4-jump-ball-1st-basket-prob

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.0 --
```

```
## v ggplot2 3.3.3     v purrr   0.3.4
## v tibble  3.1.1     v dplyr   1.0.5
## v tidyr   1.1.3     v stringr 1.4.0
## v readr   1.4.0     v forcats 0.5.1
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(brms)
```

```
## Loading required package: Rcpp
```

```
## Loading 'brms' package (version 2.15.0). Useful instructions
## can be found by typing help('brms'). A more detailed introduction
## to the package is available through vignette('brms_overview').
```

```
##
## Attaching package: 'brms'
```

```
## The following object is masked from 'package:stats':
##
##     ar
```

```
library(tidybayes)
```

```
##
## Attaching package: 'tidybayes'
```

```
## The following objects are masked from 'package:brms':
##
##     dstudent_t, pstudent_t, qstudent_t, rstudent_t
```

```
data = read.csv("espn.com/espn-pbp-1997-2021-v2.csv")
data = data %>% filter(grepl("2021\\-",Date))

#data = read.csv("espn.com/espn-pbp-2022.csv") %>% filter(GameType=="regular season")
```

```
head(data)
```

```
##    Time
## 1 10:00
## 2  9:39
## 3  9:29
## 4  9:13
## 5  9:10
## 6  9:02
##                                                 EventDescription
```

```
## 1 Elizabeth Williams vs. Tina Charles (Courtney Williams gains possession)
## 2                          Courtney Williams makes 19-foot pullup jump shot
## 3                                Natasha Cloud steps out of bounds turnover
## 4              Chennedy Carter misses 25-foot three point pullup jump shot
## 5                                           Ariel Atkins defensive rebound
## 6                                           Theresa Plaisance misses layup
##   Score EventTeam HomeOrAway    GameID              Date  GameType WinningTeam
## 1 0 - 0       ATL       away 401322870 2021-05-05T23:00Z preseason         ATL
## 2 2 - 0       ATL       away 401322870 2021-05-05T23:00Z preseason         ATL
## 3 2 - 0       WSH       home 401322870 2021-05-05T23:00Z preseason         ATL
## 4 2 - 0       ATL       away 401322870 2021-05-05T23:00Z preseason         ATL
## 5 2 - 0       WSH       home 401322870 2021-05-05T23:00Z preseason         ATL
## 6 2 - 0       WSH       home 401322870 2021-05-05T23:00Z preseason         ATL
##   AwayTeam HomeTeam ShotOutcome Quarter     pid ShotID   xcoord ycoord
## 1      ATL      WSH                   1      NA              NA     NA
## 2      ATL      WSH        made       1 2987891  shot0 21.11111     74
## 3      ATL      WSH                   1      NA              NA     NA
## 4      ATL      WSH      missed       1 4280892  shot1 28.88889     26
## 5      ATL      WSH                   1      NA              NA     NA
## 6      ATL      WSH      missed       1 2530082  shot0 88.00000     40
##   AwayScore HomeScore
## 1         0         0
## 2         2         0
## 3         2         0
## 4         2         0
## 5         2         0
## 6         2         0
```

```
jumps = data %>% filter(grepl(" vs\\. ",EventDescription) & Time=="10:00" & Quarter==1)
jumps[jumps %>% dplyr::select(GameID) %>% duplicated(),]
```

```
##  [1] Time             EventDescription Score            EventTeam
##  [5] HomeOrAway       GameID           Date             GameType
##  [9] WinningTeam      AwayTeam         HomeTeam         ShotOutcome
## [13] Quarter          pid              ShotID           xcoord
## [17] ycoord           AwayScore        HomeScore
## <0 rows> (or 0-length row.names)
```

```
jumps = jumps %>% dplyr::select(GameID,EventTeam) %>% dplyr::rename(WonJump = EventTeam)
```

```
makes = data %>% filter(grepl("makes",EventDescription))
indices = makes %>% dplyr::select(GameID) %>% duplicated()
first_score = makes[!indices,] %>% dplyr::select(GameID,EventTeam,HomeTeam,AwayTeam) %>%
  dplyr::rename(ScoredFirst = EventTeam)
```

```
cleaned_data = first_score %>% left_join(jumps)
```

```
## Joining, by = "GameID"
```

```
cleaned_data
```

```
##        GameID ScoredFirst HomeTeam AwayTeam WonJump
## 1   401322870         ATL      WSH      ATL     ATL
## 2   401323518        CONN      DAL     CONN    CONN
## 3   401322871         WSH      MIN      WSH     WSH
## 4   401323519          LA       LA       LV      LA
## 5   401323520         PHX      PHX      SEA     PHX
```

