0    0     1
##  [32,] 0.05436722    0    0     1
##  [33,] 1.00000000    1    1     1
##  [34,] 0.05436722    0    0     1
##  [35,] 1.00000000    1    1     1
##  [36,] 0.05436722    0    0     1
##  [37,] 0.05436722    0    0     1
##  [38,] 1.00000000    1    1     1
##  [39,] 1.00000000    1    1     1
##  [40,] 0.05436722    0    0     1
##  [41,] 0.05436722    0    0     1
##  [42,] 0.05436722    0    0     1
##  [43,] 0.05436722    0    0     1
##  [44,] 0.05436722    0    0     1
##  [45,] 1.00000000    1    1     1
##  [46,] 0.05436722    0    0     1
##  [47,] 0.05436722    0    0     1
##  [48,] 1.00000000    1    1     1
##  [49,] 1.00000000    1    1     1
##  [50,] 0.05436722    0    0     1
##  [51,] 0.05436722    0    0     1
```

```
## [52,] 0.05436722   0   0   1
## [53,] 0.05436722   0   0   1
## [54,] 0.05436722   0   0   1
## [55,] 0.05436722   0   0   1
## [56,] 1.00000000   1   1   1
## [57,] 0.05436722   0   0   1
## [58,] 0.05436722   0   0   1
## [59,] 1.00000000   1   1   1
## [60,] 1.00000000   1   1   1
## [61,] 0.05436722   0   0   1
## [62,] 0.05436722   0   0   1
## [63,] 1.00000000   1   1   1
## [64,] 1.00000000   1   1   1
## [65,] 0.05436722   0   0   1
## [66,] 1.00000000   1   1   1
## [67,] 0.05436722   0   0   1
## [68,] 0.05436722   0   0   1
## [69,] 0.05436722   0   0   1
## [70,] 0.05436722   0   0   1
## [71,] 0.05436722   0   0   1
## [72,] 0.05436722   0   0   1
## [73,] 0.05436722   0   0   1
## [74,] 1.00000000   1   1   1
## [75,] 0.05436722   0   0   1
## [76,] 0.05436722   0   0   1
## [77,] 0.05436722   0   0   1
## [78,] 0.05436722   0   0   1
## [79,] 0.05436722   0   0   1
## [80,] 1.00000000   1   1   1
## [81,] 0.05436722   0   0   1
## [82,] 0.05436722   0   0   1
## [83,] 0.05436722   0   0   1
## [84,] 1.00000000   1   1   1
## [85,] 0.05436722   0   0   1
## [86,] 0.05436722   0   0   1
## [87,] 1.00000000   1   1   1
## [88,] 1.00000000   1   1   1
## [89,] 1.00000000   1   1   1
## [90,] 1.00000000   1   1   1
## [91,] 1.00000000   1   1   1
## [92,] 1.00000000   1   1   1
## [93,] 0.05436722   0   0   1
## [94,] 1.00000000   1   1   1
## [95,] 1.00000000   1   1   1
## [96,] 0.05436722   0   0   1
## [97,] 1.00000000   1   1   1
## [98,] 0.05436722   0   0   1
## [99,] 1.00000000   1   1   1
## [100,] 0.05436722   0   0   1
## [101,] 0.05436722   0   0   1
## [102,] 1.00000000   1   1   1
## [103,] 1.00000000   1   1   1
## [104,] 0.05436722   0   0   1
## [105,] 0.05436722   0   0   1
```