```
## 6   401323454         CHI      IND      CHI      IND
## 7   401323455         IND      CHI      IND      IND
## 8   401320565          NY       NY      IND      IND
## 9   401320566        CONN      ATL     CONN      ATL
## 10  401320567         MIN      MIN      PHX      MIN
## 11  401320568          LA       LA      DAL       LA
## 12  401320569         WSH      WSH      CHI      CHI
## 13  401320570          LV      SEA       LV       LV
## 14  401320571          NY      IND       NY      IND
## 15  401320572         PHX     CONN      PHX      PHX
## 16  401320573         MIN       NY      MIN     <NA>
## 17  401320574         PHX      WSH      PHX      PHX
## 18  401320575          LV      SEA       LV       LV
## 19  401320576         CHI      ATL      CHI      ATL
## 20  401320577         IND     CONN      IND     CONN
## 21  401320578         MIN      MIN      SEA      SEA
## 22  401320579         ATL      IND      ATL      ATL
## 23  401320580         WSH      WSH       NY      WSH
## 24  401320581        CONN      PHX     CONN     CONN
## 25  401320582          LA       LV       LA       LA
## 26  401320583         SEA      DAL      SEA      SEA
## 27  401320584         CHI      CHI       NY      CHI
## 28  401320585         IND      IND      WSH      IND
## 29  401320586        CONN       LV     CONN       LV
## 30  401320588         DAL       NY      DAL       NY
## 31  401320587         WSH      IND      WSH      IND
## 32  401320589         CHI      CHI      ATL      ATL
## 33  401320590        CONN      SEA     CONN     CONN
## 34  401320591         PHX      PHX       LV      PHX
## 35  401320592         DAL      ATL      DAL      ATL
## 36  401320593         WSH     CONN      WSH     CONN
## 37  401320594          LA      CHI       LA       LA
## 38  401320595         SEA      SEA      MIN      MIN
## 39  401320596         IND       LV      IND       LV
## 40  401320597         ATL       NY      ATL      ATL
## 41  401320598         PHX      DAL      PHX      PHX
## 42  401320599         CHI      CHI       LA       LA
## 43  401320600         IND       LV      IND       LV
## 44  401320601         MIN      MIN     CONN      MIN
## 45  401320602          LV     CONN       LV       LV
## 46  401320604          LA      DAL       LA       LA
## 47  401320603         PHX      CHI      PHX      PHX
## 48  401320605         IND      SEA      IND      IND
## 49  401320606          LV       NY       LV       LV
## 50  401320607         CHI      PHX      CHI      PHX
## 51  401320608         IND       LA      IND      IND
## 52  401320609         MIN      MIN      ATL      MIN
## 53  401320610         DAL      SEA      DAL      SEA
## 54  401320611          LV      WSH       LV      WSH
## 55  401320612         CHI       LA      CHI      CHI
## 56  401320613        CONN     CONN       NY     CONN
## 57  401320614         MIN      MIN      ATL      ATL
## 58  401320615         SEA      SEA      DAL      DAL
## 59  401320616         WSH      WSH      MIN      MIN
```

```
## 60  401320619         PHX      PHX      DAL     PHX
## 61  401320617         SEA      ATL      SEA     ATL
## 62  401320618         CHI      CHI      IND     IND
## 63  401320620         WSH      WSH       LA     WSH
## 64  401320621         SEA      ATL      SEA     ATL
## 65  401320622         DAL      PHX      DAL     PHX
## 66  401320623         CHI      IND      CHI     CHI
## 67  401320624         MIN      MIN       LA     MIN
## 68  401320625        CONN     CONN      SEA     SEA
## 69  401320626         WSH      ATL      WSH     ATL
## 70  401320627         DAL       LV      DAL      LV
## 71  401320628         PHX      PHX       NY      NY
## 72  401320629         SEA      IND      SEA     SEA
## 73  401320630         MIN      MIN      CHI     MIN
## 74  401320631          LV       LV       NY      LV
## 75  401320632          LA       LA      PHX      LA
## 76  401320633         SEA      IND      SEA     SEA
## 77  401320634         ATL      WSH      ATL     ATL
## 78  401320635        CONN      CHI     CONN     CHI
## 79  401320636         MIN      DAL      MIN     MIN
## 80  401320637          NY       LV       NY      LV
## 81  401320638         PHX       LA      PHX     PHX
## 82  401320639        CONN      CHI     CONN     CHI
## 83  401320640         IND      WSH      IND     WSH
## 84  401320641         MIN      DAL      MIN     MIN
## 85  401320642          LA       LA       NY      LA
## 86  401320643        CONN     CONN      DAL    CONN
## 87  401320644          NY       NY      CHI      NY
## 88  401320645         WSH      SEA      WSH     SEA
## 89  401320646         MIN      ATL      MIN     MIN
## 90  401320647         DAL      IND      DAL     DAL
## 91  401320648         CHI       NY      CHI      NY
## 92  401320649         WSH       LA      WSH      LA
## 93  401320650         MIN      MIN       LV     MIN
## 94  401320651         WSH      DAL      WSH     WSH
## 95  401320652          NY      ATL       NY      NY
## 96  401320654         CHI     CONN      CHI    CONN
## 97  401320655          LV       LV      SEA      LV
## 98  401320653         PHX      PHX       LA     PHX
## 99  401320656         ATL      ATL       NY     ATL
## 100 401320657        CONN      WSH     CONN    CONN
## 101 401320658         CHI      DAL      CHI     DAL
## 102 401320659         PHX      PHX      MIN     PHX
## 103 401320660          LA       LA       LV      LV
## 104 401320661         IND      IND     CONN    CONN
## 105 401320662         DAL      DAL      CHI     DAL
## 106 401320663          LV       LA       LV      LV
## 107 401320665         ATL      SEA      ATL     ATL
## 108 401320666        CONN      IND     CONN    CONN
## 109 401320667         WSH       NY      WSH     WSH
## 110 401320664         MIN      PHX      MIN     MIN
## 111 401320668         ATL       LV      ATL     ATL
## 112 401320669         SEA       LA      SEA     SEA
## 113 401320670          NY       NY      DAL      NY
```