```
## [106,] 1.00000000   1   1   1
## [107,] 0.05436722   0   0   1
## [108,] 0.05436722   0   0   1
## [109,] 0.05436722   0   0   1
## [110,] 1.00000000   1   1   1
## [111,] 0.05436722   0   0   1
## [112,] 0.05436722   0   0   1
## [113,] 1.00000000   1   1   1
## [114,] 0.05436722   0   0   1
## [115,] 1.00000000   1   1   1
## [116,] 1.00000000   1   1   1
## [117,] 1.00000000   1   1   1
## [118,] 0.05436722   0   0   1
## [119,] 0.05436722   0   0   1
## [120,] 0.05436722   0   0   1
## [121,] 0.05436722   0   0   1
## [122,] 0.05436722   0   0   1
## [123,] 0.05436722   0   0   1
## [124,] 0.05436722   0   0   1
## [125,] 0.05436722   0   0   1
## [126,] 0.05436722   0   0   1
## [127,] 1.00000000   1   1   1
## [128,] 0.05436722   0   0   1
## [129,] 1.00000000   1   1   1
## [130,] 1.00000000   1   1   1
## [131,] 0.05436722   0   0   1
## [132,] 1.00000000   1   1   1
## [133,] 1.00000000   1   1   1
## [134,] 0.05436722   0   0   1
## [135,] 1.00000000   1   1   1
## [136,] 0.05436722   0   0   1
## [137,] 0.05436722   0   0   1
## [138,] 1.00000000   1   1   1
## [139,] 0.05436722   0   0   1
## [140,] 0.05436722   0   0   1
## [141,] 0.05436722   0   0   1
## [142,] 1.00000000   1   1   1
## [143,] 0.05436722   0   0   1
## [144,] 1.00000000   1   1   1
## [145,] 0.05436722   0   0   1
## [146,] 0.05436722   0   0   1
## [147,] 0.05436722   0   0   1
## [148,] 0.05436722   0   0   1
## [149,] 0.05436722   0   0   1
## [150,] 1.00000000   1   1   1
## [151,] 0.05436722   0   0   1
## [152,] 0.05436722   0   0   1
## [153,] 0.05436722   0   0   1
## [154,] 1.00000000   1   1   1
## [155,] 1.00000000   1   1   1
## [156,] 1.00000000   1   1   1
## [157,] 0.05436722   0   0   1
## [158,] 1.00000000   1   1   1
## [159,] 0.05436722   0   0   1
```

```
## [160,] 1.00000000   1   1   1
## [161,] 0.05436722   0   0   1
## [162,] 0.05436722   0   0   1
## [163,] 0.05436722   0   0   1
## [164,] 0.05436722   0   0   1
## [165,] 1.00000000   1   1   1
## [166,] 0.05436722   0   0   1
## [167,] 1.00000000   1   1   1
## [168,] 1.00000000   1   1   1
## [169,] 0.05436722   0   0   1
## [170,] 1.00000000   1   1   1
## [171,] 0.05436722   0   0   1
## [172,] 0.05436722   0   0   1
## [173,] 1.00000000   1   1   1
## [174,] 0.05436722   0   0   1
## [175,] 0.05436722   0   0   1
## [176,] 0.05436722   0   0   1
## [177,] 1.00000000   1   1   1
## [178,] 0.05436722   0   0   1
## [179,] 1.00000000   1   1   1
## [180,] 0.05436722   0   0   1
## [181,] 0.05436722   0   0   1
## [182,] 0.05436722   0   0   1
## [183,] 1.00000000   1   1   1
## [184,] 0.05436722   0   0   1
## [185,] 1.00000000   1   1   1
## [186,] 0.05436722   0   0   1
## [187,] 1.00000000   1   1   1
## [188,] 0.05436722   0   0   1
## [189,] 0.05436722   0   0   1
## [190,] 0.05436722   0   0   1
## [191,] 0.05436722   0   0   1
## [192,] 0.05436722   0   0   1
## [193,] 1.00000000   1   1   1
## [194,] 0.05436722   0   0   1
## [195,] 0.05436722   0   0   1
## [196,] 1.00000000   1   1   1
## [197,] 0.05436722   0   0   1
## [198,] 1.00000000   1   1   1
## [199,] 0.05436722   0   0   1
## [200,] 1.00000000   1   1   1
## [201,] 1.00000000   1   1   1
## [202,] 1.00000000   1   1   1
## [203,] 0.05436722   0   0   1
## [204,] 0.05436722   0   0   1
## [205,] 0.05436722   0   0   1
## [206,] 0.05436722   0   0   1
## [207,] 0.05436722   0   0   1
## [208,] 0.05436722   0   0   1
## [209,] 0.05436722   0   0   1
## [210,] 1.00000000   1   1   1
## [211,] 1.00000000   1   1   1
## [212,] 0.05436722   0   0   1
## [213,] 0.05436722   0   0   1
```