```
## 114 401320671         MIN      MIN      DAL     MIN
## 115 401320672         PHX       LV      PHX     PHX
## 116 401320673         SEA      SEA       LA      LA
## 117 401320674        CONN     CONN      ATL    CONN
## 118 401320675          NY      IND       NY      NY
## 119 401320676         PHX      PHX      SEA     PHX
## 120 401320677         MIN       LV      MIN     MIN
## 121 401320678         CHI      CHI      WSH     CHI
## 122 401320679         DAL      DAL       LV     DAL
## 123 401320680        CONN       NY     CONN    CONN
## 124 401320681         ATL      ATL      IND     ATL
## 125 401320682         PHX      SEA      PHX     PHX
## 126 401320683          LA       LA      MIN     MIN
## 127 401353913         SEA      SEA     CONN     SEA
## 128 401320684         CHI      CHI      SEA     SEA
## 129 401320685         DAL      DAL     CONN    CONN
## 130 401320686          LV       LV      WSH      LV
## 131 401320687         PHX      PHX      ATL     PHX
## 132 401320688         MIN      MIN       NY      NY
## 133 401320689          LA       LA      IND      LA
## 134 401320690        CONN     CONN      MIN    CONN
## 135 401320691         CHI      CHI      DAL     CHI
## 136 401320692          LV       LV      WSH      LV
## 137 401320693         PHX      PHX      IND     PHX
## 138 401320694          LA       LA      ATL      LA
## 139 401320695         SEA       NY      SEA     SEA
## 140 401320696        CONN     CONN      MIN     MIN
## 141 401320697         PHX      PHX      WSH     PHX
## 142 401320698         ATL       LA      ATL     ATL
## 143 401320699          NY       NY      SEA     SEA
## 144 401320700         DAL      DAL      IND     IND
## 145 401320701         PHX      ATL      PHX     PHX
## 146 401320702         CHI      CHI      MIN     MIN
## 147 401320703          LA       NY       LA      LA
## 148 401320704         WSH      WSH      SEA     SEA
## 149 401320705         MIN      MIN      SEA     MIN
## 150 401320706         ATL      ATL      CHI     ATL
## 151 401320707          LV     CONN       LV    CONN
## 152 401320708         WSH      WSH       LA      LA
## 153 401320709          NY       NY      PHX     PHX
## 154 401320710          LV      ATL       LV     ATL
## 155 401320711        CONN     CONN       LA    CONN
## 156 401320712         WSH      WSH      DAL     DAL
## 157 401320713         PHX       NY      PHX      NY
## 158 401320714         SEA      SEA      CHI     SEA
## 159 401320715         IND      IND       LV     IND
## 160 401320716        CONN     CONN       LA    CONN
## 161 401320717         DAL      WSH      DAL     DAL
## 162 401320718         CHI      SEA      CHI     CHI
## 163 401320719          LA      IND       LA      LA
## 164 401320720        CONN      WSH     CONN    CONN
## 165 401320721          NY      MIN       NY     MIN
## 166 401320722         PHX      PHX      CHI     PHX
## 167 401320723         DAL      DAL      ATL     ATL
```

```
## 168 401320724         MIN      MIN       LA     MIN
## 169 401320725          LV       LV      CHI     CHI
## 170 401320726         SEA      SEA       NY     SEA
## 171 401320727         PHX      IND      PHX     PHX
## 172 401320728         MIN      MIN      WSH     MIN
## 173 401320729         CHI      CHI       LV     CHI
## 174 401320730         ATL      DAL      ATL     ATL
## 175 401320731         IND      IND      PHX     PHX
## 176 401320732        CONN      DAL     CONN    CONN
## 177 401320733         WSH      SEA      WSH     SEA
## 178 401320734         ATL      ATL      PHX     PHX
## 179 401320735         MIN       LV      MIN     MIN
## 180 401320736        CONN       LA     CONN    CONN
## 181 401320737         WSH      WSH      ATL     ATL
## 182 401320738         IND      MIN      IND     IND
## 183 401320739          NY      DAL       NY      NY
## 184 401320740         PHX      PHX     CONN     PHX
## 185 401320741         CHI      CHI      WSH     CHI
## 186 401320742         MIN      MIN      IND     MIN
## 187 401320743         SEA       LA      SEA     SEA
## 188 401320744         DAL       LV      DAL     DAL
## 189 401320745         ATL      ATL      IND     ATL
## 190 401320746        CONN     CONN       NY    CONN
## 191 401320747         ATL      ATL       LA     ATL
## 192 401320748         IND      IND      MIN     MIN
## 193 401320749          NY       NY      WSH      NY
## 194 401320750         CHI      CHI       LV     CHI
## 195 401320751         SEA      SEA      PHX     PHX
## 196 401320752        CONN     CONN      ATL    CONN
## 197 401320753          LV      PHX       LV     PHX
## 198 401320754         MIN      WSH      MIN     MIN
## 199 401320755          LA      DAL       LA      LA
## 200 401320756         CHI      CHI      IND     CHI
## 201 401370430         CHI      CHI      DAL     DAL
## 202 401370431          NY      PHX       NY     PHX
## 203 401370433         PHX      SEA      PHX     PHX
## 204 401370432         CHI      MIN      CHI     MIN
## 205 401370434         CHI     CONN      CHI    CONN
## 206 401370435         PHX       LV      PHX     PHX
## 207 401370436         CHI     CONN      CHI    CONN
## 208 401370437         PHX       LV      PHX     PHX
## 209 401370439         CHI      CHI     CONN    CONN
## 210 401370438         PHX      PHX       LV     PHX
## 211 401370441         CHI      CHI     CONN     CHI
## 212 401370440         PHX      PHX       LV     PHX
## 213 401370442         PHX       LV      PHX     PHX
## 214 401370395         PHX      PHX      CHI     CHI
## 215 401370396         CHI      PHX      CHI     PHX
## 216 401370397         PHX      CHI      PHX     PHX
## 217 401370398         CHI      CHI      PHX     PHX
```

```
cleaned_data = data %>% dplyr::select(GameID,EventTeam) %>% unique() %>% left_join(cleaned_data) %>%
  mutate(WonJump01 = ifelse(EventTeam==WonJump,1,0)) %>%
  mutate(ScoredFirst01 = ifelse(EventTeam==ScoredFirst,1,0))
```

```
## Joining, by = "GameID"
```

```
cleaned_data %>% group_by(EventTeam) %>% dplyr::summarise(won=sum(WonJump01),N=n()) %>% mutate(perc = w
```

```
## # A tibble: 12 x 4
##    EventTeam   won     N   perc
##    <chr>     <dbl> <int>  <dbl>
##  1 ATL          24    33  0.727
##  2 CHI          16    44  0.364
##  3 CONN         26    38  0.684
##  4 DAL           9    34  0.265
##  5 IND          12    34  0.353
##  6 LA           16    33  0.485
##  7 LV           15    38  0.395
##  8 MIN          NA    34 NA
##  9 NY           NA    33 NA
## 10 PHX          37    44  0.841
## 11 SEA          17    35  0.486
## 12 WSH           7    34  0.206
```

```
model = brm(ScoredFirst01~ 1 + WonJump01 + (1 + WonJump01|EventTeam),family=bernoulli(),
            data = cleaned_data, cores = 4, chains = 4)
```