```
## [214,] 1.00000000     1    1       1
## [215,] 0.05436722     0    0       1
## [216,] 0.05436722     0    0       1
## [217,] 0.05436722     0    0       1
## [218,] 0.05436722     0    0       1
## [219,] 0.05436722     0    0       1
## [220,] 0.05436722     0    0       1
## [221,] 0.05436722     0    0       1
## [222,] 0.05436722     0    0       1
## [223,] 1.00000000     1    1       1
## [224,] 1.00000000     1    1       1
## [225,] 1.00000000     1    1       1
## [226,] 0.05436722     0    0       1
## [227,] 0.05436722     0    0       1
## [228,] 0.05436722     0    0       1
## [229,] 0.05436722     0    0       1
## [230,] 1.00000000     1    1       1
## [231,] 0.05436722     0    0       1
## [232,] 1.00000000     1    1       1
## [233,] 1.00000000     1    1       1
## [234,] 0.05436722     0    0       1
## [235,] 1.00000000     1    1       1
## [236,] 0.05436722     0    0       1
## [237,] 0.05436722     0    0       1
## [238,] 0.05436722     0    0       1
## [239,] 0.05436722     0    0       1
## [240,] 1.00000000     1    1       1
## [241,] 0.05436722     0    0       1
## [242,] 1.00000000     1    1       1
## [243,] 0.05436722     0    0       1
## [244,] 1.00000000     1    1       1
## [245,] 0.05436722     0    0       1
## [246,] 1.00000000     1    1       1
## [247,] 0.05436722     0    0       1
## [248,] 0.05436722     0    0       1
## [249,] 1.00000000     1    1       1
## [250,] 0.05436722     0    0       1
##
## , , Year10
##
##            Mean Mode 2.5% 97.5%
##   [1,] 0.0543585    0    0       1
##   [2,] 0.0543585    0    0       1
##   [3,] 1.0000000    1    1       1
##   [4,] 0.0543585    0    0       1
##   [5,] 0.0543585    0    0       1
##   [6,] 0.0543585    0    0       1
##   [7,] 0.0543585    0    0       1
##   [8,] 1.0000000    1    1       1
##   [9,] 0.0543585    0    0       1
##  [10,] 0.0543585    0    0       1
##  [11,] 0.0543585    0    0       1
##  [12,] 0.0543585    0    0       1
##  [13,] 0.0543585    0    0       1
```

```
## [14,] 0.0543585   0   0   1
## [15,] 0.0543585   0   0   1
## [16,] 0.0543585   0   0   1
## [17,] 0.0543585   0   0   1
## [18,] 1.0000000   1   1   1
## [19,] 1.0000000   1   1   1
## [20,] 0.0543585   0   0   1
## [21,] 1.0000000   1   1   1
## [22,] 1.0000000   1   1   1
## [23,] 0.0543585   0   0   1
## [24,] 1.0000000   1   1   1
## [25,] 0.0543585   0   0   1
## [26,] 0.0543585   0   0   1
## [27,] 0.0543585   0   0   1
## [28,] 1.0000000   1   1   1
## [29,] 1.0000000   1   1   1
## [30,] 0.0543585   0   0   1
## [31,] 0.0543585   0   0   1
## [32,] 0.0543585   0   0   1
## [33,] 1.0000000   1   1   1
## [34,] 0.0543585   0   0   1
## [35,] 0.0543585   0   0   1
## [36,] 0.0543585   0   0   1
## [37,] 0.0543585   0   0   1
## [38,] 0.0543585   0   0   1
## [39,] 0.0543585   0   0   1
## [40,] 0.0543585   0   0   1
## [41,] 0.0543585   0   0   1
## [42,] 0.0543585   0   0   1
## [43,] 0.0543585   0   0   1
## [44,] 0.0543585   0   0   1
## [45,] 0.0543585   0   0   1
## [46,] 0.0543585   0   0   1
## [47,] 0.0543585   0   0   1
## [48,] 0.0543585   0   0   1
## [49,] 0.0543585   0   0   1
## [50,] 0.0543585   0   0   1
## [51,] 1.0000000   1   1   1
## [52,] 0.0543585   0   0   1
## [53,] 0.0543585   0   0   1
## [54,] 0.0543585   0   0   1
## [55,] 0.0543585   0   0   1
## [56,] 1.0000000   1   1   1
## [57,] 0.0543585   0   0   1
## [58,] 0.0543585   0   0   1
## [59,] 0.0543585   0   0   1
## [60,] 0.0543585   0   0   1
## [61,] 0.0543585   0   0   1
## [62,] 0.0543585   0   0   1
## [63,] 0.0543585   0   0   1
## [64,] 1.0000000   1   1   1
## [65,] 0.0543585   0   0   1
## [66,] 0.0543585   0   0   1
## [67,] 0.0543585   0   0   1
```

```
##  [68,] 0.0543585   0   0   1
##  [69,] 0.0543585   0   0   1
##  [70,] 0.0543585   0   0   1
##  [71,] 0.0543585   0   0   1
##  [72,] 0.0543585   0   0   1
##  [73,] 0.0543585   0   0   1
##  [74,] 0.0543585   0   0   1
##  [75,] 0.0543585   0   0   1
##  [76,] 0.0543585   0   0   1
##  [77,] 0.0543585   0   0   1
##  [78,] 0.0543585   0   0   1
##  [79,] 0.0543585   0   0   1
##  [80,] 1.0000000   1   1   1
##  [81,] 0.0543585   0   0   1
##  [82,] 0.0543585   0   0   1
##  [83,] 0.0543585   0   0   1
##  [84,] 0.0543585   0   0   1
##  [85,] 0.0543585   0   0   1
##  [86,] 0.0543585   0   0   1
##  [87,] 1.0000000   1   1   1
##  [88,] 0.0543585   0   0   1
##  [89,] 0.0543585   0   0   1
##  [90,] 0.0543585   0   0   1
##  [91,] 0.0543585   0   0   1
##  [92,] 0.0543585   0   0   1
##  [93,] 0.0543585   0   0   1
##  [94,] 0.0543585   0   0   1
##  [95,] 0.0543585   0   0   1
##  [96,] 0.0543585   0   0   1
##  [97,] 1.0000000   1   1   1
##  [98,] 0.0543585   0   0   1
##  [99,] 0.0543585   0   0   1
## [100,] 0.0543585   0   0   1
## [101,] 0.0543585   0   0   1
## [102,] 0.0543585   0   0   1
## [103,] 1.0000000   1   1   1
## [104,] 0.0543585   0   0   1
## [105,] 0.0543585   0   0   1
## [106,] 1.0000000   1   1   1
## [107,] 0.0543585   0   0   1
## [108,] 0.0543585   0   0   1
## [109,] 0.0543585   0   0   1
## [110,] 0.0543585   0   0   1
## [111,] 0.0543585   0   0   1
## [112,] 0.0543585   0   0   1
## [113,] 1.0000000   1   1   1
## [114,] 0.0543585   0   0   1
## [115,] 0.0543585   0   0   1
## [116,] 0.0543585   0   0   1
## [117,] 1.0000000   1   1   1
## [118,] 1.0000000   1   1   1
## [119,] 1.0000000   1   1   1
## [120,] 0.0543585   0   0   1
## [121,] 0.0543585   0   0   1
```

```
## [122,] 0.0543585     0     0     1
## [123,] 0.0543585     0     0     1
## [124,] 0.0543585     0     0     1
## [125,] 0.0543585     0     0     1
## [126,] 0.0543585     0     0     1
## [127,] 0.0543585     0     0     1
## [128,] 0.0543585     0     0     1
## [129,] 0.0543585     0     0     1
## [130,] 0.0543585     0     0     1
## [131,] 0.0543585     0     0     1
## [132,] 0.0543585     0     0     1
## [133,] 0.0543585     0     0     1
## [134,] 0.0543585     0     0     1
## [135,] 1.0000000     1     1     1
## [136,] 0.0543585     0     0     1
## [137,] 0.0543585     0     0     1
## [138,] 1.0000000     1     1     1
## [139,] 1.0000000     1     1     1
## [140,] 0.0543585     0     0     1
## [141,] 0.0543585     0     0     1
## [142,] 1.0000000     1     1     1
## [143,] 0.0543585     0     0     1
## [144,] 1.0000000     1     1     1
## [145,] 0.0543585     0     0     1
## [146,] 0.0543585     0     0     1
## [147,] 0.0543585     0     0     1
## [148,] 0.0543585     0     0     1
## [149,] 0.0543585     0     0     1
## [150,] 0.0543585     0     0     1
## [151,] 0.0543585     0     0     1
## [152,] 0.0543585     0     0     1
## [153,] 0.0543585     0     0     1
## [154,] 1.0000000     1     1     1
## [155,] 0.0543585     0     0     1
## [156,] 1.0000000     1     1     1
## [157,] 1.0000000     1     1     1
## [158,] 1.0000000     1     1     1
## [159,] 0.0543585     0     0     1
## [160,] 0.0543585     0     0     1
## [161,] 0.0543585     0     0     1
## [162,] 0.0543585     0     0     1
## [163,] 0.0543585     0     0     1
## [164,] 0.0543585     0     0     1
## [165,] 0.0543585     0     0     1
## [166,] 0.0543585     0     0     1
## [167,] 0.0543585     0     0     1
## [168,] 0.0543585     0     0     1
## [169,] 0.0543585     0     0     1
## [170,] 1.0000000     1     1     1
## [171,] 0.0543585     0     0     1
## [172,] 0.0543585     0     0     1
## [173,] 0.0543585     0     0     1
## [174,] 0.0543585     0     0     1
## [175,] 0.0543585     0     0     1
```