```
## Warning: Rows containing NAs were excluded from the model.
```

```
## Compiling Stan program...
```

```
## Trying to compile a simple C file
```

```
## Running /Library/Frameworks/R.framework/Resources/bin/R CMD SHLIB foo.c
## clang -mmacosx-version-min=10.13 -I"/Library/Frameworks/R.framework/Resources/include" -DNDEBUG   -I
## In file included from <built-in>:1:
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/StanHeaders/incl
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/src/Core/util/
## namespace Eigen {
## ^
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/src/Core/util/
## namespace Eigen {
##                ^
##                ;
## In file included from <built-in>:1:
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/StanHeaders/incl
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/Core:96:10: fa
## #include <complex>
##          ^~~~~~~~
## 3 errors generated.
## make: *** [foo.o] Error 1
```

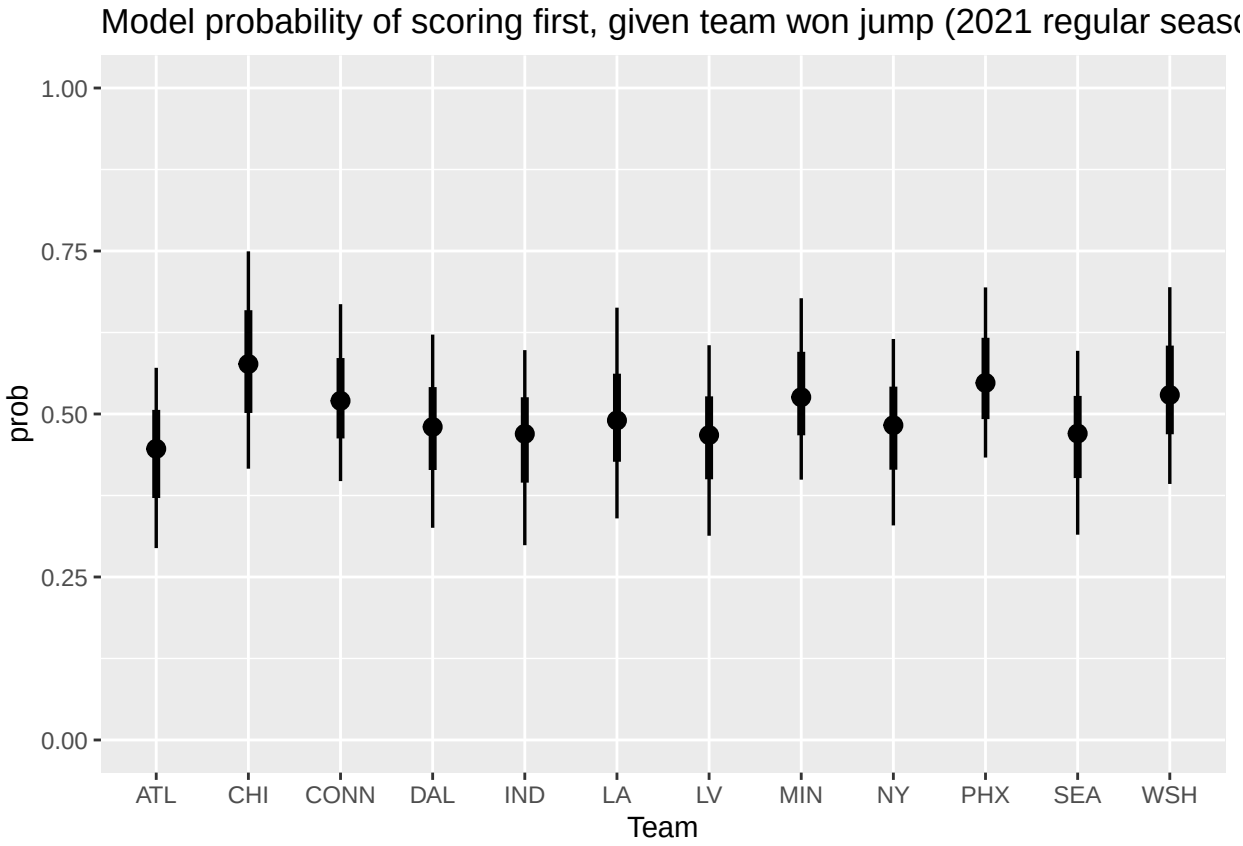
```
## Start sampling
```

```
model
```

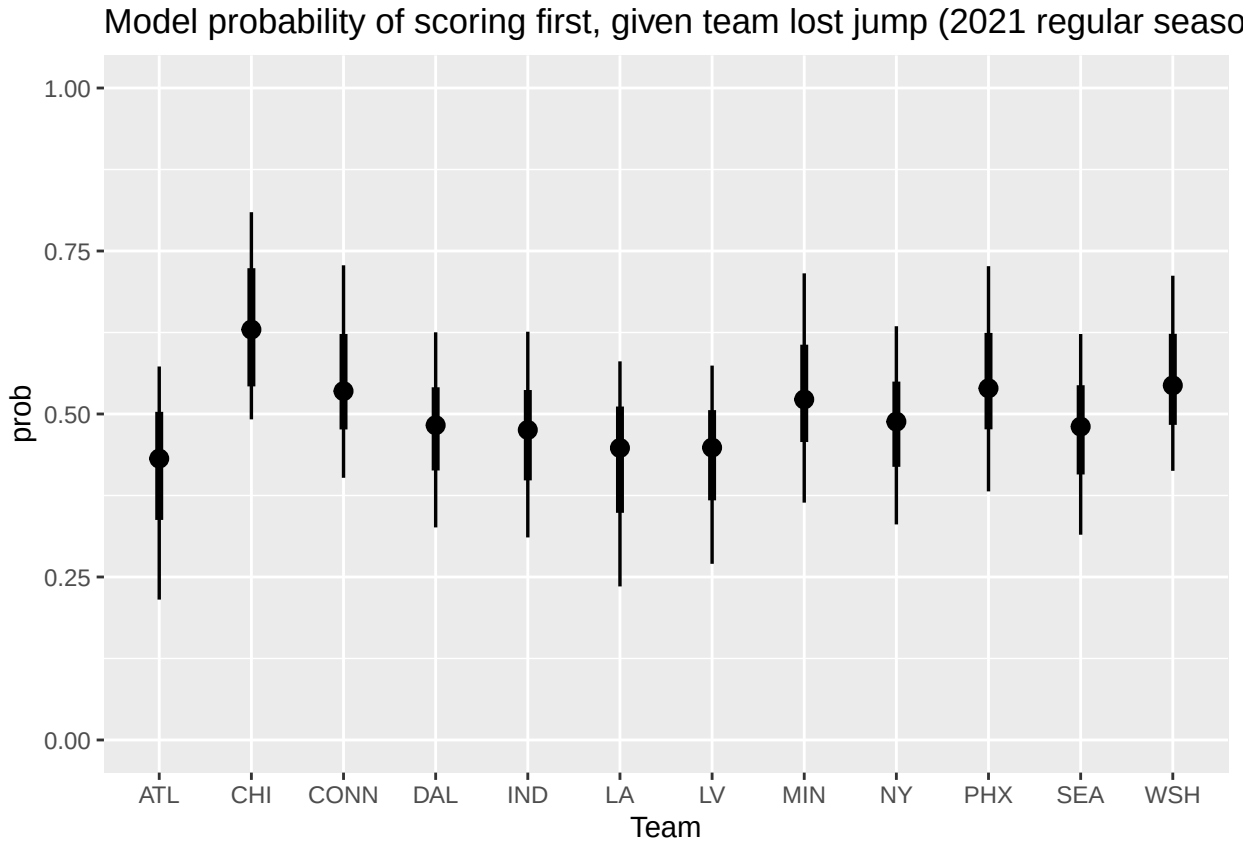
```
##  Family: bernoulli
##   Links: mu = logit
## Formula: ScoredFirst01 ~ 1 + WonJump01 + (1 + WonJump01 | EventTeam)
```

```
##    Data: cleaned_data (Number of observations: 432)
## Samples: 4 chains, each with iter = 2000; warmup = 1000; thin = 1;
##          total post-warmup samples = 4000
##
## Group-Level Effects:
## ~EventTeam (Number of levels: 12)
##                           Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS
## sd(Intercept)                 0.43      0.22     0.05     0.92 1.00      912
## sd(WonJump01)                 0.31      0.24     0.01     0.90 1.00     1201
## cor(Intercept,WonJump01)     -0.39      0.54    -0.99     0.86 1.00     1772
##                           Tail_ESS
## sd(Intercept)                 989
## sd(WonJump01)                2217
## cor(Intercept,WonJump01)     2462
##
## Population-Level Effects:
##           Estimate Est.Error l-95% CI u-95% CI Rhat Bulk_ESS Tail_ESS
## Intercept    -0.62      0.21    -1.05    -0.22 1.00     1946     1838
## WonJump01     1.18      0.25     0.72     1.67 1.00     2407     1883
##
## Samples were drawn using sampling(NUTS). For each parameter, Bulk_ESS
## and Tail_ESS are effective sample size measures, and Rhat is the potential
## scale reduction factor on split chains (at convergence, Rhat = 1).
```

```
coefs = data.frame(model) %>% dplyr::select(starts_with("r_EventTeam"))
names(coefs) = gsub("r_EventTeam\\.","",names(coefs))
names(coefs) = gsub("\\.$","",names(coefs))

int_coefs = coefs %>% dplyr::select(ends_with("Intercept")) %>%
  pivot_longer(cols=ends_with("Intercept"),names_to = "Team",values_to = "Intercept") %>%
  mutate(Team = gsub("\\.Intercept","",Team))
jump_b = coefs %>% dplyr::select(ends_with("WonJump01")) %>%
  pivot_longer(cols=ends_with("WonJump01"),names_to = "Team",values_to = "WonJump01") %>%
  mutate(Team = gsub("\\.WonJump01","",Team)) %>%
  dplyr::select(-Team)

coefs = cbind(int_coefs,jump_b)

# prob given won jump
coefs %>% mutate(prob = inv_logit_scaled(Intercept+WonJump01)) %>%
  ggplot(aes(x=Team,y=prob)) + stat_pointinterval() +
  ggtitle("Model probability of scoring first, given team won jump (2021 regular season data)") + ylim(
```




```
# prob given not won jump
coefs %>% mutate(prob = inv_logit_scaled(Intercept)) %>%
  ggplot(aes(x=Team,y=prob)) + stat_pointinterval() +
  ggtitle("Model probability of scoring first, given team lost jump (2021 regular season data)") + ylim
```