```
## [176,] 0.0543585     0    0    1
## [177,] 0.0543585     0    0    1
## [178,] 0.0543585     0    0    1
## [179,] 0.0543585     0    0    1
## [180,] 0.0543585     0    0    1
## [181,] 0.0543585     0    0    1
## [182,] 0.0543585     0    0    1
## [183,] 0.0543585     0    0    1
## [184,] 0.0543585     0    0    1
## [185,] 0.0543585     0    0    1
## [186,] 0.0543585     0    0    1
## [187,] 1.0000000     1    1    1
## [188,] 0.0543585     0    0    1
## [189,] 0.0543585     0    0    1
## [190,] 0.0543585     0    0    1
## [191,] 0.0543585     0    0    1
## [192,] 0.0543585     0    0    1
## [193,] 0.0543585     0    0    1
## [194,] 0.0543585     0    0    1
## [195,] 0.0543585     0    0    1
## [196,] 0.0543585     0    0    1
## [197,] 0.0543585     0    0    1
## [198,] 1.0000000     1    1    1
## [199,] 0.0543585     0    0    1
## [200,] 0.0543585     0    0    1
## [201,] 0.0543585     0    0    1
## [202,] 1.0000000     1    1    1
## [203,] 0.0543585     0    0    1
## [204,] 0.0543585     0    0    1
## [205,] 0.0543585     0    0    1
## [206,] 0.0543585     0    0    1
## [207,] 0.0543585     0    0    1
## [208,] 0.0543585     0    0    1
## [209,] 0.0543585     0    0    1
## [210,] 1.0000000     1    1    1
## [211,] 0.0543585     0    0    1
## [212,] 0.0543585     0    0    1
## [213,] 0.0543585     0    0    1
## [214,] 1.0000000     1    1    1
## [215,] 0.0543585     0    0    1
## [216,] 0.0543585     0    0    1
## [217,] 0.0543585     0    0    1
## [218,] 0.0543585     0    0    1
## [219,] 0.0543585     0    0    1
## [220,] 0.0543585     0    0    1
## [221,] 0.0543585     0    0    1
## [222,] 0.0543585     0    0    1
## [223,] 0.0543585     0    0    1
## [224,] 0.0543585     0    0    1
## [225,] 0.0543585     0    0    1
## [226,] 0.0543585     0    0    1
## [227,] 0.0543585     0    0    1
## [228,] 0.0543585     0    0    1
## [229,] 0.0543585     0    0    1
```

```
## [230,] 0.0543585    0    0    1
## [231,] 0.0543585    0    0    1
## [232,] 1.0000000    1    1    1
## [233,] 0.0543585    0    0    1
## [234,] 1.0000000    1    1    1
## [235,] 1.0000000    1    1    1
## [236,] 1.0000000    1    1    1
## [237,] 0.0543585    0    0    1
## [238,] 0.0543585    0    0    1
## [239,] 0.0543585    0    0    1
## [240,] 0.0543585    0    0    1
## [241,] 0.0543585    0    0    1
## [242,] 0.0543585    0    0    1
## [243,] 0.0543585    0    0    1
## [244,] 1.0000000    1    1    1
## [245,] 0.0543585    0    0    1
## [246,] 1.0000000    1    1    1
## [247,] 0.0543585    0    0    1
## [248,] 0.0543585    0    0    1
## [249,] 0.0543585    0    0    1
## [250,] 0.0543585    0    0    1
```

On ajuste plusiers modèles.

```
fm <- colext(~1, ~1, ~1, ~1, umf)
fm1 <- colext(~1, ~year, ~1, ~1, umf)
fm2 <- colext(~1, ~1, ~year, ~1, umf)
fm3 <- colext(~1, ~year, ~year, ~1, umf)
```

On les rassemble.

```
fmList <- fitList('{psi, col, ext, det}' = fm,
                  '{psi, col(year), ext, det}' = fm1,
                  '{psi, col, ext(year), det}' = fm2,
                  '{psi, col(year), ext(year), det}' = fm3)
```

Les AIC.