```
model_scoring_only = brm(ScoredFirst01~ 1 + (1|EventTeam),family=bernoulli(),
            data = cleaned_data, cores = 4, chains = 4)
```

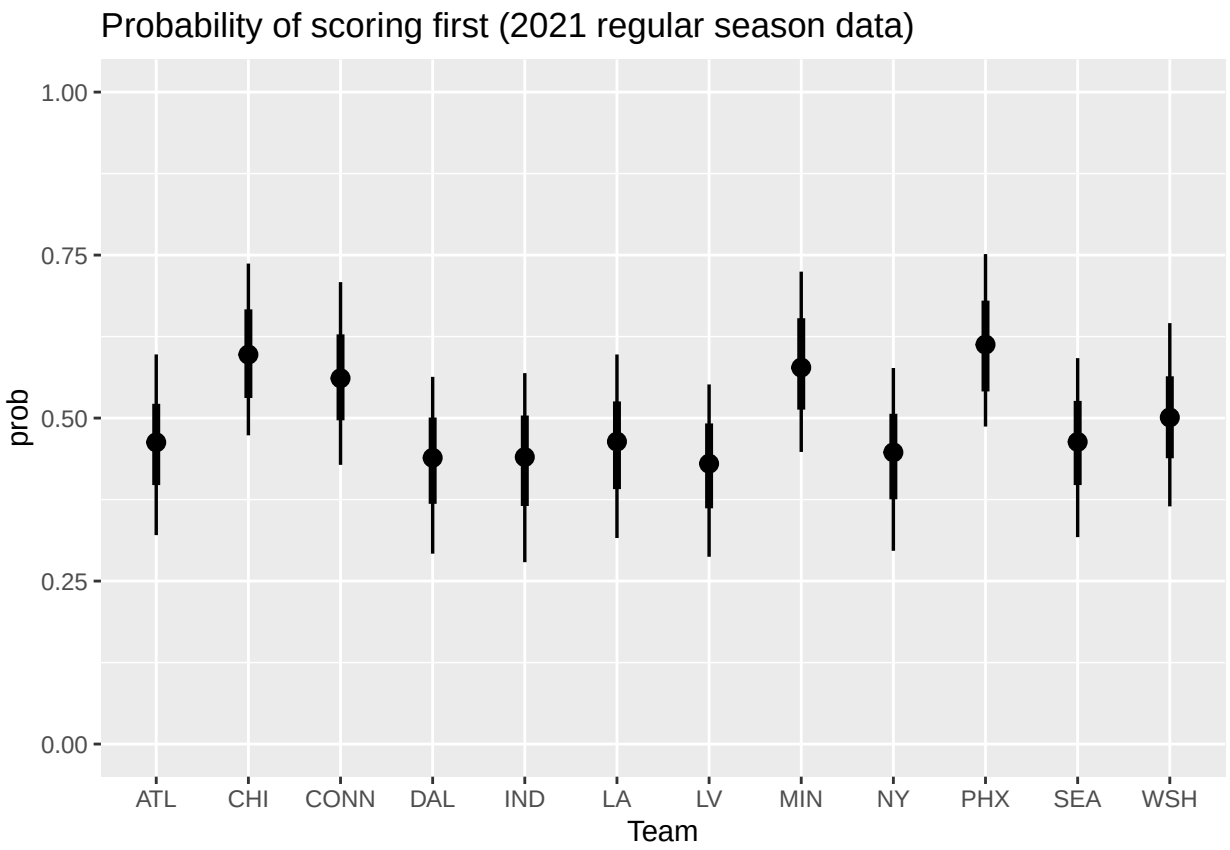
```
## Compiling Stan program...
```

```
## Trying to compile a simple C file
```

```
## Running /Library/Frameworks/R.framework/Resources/bin/R CMD SHLIB foo.c
## clang -mmacosx-version-min=10.13 -I"/Library/Frameworks/R.framework/Resources/include" -DNDEBUG   -I
## In file included from <built-in>:1:
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/StanHeaders/incl
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/src/Core/util/
## namespace Eigen {
## ^
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/src/Core/util/
## namespace Eigen {
##                 ^
##                 ;
## In file included from <built-in>:1:
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/StanHeaders/incl
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/Core:96:10: fa
## #include <complex>
##          ^~~~~~~~~
## 3 errors generated.
## make: *** [foo.o] Error 1
```

```
## Start sampling
```

```
coefs = data.frame(model_scoring_only) %>% dplyr::select(starts_with("r_EventTeam"))
names(coefs) = gsub("r_EventTeam\\.","",names(coefs))
names(coefs) = gsub("\\.$","",names(coefs))

int_coefs = coefs %>% dplyr::select(ends_with("Intercept")) %>%
  pivot_longer(cols=ends_with("Intercept"),names_to = "Team",values_to = "Intercept") %>%
  mutate(Team = gsub("\\.Intercept","",Team))