```
modSel(fmList)
```

```
##                                   nPars      AIC   delta   AICwt cumltvWt
## {psi, col(year), ext(year), det}     20  4856.93    0.00 1.0e+00     1.00
## {psi, col, ext(year), det}           12  4887.51   30.58 2.3e-07     1.00
## {psi, col(year), ext, det}           12  4933.79   76.86 2.0e-17     1.00
## {psi, col, ext, det}                  4  4972.60  115.67 7.6e-26     1.00
```

On crée un variable pour l'effet du temps, et on prédit colonisation et extinction.

```
nd <- data.frame(year = paste0("year", 1:9))
col_pred <- predict(fm3, type = 'col', newdata = nd)
ext_pred <- predict(fm3, type = 'ext', newdata = nd)
```

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Visualise.

```
par(mfrow = c(1,2))
plot(1:9, col_pred[,1],
     xlab = "year",
     ylab = "estimated prob",
     main = "colonization")
plot(1:9, ext_pred[,1],
     xlab = "year",
     ylab = "estimated prob",
     main = "extinction")
```
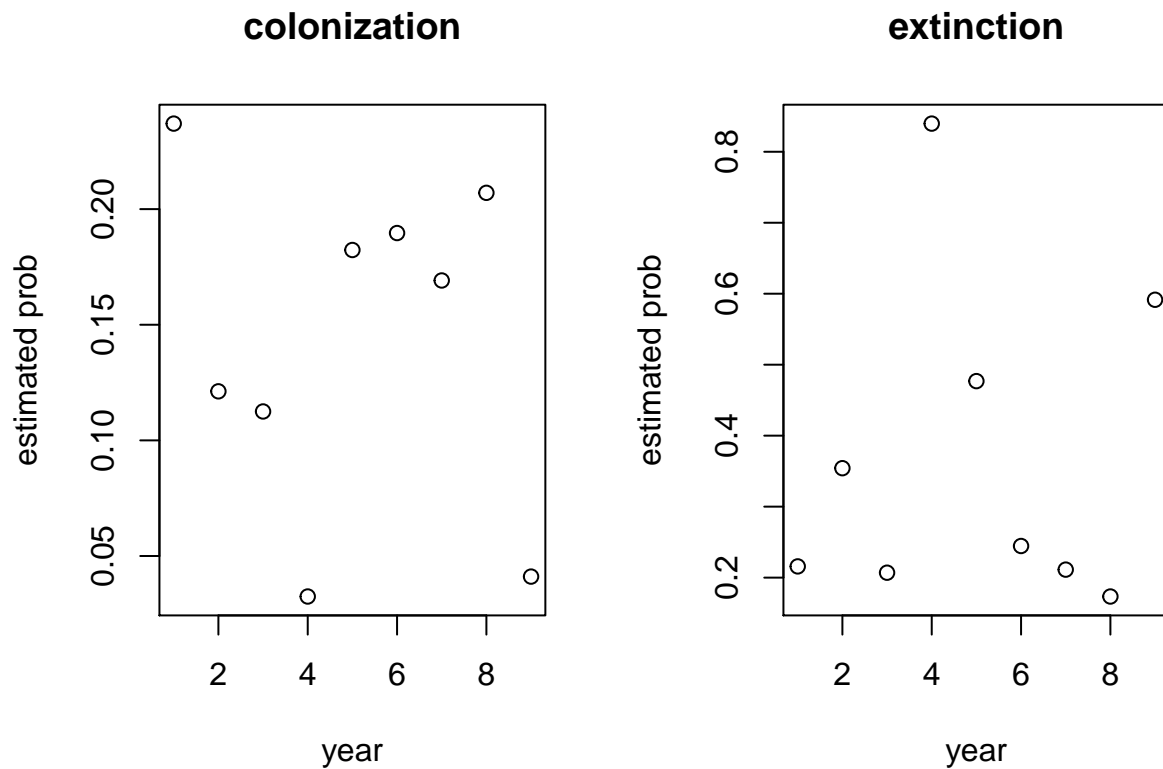

La même chose avec intervalle de confiance.

```
library(plotrix)
par(mfrow = c(1,2))
plotCI(1:9, col_pred[,1],
       li = col_pred[,3],
       ui = col_pred[,4],
       xlab = "year",
       ylab = "estimated prob",
       main = "colonization")
plotCI(1:9, ext_pred[,1],
       li = ext_pred[,3],
       ui = ext_pred[,4],
       xlab = "year",
       ylab = "estimated prob",
       main = "extinction")
```

colonization   **extinction**