# prob of scoring first
int_coefs %>% mutate(prob = inv_logit_scaled(Intercept)) %>%
  ggplot(aes(x=Team,y=prob)) + stat_pointinterval() +
  ggtitle("Probability of scoring first (2021 regular season data)") + ylim(c(0,1))
```



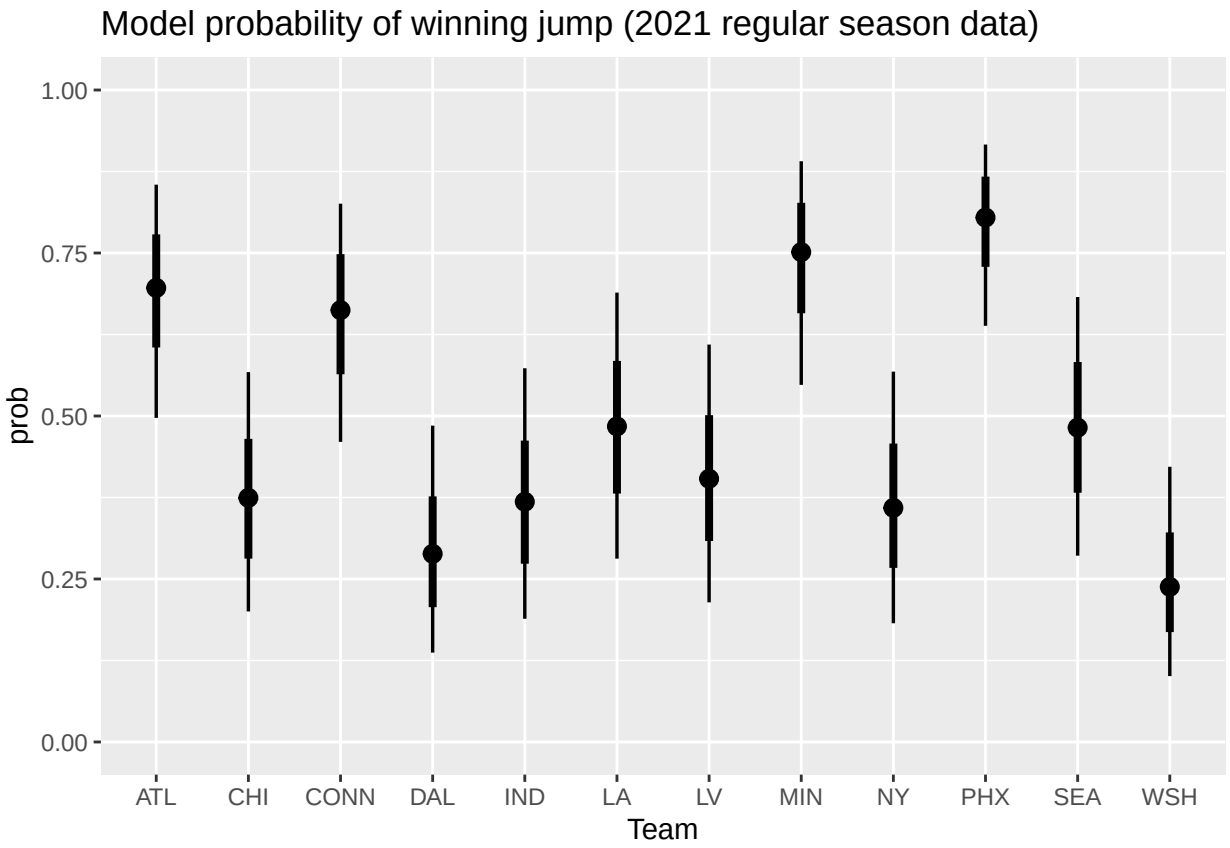

```
model_jump_only = brm(WonJump01~ 1 + (1|EventTeam),family=bernoulli(),
            data = cleaned_data, cores = 4, chains = 4)
```

```
## Warning: Rows containing NAs were excluded from the model.

## Compiling Stan program...

## recompiling to avoid crashing R session

## Trying to compile a simple C file

## Running /Library/Frameworks/R.framework/Resources/bin/R CMD SHLIB foo.c
## clang -mmacosx-version-min=10.13 -I"/Library/Frameworks/R.framework/Resources/include" -DNDEBUG   -I
## In file included from <built-in>:1:
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/StanHeaders/incl
```

```
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/src/Core/util
## namespace Eigen {
## ^
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/src/Core/util
## namespace Eigen {
##                 ^
##                 ;
## In file included from <built-in>:1:
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/StanHeaders/inc
## In file included from /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/inclu
## /Library/Frameworks/R.framework/Versions/4.0/Resources/library/RcppEigen/include/Eigen/Core:96:10: fa
## #include <complex>
##          ^~~~~~~~
## 3 errors generated.
## make: *** [foo.o] Error 1
```

```
## Start sampling
```

```
coefs = data.frame(model_jump_only) %>% dplyr::select(starts_with("r_EventTeam"))
names(coefs) = gsub("r_EventTeam\\.","",names(coefs))
names(coefs) = gsub("\\.$","",names(coefs))

int_coefs = coefs %>% dplyr::select(ends_with("Intercept")) %>%
  pivot_longer(cols=ends_with("Intercept"),names_to = "Team",values_to = "Intercept") %>%
  mutate(Team = gsub("\\.Intercept","",Team))

# prob of scoring first
int_coefs %>% mutate(prob = inv_logit_scaled(Intercept)) %>%
  ggplot(aes(x=Team,y=prob)) + stat_pointinterval() +
  ggtitle("Model probability of winning jump (2021 regular season data)") + ylim(c(0,1))
```


Model probability of winning jump (2021 regular season data)
prob
1.00
0.75
0.50
0.25
0.00
ATL
CHI
CONN
DAL
IND
LA
LV
MIN
NY
PHX
SEA
WSH
Team